

# 2019 Annual Groundwater Monitoring and Corrective Action Report

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

Submitted to:

Ameren Missouri 1901 Chouteau Avenue, St. Louis, Missouri 63103

Submitted by:

### Golder Associates Inc.

13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021 +1 314 984-8800

Project No. 153-140601

January 31, 2020

### **Table of Contents**

1.0	INTRO	DDUCTION	1
2.0	INST	ALLATION OR DECOMMISSIONING OF MONITORING WELLS	1
3.0	GROU	JNDWATER SAMPLING RESULTS AND DISCUSSION	1
	3.1	Detection Monitoring Program	2
	3.2	Groundwater Elevation, Flow Rate and Direction	2
4.0	STAT	US OF THE GROUNDWATER MONITORING PROGRAM	3
	4.1	Sampling Issues	3
5.0	ACTIV	/ITIES PLANNED FOR 2020	3

### TABLES

- Table 2 November 2018 Detection Monitoring Results
- Table 3 August 2019 Detection Monitoring Results
- Table 4 November 2019 Detection Monitoring Results

### FIGURES

Figure 1 - Site Location Aerial Map and Monitoring Well Locations

### APPENDICES

APPENDIX A Laboratory Analytical Data

APPENDIX B

Alternative Source Demonstration - August 2019 Sampling Event

### APPENDIX C

Potentiometric Surface Maps

### **1.0 INTRODUCTION**

This annual report was developed to meet the requirements of United States Environmental Protection Agency (USEPA) 40 CFR Part 257 "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule" (the CCR Rule). The CCR Rule requires owners or operators of existing CCR units to produce an Annual Groundwater Monitoring and Corrective Action Report (Annual Report) each year (§§ 257.90(e)). Ameren Missouri (Ameren) has determined that the Utility Waste Landfill (UWL) 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, 2019 through December 31, 2019.

### 2.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

In accordance with the CCR Rule, a groundwater monitoring system has been installed to monitor the SCL4A. The groundwater monitoring system consists of six (6) groundwater monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monitoring wells were installed or decommissioned in 2019 as a part of the CCR Rule monitoring program for the SCL4A. For more information on the groundwater monitoring network, details are provided in the 2017 Annual Groundwater Monitoring Report for the SCL4A.

### 3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCL4A CCR Unit in 2019. **Table 1** below provides a summary of the groundwater samples collected in 2019 including the number of samples, the date of sample collection, and the monitoring program.

		Gro	undwater M	onitoring W	ells		Manitarina
Sampling Event	BMW-1S	BMW-3S	UG-3	TMW-1	TMW-2	TMW-3	Monitoring Program
		D	ate of Samp	ole Collectio	n		riogram
January 2019 Verification Sampling	-	-	-	-	1/8/2019	-	Detection
August 2019 Detection Monitoring	8/2/2019	8/2/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	Detection
October 2019 Verification Sampling	-	-	10/2/2019	-	10/2/2019	-	Detection
November 2019 Detection Monitoring	11/15/2019	11/15/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019	Detection
Total Number of Samples Collected	2	2	3	2	4	2	NA

### Table 1 – Summary of Groundwater Sampling Dates

Notes:

2.) Verification Sampling Events tested for Appendix III Parameters with initial exceedances.

3.) "-" No sample collected.

4.) NA - Not applicable.

<sup>1.)</sup> Detection Monitoring Events tested for Appendix III Parameters.

### 3.1 Detection Monitoring Program

A Detection Monitoring event was completed November 12-14, 2018. Verification Sampling and the statistical analysis to evaluate for Statistically Significant Increases (SSIs) for the November 2018 event were not completed until 2019 and are, therefore, included in this report. Detections of Appendix III analytes triggered a Verification Sampling event, which was completed on January 8, 2019 and did not verify any SSIs. **Table 2** summarizes the results of the statistical analysis of the November 2018 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

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

As outlined in section 257.94(e)(2) of the CCR Rule, the owner or operator may demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. An Alternative Source Demonstration (ASD) was completed for these SSIs and is provided in **Appendix B**. This ASD demonstrates that SSIs are not caused by the SCL4A CCR Unit and the SCL4A CCR Unit remains in Detection Monitoring.

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

A Detection Monitoring event was completed November 14-15, 2019, and testing was performed for all Appendix III analytes. Statistical analyses to evaluate for SSIs in the November 2019 data were not completed in 2019 and the results will be provided in the 2020 annual report. **Table 4** summarizes the results of the November 2019 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

### 3.2 Groundwater Elevation, Flow Rate and Direction

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

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

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

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

### 4.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

The SCL4A remains in Detection Monitoring. Section 5.0 provides a discussion of the activities planned for 2020.

### 4.1 Sampling Issues

Detection Monitoring for the SEC was planned for May 2019. However, from approximately March to July 2019, some of the monitoring wells at the SEC were under water due to the flooding of the Mississippi and Missouri Rivers. This caused a delay in the planned sampling dates for the SCL4A. On July 15-17, 2019, Golder performed post-flood monitoring well inspections at the SEC and found that at the SCL4A; BMW-1S, BMW-3S, TMW-1, TMW-2, and UG-3 had been impacted by the flood. On July 23, 2019, Golder re-developed BMW-1S, BMW-3S, TMW-1, and TMW-2 to remove floodwater impacts to the wells prior to any future groundwater elevation measurements or groundwater samples being collected. After successful re-development, BMW-1S, BMW-3S, TMW-1, and TMW-2 were returned to service. Gredell Engineering Resources re-developed wells used for the UWL permitting at the SEC August 12-16, 2019. After successful re-development UG-3 was returned to service.

No other notable sampling issues were encountered in 2019.

### 5.0 ACTIVITIES PLANNED FOR 2020

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

# Tables

### Table 2 November 2018 Detection Monitoring Results SCL4A - Sioux Landfill Cell 4A Sioux Energy Center, St. Charles County, MO

		BACKG	ROUND			GRO	UNDWATER M	IONITORING W	/ELLS		
ANALYTE	UNITS	BMW-1S	BMW-3S	Prediction Limit UG-3	UG-3	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
	November 2018 Detection Monitoring Event										
DATE	NA	11/12/2018	11/12/2018	NA	11/14/2018	NA	11/14/2018	NA	11/14/2018	NA	11/14/2018
рН	SU	7.46	7.49	5.901- 7.849	7.10	5.536-7.999	6.51	5.884-7.958	6.97	5.889-7.889	7.03
BORON, TOTAL	μg/L	72.9 J	61.5 J	896.5	425	DQR	69.5 J	DQR	81.4 J	133	87.4 J
CALCIUM, TOTAL	μg/L	157,000	124,000	154,345	129,000	118,318	96,400	135,076	131,000	153,227	137,000
CHLORIDE, TOTAL	mg/L	6.7	10.1	78.76	67.0	5.179	2.9	4.151	2.9	3.1	2.4
FLUORIDE, TOTAL	mg/L	0.34	0.36	0.3771	0.21	0.4047	0.40 J	0.4053	0.36	0.3588	ND
SULFATE, TOTAL	mg/L	28.8	25.6	172.4	63.9	46.3	46.1	37.9	49.8	63.54	51.3
TOTAL DISSOLVED SOLIDS	mg/L	556	436	658.7	575	506.2	334	476.5	414	514.3	457
				January 201	19 Verification	Sampling					
DATE	NA								1/8/2019		
рН	SU								7.17		
BORON, TOTAL	μg/L										
CALCIUM, TOTAL	μg/L										
CHLORIDE, TOTAL	mg/L										
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L								26.4		
TOTAL DISSOLVED SOLIDS	mg/L										

NOTES:

1. Unit Abbreviations:  $\mu g/L$  - micrograms per liter, mg/L - milligrams per liter, SU - standard units.

2. J - Result is an estimated value.

3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.

4. NA - Not applicable.

5. Prediction Limits calculated using Sanitas Software.

6. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

7. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).

8. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).

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

# Table 3August 2019 Detection Monitoring ResultsSCL4A - Sioux Landfill Cell 4ASioux Energy Center, St. Charles County, MO

		BACKG	ROUND			GRO	UNDWATER M	10NITORING W	/ELLS		
ANALYTE	UNITS	BMW-1S	BMW-3S	Prediction Limit UG-3	UG-3	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
				August 2019 D	Detection Mon	itoring Event					
DATE	NA	8/2/2019	8/2/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019
рН	SU	6.90	7.53	5.901-7.849	6.72	5.536-7.999	6.65	5.884-7.958	6.52	5.889-7.889	6.57
BORON, TOTAL	μg/L	ND	ND	896.5	1040	DQR	66.6 J	DQR	84.6 J	133	86.2 J
CALCIUM, TOTAL	μg/L	149,000	122,000	154,345	159,000	118,318	99,800	135,076	123,000	153,227	123,000 J
CHLORIDE, TOTAL	mg/L	8.8	10.6	78.76	85.0	5.179	2.1	4.151	3.3	3.1	2.6
FLUORIDE, TOTAL	mg/L	0.31	0.35	0.3771	0.33	0.4047	0.35	0.4053	0.32	0.3588	0.29
SULFATE, TOTAL	mg/L	34.1	25.3	172.4	144	46.3	40.2	37.9	52.1	63.54	37.2
TOTAL DISSOLVED SOLIDS	mg/L	548	452	658.7	710 J	506.2	390 J	476.5	481 J	514.3	454 J
				October 2019	Verification Sa	mpling Event					
DATE	NA				10/2/2019				10/2/2019		
рН	SU				7.03				6.61		
BORON, TOTAL	µg/L				1120						
CALCIUM, TOTAL	µg/L				163,000						
CHLORIDE, TOTAL	mg/L				81.2						
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L								75.6		
TOTAL DISSOLVED SOLIDS	mg/L				724				512		

NOTES:

1. Unit Abbreviations:  $\mu$ g/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.

2. J - Result is an estimated value.

3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.

4. NA - Not applicable.

5. Prediction Limits calculated using Sanitas Software.

6. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

7. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).

8. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).

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

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

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

			ROUND	GROUNDWATER MONITORING WELLS					
ANALYTE	UNITS	BMW-1S	BMW-3S	UG-3	TMW-1	TMW-2	TMW-3		
	N	ovember 2019	Detection Mo	nitoring Event					
DATE	NA	11/13/2019	11/13/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019		
рН	SU	6.88	7.13	7.08	6.93	6.90	6.99		
BORON, TOTAL	μg/L	118	80.1 J	976	79.7 J	98.1 J	97.6 J		
CALCIUM, TOTAL	μg/L	143,000 J	102,000	135,000 J	95,100	120,000	116,000		
CHLORIDE, TOTAL	mg/L	6.4	7.6	83.5	1.8	4.5	2.4		
FLUORIDE, TOTAL	mg/L	0.28	0.23	0.33	0.34	0.35	0.28		
SULFATE, TOTAL	mg/L	26.5	34.4	185 J	36.9	75.1	36.7		
TOTAL DISSOLVED SOLIDS	mg/L	551	418	721	387	502	454		

### NOTES:

1. Unit Abbreviations:  $\mu g/L$  - micrograms per liter, mg/L - milligrams per liter, SU - standard units.

2. J - Result is an estimated value.

3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.

4. NA - Not applicable.

# Figures



•2•	Sioux	Center	enter Pro	perty Bound	ary	
		Perimeter F		-	-	
		1A - Landfill				
		r Recycle P				
		•				
				ing Wells Monitorir		
$\mathbf{\Phi}$	SCL4	1A Monitorin	ng Well			
$\oplus$	Back	ground Mor	nitoring V	Vell		
112000						
÷						
0		1,000		2,000	3,000	
0		1,000		2,000		
0		1,000		2,000	3,000	
NOTE(S	SOUNDAF	RIES AND LOCATIO				
<b>NOTE(S</b> 1.) ALL E 2.) UWL	SOUNDAF		L.			
<b>NOTE(S</b> 1.) ALL E 2.) UWL	SOUNDAF - UTILITY - COAL C	RIES AND LOCATIO	L.			
NOTE(S 1.) ALL E 2.) UWL 3.) CCR REFERE 1.) AME 2011.	OUNDAF - UTILITY - COAL C ENCE(S) REN MIS	RIES AND LOCATIO WASTE LANDFILI OMBUSTION RES	L. SIDUAL. ERGY CENT	PROXIMATE. ER, SIOUX PROPER	Feet	
NOTE(S 1.) ALL E 2.) UWL 3.) CCR REFERE 1.) AME 2011.	OUNDAF - UTILITY - COAL C ENCE(S) REN MIS	RIES AND LOCATIO WASTE LANDFILI OMBUSTION RES	L. SIDUAL. ERGY CENT	PROXIMATE.	Feet	
NOTE(S 1.) ALL E 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COC CLIENT	OUNDAF - UTILITY - COAL C ENCE(S) REN MIS	RIES AND LOCATIO WASTE LANDFILL COMBUSTION RES SOURI SIOUX ENI E SYSTEM: NAD 11	L. SIDUAL. ERGY CENT	PROXIMATE. ER, SIOUX PROPER	Feet	
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 2011. 2.) COC CLIENT AMEE	SOUNDAF - UTILITY - COAL C ENCE(S) REN MIS DRDINATE	RIES AND LOCATIO WASTE LANDFILL COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 11 ISSOURI	L. SIDUAL. ERGY CENT 983 STATE P	PROXIMATE. ER, SIOUX PROPER	Feet RTY CONTROL MA AST FIPS 2,401 FE	
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COC CLIENT AMEF SIOUZ PROJEC	COUNDAR - UTILITY - COAL C ENCE(S) REN MIS PRDINATE REN M X ENE CT	RIES AND LOCATIO WASTE LANDFILI COMBUSTION RES SOURI SIOUX ENI E SYSTEM: NAD 19 ISSOURI ISSOURI RGY CENTE	L. SIDUAL. ERGY CENT 983 STATE P	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E	Feet RTY CONTROL MA AST FIPS 2,401 FE	ЕТ.
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COO CLIENT AMEF SIOU PROJEC GROU	COUNDAR - UTILITY - COAL C ENCE(S) REN MIS PRDINATE REN M X ENE CT	RIES AND LOCATIO WASTE LANDFILL COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 11 ISSOURI	L. SIDUAL. ERGY CENT 983 STATE P	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E	Feet RTY CONTROL MA AST FIPS 2,401 FE	ЕТ.
NOTE(S 1.) ALLE 2.) UWCL 3.) CCR REFERE 2011. 2.) COC CLIENT AMEF SIOUZ PROJEC GROU	COUNDAR - UTILITY - COAL C ENCE(S) REN MIS ORDINATE REN M X ENE T JNDW	RIES AND LOCATIO WASTE LANDFILI OMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 19 ISSOURI RGY CENTE ATER MONI	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E PROGRAM	Feet	Amerel
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 2.1. AME 2011. 2.) COC CLIENT AMEF SIOU PROJEC GROU TITLE SITE	COUNDAR - UTILITY - COAL C ENCE(S) REN MIS DRDINATE REN M X ENE T JNDW LOCA	RIES AND LOCATIO WASTE LANDFILI COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 19 ISSOURI RGY CENTE ATER MONI TION AERIA	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E	Feet	Amerel
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 2.1. AME 2011. 2.) COC CLIENT AMEF SIOU PROJEC GROU TITLE SITE		RIES AND LOCATIO WASTE LANDFILI COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 19 ISSOURI RGY CENTE ATER MONI TION AERIA	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E PROGRAM	Feet	Amerel
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COC CLIENT AMEF SIOU PROJEC GROU TITLE SITE LOCA		RIES AND LOCATIO WASTE LANDFILI COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 19 ISSOURI RGY CENTE ATER MONI TION AERIA	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E PROGRAM	Feet RTY CONTROL MA AST FIPS 2,401 FE	Amerel
NOTE(S 1.) ALLE 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COC CLIENT AMEF SIOU PROJEC GROU TITLE SITE LOCA	CUNDAR - UTILITY - COAL C INCE(S) REN MIS DRDINATE REN MIS DRDINATE REN MIS DRDINATE T JNDW LOCA LOCA	RIES AND LOCATIO WASTE LANDFILL COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 11 ISSOURI ISSOURI RGY CENTE ATER MONI TION AERIA S	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E PROGRAM AND MONITO	Feet RTY CONTROL MA AST FIPS 2,401 FE RING WELL 2020-01-15	Amerel
NOTE(S 1) ALLE 2.) UWL 3.) CCR REFERE 1.) AME 2011. 2.) COC CLIENT AMEF SIOU PROJEC GROU TITLE SITE LOCA	CUNDAR - UTILITY - COAL C INCE(S) REN MIS DRDINATE REN MIS DRDINATE REN MIS DRDINATE T JNDW LOCA LOCA	RIES AND LOCATIO WASTE LANDFILI COMBUSTION RES SOURI SIOUX EN E SYSTEM: NAD 19 ISSOURI RGY CENTE ATER MONI TION AERIA	L. SIDUAL. ERGY CENT 983 STATE P ER TORING	PROXIMATE. ER, SIOUX PROPEI LANE MISSOURI E PROGRAM AND MONITO	Feet  Feet  RTY CONTROL MA AST FIPS 2,401 FE  RING WELL  2020-01-15 JSI	Amerel

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

APPENDIX A

# Laboratory Analytical Data



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

January 10, 2019

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

RE: Project: SCL4A GW SAMPLING Pace Project No.: 60291372

Dear Mark Haddock:

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

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

Sincerely,

Jami Church

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

Enclosures

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





### CERTIFICATIONS

Project: SCL4A GW SAMPLING

Pace Project No.: 60291372

### **Kansas Certification IDs**

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



### SAMPLE SUMMARY

Project: SCL4A GW SAMPLING

Pace Project No.: 60291372

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60291372001	S-TMW-2	Water	01/08/19 12:20	01/09/19 03:00



### SAMPLE ANALYTE COUNT

Project:SCL4A GW SAMPLINGPace Project No.:60291372

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60291372001	S-TMW-2	EPA 300.0	MGS	1	PASI-K



Project: SCL4A GW SAMPLING

Pace Project No.: 60291372

Sample: S-TMW-2 Lab ID: 60291372001		Collecte	llected: 01/08/19 12:20 Received: 01/09/19 03:00 Matrix:			atrix: Water			
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	300.0						
Sulfate	26.4	mg/L	5.0	1.2	5		01/10/19 12:13	14808-79-8	



### **QUALITY CONTROL DATA**

Project: SCL4A	GW SAMPLING										
Pace Project No.: 602913	72										
QC Batch: 56407	1	Analy	sis Method:	E	PA 300.0						
QC Batch Method: EPA 3	00.0	Analy	sis Descript	tion: 30	0.0 IC Anic	ons					
Associated Lab Samples:	60291372001										
METHOD BLANK: 231423	5		Matrix: Wa	ter							
Associated Lab Samples:	60291372001										
		Blan	k R	eporting							
Parameter	Units	Resu	ılt	Limit	MDL		Analyzed	Qua	alifiers		
Sulfate	mg/L		<0.24	1.0		0.24	01/10/19 09:4	.8			
LABORATORY CONTROL S	AMPLE: 2314236						_				
Parameter	Units	Spike Conc.	LCS Resu		LCS % Rec		Rec mits Q	ualifiers			
								luaimers	-		
Sulfate	mg/L	ł	5	4.9	98		90-110				
MATRIX SPIKE & MATRIX S	PIKE DUPLICATE: 23	14237		2314238							
		MS	MSD	201 200							
	602913710	02 Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units Result	Conc.	Conc.	Result	Result	% Re	c % Rec	Limits	RPD	RPD	Qual
Sulfate	mg/L 2	9.7 25	25	57.6	53.6	1	96	90-110	7	15	M1

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



### QUALIFIERS

### Project: SCL4A GW SAMPLING

Pace Project No.: 60291372

### DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

**RPD** - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

### LABORATORIES

PASI-K Pace Analytical Services - Kansas City

### ANALYTE QUALIFIERS

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



### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:	SCL4A GW SAMPLING
Pace Project No.:	60291372

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60291372001	S-TMW-2	EPA 300.0	564071		

Pace Analytical Sample Condition U	لحی Ipon Receipt	- WO#:60291372
Tracking #:       Packing #:       Packing #:         Custody Seal on Cooler/Box Present: Yes Ø No □         Packing Material:       Bubble Wrap □       Bubble Bags 0         Thermometer Used:       Y-301       Type o         Cooler Temperature (°C):       As-read       0-9       Corr. Factor	e Shipping Label Used? Seals intact: Yes Ø Ø Foam □ f Ice: ₩€t Blue None	No Date and initials of person
Temperature should be above freezing to 6°C	Pres DNO DN/A	
Chain of Custody present:	ZYes DNo DN/A	
Chain of Custody relinquished:		
Samples arrived within holding time:	Dyes ANO DN/A	
Short Hold Time analyses (<72hr):	Res DNO DN/A	
Rush Turn Around Time requested:	ZYes DNO DN/A	
Sufficient volume:		
Correct containers used:	Pyes 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?	DYes No DN/A	
Sample labels match COC: Date / time / ID / analyses	Yes No N/A	
Samples contain multiple phases? Matrix: WT Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	DYes DNO	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes ØNo	
Trip Blank present:		
Headspace in VOA vials ( >6mm):	Yes No N/A	
Samples from USDA Regulated Area: State:	Yes No PN/A	
Additional labels attached to 5035A / TX1005 vials in the field		
Client Notification/ Resolution:       Copy COC         Person Contacted:       Date         Comments/ Resolution:	to Client? Y / N /Time:	Field Data Required? Y / N
Project Manager Review:	Date	— 1/9/19

Pace Analytical 9

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

equired C	Required Client Information:			0.17.17	lana and	Ā	Attention:					Г							
Company:	Golder Associates	Report To: Mark Haddock (mhaddock@golder.com)	addock (mhi	addock@g	older.com)	<	11011011									2			
Address.	820 South Main Street, Suite 100	Copy To: Jeffrey Ingram	ngram			0	Company Name:	ne:				LC .	EGULA	REGULATORY AGENCY	GENCY	10		8	
	St Charles, MO 63301		1			¥	Address:						NPDES	7	GROUND WATER	WATER	L	DRINKING WATER	ATER
Email To:	maddock@aolder.com	Purchase Order No.:				0. 0	Pace Quote Reference						T UST	L	RCRA		Б Ц	OTHER	
	636-724-9191 Fax 636-724-9323	Project Name: SULL	D	I.W. Samelia	PLAN	10.2	Pace Project Manager.	Jamie Church	Church				Site Location	ttion	QW	1111			
Requested		Project Number.	L NH	813	Can	0	Pace Profile #:	9285					ST,	STATE:					
			20110								Reque	sted A	nalysis I	Requested Analysis Filtered (Y/N)	(N/A				
0.0	Section D Valid Matrix Codes	(jieit)		COLLECTED	TED		_	Preservatives	atives	1 N /↓	z	z	z z						
			COMPOSITE START	SITE	COMPOSITE END/GRAB	OFFECTION	s			11						(N/Y) ər			
# W	SAMPLE ID (A-2, 0-91,-) Sample IDs MUST BE UNIQUE	ATRIX CODE (se				 D TA 9M9T ∃J9MA	DF CONTAINER	ICI ICI INO <sup>3</sup> <sup>5</sup> 20 <sup>4</sup>	aOH lethanol lonedta	ther Analysis Tes	alcium alcium	luoride horide	ulfate DS			Residual Chlorin		40291372	12 Labid
ал	C- mut		DATE	TIME	DATE T 19 /15 15	TIME S	n -	H H	N N	1	C	Н	1	B P AN	878				00
	) Million	-	0 0		-										-	_			
		MT 0	0			-								_					
4		WT 0	0				_			T	_			-		+			
S		M N	0			-				T						+			
9		WT 0	0							T	-	-	-	-					
7		Ţ	U					_		T						-			
80		MT 0	U					+		Т		-	-						
6		-	U				-			T	-								
10		_	0	-							-								
= :			9 0	F															
12	ADDITIONAL COMMENTS	RELINC	RELINQUISHED BY / AFFILIATION	AFFILIATIO	7	DATE	TIME	10	ACCEP	ACCEPTED BY / AFFILIATION	AFFILIA	TION	Ď	DATE	TIME		SAMPL	SAMPLE CONDITIONS	ş
		hum	2m	Iboldu		61/08/14		Å	2.22		Duce		11	19119 C	0320	0.9	2	X	7
											-		+						
F													_	-					t
Page		-		SAMPLER NAME	R NAME ANI	AND SIGNATURE										Э. u	(N/, uo pe		s Intac (N
910				Ľ	PRINT Name of SAMPLER:	f SAMPLER:	ڊ. ب	Schneidi	Lr.		DATE	DATE Slaned	-	01		dwəj	Y) 901	;ooler	elqme
0					and the second s	A THE PARTY NAMES		AN UN			1.53	Rin	ALLAN.	110		L	Ы		35

"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



### **MEMORANDUM**

Project No. 1531406

DATE January 10, 2019

TO Project File Golder Associates

СС

**FROM** Tommy Goodwin

EMAIL tgoodwin@golder.com

## DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – VERIFICATION SAMPLING – DATA PACKAGE 60291372

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

When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.

### **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

Project I	ny Name: <u>Golder Associates</u> Name: <u>Ameren - 5004A- 1</u> 5- Jan 7019 er: <u>T Goodwin</u>	_	Proje	ct Numl	nger: <u>J Ingram</u> ber: <u>1531406</u> ite: <u>\/io/i</u> A
Laborate	ory: <u>Pace Analytical</u>		SDG	#:6	0291372 @
					Fe (SM 3500-Fe B#4), Aniona (300.0), P (365.4), Ra (903,18904.0)
Matrix: Sample M	□ Air □ Soil/Sed. IX Water □ Waste Names <u>5-↑µω-2</u>				Anions (200 0)
NOTE:	Please provide calculation in Comment areas or	on the	back (if o	on the b	ack please indicate in comment areas).
Field In	formation	YES	NO	NA	COMMENTS
a)	Sampling dates noted?	х			1/8/19
b)	Sampling team indicated?	X			
C)	Sample location noted?	x			
d)	Sample depth indicated (Soils)?			x	
e)	Sample type indicated (grab/composite)?	x			Grab
f)	Field QC noted?	x			
g)	Field parameters collected (note types)?	x			pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h)	Field Calibration within control limits?	x			
i)	Notations of unacceptable field conditions/performa	nces fro	om field lo	gs or fie	Id notes?
			x		
j)	Does the laboratory narrative indicate deficiencies? Note Deficiencies:			x	
Chain-c	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			
Genera	I (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?	Ø			
c)	Were the correct preservatives used?	$\overline{\mathbf{x}}$			
d)	Was the correct method used?	x			
e)	Were appropriate reporting limits achieved?	x			
f)	Were any sample dilutions noted?	Ø	Ľ		
g)	Were any matrix problems noted?	Z			
		/			

### QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks		YES	NO	NA	COMMENTS
a)	Were analytes detected in the method blank(s)?		ø		
b)	Were analytes detected in the field blank(s)?			ø	
c)	Were analytes detected in the equipment blank(s)?			x	
d)	Were analytes detected in the trip blank(s)?			x	
Labora	tory 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?	Ø			
Duplica	ites	YES	NO	NA	COMMENTS
a)	Were field duplicates collected (note original and du	uplicate s	sample n	ames)?	Dup-1@ V/A
			$\not$		FB-1@ <b>NJA</b>
b)	Were field dup. precision criteria met (note RPD)?			$\not \!$	
c)	Were lab duplicates analyzed (note original and dup	plicate sa	amples)?		
		X			
d)	Were lab dup. precision criteria met (note RPD)?	ø			
Blind S	tandards	YES	NO	NA	COMMENTS
a)	Was a blind standard used (indicate name,			x	
	analytes included and concentrations)?				
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?		$\square$		5012-
	Recovery could not be calculated since sample contained high concentration of analyte?			x	
b)	Was MSD accuracy criteria met?	Ø			
	Recovery could not be calculated since sample contained high concentration of analyte?			x	
c)	Were MS/MSD precision criteria met?	Ø			

### Comments/Notes:

Revised May 2004

### QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

.

### **Data Qualification:**

Sample Name	Constituent(s)	Result	Qualifier	Reason
None -				
		$\overline{\}$		
	Ω.			
-	7 n/	//		
Signature:	m poord	Mp		Date:10/19
				/ /

Revised May 2004

Page 3 of 3



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

October 17, 2019

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

### RE: Project: AMEREN SIOUX ENERGY CTR Pace Project No.: 60312388

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between August 03, 2019 and August 21, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Jami Church

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

Enclosures

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





### CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

### **Kansas Certification IDs**

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



### SAMPLE SUMMARY

### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60312388001	S-TMW-1	Water	08/04/19 11:50	08/20/19 02:45
60312388002	S-TMW-2	Water	08/04/19 11:10	08/20/19 02:45
60312388003	S-TMW-3	Water	08/04/19 10:10	08/20/19 02:45
60312388004	S-UG-3	Water	08/04/19 10:15	08/20/19 02:45
60312388005	S-SCL4A-FB-1	Water	08/04/19 10:02	08/20/19 02:45
60312388006	S-SCL4A-DUP-1	Water	08/04/19 08:00	08/21/19 02:45
60310790002	S-BMW-1S	Water	08/01/19 10:55	08/03/19 02:50
60310790003	S-BMW-3S	Water	08/01/19 11:45	08/03/19 02:50



### SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60312388001	S-TMW-1	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60312388002	S-TMW-2	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60312388003	S-TMW-3	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60312388004	S-UG-3	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60312388005	S-SCL4A-FB-1	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60312388006	S-SCL4A-DUP-1	EPA 200.7	EMR	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60310790002	S-BMW-1S	EPA 200.7	НКС	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310790003	S-BMW-3S	EPA 200.7	НКС	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K



08/30/19 21:05 14808-79-8

### ANALYTICAL RESULTS

### Project: AMEREN SIOUX ENERGY CTR

40.2

mg/L

Pace Project No.: 60312388

Sulfate

Sample: S-TMW-1	Lab ID:	60312388001	Collecte	d: 08/04/19	9 11:50	Received: 08/	20/19 02:45 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	aration Meth	od: EP	A 200.7			
Boron	66.6J	ug/L	100	10.7	1	08/21/19 13:22	08/22/19 18:17	7440-42-8	
Calcium	99800	ug/L	200	50.0	1	08/21/19 13:22	08/22/19 18:17	7440-70-2	
Iron	69.7	ug/L	50.0	14.0	1	08/21/19 13:22	08/22/19 18:17	7439-89-6	
Magnesium	18200	ug/L	50.0	13.0	1	08/21/19 13:22	08/22/19 18:17	7439-95-4	
Manganese	180	ug/L	5.0	2.1	1	08/21/19 13:22	08/22/19 18:17	7439-96-5	
Potassium	4900	ug/L	500	79.0	1	08/21/19 13:22	08/22/19 18:17	7440-09-7	
Sodium	2760	ug/L	500	144	1	08/21/19 13:22	08/22/19 18:17	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	269	mg/L	20.0	6.5	1		08/26/19 14:04		H3
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	390	mg/L	10.0	10.0	1		08/22/19 18:25		H3
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	2.1	mg/L	1.0	0.22	1		08/30/19 20:50	16887-00-6	
Fluoride	0.35	mg/L	0.20	0.085	1		08/30/19 20:50	16984-48-8	

5.0

1.2

5



### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 6031

	2388	6031
	2388	6031

Sample: S-TMW-2	Lab ID:	60312388002	Collected	1: 08/04/19	9 11:10	Received: 08/	20/19 02:45 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	84.6J	ug/L	100	10.7	1	08/21/19 13:22	08/22/19 18:19	7440-42-8	
Calcium	123000	ug/L	200	50.0	1	08/21/19 13:22	08/22/19 18:19	7440-70-2	
Iron	398	ug/L	50.0	14.0	1	08/21/19 13:22	08/22/19 18:19	7439-89-6	
Magnesium	23100	ug/L	50.0	13.0	1	08/21/19 13:22	08/22/19 18:19	7439-95-4	
Manganese	466	ug/L	5.0	2.1	1	08/21/19 13:22	08/22/19 18:19	7439-96-5	
Potassium	5150	ug/L	500	79.0	1	08/21/19 13:22	08/22/19 18:19	7440-09-7	
Sodium	3180	ug/L	500	144	1	08/21/19 13:22	08/22/19 18:19	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	361	mg/L	20.0	6.5	1		08/26/19 14:08		H3
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	481	mg/L	10.0	10.0	1		08/22/19 18:25		H3
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	3.3	mg/L	1.0	0.22	1		08/30/19 21:49	16887-00-6	
Fluoride	0.32	mg/L	0.20	0.085	1		08/30/19 21:49	16984-48-8	
Sulfate	52.1	mg/L	5.0	1.2	5		08/30/19 22:04	14808-79-8	



### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312

60312388		

Sample: S-TMW-3	Lab ID:	60312388003	Collected:	08/04/19	10:10	Received: 08/	/20/19 02:45 M	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepar	ation Meth	od: EP	A 200.7			
Boron	86.2J	ug/L	100	10.7	1	08/21/19 13:22	08/22/19 18:26	7440-42-8	
Calcium	123000	ug/L	200	50.0	1	08/21/19 13:22	08/22/19 18:26	7440-70-2	M1
Iron	1380	ug/L	50.0	14.0	1	08/21/19 13:22	08/22/19 18:26	7439-89-6	
Magnesium	23300	ug/L	50.0	13.0	1	08/21/19 13:22	08/22/19 18:26	7439-95-4	
Manganese	631	ug/L	5.0	2.1	1	08/21/19 13:22	08/22/19 18:26	7439-96-5	
Potassium	5550	ug/L	500	79.0	1	08/21/19 13:22	08/22/19 18:26	7440-09-7	
Sodium	4080	ug/L	500	144	1	08/21/19 13:22	08/22/19 18:26	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	369	mg/L	20.0	6.5	1		08/26/19 14:14		H3
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	454	mg/L	10.0	10.0	1		08/22/19 18:25		H3
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	2.6	mg/L	1.0	0.22	1		08/30/19 22:19	16887-00-6	
Fluoride	0.29	mg/L	0.20	0.085	1		08/30/19 22:19	16984-48-8	
Sulfate	37.2	mg/L	5.0	1.2	5		08/30/19 23:04	14808-79-8	
		5							



### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 6031

### 60312388

nalyzed CAS No. Q	ual
/19 18:32 7440-42-8	
/19 18:32 7440-70-2	
/19 18:32 7439-89-6	
/19 18:32 7439-95-4	
/19 18:32 7439-96-5	
/19 18:32 7440-09-7	
/19 18:32 7440-23-5	
/19 14:24 H3	
/19 18:25 H3	
/19 00:04 16887-00-6	
/19 23:49 16984-48-8	
/19 00:04 14808-79-8 E	
	/19       18:32       7440-70-2         /19       18:32       7439-89-6         /19       18:32       7439-95-4         /19       18:32       7439-96-5         /19       18:32       7440-09-7         /19       18:32       7440-23-5         /19       14:24       H3         /19       18:25       H3         /19       18:25       H3



### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

Sample: S-SCL4A-FB-1	Lab ID:	60312388005	Collected	d: 08/04/19	0 10:02	Received: 08/	20/19 02:45 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	<10.7	ug/L	100	10.7	1	08/21/19 13:22	08/22/19 18:34	7440-42-8	
Calcium	58.2J	ug/L	200	50.0	1	08/21/19 13:22	08/22/19 18:34	7440-70-2	
Iron	<14.0	ug/L	50.0	14.0	1	08/21/19 13:22	08/22/19 18:34	7439-89-6	
Magnesium	<13.0	ug/L	50.0	13.0	1	08/21/19 13:22	08/22/19 18:34	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	08/21/19 13:22	08/22/19 18:34	7439-96-5	
Potassium	<79.0	ug/L	500	79.0	1	08/21/19 13:22	08/22/19 18:34	7440-09-7	
Sodium	<144	ug/L	500	144	1	08/21/19 13:22	08/22/19 18:34	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		08/26/19 14:27		H3
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	17.0	mg/L	5.0	5.0	1		08/22/19 18:25		H3
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	0.46J	mg/L	1.0	0.22	1		08/31/19 00:49	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		08/31/19 00:49	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/31/19 00:49	14808-79-8	



### Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

Sample: S-SCL4A-DUP-1	Lab ID:	60312388006	Collected	d: 08/04/19	08:00	Received: 08/	21/19 02:45 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	87.1J	ug/L	100	10.7	1	08/21/19 13:22	08/22/19 18:37	7440-42-8	
Calcium	125000	ug/L	200	50.0	1	08/21/19 13:22	08/22/19 18:37	7440-70-2	
Iron	348	ug/L	50.0	14.0	1	08/21/19 13:22	08/22/19 18:37	7439-89-6	
Magnesium	23600	ug/L	50.0	13.0	1	08/21/19 13:22	08/22/19 18:37	7439-95-4	
Manganese	476	ug/L	5.0	2.1	1	08/21/19 13:22	08/22/19 18:37	7439-96-5	
Potassium	5140	ug/L	500	79.0	1	08/21/19 13:22	08/22/19 18:37	7440-09-7	
Sodium	3240	ug/L	500	144	1	08/21/19 13:22	08/22/19 18:37	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	347	mg/L	20.0	6.5	1		08/26/19 14:33		H3
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	218	mg/L	10.0	10.0	1		08/22/19 18:25		H3
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	3.3	mg/L	1.0	0.22	1		08/31/19 01:04	16887-00-6	
Fluoride	0.32	mg/L	0.20	0.085	1		08/31/19 01:04	16984-48-8	
Sulfate	51.9	mg/L	5.0	1.2	5		08/31/19 01:19	14808-79-8	



# Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312

# 60312388

Sample: S-BMW-1S	Lab ID:	60310790002	Collected:	08/01/19	9 10:55	Received: 08/	/03/19 02:50 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical I	Method: EPA 2	00.7 Prepara	ation Meth	od: EP	A 200.7			
Boron	70.8J	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:51	7440-42-8	В
Calcium	149000	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:36	7440-70-2	
Iron	<14.0	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:36	7439-89-6	
Magnesium	28400	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:36	7439-95-4	
Manganese	472	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:36	7439-96-5	
Potassium	383J	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:36	7440-09-7	
Sodium	5350	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:36	7440-23-5	
2320B Alkalinity	Analytical I	Method: SM 23	320B						
Alkalinity, Total as CaCO3	432	mg/L	20.0	6.5	1		08/15/19 11:20		
2540C Total Dissolved Solids	Analytical I	Method: SM 25	540C						
Total Dissolved Solids	548	mg/L	10.0	10.0	1		08/07/19 13:13		
300.0 IC Anions 28 Days	Analytical I	Method: EPA 3	00.0						
Chloride	8.8	mg/L	1.0	0.22	1		08/15/19 04:53	16887-00-6	
Fluoride	0.31	mg/L	0.20	0.085	1		08/15/19 04:53	16984-48-8	
Sulfate	34.1	mg/L	2.0	0.46	2		08/15/19 05:44	14808-79-8	
		-							



# Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312

60312388

Sample: S-BMW-3S	Lab ID:	60310790003	Collected	1: 08/01/19	9 11:45	Received: 08/	/03/19 02:50 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	73.9J	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:53	7440-42-8	В
Calcium	122000	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:38	7440-70-2	
Iron	44.3J	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:38	7439-89-6	
Magnesium	22400	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:38	7439-95-4	
Manganese	298	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:38	7439-96-5	
Potassium	648	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:38	7440-09-7	
Sodium	5280	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:38	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	358	mg/L	20.0	6.5	1		08/15/19 11:25		
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	452	mg/L	10.0	10.0	1		08/07/19 13:14		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	10.6	mg/L	1.0	0.22	1		08/15/19 06:01	16887-00-6	
Fluoride	0.35	mg/L	0.20	0.085	1		08/15/19 06:01	16984-48-8	
Sulfate	25.3	mg/L	2.0	0.46	2		08/15/19 06:17	14808-79-8	



Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

6017	14	Analysis Me	ethod:	EPA 200.7			
EPA	200.7	Analysis Description:		200.7 Metals, Total			
ples:	60310790002, 60310790003						
24614	67	Matrix	k: Water				
ples:	60310790002, 60310790003						
		Blank	Reporting				
	EPA	2461467	EPA 200.7 Analysis De ples: 60310790002, 60310790003 2461467 Matrix	EPA 200.7         Analysis Description:           ples:         60310790002, 60310790003           2461467         Matrix: Water	EPA 200.7Analysis Description:200.7 Metals, Totalples:60310790002, 6031079000324614672461467Matrix: Water	EPA 200.7     Analysis Description:     200.7 Metals, Total       ples:     60310790002, 60310790003     Matrix: Water	EPA 200.7     Analysis Description: 200.7 Metals, Total       ples:     60310790002, 60310790003       2461467     Matrix: Water

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

# LABORATORY CONTROL SAMPLE: 2461468

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461469 2461470												
Parameter	Units	60310791001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	217	1000	1000	1230	1210	101	100	70-130	1	20	-
Calcium	ug/L	58100	10000	10000	70000	68700	119	106	70-130	2	20	
Iron	ug/L	1010	10000	10000	10700	10800	97	97	70-130	1	20	
Magnesium	ug/L	16700	10000	10000	26800	26400	101	97	70-130	1	20	
Manganese	ug/L	113	1000	1000	1100	1100	98	99	70-130	0	20	
Potassium	ug/L	4210	10000	10000	14400	14300	102	101	70-130	0	20	
Sodium	ug/L	14000	10000	10000	24700	24300	107	103	70-130	2	20	

MATRIX SPIKE & MATRIX SI	PIKE DUPLIC	ATE: 2461	471		2461472							
	60	0310791002	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	12400	1000	1000	13200	13600	84	116	70-130	2	20	
Calcium	ug/L	171000	10000	10000	180000	184000	94	127	70-130	2	20	

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**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

MATRIX SPIKE & MATRIX	SPIKE DUPLIC	CATE: 2461	471		2461472							
Parameter	6 Units	0310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	416	10000	10000	10100	10200	97	98	70-130	0	20	
Magnesium	ug/L	5320	10000	10000	14500	14700	92	94	70-130	1	20	
Manganese	ug/L	168	1000	1000	1140	1160	97	99	70-130	1	20	
Potassium	ug/L	22900	10000	10000	33000	33600	101	107	70-130	2	20	
Sodium	ug/L	46500	10000	10000	56500	57800	100	113	70-130	2	20	

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.



Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

QC Batch:	6046	59		Analysis M	ethod:	EPA 200.7	
QC Batch Method:	EPA 2	200.7		Analysis D	escription:	200.7 Metals,	Total
Associated Lab Samp	oles:	60312388001,	60312388002,	60312388003	60312388004	, 60312388005	, 60312388006

 METHOD BLANK:
 2471841
 Matrix:
 Water

 Associated Lab Samples:
 60312388001, 60312388002, 60312388003, 60312388004, 60312388005, 60312388006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	08/22/19 18:14	
Calcium	ug/L	<50.0	200	50.0	08/22/19 18:14	
Iron	ug/L	<14.0	50.0	14.0	08/22/19 18:14	
Magnesium	ug/L	<13.0	50.0	13.0	08/22/19 18:14	
Manganese	ug/L	<2.1	5.0	2.1	08/22/19 18:14	
Potassium	ug/L	<79.0	500	79.0	08/22/19 18:14	
Sodium	ug/L	<144	500	144	08/22/19 18:14	

# LABORATORY CONTROL SAMPLE: 2471842

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	975	98	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10100	101	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	9730	97	85-115	
Sodium	ug/L	10000	9740	97	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPL	ICATE: 2471	843		2471844							
			MS	MSD								
		60312388003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L		1000	1000	1050	987	96	90	70-130	6	20	
Calcium	ug/L	123000	10000	10000	136000	126000	131	24	70-130	8	20	M1
Iron	ug/L	1380	10000	10000	11000	10400	97	90	70-130	6	20	
Magnesium	ug/L	23300	10000	10000	33300	31100	100	78	70-130	7	20	
Manganese	ug/L	631	1000	1000	1620	1510	99	88	70-130	7	20	
Potassium	ug/L	5550	10000	10000	15200	14300	96	87	70-130	6	20	
Sodium	ug/L	4080	10000	10000	13700	12800	96	88	70-130	6	20	

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

# **REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



· <b>J</b> ···	X ENERGY CTR							
Pace Project No.: 60312388 QC Batch: 603364		Apolysis M	athad	SM 2320B				
		Analysis Mo			•••			
QC Batch Method: SM 2320B		Analysis De	escription:	2320B Alkalin	iity			
Associated Lab Samples: 603107	90002, 60310790003							
METHOD BLANK: 2467297		Matrix	: Water					
Associated Lab Samples: 603107	90002, 60310790003							
		Blank	Reporting					
Parameter	Units	Result	Limit	MDL		Analyz	ed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	5 20	0	6.5	08/15/19	10:55	
LABORATORY CONTROL SAMPLE	2467298							
		Spike	LCS	LCS		Rec		
Parameter	Units	Conc.	Result	% Rec	L	imits	Qua	alifiers
Alkalinity, Total as CaCO3	mg/L	500	486	97		90-110		
SAMPLE DUPLICATE: 2467299								
		60310412023	Dup			Max		
Parameter	Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as CaCO3	mg/L	277	29	6	7		10	
SAMPLE DUPLICATE: 2467300								
		60310791002	Dup			Max		
Parameter	Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as CaCO3	mg/L	186	- <u> </u>		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.



- <b>J</b>	AMEREN SIOUX 60312388	ENERGY CTR					
QC Batch:	605187		Analysis Me	ethod:	SM 2320B		
QC Batch Method:	SM 2320B		Analysis De	escription:	2320B Alkalini	ity	
Associated Lab Sam	ples: 60312388	8001, 60312388002	, 60312388003,	60312388004,	, 60312388005	, 60312388006	
METHOD BLANK:	2473739		Matrix	: Water			
Associated Lab Sam	ples: 60312388	8001, 60312388002	, 60312388003,	60312388004,	, 60312388005	, 60312388006	
			Blank	Reporting			
Param	eter	Units	Result	Limit	MDL	Analyz	ed Qualifiers
Alkalinity, Total as Ca	aCO3	mg/L	<6.5	20	).0	6.5 08/26/19	13:53
_ABORATORY CON	TROL SAMPLE:	2473740					
_			Spike	LCS	LCS	% Rec	
Param	eter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Alkalinity, Total as Ca	aCO3	mg/L	500	484	97	90-110	
SAMPLE DUPLICAT	E: 2473741						
			60312388003	Dup		Max	
-		Units	Result	Result	RPD	RPD	Qualifiers
Param	eter	Onits	rtoourt	riooun			

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.



		SM 2540C 2540C Total I	Dissolv	ved Solids		
Analysis De	escription:		Dissolv	ved Solids		
Matrix		23400 10181	2155010	eu Solius		
	: Water					
	: Water					
Blank	Reporting					
Result	Limit	MDL		Analyz	zed	Qualifiers
<5.0	) 5	5.0	5.0	08/07/19	13:10	
Spike	LCS	LCS	%	Rec		
Conc.	Result	% Rec			Qua	alifiers
1000	982	98		80-120		
60310791002	Dup			Max		
Result	Result	RPD		RPD		Qualifiers
822		<u></u>	2		10	
	. 0	00	2		10	
60310412023	Dup			Max		
Result	Result	RPD		RPD		Qualifiers
545	6		10		10	
	Result           <5.0	ResultLimit<5.0	Result         Limit         MDL           <5.0	Result         Limit         MDL           <5.0	ResultLimitMDLAnalyz<5.0	Result         Limit         MDL         Analyzed           <5.0

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.



-,	MEREN SIOUX	ENERGY CTR					
QC Batch:	604897		Analysis Me	ethod:	SM 2540C		
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total E	Dissolved Solids	
Associated Lab Samp	oles: 60312388	001, 6031238800	02, 60312388003,	60312388004,	60312388005	5, 60312388006	
METHOD BLANK: 2	2472721		Matrix	k: Water			
Associated Lab Samp	oles: 60312388	001, 6031238800	02, 60312388003,	60312388004,	60312388005	5, 60312388006	
			Blank	Reporting			
Parame	eter	Units	Result	Limit	MDL	Analyz	zed Qualifiers
Total Dissolved Solids	3	mg/L	<5.0	) 5	.0	5.0 08/22/19	18:25
LABORATORY CONT	ROL SAMPLE:	2472722					
			Spike	LCS	LCS	% Rec	
Parame	eter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Total Dissolved Solids	3	mg/L	500	502	100	80-120	
SAMPLE DUPLICATE	: 2472723						
			60312388003	Dup		Max	
Parame	eter	Units	Result	Result	RPD	RPD	Qualifiers
Total Dissolved Solids	3	mg/L	454	46	63	2	10 H3
SAMPLE DUPLICATE	: 2472724						
			60312038003	Dup		Max	
Parame	eter	Units	Result	Result	RPD	RPD	Qualifiers
Total Dissolved Solids	3	mg/L	825	5 84	17	3	10

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



Project:	AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

QC Batch: 603127	QC Batch: 603127		ethod:	EPA 300	0.0			
QC Batch Method: EPA 300.0		Analysis D	escription:	300.0 IC	Anions			
Associated Lab Samples: 60310	0790002, 60310790003							
METHOD BLANK: 2466421		Matri	x: Water					
Associated Lab Samples: 60310	0790002, 60310790003							
		Blank	Reportin	g				
Parameter	Units	Result	Limit		MDL	Analyz	ed C	Qualifiers
Chloride	mg/L	<0.22	2	1.0	0.22	08/14/19	11:57	
Fluoride	mg/L	<0.08	5 (	0.20	0.085	08/14/19	11:57	
Sulfate	mg/L	<0.23	3	1.0	0.23	08/14/19	11:57	
LABORATORY CONTROL SAMPL	E: 2466422							
		Spike	LCS	LCS		% Rec		
Parameter	Units	Conc.	Result	% Rec		Limits	Qualifiers	
Chloride	mg/L	5	4.7		94	90-110		
Fluoride	mg/L	2.5	2.4		97	90-110		
Sulfate	mg/L	5	4.7		95	90-110		

MATRIX SPIKE & MATRIX SP	VIKE DUPLI	CATE: 2466	423		2466424							
			MS	MSD								
	6	60310412023	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	25.5	25	25	50.0	49.4	98	96	80-120	1	15	
Fluoride	mg/L	2.1	2.5	2.5	4.6	4.7	101	102	80-120	1	15	
Sulfate	mg/L	96.6	25	25	122	120	100	94	80-120	1	15	E

MATRIX SPIKE SAMPLE:	2466425						
		60310952001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	46500	50000	99400	106	80-120	
Fluoride	mg/L	ND	25000	24700	99	80-120	
Sulfate	mg/L	21700	50000	73700	104	80-120	

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.



EPA 300.0

300.0 IC Anions

Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

QC Batch:

QC Batch Method:

#### 606780 Analysis Method: EPA 300.0

Analysis Description:

Associated Lab Samples: 60312388001, 60312388002, 60312388003, 60312388004, 60312388005, 60312388006

METHOD BLANK: 2479760 Matrix: Water Associated Lab Samples: 60312388001, 60312388002, 60312388003, 60312388004, 60312388005, 60312388006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/30/19 20:20	
Fluoride	mg/L	<0.085	0.20	0.085	08/30/19 20:20	
Sulfate	mg/L	<0.23	1.0	0.23	08/30/19 20:20	

#### LABORATORY CONTROL SAMPLE: 2479761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	5	4.7	93	90-110	

MATRIX SPIKE & MATRIX S		CATE: 2479	762		2479763							
			MS	MSD								
	e	60312388003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	2.6	5	5	7.5	7.5	96	98	80-120	1	15	
Fluoride	mg/L	0.29	2.5	2.5	2.8	2.8	98	100	80-120	2	15	
Sulfate	mg/L	37.2	25	25	62.7	62.3	102	100	80-120	1	15	

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



# QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

# DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

**RPD** - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

### LABORATORIES

PASI-K Pace Analytical Services - Kansas City

# ANALYTE QUALIFIERS

- B Analyte was detected in the associated method blank.
- E Analyte concentration exceeded the calibration range. The reported result is estimated.
- H3 Sample was received or analysis requested beyond the recognized method holding time.
- M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR

Pace Project No.: 60312388

Analytical Lab ID **QC Batch Method** QC Batch Batch Sample ID **Analytical Method** 60310790002 S-BMW-1S EPA 200.7 601714 EPA 200.7 601738 60310790003 601714 S-BMW-3S EPA 200.7 EPA 200.7 601738 60312388001 S-TMW-1 EPA 200.7 604659 EPA 200.7 604692 S-TMW-2 604659 60312388002 EPA 200.7 EPA 200.7 604692 S-TMW-3 EPA 200.7 60312388003 EPA 200.7 604659 604692 S-UG-3 60312388004 EPA 200.7 604659 EPA 200.7 604692 S-SCL4A-FB-1 60312388005 EPA 200.7 604659 EPA 200.7 604692 60312388006 S-SCL4A-DUP-1 EPA 200.7 604659 EPA 200.7 604692 60310790002 S-BMW-1S SM 2320B 603364 60310790003 S-BMW-3S SM 2320B 603364 60312388001 S-TMW-1 SM 2320B 605187 60312388002 S-TMW-2 SM 2320B 605187 60312388003 S-TMW-3 SM 2320B 605187 60312388004 S-UG-3 SM 2320B 605187 60312388005 S-SCL4A-FB-1 SM 2320B 605187 60312388006 S-SCL4A-DUP-1 SM 2320B 605187 60310790002 S-BMW-1S SM 2540C 601524 60310790003 S-BMW-3S SM 2540C 601524 60312388001 S-TMW-1 SM 2540C 604897 60312388002 S-TMW-2 SM 2540C 604897 S-TMW-3 60312388003 SM 2540C 604897 60312388004 S-UG-3 SM 2540C 604897 60312388005 S-SCL4A-FB-1 SM 2540C 604897 60312388006 S-SCL4A-DUP-1 SM 2540C 604897 60310790002 S-BMW-1S EPA 300.0 603127 60310790003 S-BMW-3S EPA 300.0 603127 60312388001 S-TMW-1 EPA 300.0 606780 60312388002 S-TMW-2 EPA 300.0 606780 60312388003 S-TMW-3 EPA 300.0 606780 60312388004 S-UG-3 EPA 300.0 606780 606780 60312388005 S-SCL4A-FB-1 EPA 300.0 60312388006 S-SCL4A-DUP-1 EPA 300.0 606780

$\sim$		WO#:60312388
Pace Analytical Sample Condition	Upon Receipt	6031 <b>2366</b>
Client Name: <u>Crolder Associa</u>	ates	
Courier: FedEx UPS VIA Clay	PEX 🗆 ECI 🗆	Pace Xroads Client Other
	ace Shipping Label Used	
Custody Seal on Cooler/Box Present: Yes No D Packing Material: Bubble Wrap D Bubble Bags	Seals intact: Yes □ □	No $\square$ None $\square$ Other $\mathbb{Z}2P/C$
Thermometer Used: 1295 Type	of Ice Wet Blue Nor	ne
Cooler Temperature (°C): As-read 1.4,0.4, Corr. Fac	ctor 0. 7 Correct	red 1.2,0.2,4.1 Date and initials of person examining contents: VB 8/20/14
Temperature should be above freezing to 6°C	<u> </u>	
Chain of Custody present:	Ves DNo DN/A	
Chain of Custody relinquished:	Yes No N/A	
Samples arrived within holding time:	Yes No NA	
Short Hold Time analyses (<72hr):	□Yes ØNo □N/A	
Rush Turn Around Time requested:	□Yes No □N/A	
Sufficient volume:	Yes No N/A	
Correct containers used:		
Pace containers used:		
Containers intact:	Yes DNO DN/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	⊡yes □No ZN/A	
Filtered volume received for dissolved tests?	□Yes □No DN/A	ON COC MS/MSD For S-TMW-3
Sample labels match COC: Date / time / ID / analyses	Yes INO DN/A	15 Labeled as S-SCL4A MS/MSD
Samples contain multiple phases? Matrix: W+	□Yes □No □N/A	but sample 10 & Time match S-TMW-3
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) Cyanide water sample checks:		List sample IDs, volumes, lot #'s of preservative and the date/time added.
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 ØN/A	
Samples from USDA Regulated Area: State:	UYes DNo DN/A	
Additional labels attached to 5035A / TX1005 vials in the field	d? 🗆 Yes 🗆 No 🖉 N/A	
Client Notification/ Resolution: Copy COC		Field Data Required? Y / N
	/Time:	a
Comments/ Resolution:		
Janni Church		8/21/19
Project Manager Review:	Date	:

Raneokhaigtidatal

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Company: Gold Address: 1351 Bally																	ě.				
	Golder Associates	Report To: Mark Haddock (mhaddock@golder.com)	(Haddoc	ik (mhad	dock@go	der.com)		Attention:													
Ballt	13515 Barrett Parkway Drive, Ste 260	Copy To: Jeffr	Jeffrey Ingram	F				Company Name:	Name:						REGULA	REGULATORY AGENCY	GENCY			-	
	Ballwin, MO 63021							Address:							NPDES	ĒS	GROUN	GROUND WATER	ER	DRINKIN	DRINKING WATER
Email To: mad	maddock@golder.com	Purchase Order No.:						Pace Quot							UST		RCRA			OTHER	
Phone: 636-724-9191	Fax: 636-724-9323	Project Name:	Ameren	Ameren Sioux EC	C SCPA N&E	ßЕ		Pace Project	10	Jamie Church	f				Site Location	ation					
Requested Due Date/TAT:	Standard	Project Number: 153-1406.0003L	153-140	6.0003L	(COC #20)	(		Pace Profil	e# 9285	5					ST	STATE:	P ■				
													Requi	ested A	nalysis	Requested Analysis Filtered (Y/N)	(NIN)				
Section D Required Cl	Section D Valid Matrix Codes Required Client Information MATRIX CODE		(aw		COLLECTED	ED			Pre	Preservatives	ŷ	2 <b>↑</b> N / A	z z	ż	Jyi z						
Sample		N N N N N N N N N N N N N N N N N N N	ODED BARDEO) ERYT	COMPOSITE START		ENDGRAS	TEMP AT COLLECTION	SREINERS DUTAINERS		•ر 		ysis Test <b>ļ</b> *	ity		the second s			ıal Chlorine (Y/N)	0461 f <sup>4</sup>	2°CS	Streves ?
# MƏTI		XIЯTAM		DATE	TIME	DATE	AMPLE 3J9MA2	H OF CC	FONH FOS <sup>2</sup> H	HCI HOBN Degen	Ofher Methan Ma <sub>2</sub> S <sub>2</sub> C	lenA 🖡	Metalini Metalini	:nou:	Ferric I			nbisəЯ	Pace	Project !	Pace Project No./ Lab I.D.
3	S-TMW-1	ΨT	U	1	201	-		3 2	-				11		~	7240	1 8003	2	NEdg		00
23	S-TMW-2	TW	U	11	110			-	_	_			11		-	7			7		000
5	S-TMW-3	Ŵ	-		1010									_	A	Sme Brank	1 3 Bp2	020	3863	3	O NOS
4	S-UG-3	WT	U	1	lois		_	_								200	eg	20	1899	_	001
S	S-SCL4A-DUP-1	Μ	υ	1	1	-								-		202	2	10	1220		2010
61	S-SCL4A-FB-1	ΜŢ	U	-	205	_	_	_						-	-	1700	ŝ	30	500	2	000
	S-CULYA-NS S-BUNN-1S	ΓM	U	2	1010	2		_				-		-	-						
a3 5- 5cl	- Schum-MS& S-BMW 30-	ΜŢ	U	-	6 (À	_		-	-			-	1	-	-1		_	_			
v	/	W	U				_	ł		1	1		-	_	-		_	-			
10		ΨŢ	G										H	H	#	1		-			
11		Ψ	U	1	1		-						_				-	1	9		
12		WT	U		-	$\mid$	1			_				-	1		_	-			
	ADDITIONAL COMMENTS	REI	HSINDNE	ED BY / AF	RELINQUISHED BY / AFFILIATION		DATE	TIME	Ш	-	ACREPTI	CEEPTED BY / AFFILIATION	AFFILIA	NOL	a	DATE	TIME		SAMP	SAMPLE CONDITIONS	SNOI
EPA 200 7: Ba, Li, EPA 200 8: As	-EPA 200.7: Ba, Li, Mos fe, Mg, Mn, K, Na +EPA 200.8: As	HAZ.	Å	ha / c	-2100	5 8	14/14	134	2	N.	2	5			نعن	8:19-6	13:5	9			
		F	9	-1		ŝ	P.P.	13:51	N.	at a	R	9	E.	20	Rec 8	201902	ह	2.1	>	>	7
															_			4.1	-	•	-
				5	AMPLER	SAMPLER NAME AND SIGNATURE	IGNATU	ЗE	R								1	O.		Jeloo	
				1	PRI	PRINT Name of SAMPLER:	SAMPLER	LL LL	A R	T.	r s							ui qm	pevie: I/Y) e	(N/N) O pa O pa	(N/X) səld
					SIG	SIGNATURE of SAMPLER:	SAMPLEF		2	5			DATE	DATE Signed	211	1411	5	ıөТ		Seal C	me2



Sample Condition Upon Receipt

# WO#:60310790

Client Name: Golder		
Courier: FedEx 🗆 UPS 🗆 VIA 🗆 Clay 🗆	PEX 🗆 🛛 ECI 🗆	Pace 🗆 Xroads 🗖 Client 🗆 Other 🗇
Tracking #: Pac	e Shipping Label Used	j? Yes □ No
Custody Seal on Cooler/Box Present: Yes No D	Seals intact: Yes	No 🗆
Packing Material: Bubble Wrap D Bubble Bags	Foam	None  Other
Thermometer Used: <u>K-294</u> Type of	fice: Wet Blue Nor	ne
Cooler Temperature (°C): As-read <u>2,6, 2,0</u> Corr. Fact	corCorrect	Date and initials of person examining contents: (3)71
Temperature should be above freezing to 6°C		
Chain of Custody present:	Ves 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):	DYes No DN/A	
Rush Turn Around Time requested:		
	ZYes No N/A	
Sufficient volume:		-
Correct containers used:	ZYes □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 ØN/A	No volume for analysis
Sample labels match COC: Date / time / ID / analyses	N/A	total showhows.
Samples contain multiple phases? Matrix:	DYes No DN/A	4 - 1
Containers requiring pH preservation in compliance?	Yes No N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
(HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide)	Ł	
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) 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):		
Samples from USDA Regulated Area: State:	DYes DNO DNA	
Additional labels attached to 5035A / TX1005 vials in the field	? DYes DNO DNA	
Client Notification/ Resolution: Copy COC	to Client? Y 🖉 N	Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution:		
Janui Chush		
Project Manager Review:	Dat	e

	tical	305 COTI
	Analy	www.pace/abs com
C	Pace	
	2	

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required C	lient Information:	Section B Required Project Information:	Section C Invoice Information:	Page: of
Company:	Golder Associates	Report To: Jeffrey Ingram	Atlention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To: Ryan Feldmann/Eric Schneider	Company Name:	REGULATORY AGENCY
	Ballwin, MO 63021		Address:	NPDES GROUND WATER DRINKING WATER
Email To:	jeffrey ingram@golder.com	Purchase Order No.:	Pace Quote Reference:	UST RCRA OTHER
Phone:	636-724-9191 Fax: 636-724-9323 F	Project Name: Ameren Sioux Energy Center	Pace Project Jamie Church Manager:	Site Location MC UIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
Reques	Requested Due Date/TAT: Standard	Project Number: 153-1406-01.0003B (COC#6)	Pace Profile # 9285	STATE: WO
			Requ	Requested Analysis Filtered (Y/N)
	ō	(Mel o	Preservatives	
	DRINKING WATER WASTER WASTE WATER WASTE WATER PRODUCT SOLLSOUD OIL	WW WW WW WW WW WW WW WW CCOONPOSITE STARE CCOONPOSITE COMPOSITE CO	t S DIFECTION	(N/A) =
# W3	SAMPLE ID (A:Z. 0-9/) Sample IDs MUST BE UNIQUE	ATRIX CODE (s	MPLE TEMP AT Co OF CONTRINERS OF CONTRINERS AO3 SOA S2S_03 S0A AO3 S2S_03 S2S_03 S2S_03 S3S_203 S3S_03 S3	SS esidual Chlorine esidual Chlorine
ш -	S-I MW-1S	B DATE TIME DATE	W     -       1     -       0     -       W     -       N     -       N     -       H <td>A = A     A</td>	A = A     A
· ·	S-LMW-2S			
	S-LMW-3S	-		
4	S-LMW-4S	WT G		
6	S-LWM-5S	WT G		
9	S-LWM-6S	WT G		
2	S-LMW-7S	WT G		
••	S-LMW-8S	WT G		
đ	S-LMW-9S	WT G		
10	S-BMW-1S	WT G Q////1 [455		1 TSP3NI
1	S-BMW-3S			2003
7	S-LMW-DUP-1			DATE SAMPLE CONDITIONS
	ADDITIONAL COMMENTS	2	ALC LIAF	
	100°, 10°, 10°, 10°, 10°, 10°, 10°, 10°,	112 March 100mac	0/2/11 10>>> 14/2/2 /0200	Charles 2250 2:0 / (
		SAMPLER NAME AND SIGNATURE	ID SIGNATURE	Intact (V/V) (V/V) (V/V)
		PRINT Name o	PRINT Name of SAMPLER: KYAN PEICIMANN	roder (
		SIGNATURE	SIGNATURE of SAMPLER: DATE MAND	e) Isu) Isu)

Pace Analytical Sample Condition L	Jpon Receipt	WO#:60310790
Client Name: Golder Assoc.		
Courier: FedEx 🗆 UPS 🗆 VIA 🗆 Clay 🗆	PEX 🗆 🛛 ECI 🗆	Pace 🗆 Xroads Client 🗆 Other 🗆
	ce Shipping Label Use	
Custody Seal on Cooler/Box Present: Yes 🗴 No 🗆	Seals intact: Yes	
Packing Material: Bubble Wrap  Bubble Bags  Bubble Bags		None Other Cp/C
	f Ice: Wet Blue No	Data and initials of namen
Cooler Temperature (°C): As-read <u>C.A</u> Corr. Fact	tor <u> </u>	ted $0.2$ Date and initials of person examining contents: $8.9.19$ $1.9$
Temperature should be above freezing to 6°C 0. 6 1000.	. /	0.6,1.0,0.3
Chain of Custody present:		
Chain of Custody relinquished:	Yes No N/A	
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):		
Rush Turn Around Time requested:	□Yes No □N/A	
Sufficient volume:	Yes No N/A	
Correct containers used:		
Pace containers used:	Yes No N/A	
Containers intact:		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?		
Filtered volume received for dissolved tests?		
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix: WT Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	1	List sample IDs, volumes, lot #'s of preservative and the aate/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):		
Samples from USDA Regulated Area: State:	□Yes □No ANA	
Additional labels attached to 5035A / TX1005 vials in the field	? 🛛 Yes 🗆 No 🕅 🕅 /A	
Client Notification/ Resolution: Copy COC t		Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution:		
Project Manager Review:	Dat	e: 8/8/19

10	E
utical	o sabie
Analy	www.pacelabs.com
CPAD	2
( Ja	ŝ
٩	1
	-

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

ction A       Section B         adired Clerit Information:       Report To: Jeffrey Information:       Section C       Section C         mpany:       Golder Associates       Report To: Jeffrey Information:       Invoice Information:       Invoice Information:         mpany:       Golder Associates       Report To: Jeffrey Ingram       Name       Attention:         mpany:       Golder Associates       Report To: Jeffrey Ingram       Attention:         dress:       13515 Barrett Parkway Drive, Ste 260       Copy To: Ryan Feldmann/Eric Schneider       Company Name:         dress:       Ballwin, MO 63021       NPES       ReCULATORY AGENCY       NPES         all To:       jeffrey Ingram@golder.com       Purchase Order No.:       Reference       UST       RCRA       OTHER         one:       636-724-9323       Project Name:       Aneren Sloux Energy Center       Manage:       Jamie Church       State:       OTHER         one:       636-724-9323       Project Name:       153-1406-01 00038 (COC#6)       Pace Project       Jamie Church       State:       MO					
Report To: Jeffrey Ingram     Attention:       e, Ste 260     Copy To: Ryan Feldmann/Eric Schneider     Company Name:       REGULATORY AC     Company Name:     REGULATORY AC       Purchase Order No.:     Project Name:     NPDES       9323     Project Name:     Jamie Church     Site Location       Project Number:     T53-1406-01 00038 (COC#6)     Pace Profile # 9285     S17AE:	Section A Required Client Information:		Section B Required Project Information:	Section C Invoice Information:	of
13515 Barrett Parkway Drive, Ste 260     Copy To: Ryan Feldmann/Eric Schneider     Company Name:     REGULATORY AG       Ballwin, MO 63021     Address:     Address:     NPDES       Jeffrey Ingram@golder.com     Parce auote     Parce ouote     NPDES       5-724-9191     Fax: 636-724-9323     Project Name:     Ameren Sloux Energy Center     Parce Prodied       Wanager:     Vanager:     Ameren Sloux Energy Center     Parce Prodied     Site Location	mpany: Golder Assou		Report To: Jeffrey Ingram	Attention:	
Ballwin, MO 63021     Address:     Address:     NPDES       jeffrey ingram@golder.com     Pare oute     Pare oute     NPDES       5-724-9191     Fax: 636-724-9323     Project Name: Ameren Sioux Energy Center     Pare Project Jamie Church     Ste Location       ue DaterTAT:     standard     Project Number: 153-1406-01.0003B (COC#6)     Pare Project Sioux     Stat		tt Parkway Drive, Ste 260	Copy To: Ryan Feldmann/Eric Schneider	Company Name:	REGULATORY AGENCY
jeffrey         ingram@golder.com         Purchase Order No.:         Pase Oucle         Descence         UST         RCRA           5-724-9191         Fax: 636-724-9323         Project Name:         Ameren Sioux Energy Center         Pase Project         Jamie Church         Site Location         MO           ue DateFTAT:         Standard         Project Number: 153-1406-01 00038 (COC#6)         Pase Project         Jamie Church         Site Location         MO	Ballwin, MO	63021		Address:	V
Fax: 636-724-9323         Project Name:         Ameren Sioux Energy Center         Pace Project Jamie Church         Stell           standard         Project Number:         153-1406-01.0003B (COC#6)         Pace Profile #: 9285         9285	all To: jeffrey ingrai	m@golder.com	Purchase Order No.:	Pace Quote Reference	RCRA
Standard Project Number: 153-1406-01 0003B (COC#6) Pace Profile #: 9285	one: 636-724-9191		Project Name: Ameren Sioux Energy Center	Pace Project Jamie Church Manager:	Site Location
	quested Due Date/TAT:	Standard	Project Number: 153-1406-01 0003B (COC#6)	Pace Profile # 9285	STATE: MO

Reques	Requested Due Date/IAT: Standard	Project Number: 153-1406-01	oer: 153	-1406-01	0003B (COC#6)	COC#6)		Pace Profile #	100 10	9285					STATE:	, E						
												4	sedues	ted Ani	Requested Analysis Filtered (Y/N)	Itered (	(N/A					
	× ×	J J	-		COLL	COLLECTED			ЪЧ	Preservatives	es	Z ♦ N /A	z z	z z								
	DRINKING WATER WATER WASTE WATER PRODUCT SOILSOLID OIL	WT W J	-GEAB C=C	COMPOSI START	START	COMPOSITE END/GRAB						ţ,	e/Sulfate									
	SAMPLE IU W (A.Z. 0-9./) A Sample IDs MUST BE UNIQUE	2400					TA 9M3	АЗИІАТИ	Dav			sis Tes	/Fluorid	and the second second					9	064012	OK	
# WƏLI		VIGTAN	XIATAM T 3J9MA2	DATE	TIME	DATE	T 3J9MA2	# OE CO	HNO <sup>3</sup> H <sup>5</sup> 2O <sup>4</sup> Oublese	N®OH HCI	Nethano Methano Other	<b>y Isnaly:</b> Metals*		(tinils)lA A <mark>9 IstoT</mark>				leubisəЯ	Pacel	Pace Project No./ Lab I.D.	o./ Lab I.	
1	S-LMW-1S	×	WT G	2														1				Ι
2	S-LMW-2S	×	WT G	-		8/0/A	1030	3	1 2				1		12.P.2	20.0	844	AP2			30	
e	S-TMWV-3S	×	WT G	_		8/5/R	0201		1 2				1	1		1	1.1	-			8	
4	S-LMW-4S	×	WT G	-		/19	1450	32	( 1				11	1	2		7	7			8	0
S	S-LWM-5S	5	MT G	-		5	1030	90	5			$\mathbf{X}$	11	N	AD	2. 0	B BYN	136	C1242		8	
9	S-LWM-6S	×	WT G	-		815/17	1135	33	A 1				11	10	2 PD (	21	Ptv	K.P.	202		EU EU	
7	S-LMW-7S	×	WT G			815/17	5521	5	2 1				11	1	-	1	1.1.				8	
8	S-LMWV-8S	>	WT G		_	8/6/9	69255	3	5				11	1	N		)	7	>		DID.	
m	S-TMW-9S	×	WT G		-		t		1				-		1			T			e R	
10	S-BMW-1S	×	WT G		_			1														
11	S-BMW-3S	Š	WT G		1											$\left  \right $	1					
12	S-LMW-DUP-1	>	WT G		1	8/5/19	1	3	2 1			>	11	1	6 4 4	C B	SPEND,	BR	30		0)	
1	ADDITIONAL COMMENTS	0	NUM	RELINQUISHED BY I	AFFILIATION	NOL	DATE	TIME	ų.		ACCEPTED BY / AFFILIATION	BY / AFI	FILIATIO	2	DATE	-	TIME		SAMPL	SAMPLE CONDITIONS	SNC	
*EPA 2(	'EPA 200,7: B, Ca, Fe, Mg, Mn, K, Na	Z	R	La 1	Golde	ler	8/6/19	1	200	IN	Hr.	1	165		8.0.1	190,	Troco	10.0	1	7		
	2									5	-7					_	0	9.0				
																	/	0	1	_		
								_	_								2	MC	5		12	/
					SAMPLE	SAMPLER NAME AND SIGNATURE	ID SIGNATU	R					5					о.		oler V	Joen	
						PRINT Name	PRINT Name of SAMPLER:	جمي سا ٢	SS S	Suc.	allor							ui du	bevie //Y) e	(N/A) og po ipojsr	n selo N/Y)	4.4.1
						SIGNATURE	SIGNATURE of SAMPLER:	J.		5	0		DATE Signed	bed Size	16/19	æ		neT		ees!	រុ៣ធខ	
								h	ł	1	Y		A Long and and the local dist	1	-				1	-	;	1

Pace Analytical

1

CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately,

Company:     Colder Associates     Report Ter: Jeffrey Ingram     Attention:       Address:     13515 Barrett Parkway Drive, Ste 260     Copy To: Ryan Feldmann/Eric Schneider     Company Name:       Address:     13515 Barrett Parkway Drive, Ste 260     Copy To: Ryan Feldmann/Eric Schneider     Company Name:       Ballwin, MO 63021     Mo 63021     NPDES     GROUND WATER     DRINKING WATER       Email To:     Jeffrey Ingram@golder.com     Purchase Order No.:     Ree Quote     UST     RCRA     OTHER       Phone:     636-724-9191     Fax: 656-724-9323     Project Name:     America     Jamie Church     Site Location     MO       Requested Due Date/TAT:     Standard     Project Number:     153-1406-01.0003B (COC #6)     Pase Project     Site Location     MO	Section A Required Client Information:	formation:	Section B Required Project Information:	Section C Invoice Information:	Page: Z	ol
Test Parkway Drive, Ste 260     Copy Tor:     Ryan Feldmann/Eric Schneider     Company Name:     REGULATORY AGENCY       D 63021     D 63021     NPDES     GROUND WATER       D 63021     Address:     NPDES     GROUND WATER       D 63021     Purchase Order No.:     Pare Project     Pare Project     UST     RCRA       I Fax     636-724-9323     Project Name:     Ameren Sioux Energy Center     Pare Project     Modelst.       I Fax     636-724-9323     Project Name:     Ameren Sioux Energy Center     Pare Project     Modelst.       I Fax     636-724-9323     Project Number:     153-1406-01.0003B (COC #6)     Pace Project     Ste Location     MO       I Fax     Standard     Project Number:     153-1406-01.0003B (COC #6)     Pace Project     Standard     MO	ny: G		Report To: Jeffrey Ingram	Attention:		
D 63021 Address: Address: NPDES GROUND WATER Tam@golder.com Purchase Order No: Face Quote UST RCRA Tam@golder.com Purchase Order No: Revenue Tam@golder.com Purchase Order No: Revenue Tamager Tamag		3515 Barrett Parkway Drive, Ste 260	Copy To: Ryan Feldmann/Eric Schneider	Company Name:	REGULATORY AGENCY	
Purchase Order No.:     Pace Quote     UST     RCRA       9323     Project Name:     Ameren Sioux Energy Center     Prese Project     Jamie Church     Site Location       Project Number:     153-1406-01.0003B (COC #6)     Prese Profile #, 9285     9285     MO	ĕ	allwin, MO 63021		Address:	GROUND WATER	DRINKING WATER
Fax 636-724-9323         Project Name:         Ameren Sioux Energy Center         Pace Project Nuch         Site Location           standard         Project Number:         153-1406-01.0003B (COC #6)         Pace Profile #         9285         STATE:		frey ingram@golder.com	Purchase Order No.:	Pace Quote Reference	RCRA	OTHER
Standard Project Number: 153-1406-01.0003B (COC #6) Pace Prome # 9285 STATE: Requested Analysis Filtered (YIN	636-72		Project Name: Ameren Sioux Energy Center	Pace Project Jamie Church Manager,		
Requested Analysis Filtered (YIN) V////////////////////////////////////	sted Due D		Project Number: 153-1406-01.0003B (COC #6)	Pace Profile # 9285	ļ,	
				Reques	ted Analysis Filtered (YIN)	

																Re	Requested Analysis Filtered (Y/N)	ed Ar	alysi	IS Filt	ered	(NIX)							
	Section D Valid Ma Required Client Information MATRIX	Valid Matrix Codes MATRIX CODE		(awc		COLLE	COLLECTED				Ē.	resen	Preservatives	5	1 N /A	z	z z	z	z										
	WATER V WATER V PRODUCT S PRODUCT S OULSOUD S	WATER DW ATER WT D SL OL	see valid codes	))=) 8499=	COMPOSITE START	E L	COMPOSITE END/GRAB								ţ.		e)Billio							(N/A)					
# MƏTI	SAMPLE ID (A.Z.091.) Sample IDS MUST BE UNIQUE	AR 75 15			DATE	MH MH	DATE	E E E E E E E E E E E E E E E E E E E	AMPLE TEMP AT C	Unpreserved Upreserved	<sup>₽</sup> OS <sup>z</sup> H	HCI HNO <sup>3</sup>	N <sup>g</sup> O <sub>s</sub> O <sub>s</sub> O <sub>s</sub> O	Ofher Methanol	teaT sisylsnA	*slstelv	rDS Chloride/Fluorid	Alkalinity	rotal Phosphoru					Presidual Chlorine		UU310700	CT NOT		C
-	S-LMW-DUP-2		M	U			8/0/19	1	3	0	Ĺ								0	100	2	200	S	イ	120			210	
2	S-LMW-FB-1		ΜŢ	U	/		8/5/19	1408	10.3	3 2	É				-	1	>			-	-	-	Ê	1	-			10	-
ю	S-LMW-FB-2		۲.	U			8/6/19	2180		3 2					1	1	1	1		1			~		1			0	5
4			۲V	0		1			_			_				_				)			_	_	)				
S			۲.	U	/		6	/																					
9			M	U	_				+	+																			
7			Ţ	U	/								+	7															
80			Y	U					_			_			F	1													
σ			ž	U											1		1	1											
10			ħ	U		_			-	_					9	_			1	1	-					_			
11			۲.	U		-				_					19		_				H	1							Ì
12			M	U		/			_						1	_			_				1	1					
1 - 2	ADDITIONAL COMMENTS	5	RELIN	IQUISH	RELINQUISHED BY I A	AFFILIATION	NC	DATE		TIME			AC	ACCEPTED BY / AFFILIATION	ED BY	AFFIL	ATION	-		DATE		TIME	10		SAM	SAMPLE CONDITIONS	NDITION	ß	
EPA 20	EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	2x	1		R	(50)	loler	8/9/1	19	(700	0			17	2	2	145	1	Ċ0	8.J.19	$\sim$	Sec	(A)	0.		-	7	5	
		2									1			5	-				-				0.0	Q		-			
											-												0-1	0	11			-	
									_														0.1	3	2			2	
						SAMPLE	R NAME A	SAMPLER NAME AND SIGNATURE	URE				1	2	1					10			э.	2	() uo		-	last	
						"	RINT Nam	PRINT Name of SAMPLER:	ä	Luc	JCGS	<b>V</b>	0,00	er c									u du	ui di	bevie AYY) e	poter oO be	(N/X	시/시) 비 \$9 (	(N/1
						57	SIGNATUR	SIGNATURE of SAMPLER:	ER:	6	V	11		0		DAT	DATE Signed	pa	10	1.10	۵		neT		ioeମ ioe			) dwe	)
									8	1	V	X	1	X		W	Man			5	•		-	1				s	



Sample Condition Upon Receipt

# W0#:60310790 60310790

Client Name: Golder		
Courier: FedEx 🗆 UPS 🗆 VIA 🗆 Clay 🗆	PEX 🗆 ECI 🗆	Pace 🗆 Xroads 🖉 Client 🗆 Other 🗆
Tracking #: Pa	ce Shipping Label Use	d? Yes □ No 🗖
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	No 🗆
Packing Material: Bubble Wrap  Bubble Bags	1	None  Other
Thermometer Used: <u>1-294</u> Type of	of Ice: Wet Blue No	Date and initials of person
Cooler Temperature (°C): As-read <u>2,2</u> Corr. Fac	tor <u>ノン</u> Correct	examining contents: 51/01/9
Temperature should be above freezing to 6°C	/	
Chain of Custody present:	Yes No N/A	
Chain of Custody relinquished:		
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):	Yes No N/A	
Rush Turn Around Time requested:	DYes No DN/A	
Sufficient volume:	Hes 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 ANA	
Filtered volume received for dissolved tests?		
Sample labels match COC: Date / time / ID / analyses	Yes No N/A	
Samples contain multiple phases? Matrix:		
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide)		List sample IDs, volumes, lot #'s of preservative and the date/time added.
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) 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 DN/A	
Headspace in VOA vials ( >6mm):	Yes No DN/A	
Samples from USDA Regulated Area: State:	TYes No DN/A	
Additional labels attached to 5035A / TX1005 vials in the field	? 🛛 Yes 🗆 No 🗍 N/A	
Client Notification/ Resolution: Copy COC 1	to Client? Y // N	Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution:		
Janni Churh		8/13/19
Janus Course	2	

Project Manager Review:

C

5

Date:

# CHAIN-OF-CUSTODY / Analytical Request Document

of		ZU13245		GROUND WATER   DRINKING WATER	C OTHER		A short if		Hard and	(N/A) (	Parallal Chlorine	10										SAMPLE CONDITIONS		
Page:			REGULATORY AGENCY	F NPDES N GROUNI	F UST F RCRA	Site Location	STATE:	Requested Analysis Filtered (Y/N)				NECT. ROSE	P						/	/		DATE TIME	Ł 8 9/9 1311	A
on c	Invoice Information:	out	Company Name:	28:	uote tce:	meet Jamie Church	Pace Profile #: 0725	-	Preservatives	oft 2/ap	H <sub>2</sub> SO <sub>4</sub> H <sub>2</sub> SO <sub>4</sub> HO <sub>3</sub> HOO3 HaOH Nethanol Diher Metals Test Metals * Metals * Metals * Metals * Metals *				/							TIME A CEPTED BY AFFILATION	ISI'U UHSUDA TOUS	1 + 1 - 1 - 1 - 1
Section C	Invoio		Elic Schneider Comp	Address	Pace Quote Reference:	Energy Center	CO3R		COLLECTED		H H H H OF CONTAINER A M P H OF CONTAINER	18/9/9 0935										DATE	Gorder 8/9/19	01-1-
Section B	Required Project Information:	Report To: Jeffrey Ingraum	Ryan Feldmann /	· · · · · · · · · · · · · · · · · · ·	Purchase Order No.:	Project Name: A Mercen Sion	Project Number: 152-14/201 D		(dW	2 C P W W T W T W W T See valid codes to GORPE C=CC START ST	) ADDS XIATAM	┢					×					RELINQUISHED BY AFFILIATION	12 Nach	· INI A WIN
Section A Section A	kient Information:		Address: 13515 Britett Parkney N. Ste 200 To:	Ralling MD (2021	Teffrey-ingramlegoberzon	3323	Requested Due Date/TAT: Stondard Project		Section D Matrix Codes Required Client Information MATRIX / CODE	Drinking Water Water Waste Water Product Soil/Solid		1 S-LMW-95	2	3	4	5	2	8	6	10	11	ADDITIONAL COMMENTS	*EPA 200.7. Man. B. Ca. Fe. Ma. 2	

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 involces not paid within 30 days.

Samples Intact (V/Y)

Custody Sealed Cooler (Y/N)

Received on Ice (Y/N)

O° ni qmeT

5

σ 8

DATE Signed (MM/DD/YY):

9 Q

ł

<

NING

UCQS

SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: SIGNATURE of SAMPLER:

ORIGINAL

Page 32 of 32

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



# **MEMORANDUM**

Project No. 1531406

DATE October 17, 2019

- TO Project File Golder Associates
- CC Amanda Derhake, Jeff Ingram
- **FROM** Tommy Goodwin

# EMAIL Tommy\_Goodwin@golder.com

# DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER - SCL4A - DATA PACKAGE 60312388A

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

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When a compound was detected in a blank (i.e. method, field), and the blank comparison criterion was not met, associated sample results were qualified as estimates (J) or non-detects (U).
- When a duplicate comparison criterion was not met, associated sample detections were qualified as estimates (J).
- When MS/MSD recovery exceeded the QC limits, the associated sample result was qualified as an estimate (J).
- When an analyte was analyzed outside of EPA hold time, associated detections were qualified as estimates (J).

# **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

Compa	ny Name: Golder Associates	Project Manager: J Ingram					
	Name: Ameren - Sioux - SCL4A	_		ect Numbe			
Review	er: T Goodwin		Vali	dation Date	10/17/2019		
	ory: <u>Pace Analytical - KS</u> al Method (type and no.): EPA 200.7 (Metals); SM 232			G #: 6031238			
	al Method (type and no.): <u>EPA 200.7 (Metals); SM 232</u> Air Soil/Sed. <b>W</b> ater Waste		<i>)</i> , 31vi 2340	JO (100), LF	A 300.0 (Allions)		
	Names S-TMW-1, S-TMW-2, S-TMW-3, S-UG-3, S-SCL4		S-SCL4A	-DUP-1, S-BI	MW-1S, S-BMW-3S		
-							
NOTE:	Please provide calculation in Comment areas or	on the	back (if	on the bac	k please indicate in comment areas).		
Field In	formation	YES	NO	NA	COMMENTS		
a)	Sampling dates noted?	×			8/1-8/4/2019		
b)	Sampling team indicated?	×					
c)	Sample location noted?	×					
d)	Sample depth indicated (Soils)?			×			
e)	Sample type indicated (grad)composite)?	×					
f)	Field QC noted?	x					
g)	Field parameters collected (note types)?	×			pH, Sp.Cond, ORP, Temp, DO, Turb		
h)	Field Calibration within control limits?	×					
i)	Notations of unacceptable field conditions/performa	ances fr	om field l	ogs or field	notes?		
			×				
j)	Does the laboratory narrative indicate deficiencies?	, 🗆		×			
	Note Deficiencies:						
Chain-	of-Custody (COC)	YES	NO	NA	COMMENTS		
a)	Was the COC properly completed?	×					
b)	Was the COC signed by both field		_	_			
	and laboratory personnel?	x			· · · · · · · · · · · · · · · · · · ·		
c)	Were samples received in good condition?	x					
Genera	Il (reference QAPP or Method)	YES	NO	NA	COMMENTS		
a)	Were hold times met for sample pretreatment?	×					
b)	Were hold times met for sample analysis?		×		See Notes		
c)	Were the correct preservatives used?	×					
d)	Was the correct method used?	x					
e)	Were appropriate reporting limits achieved?	×					
f)	Were any sample dilutions noted?	×			See Notes		
g)	Were any matrix problems noted?		×				

# **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

Blanks		YES	NO	NA	COMMENTS
a)	Were analytes detected in the method blank(s)?	×			See Notes
b)	Were analytes detected in the field blank(s)?	x			See Notes
c)	Were analytes detected in the equipment blank(s)?			×	
d)	Were analytes detected in the trip blank(s)?			×	
Labora	tory 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?	×			
Duplica	ates	YES	NO	NA	COMMENTS
a)	Were field duplicates collected (note original and du	uplicate	e sample na	ames)?	DUP-1 @ S-TMW-2
		×			FB-1 @ S-UG-3
b)	Were field dup. precision criteria met (note RPD)?		×		See Notes
c)	Were lab duplicates analyzed (note original and du	plicate	samples)?		
		×			-88003: Alk, TDS
d)	Were lab dup. precision criteria met (note RPD)?	×			See Notes
Blind S	Standards	YES	NO	NA	COMMENTS
a)	Was a blind standard used (indicate name,		×		COMMENTS
a)	analytes included and concentrations)?		Ē		
b)	Was the %D within control limits?			×	
Matrix	Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	
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?		x		See Notes
	Recovery could not be calculated since sample contained high concentration of analyte?			×	
c)	Were MS/MSD precision criteria met?	×			

# Comments/Notes:

MB: -90002-03: B (11.8),		
FB-1: Ca (58.2), TDS (17.0), CI (0.46)		
MS/MSD: -80003: Ca (MSH,MSDL2),		
Hold Time: -80001-6: TDS, Alk		
DUP-1: TDS (75)		
Max Lab Duplicate RPD: 2% (Limit: 10%)		
Dilution: Chloride and Sulfate were diluted in se	everal samples; no qualification is necessary.	

# **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

# Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-TMW-1	Alkalinity (Alk)	-	J	Analyzed Outside of EPA Hold Time
"	Total Dissolved Solids (TDS)	-	J	n
S-TMW-2	Alk	-	J	п
TI	TDS	-	J	Field Duplicate (FD) and Hold Time Exceeded Limits; Result > PQ
S-TMW-3	Alk	-	J	Analyzed Outside of EPA Hold Time
"	TDS	-	J	n
**	Calcium (Ca)	-	J	MS/MSD Exceeded Calibration Range
S-UG-3	Alk	-	J	Analyzed Outside of EPA Hold Time
Ŧ	TDS	_	J	H
S-SCL4A-FB-1	TDS	-	J	11
'S-SCL4A-DUP-1	Alk	-	J	п
11	TDS	-	J	FD and Hold Time Exceeded Limits; Result > PQ
S-BMW-1S	Boron (B)	100	U	Analyte Detected in Method Blank (MB); PQL>Result>MD
S-BMW-3S	11	100	U	U
		<		
		$\overline{}$		
2				
			-	
			1	
			+	
	111	/		10/17/2010
Signature:	an 11 food 1			Date: 10/17/2019



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

October 21, 2019

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

RE: Project: AMEREN SIOUX ENERGY CTR SCL4A Pace Project No.: 60317030

Dear Jeffrey Ingram:

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

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

Sincerely,

Jami Church

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

Enclosures

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





# CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

# **Kansas Certification IDs**

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



# SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60317030001	S-UG3	Water	10/02/19 11:22	10/04/19 02:55
60317030002	S-SCL4A-DUP-1	Water	10/02/19 11:22	10/04/19 02:55
60317030003	S-TMW-2	Water	10/02/19 09:45	10/04/19 02:55
60317030004	SCL4A-FB-1	Water	10/02/19 09:55	10/04/19 02:55



# SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60317030001	S-UG3	EPA 200.7	LRS	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	1	PASI-K
60317030002	S-SCL4A-DUP-1	EPA 200.7	LRS	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	1	PASI-K
60317030003	S-TMW-2	SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	1	PASI-K
60317030004	SCL4A-FB-1	EPA 200.7	LRS	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	2	PASI-K



# Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Sample: S-UG3	Lab ID:	Lab ID: 60317030001		Collected: 10/02/19 11:22			/04/19 02:55 Ma	latrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	aration Meth	od: EP	A 200.7			
Boron	1120	ug/L	100	10.7	1	10/11/19 14:00	10/14/19 15:07	7440-42-8	
Calcium	163000	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 15:07	7440-70-2	
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	724	mg/L	10.0	10.0	1		10/08/19 15:20		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	81.2	mg/L	5.0	1.1	5		10/15/19 19:44	16887-00-6	



# Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Sample: S-SCL4A-DUP-1	Lab ID: (	Lab ID: 60317030002		Collected: 10/02/19 11:22			/04/19 02:55 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical M	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	1080	ug/L	100	10.7	1	10/11/19 14:00	10/14/19 15:09	7440-42-8	
Calcium	156000	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 15:09	7440-70-2	
2540C Total Dissolved Solids	Analytical M	Method: SM 25	40C						
Total Dissolved Solids	757	mg/L	10.0	10.0	1		10/08/19 15:20		
300.0 IC Anions 28 Days	Analytical M	Method: EPA 3	00.0						
Chloride	77.6	mg/L	10.0	2.2	10		10/16/19 11:36	16887-00-6	



# Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

No ·	60317030	

Sample: S-TMW-2	Lab ID:	Lab ID: 60317030003		Collected: 10/02/19 09:45			/04/19 02:55 Ma	latrix: Water		
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual	
2540C Total Dissolved Solids Analytical Method: SM 2540C										
Total Dissolved Solids	512	mg/L	10.0	10.0	1		10/08/19 15:20			
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0									
Sulfate	75.6	mg/L	10.0	2.3	10		10/16/19 11:53	14808-79-8		



# Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Sample: SCL4A-FB-1	Lab ID: 60317030004		Collecte	d: 10/02/19	09:55	Received: 10/			
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	aration Meth	od: EP	A 200.7			
Boron	<10.7	ug/L	100	10.7	1	10/11/19 14:00	10/14/19 15:17	7440-42-8	
Calcium	<50.0	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 15:17	7440-70-2	
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		10/08/19 15:20		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	<0.22	mg/L	1.0	0.22	1		10/17/19 14:43	16887-00-6	
Sulfate	<0.23	mg/L	1.0	0.23	1		10/17/19 14:43	14808-79-8	



Project: AMERE Pace Project No.: 6031703		NERGY CTR SC	CL4A									
QC Batch: 615188	3		Analy	Analysis Method:		EPA 200.7						
QC Batch Method: EPA 20	00.7		Analy	/sis Descrip	ption:	200.7 Metals	s, Total					
Associated Lab Samples:	603170300	01, 6031703000	2, 6031703	0004								
METHOD BLANK: 2511571				Matrix: Wa	ater							
Associated Lab Samples:	603170300	01, 6031703000	2, 6031703	0004								
			Blar	nk l	Reporting							
Parameter		Units	Res	ult	Limit	MDL		Analyzed		Qualifiers		
Boron		ug/L		<10.7	10	0	10.7	10/14/19 14:4	47			
Calcium		ug/L		<50.0	20	0	50.0	10/14/19 14:4	47			
LABORATORY CONTROL S	AMPLE:	2511572	Spike	LC	S	LCS	%	Rec				
Parameter		Units	Conc.	Res	sult	% Rec	Lir	nits C	Qualifiers			
Boron		ug/L	100	0	988	99		85-115		_		
Calcium		ug/L	1000	0	10100	101		85-115				
MATRIX SPIKE & MATRIX S	PIKE DUPI	_ICATE: 2511	573		2511574							
			MS	MSD								
Parameter	Units	60317027001 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	244	1000	1000	1250	1220	10	1 98	70-130	2	20	
Calcium	ug/L	166000	10000	10000	176000	176000	99	9 92	70-130	0	20	
MATRIX SPIKE SAMPLE:		2511575										
			60317	068001	Spike	MS		MS	% Rec			
Parameter		Units	Re	sult	Conc.	Result		% Rec	Limits		Qualif	iers
Boron		ug/L		218	1000	12	210	99	70	-130		
Calcium		ug/L		138000	10000	1450	000	69	70	-130 M	1	

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.



Project: AMEREN SIOUX Pace Project No.: 60317030	ENERGY CTR S	CL4A						
QC Batch: 614091	614091		Analysis Method: Analysis Description:		SM 2540C 2540C Total Dissolved Solids			
QC Batch Method: SM 2540C		Analysis De						
Associated Lab Samples: 6031703	0001, 603170300	02, 60317030003,	60317030004					
METHOD BLANK: 2507725		Matrix	Matrix: Water					
Associated Lab Samples: 6031703	0001, 6031703000	02, 60317030003,						
Parameter	Units	Blank Result	Reporting Limit	MDL	Analy	zed Qualifier	rs	
Total Dissolved Solids	mg/L			.0	5.0 10/08/19			
	···g, =		-	-				
LABORATORY CONTROL SAMPLE:	2507726							
_		Spike	LCS	LCS	% Rec			
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers		
Total Dissolved Solids	mg/L	1000	982	98	80-120			
SAMPLE DUPLICATE: 2507728								
		60317050012	Dup		Max			
Parameter	Units	Result	Result	RPD	RPD	Qualifiers		
Total Dissolved Solids	mg/L	47100	) 4540	0	4	10	_	
SAMPLE DUPLICATE: 2507743								
		60317050008	Dup		Max			
Parameter	Units	Result	Result	RPD	RPD	Qualifiers	_	
Total Dissolved Solids	mg/L	947	7 95	57	1	10		

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



Project:	AMERE	EN SIOUX ENI	ERGY CTR SO	CL4A											
Pace Project No.:	603170	30													
QC Batch:	61419	96		Analy	sis Metho	d:	EP	A 300.0							
QC Batch Method:	EPA 3	800.0		Analy	sis Descr	iption:	on: 300.0 IC Anions								
Associated Lab Sar	nples:	60317030001	I, 6031703000	2, 6031703	0003										
METHOD BLANK:	250810	0			Matrix: W	/ater									
Associated Lab Sar	nples:	60317030001	I, 6031703000	2, 6031703	0003										
			Blar	nk	Reporting	9									
Parameter Un		Units	Resu	ult	Limit		MDL	-	Anal	yzed	Qu	alifiers			
Chloride			mg/L		<0.22		1.0		0.22	10/15/1	9 15:0	08			
Sulfate			mg/L		<0.23		1.0		0.23	10/15/1	9 15:0	80			
LABORATORY CO	NTROLS	SAMPLE: 25	508101												
LABORATORY COI	NTROL S	SAMPLE: 25	508101	Spike	LC	CS		LCS	%	Rec					
LABORATORY COI		SAMPLE: 25	08101 Units	Spike Conc.		CS sult		LCS Rec		a Rec imits	(	Qualifiers			
Paran		SAMPLE: 25		Conc.					L			Qualifiers	_		
		SAMPLE: 25	Units	Conc.	Re	sult		Rec	L	imits	 D	Qualifiers			
Parar Chloride Sulfate	neter		Units mg/L mg/L	Conc.	Re	sult 4.6	%	Rec 92	L	imits 90-11	 D	Qualifiers	_		
Parar Chloride Sulfate	neter		Units mg/L mg/L	Conc.	Re	4.6 4.8	%	Rec 92	L	imits 90-11	 D	Qualifiers			
Parar Chloride Sulfate	neter	SPIKE DUPLIC	Units mg/L mg/L	Conc.	Re 5 5	4.6 4.8	% 03	Rec 92	L	imits 90-11	) ) )	Qualifiers % Rec	_	Мах	
Parar Chloride Sulfate	neter //ATRIX S	SPIKE DUPLIC	Units mg/L mg/L CATE: 2508	Conc. 102 MS	Re 5 5 MSD	4.6 4.8 25081	03	92 92 97		imits 90-11 90-11	5D		RPD	Max RPD	Qual
Parar Chloride Sulfate MATRIX SPIKE & M	neter //ATRIX S	SPIKE DUPLIC	Units mg/L mg/L CATE: 2508 0317026001	Conc. 102 MS Spike	Re 5 5 MSD Spike	sult 4.6 4.8 25081 MS	03 I	92 92 97 MSD	MS % Rec	imits 90-11 90-11	5D	% Rec		RPD	

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.



Project: AMEREN Pace Project No.: 6031703		ERGY CTR SO	CL4A									
QC Batch: 616463	3		Ana	ysis Metho	od: I	EPA 300.0						
QC Batch Method: EPA 30	0.0		Ana	ysis Desci	iption:	300.0 IC Ani	ons					
Associated Lab Samples: 6	60317030004	1										
METHOD BLANK: 2516455	1			Matrix: V	Vater							
Associated Lab Samples: 6	60317030004	1										
		Bla		Reporting								
Parameter		Units	Res	sult	Limit	MDL		Analyzed	Qı	alifiers		
Chloride		mg/L		<0.22	1.	0	0.22 1	0/17/19 12:	30			
Sulfate		mg/L		<0.23	1.	0	0.23 1	0/17/19 12:	30			
LABORATORY CONTROL SA	AMPLE: 25	516456										
			Spike	L	CS	LCS	% F	Rec				
Parameter		Units	Conc.	Re	sult	% Rec	Lin	nits (	Qualifiers			
Chloride		mg/L		5	4.7	94		90-110		_		
Sulfate		mg/L		5	5.3	105	i	90-110				
MATRIX SPIKE & MATRIX SF		CATE: 2516	457 MS	MSD	2516458							
	6	0317030004	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	<0.22	5	5	4.8	4.9	95	97	80-120	2	15	
Sulfate	mg/L	<0.23	5	5	5.4	5.5	107	' 111	80-120	3	15	
MATRIX SPIKE SAMPLE:	25	516459										
_				7863001	Spike	MS		MS	% Rec		<b>.</b>	
Parameter		Units	R	esult	Conc.	Result		% Rec	Limits		Quali	iers
Chloride		mg/L		0.52J	5		5.0	89	80	-120		

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



# QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

#### DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

**RPD** - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

#### LABORATORIES

PASI-K Pace Analytical Services - Kansas City

#### ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

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



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60317030

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60317030001	S-UG3	EPA 200.7	615188	EPA 200.7	615295
60317030002	S-SCL4A-DUP-1	EPA 200.7	615188	EPA 200.7	615295
60317030004	SCL4A-FB-1	EPA 200.7	615188	EPA 200.7	615295
60317030001	S-UG3	SM 2540C	614091		
60317030002	S-SCL4A-DUP-1	SM 2540C	614091		
60317030003	S-TMW-2	SM 2540C	614091		
60317030004	SCL4A-FB-1	SM 2540C	614091		
60317030001	S-UG3	EPA 300.0	614196		
60317030002	S-SCL4A-DUP-1	EPA 300.0	614196		
60317030003	S-TMW-2	EPA 300.0	614196		
60317030004	SCL4A-FB-1	EPA 300.0	616463		



Sample Condition Upon Receipt

# WO#:60317030

Client Name: Golder Associates		
Courier: FedEx 🗆 UPS 🖾 VIA 🗆 Clay 🗆 I		Pace 🗆 Xroads 🗹 Client 🗆 Other 🗆
Tracking #: Pac	e Shipping Label Us	sed?Yes 🗆 No 🗹
Custody Seal on Cooler/Box Present: Yes 🗹 🛛 No 🗆	Seals intact: Yes	
Packing Material: Bubble Wrap  Bubble Bags	🗆 💦 Foam 🗆	
Thermometer Used: T-301 Type of	fice: (Wer) Blue N	
Cooler Temperature (°C): As-read Oll Corr. Fact	or +0.0 Corre	ected D · 1 Date and initials of person examining contents: 10, 4, 19
Temperature should be above freezing to 6°C		
Chain of Custody present:	EYes No N/A	4
Chain of Custody relinquished:	Yes No N/A	4
Samples arrived within holding time:		A
Short Hold Time analyses (<72hr):	□Yes @No □N/A	4
Rush Turn Around Time requested:	□Yes ₽No □N/A	4
Sufficient volume:	Yes No N/A	A
Correct containers used:	ITYes □No □N/A	4
Pace containers used:	₽Yes □No □N/A	4
Containers intact:	Yes No N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No <b>□</b> ₩	
Filtered volume received for dissolved tests?		
Sample labels match COC: Date / time / ID / analyses	MYes DNo DN/A	
Samples contain multiple phases? Matrix.	Yes Mo N/A	
Containers requiring pH preservation in compliance?	Yes No N/A	List sample IDs, volumes, lot #'s of preservative and the Idate/time added.
(HNO₃, H₂SO₄, HCI<2; NaOłI>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		
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 INO □N/A	λ.
Headspace in VOA vials ( >6mm).	□Yes □No PN/A	X •
Samples from USDA Regulated Area: State:	□Yes □No ŒN/A	х — — — — — — — — — — — — — — — — — — —
Additional labels attached to 5035A / TX1005 vials in the field?		
Client Notification/ Resolution: Copy COC to	Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/T	ime:	
Comments/ Resolution:		
		10/8/19
Project Managar Parious Jana Churk		
Project Manager Review	Da	ate'

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Immunolia         Resultation         Immunolia         Resultation         Immunolia           3131 Elamet Parkay Dire, Raj FidmaneTerc Strender         Carlor Fagar FidmaneTerc Strender         Carlor Figur Strender         Carlor Fagar FidmaneTerc Strender         Carlor Figur Strender         Carlor Fig	Amin Muddrath (50/der 172777 1333 amg. 8/2 MM 18/142 10/28/14 13:34
Required Client Information: Company: Golder Associates Address: 13515 Barrett Parkway Drive, S Ballwin, MO 63021 Email To: <u>leftrey Ingram@golder.com</u> Phone: 636-724-9191 Fax: 636-724-93 Requested Due DaterTAT: Standard Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard Section D Requested Due DaterTAT: Standard A 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	



# **MEMORANDUM**

Project No. 1531406

DATE November 5, 2019

- TO Project File Golder Associates
- **CC** Amanda Derhake, Jeff Ingram
- **FROM** Tommy Goodwin

EMAIL Tommy\_Goodwin@golder.com

# DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – VERIFICATION SAMPLING - DATA PACKAGE 60317030

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**

Compa	ny Name: Golder Associates		Proi	ect Manag	ler: JIngram
Project	Name: Ameren - Sioux - SCL4A		-	-	er: 1531406
Review	er: T Goodwin				e: 11/5/2019
Laborat	tory: Pace Analytical - KS		SDC	G #: 603170	130
Analytic	cal Method (type and no.): _EPA 200.7 (Metals); SM 2	2540C (TDS			
	Air 🗌 Soil/Sed. 🔳 Water 🗌 Waste				
Sample	Names S-UG-3, S-SCL4A-DUP-1, S-TMW-2, SCL4A-F	B-1			
NOTE:	Please provide calculation in Comment areas	or on the	back (if	on the ba	ck please indicate in comment areas).
Field In	formation	YES	NO	NA	COMMENTS
a)	Sampling dates noted?	×			10/2/2019
b)	Sampling team indicated?	×			
c)	Sample location noted?	×			
d)	Sample depth indicated (Soils)?			×	
e)	Sample type indicated (grad)composite)?	×			
f)	Field QC noted?	×			
g)	Field parameters collected (note types)?	×			pH, Sp.Cond, ORP, Temp, DO, Turb
h)	Field Calibration within control limits?	×			
i)	Notations of unacceptable field conditions/perform	nances fro	om field l	ogs or field	I notes?
			×		
j)	Does the laboratory narrative indicate deficiencie	s? 📋		×	
	Note Deficiencies:				
					R(
Chain-o	of-Custody (COC)	YES	NO	NA	COMMENTS
	Wee the COC generality several to do			_	
a)	Was the COC properly completed?	×			
0)	Was the COC signed by both field and laboratory personnel?	×			
c)	Were samples received in good condition?	×			
Genera	I (reference QAPP or Method)	YES	NO	NA	COMMENTS
a)	Were hold times met for sample pretreatment?	×			
b)	Were hold times met for sample analysis?	×			
c)	Were the correct preservatives used?	x			
d)	Was the correct method used?	×			
e)	Were appropriate reporting limits achieved?	×			
f)	Were any sample dilutions noted?	×			See Notes

×

g) Were any matrix problems noted?

# **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

Blanks		YES	NO	NA	COMMENTS
a)	Were analytes detected in the method blank(s)?		×		
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)?			×	
Labora	tory 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?	×			
c)	Was the LCS accuracy criteria met?	x			
Duplica	ates	YES	NO	NA	COMMENTS
a)	Were field duplicates collected (note original and du	uplicate	sample n	ames)?	DUP-1 @ S-UG3
		×			FB-1 @ S-TMW-2
b)	Were field dup. precision criteria met (note RPD)?	×			See Notes
c)	Were lab duplicates analyzed (note original and dup	plicate s	amples)?	•	
			×		
d)	Were lab dup. precision criteria met (note RPD)?			x	
Blind S	tandards	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?	x			
	Recovery could not be calculated since sample contained high concentration of analyte?			×	
c)	Were MS/MSD precision criteria met?	×			

#### Comments/Notes:

ē . .

Max Field RPD: 4.5% (Limit 20%) Dilution: Chloride and Sulfate diluted in some samples; no qualification is necessary.

Revised May 2004

# **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

# Data Qualification:

45 × 6

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				
	\ \			
·				
	\			
		~	+	
			$\vdash$	
				<u> </u>
				- \
				<u> </u>
	· · · · · ·			
	110			
Signature:	mm Bood h			Date: 11/5/2019
	11			Bait.

Revised May 2004

Page 3 of 3



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

December 09, 2019

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

RE: Project: AMEREN SIOUX ENERGY CTR SCL4A Pace Project No.: 60321516

Dear Jeffrey Ingram:

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

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

Sincerely,

Jami Church

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

Enclosures

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





#### CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

#### **Pace Analytical Services Kansas**

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



# SAMPLE SUMMARY

#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60321516001	S-TMW-1	Water	11/14/19 10:03	11/16/19 02:35
60321516002	S-TMW-2	Water	11/14/19 11:14	11/16/19 02:35
60321516003	S-TMW-3	Water	11/14/19 12:51	11/16/19 02:35
60321516004	S-UG-3	Water	11/14/19 14:49	11/16/19 02:35
60321516005	S-SCL4A-DUP-1	Water	11/14/19 14:49	11/16/19 02:35
60321516006	S-SCL4A-FB-1	Water	11/14/19 12:13	11/16/19 02:35
60321516007	MS	Water	11/14/19 14:54	11/16/19 02:35
60321513010	S-BMW-1S	Water	11/15/19 14:43	11/16/19 02:35
60321513011	S-BMW-3S	Water	11/15/19 12:18	11/16/19 02:35



# SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60321516001	S-TMW-1	EPA 200.7	НКС	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321516002	S-TMW-2	EPA 200.7	НКС	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321516003	S-TMW-3	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321516004	S-UG-3	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB, MGS	3	PASI-K
60321516005	S-SCL4A-DUP-1	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321516006	S-SCL4A-FB-1	EPA 200.7	НКС	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321513010	S-BMW-1S	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321513011	S-BMW-3S	EPA 200.7	НКС	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 603

# : 60321516

Sample: S-TMW-1	Lab ID:	60321516001	Collected	d: 11/14/19	10:03	Received: 11/	16/19 02:35 M	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	79.7J	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:16	7440-42-8	
Calcium	95100	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:16	7440-70-2	
Iron	40.0J	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:16	7439-89-6	
Magnesium	18000	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:16	7439-95-4	
Manganese	206	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:16	7439-96-5	
Potassium	5390	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:16	7440-09-7	
Sodium	2820	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:16	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	326	mg/L	20.0	6.5	1		11/22/19 17:04		
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	387	mg/L	5.0	5.0	1		11/21/19 16:02		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	0.00						
Chloride	1.8	mg/L	1.0	0.22	1		11/27/19 16:54	16887-00-6	
Fluoride	0.34	mg/L	0.20	0.085	1		11/27/19 16:54	16984-48-8	
Sulfate	36.9	mg/L	5.0	1.2	5		11/27/19 17:10	14808-79-8	



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Sample: S-TMW-2	Lab ID:	60321516002	Collected	1: 11/14/19	11:14	Received: 11/	16/19 02:35 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	98.1J	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:18	7440-42-8	
Calcium	120000	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:18	7440-70-2	
Iron	339	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:18	7439-89-6	
Magnesium	23800	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:18	7439-95-4	
Manganese	416	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:18	7439-96-5	
Potassium	5550	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:18	7440-09-7	
Sodium	3440	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:18	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	385	mg/L	20.0	6.5	1		11/22/19 17:11		
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	502	mg/L	10.0	10.0	1		11/21/19 16:02		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	4.5	mg/L	1.0	0.22	1		11/27/19 17:58	16887-00-6	
Fluoride	0.35	mg/L	0.20	0.085	1		11/27/19 17:58	16984-48-8	
Sulfate	75.1	mg/L	5.0	1.2	5		11/27/19 18:14	14808-79-8	



. . .

# **ANALYTICAL RESULTS**

#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516 - -----

-

	 	 	 -	-	 -
60221516					

....

-----

Sample: S-TMW-3	Lab ID:	Lab ID: 60321516003 Collected: 11/14/19 12:51 Received: 11/16/19 02:35 Matrix: V						atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	97.6J	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:20	7440-42-8	
Calcium	116000	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:20	7440-70-2	
Iron	1260	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:20	7439-89-6	
Magnesium	22900	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:20	7439-95-4	
Manganese	520	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:20	7439-96-5	
Potassium	6000	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:20	7440-09-7	
Sodium	4060	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:20	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	379	mg/L	20.0	6.5	1		11/22/19 17:16		
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	454	mg/L	5.0	5.0	1		11/21/19 16:02		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	2.4	mg/L	1.0	0.22	1		11/27/19 18:30	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.085	1		11/27/19 18:30	16984-48-8	
Sulfate	36.7	mg/L	5.0	1.2	5		11/27/19 18:46	14808-79-8	



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 603

60321516

Sample: S-UG-3	Lab ID:	60321516004	Collected:	11/14/19	9 14:49	Received: 11/	16/19 02:35 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepara	ation Meth	nod: EP/	A 200.7			
Boron	976	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:22	7440-42-8	
Calcium	135000	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:22	7440-70-2	M1
Iron	99.1	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:22	7439-89-6	
Magnesium	28600	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:22	7439-95-4	
Manganese	668	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:22	7439-96-5	
Potassium	5790	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:22	7440-09-7	
Sodium	26100	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:22	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	360	mg/L	20.0	6.5	1		11/22/19 17:32		
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	721	mg/L	10.0	10.0	1		11/21/19 16:03		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	83.5	mg/L	5.0	1.1	5		11/27/19 19:50	16887-00-6	
Fluoride	0.33	mg/L	0.20	0.085	1		11/27/19 19:02	16984-48-8	
Sulfate	185	mg/L	20.0	4.6	20		12/02/19 10:04	14808-79-8	M1



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

		-	-	-		-	-	
No ·	60321516							

Lab ID:	60321516005	Collected	11/14/19	9 14:49	Received: 11/	16/19 02:35 Ma	atrix: Water	
Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 2	00.7 Prepar	ation Meth	nod: EP/	A 200.7			
92.4J	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:33	7440-42-8	
112000	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:33	7440-70-2	
318	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:33	7439-89-6	
22100	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:33	7439-95-4	
396	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:33	7439-96-5	
5180	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:33	7440-09-7	
3240	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:33	7440-23-5	
Analytical	Method: SM 23	20B						
384	mg/L	20.0	6.5	1		11/22/19 17:44		
Analytical	Method: SM 25	40C						
486	mg/L	10.0	10.0	1		11/21/19 16:03		
Analytical	Method: EPA 3	00.0						
4.5	mg/L	1.0	0.22	1		11/27/19 21:11	16887-00-6	
0.34	0	0.20	0.085	1		11/27/19 21:11	16984-48-8	
	•			5		11/27/19 21:27	14808-79-8	
	Results Analytical 92.4J 112000 318 22100 396 5180 3240 Analytical 384 Analytical 486 Analytical 486	Analytical Method: EPA 2 92.4J ug/L 112000 ug/L 318 ug/L 22100 ug/L 396 ug/L 5180 ug/L 3240 ug/L Analytical Method: SM 23 384 mg/L Analytical Method: SM 25 486 mg/L Analytical Method: EPA 3 4.5 mg/L 0.34 mg/L	Results         Units         PQL           Analytical Method: EPA 200.7         Prepare           92.4J         ug/L         100           112000         ug/L         200           318         ug/L         50.0           22100         ug/L         50.0           396         ug/L         500           396         ug/L         500           3240         ug/L         500           Analytical Method: SM 2320B         Analytical Method: SM 2540C           486         mg/L         10.0           Analytical Method: EPA 300.0         4.5         mg/L         1.0           Analytical Method: EPA 300.0         4.5         mg/L         1.0	Results         Units         PQL         MDL           Analytical Method: EPA 200.7         Preparation Method           92.4.1         ug/L         100         10.7           112000         ug/L         200         50.0           318         ug/L         50.0         14.0           22100         ug/L         50.0         13.0           396         ug/L         500         79.0           3240         ug/L         500         144           Analytical Method: SM 2320B         384         mg/L         20.0         6.5           Analytical Method: SM 2540C         486         mg/L         10.0         10.0           Analytical Method: EPA 300.0         4.5         mg/L         1.0         0.22           0.34         mg/L         0.20         0.085         0.0	Results         Units         PQL         MDL         DF           Analytical Method: EPA 200.7         Preparation Method: EPA         100         10.7         1           112000         ug/L         200         50.0         1           318         ug/L         50.0         14.0         1           22100         ug/L         50.0         13.0         1           396         ug/L         50.0         13.0         1           396         ug/L         50.0         2.1         1           5180         ug/L         500         79.0         1           3240         ug/L         500         144         1           Analytical Method: SM 2320B         384         mg/L         20.0         6.5         1           Analytical Method: SM 2540C         486         mg/L         10.0         10.0         1           Analytical Method: EPA 300.0         1         1.0         0.22         1           4.5         mg/L         1.0         0.22         1           0.34         mg/L         0.20         0.085         1	Results         Units         PQL         MDL         DF         Prepared           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         Interparation Method: EPA 200.7         Interparation Method: EPA 200.7           92.4.1         ug/L         100         10.7         1         11/26/19 08:04           112000         ug/L         200         50.0         1         11/26/19 08:04           318         ug/L         50.0         14.0         1         11/26/19 08:04           22100         ug/L         50.0         13.0         1         11/26/19 08:04           396         ug/L         50.0         13.0         1         11/26/19 08:04           396         ug/L         50.0         2.1         1         11/26/19 08:04           396         ug/L         500         79.0         1         11/26/19 08:04           3240         ug/L         500         144         1         11/26/19 08:04           Analytical Method: SM 2320B         Interparation         Interparation         Interparation           486         mg/L         10.0         10.0         1           Analytical Method: EPA 300.0         Interparation         Interparatin         Interparat	Results         Units         PQL         MDL         DF         Prepared         Analyzed           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         Indext 100         10.7         1         11/26/19 08:04         11/26/19 17:33           112000         ug/L         200         50.0         1         11/26/19 08:04         11/26/19 17:33           318         ug/L         50.0         14.0         1         11/26/19 08:04         11/26/19 17:33           22100         ug/L         50.0         13.0         1         11/26/19 08:04         11/26/19 17:33           396         ug/L         50.0         2.1         1         11/26/19 08:04         11/26/19 17:33           396         ug/L         50.0         79.0         1         11/26/19 08:04         11/26/19 17:33           318         ug/L         500         79.0         1         11/26/19 08:04         11/26/19 17:33           3240         ug/L         500         79.0         1         11/26/19 08:04         11/26/19 17:33           Analytical Method: SM 2320B         1         11/26/19 08:04         11/26/19 17:33         11/26/19 17:34           486         mg/L         10.0         10.0         1	Results         Units         PQL         MDL         DF         Prepared         Analyzed         CAS No.           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         Image: Constraint of the second secon



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Sample: S-SCL4A-FB-1	Lab ID:	60321516006	Collected	d: 11/14/19	12:13	Received: 11/	16/19 02:35 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
Boron	<10.7	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:35	7440-42-8	
Calcium	<50.0	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:35	7440-70-2	
Iron	<14.0	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:35	7439-89-6	
Magnesium	<13.0	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:35	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:35	7439-96-5	
Potassium	<79.0	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:35	7440-09-7	
Sodium	<144	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:35	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	320B						
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		11/22/19 17:48		
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
Total Dissolved Solids	10.5	mg/L	5.0	5.0	1		11/21/19 16:03		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	<0.22	mg/L	1.0	0.22	1		11/27/19 21:43	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		11/27/19 21:43	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		11/27/19 21:43	14808-79-8	



Project:	AMEREN SIOUX ENERGY CTR SCL4A
	AMENEN SIOON ENERGY OT SOLAN

Pace Project No.: 60321516

Sample: MS	Lab ID:	Lab ID: 60321516007		Collected: 11/14/19 14:54		Received: 11/16/19 02:35 N		latrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical	Method: SM 35	500-Fe B#4						
Iron, Ferrous	<0.034	mg/L	0.20	0.034	1		11/19/19 11:39		H3,H6



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

10.	60321516	

Sample: S-BMW-1S	Lab ID:	60321513010	Collected	1: 11/15/19	9 14:43	Received: 11/	16/19 02:35 Ma	atrix: Water	
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical	Method: EPA 2	00.7 Prepa	ration Metl	hod: EP	A 200.7			
Boron	118	ug/L	100	10.7	1	11/26/19 09:12	11/26/19 18:13	7440-42-8	
Calcium	143000	ug/L	200	50.0	1	11/26/19 09:12	11/26/19 18:13	7440-70-2	M1
Iron	<14.0	ug/L	50.0	14.0	1	11/26/19 09:12	11/26/19 18:13	7439-89-6	
Magnesium	29700	ug/L	50.0	13.0	1	11/26/19 09:12	11/26/19 18:13	7439-95-4	
Manganese	426	ug/L	5.0	2.1	1	11/26/19 09:12	11/26/19 18:13	7439-96-5	
Potassium	424J	ug/L	500	79.0	1	11/26/19 09:12	11/26/19 18:13	7440-09-7	
Sodium	5360	ug/L	500	144	1	11/26/19 09:12	11/26/19 18:13	7440-23-5	
2320B Alkalinity	Analytical	Method: SM 23	20B						
Alkalinity, Total as CaCO3	428	mg/L	20.0	6.5	1		11/25/19 15:41		
2540C Total Dissolved Solids	Analytical	Method: SM 25	40C						
Total Dissolved Solids	551	mg/L	10.0	10.0	1		11/22/19 08:54		
300.0 IC Anions 28 Days	Analytical	Method: EPA 3	00.0						
Chloride	6.4	mg/L	1.0	0.22	1		11/27/19 19:32	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.085	1		11/27/19 19:32	16984-48-8	
Sulfate	26.5	mg/L	2.0	0.46	2		11/30/19 01:38	14808-79-8	



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Lab ID:	60321513011	Collected	d: 11/15/19	12:18	Received: 11/	16/19 02:35 Ma	atrix: Water	
Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Analytical	Method: EPA 2	00.7 Prepa	ration Meth	od: EP	A 200.7			
80.1J	ug/L	100	10.7	1	11/26/19 09:12	11/26/19 18:17	7440-42-8	
102000	ug/L	200	50.0	1	11/26/19 09:12	11/26/19 18:17	7440-70-2	
6800	ug/L	50.0	14.0	1	11/26/19 09:12	11/26/19 18:17	7439-89-6	
25600	ug/L	50.0	13.0	1	11/26/19 09:12	11/26/19 18:17	7439-95-4	
519	ug/L	5.0	2.1	1	11/26/19 09:12	11/26/19 18:17	7439-96-5	
3840	ug/L	500	79.0	1	11/26/19 09:12	11/26/19 18:17	7440-09-7	
6610	ug/L	500	144	1	11/26/19 09:12	11/26/19 18:17	7440-23-5	
Analytical	Method: SM 23	20B						
342	mg/L	20.0	6.5	1		11/25/19 15:52		
Analytical	Method: SM 25	40C						
418	mg/L	5.0	5.0	1		11/22/19 08:54		
Analytical	Method: EPA 3	00.0						
7.6	mg/L	1.0	0.22	1		11/27/19 21:07	16887-00-6	
0.23	•	0.20	0.085	1		11/27/19 21:07	16984-48-8	
34.4	-	2.0	0.46	2		11/27/19 21:23	14808-79-8	
	Results         Analytical         80.1J         102000         6800         25600         519         3840         6610         Analytical         342         Analytical         418         Analytical         7.6         0.23	Analytical Method: EPA 2 80.1J ug/L 102000 ug/L 6800 ug/L 25600 ug/L 519 ug/L 3840 ug/L 6610 ug/L Analytical Method: SM 23 342 mg/L Analytical Method: SM 25 418 mg/L Analytical Method: EPA 3 7.6 mg/L 0.23 mg/L	Results         Units         PQL           Analytical Method: EPA 200.7         Prepared           80.1J         ug/L         100           102000         ug/L         200           6800         ug/L         50.0           25600         ug/L         500           519         ug/L         500           6610         ug/L         500           6610         ug/L         500           Analytical Method: SM 2320B         342         mg/L         20.0           Analytical Method: SM 2540C         418         mg/L         5.0           Analytical Method: EPA 300.0         7.6         mg/L         1.0           0.23         mg/L         0.20         1.0	Results         Units         PQL         MDL           Analytical Method: EPA 200.7         Preparation Method           80.1J         ug/L         100         10.7           102000         ug/L         200         50.0           6800         ug/L         50.0         14.0           25600         ug/L         500         13.0           519         ug/L         500         79.0           6610         ug/L         500         144           Analytical Method: SM 2320B         342         mg/L         20.0         6.5           Analytical Method: SM 2540C         418         mg/L         5.0         5.0           418         mg/L         5.0         5.0         5.0           7.6         mg/L         1.0         0.22           0.23         mg/L         0.20         0.085	Results         Units         PQL         MDL         DF           Analytical Method: EPA 200.7         Preparation Method: EPA         100         10.7         1           102000         ug/L         200         50.0         1           6800         ug/L         50.0         14.0         1           25600         ug/L         50.0         13.0         1           519         ug/L         500         79.0         1           6610         ug/L         500         79.0         1           6610         ug/L         500         144         1           Analytical Method: SM 2320B         342         mg/L         20.0         6.5         1           Analytical Method: SM 2540C         418         mg/L         5.0         5.0         1           Analytical Method: EPA 300.0         7.6         mg/L         1.0         0.22         1           0.23         mg/L         0.20         0.085         1	Results         Units         PQL         MDL         DF         Prepared           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         1         11/26/19 09:12           102000         ug/L         200         50.0         1         11/26/19 09:12           6800         ug/L         50.0         14.0         1         11/26/19 09:12           25600         ug/L         50.0         14.0         1         11/26/19 09:12           519         ug/L         5.0         2.1         1         11/26/19 09:12           3840         ug/L         500         79.0         1         11/26/19 09:12           3840         ug/L         500         79.0         1         11/26/19 09:12           6610         ug/L         500         79.0         1         11/26/19 09:12           6610         ug/L         500         79.0         1         11/26/19 09:12           Analytical Method: SM 2320B         342         mg/L         20.0         6.5         1           Analytical Method: SM 2540C         418         mg/L         5.0         5.0         1           Analytical Method: EPA 300.0         5.0         1         1.0         0.	Results         Units         PQL         MDL         DF         Prepared         Analyzed           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         80.1 J         ug/L         100         10.7         1         11/26/19 09:12         11/26/19 18:17           102000         ug/L         200         50.0         1         11/26/19 09:12         11/26/19 18:17           6800         ug/L         50.0         14.0         1         11/26/19 09:12         11/26/19 18:17           6800         ug/L         50.0         13.0         1         11/26/19 09:12         11/26/19 18:17           519         ug/L         5.0         2.1         1         11/26/19 09:12         11/26/19 18:17           6610         ug/L         500         79.0         1         11/26/19 09:12         11/26/19 18:17           Analytical Method: SM 2320B         342         mg/L         20.0         6.5         1         11/25/19 15:52           Analytical Method: SM 2540C         418         mg/L         5.0         5.0         1         11/22/19 08:54           Analytical Method: EPA 300.0         7.6         mg/L         1.0         0.22         1         11/27/19 21:07           0.23 <td>Results         Units         PQL         MDL         DF         Prepared         Analyzed         CAS No.           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         1         11/26/19 09:12         11/26/19 18:17         7440-42-8           102000         ug/L         200         50.0         1         11/26/19 09:12         11/26/19 18:17         7440-42-8           102000         ug/L         200         50.0         1         11/26/19 09:12         11/26/19 18:17         7440-70-2           6800         ug/L         50.0         14.0         1         11/26/19 09:12         11/26/19 18:17         7439-89-6           25600         ug/L         50.0         13.0         1         11/26/19 09:12         11/26/19 18:17         7439-95-4           519         ug/L         5.0         2.1         1         11/26/19 09:12         11/26/19 18:17         7439-96-5           3840         ug/L         500         79.0         1         11/26/19 09:12         11/26/19 18:17         7440-09-7           6610         ug/L         500         144         1         11/26/19 09:12         11/26/19 18:17         7440-23-5           Analytical Method: SM 2540C         1         11/25/19 15:52&lt;</td>	Results         Units         PQL         MDL         DF         Prepared         Analyzed         CAS No.           Analytical Method: EPA 200.7         Preparation Method: EPA 200.7         1         11/26/19 09:12         11/26/19 18:17         7440-42-8           102000         ug/L         200         50.0         1         11/26/19 09:12         11/26/19 18:17         7440-42-8           102000         ug/L         200         50.0         1         11/26/19 09:12         11/26/19 18:17         7440-70-2           6800         ug/L         50.0         14.0         1         11/26/19 09:12         11/26/19 18:17         7439-89-6           25600         ug/L         50.0         13.0         1         11/26/19 09:12         11/26/19 18:17         7439-95-4           519         ug/L         5.0         2.1         1         11/26/19 09:12         11/26/19 18:17         7439-96-5           3840         ug/L         500         79.0         1         11/26/19 09:12         11/26/19 18:17         7440-09-7           6610         ug/L         500         144         1         11/26/19 09:12         11/26/19 18:17         7440-23-5           Analytical Method: SM 2540C         1         11/25/19 15:52<



Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

QC Batch:	624736	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total

Associated Lab Samples: 60321513010, 60321513011

#### METHOD BLANK: 2547231

Associated Lab Samples:	60321513010, 60321513011

Demonster	11-26	Blank	Reporting	MDI	A so a bosso a d	0
Parameter	Units	Result	Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	11/26/19 17:42	
Calcium	ug/L	<50.0	200	50.0	11/26/19 17:42	
Iron	ug/L	21.5J	50.0	14.0	11/26/19 17:42	
Magnesium	ug/L	<13.0	50.0	13.0	11/26/19 17:42	
Manganese	ug/L	<2.1	5.0	2.1	11/26/19 17:42	
Potassium	ug/L	<79.0	500	79.0	11/26/19 17:42	
Sodium	ug/L	<144	500	144	11/26/19 17:42	

Matrix: Water

#### LABORATORY CONTROL SAMPLE: 2547232

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

MATRIX SPIKE & MATRIX	SPIKE DUPL	ICATE: 2547	233 MS	MSD	2547234							
Parameter	Units	60321513002 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	11200	1000	1000	12600	12700	132	144	70-130	1	20	M1
Calcium	ug/L	170000	10000	10000	182000	184000	127	140	70-130	1	20	M1
Iron	ug/L	69.8	10000	10000	9170	9330	91	93	70-130	2	20	
Magnesium	ug/L	29800	10000	10000	40000	40200	102	104	70-130	0	20	
Manganese	ug/L	404	1000	1000	1410	1430	101	102	70-130	1	20	
Potassium	ug/L	7710	10000	10000	17900	18000	102	103	70-130	1	20	
Sodium	ug/L	67100	10000	10000	78300	78700	112	116	70-130	1	20	

MATRIX SPIKE SAMPLE:	2547235						
		60321513010	Spike	MS	MS	% Rec	0 117
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Boron	ug/L	118	1000	1140	102	70-130	
Calcium	ug/L	143000	10000	146000	26	70-130	M1
Iron	ug/L	<14.0	10000	8880	89	70-130	

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**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

MATRIX SPIKE SAMPLE:	2547235						
		60321513010	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Magnesium	ug/L	29700	10000	38000	83	70-130	
Manganese	ug/L	426	1000	1400	97	70-130	
Potassium	ug/L	424J	10000	10200	98	70-130	
Sodium	ug/L	5360	10000	14900	96	70-130	

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.



Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

ace 1 10ject 10... 0002101

# QC Batch: 624739 Analysis Method: EPA 200.7 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60321516001, 60321516002, 60321516003, 60321516004, 60321516005, 60321516006

METHOD BLANK: 2547247

# Matrix: Water

Associated Lab Samples: 60321516001, 60321516002, 60321516003, 60321516004, 60321516005, 60321516006

		Blank	Reporting			
Parameter	Units	Result	Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	11/26/19 17:04	
Calcium	ug/L	<50.0	200	50.0	11/26/19 17:04	
Iron	ug/L	<14.0	50.0	14.0	11/26/19 17:04	
Magnesium	ug/L	<13.0	50.0	13.0	11/26/19 17:04	
Manganese	ug/L	<2.1	5.0	2.1	11/26/19 17:04	
Potassium	ug/L	<79.0	500	79.0	11/26/19 17:04	
Sodium	ug/L	<144	500	144	11/26/19 17:04	

#### LABORATORY CONTROL SAMPLE: 2547248

-		Spike	LCS	LCS	% Rec	0 11
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Boron	ug/L	1000	1000	100	85-115	
Calcium	ug/L	10000	9260	93	85-115	
Iron	ug/L	10000	9110	91	85-115	
Magnesium	ug/L	10000	9750	97	85-115	
Manganese	ug/L	1000	985	98	85-115	
Potassium	ug/L	10000	9850	98	85-115	
Sodium	ug/L	10000	9920	99	85-115	

MATRIX SPIKE & MATRIX	SPIKE DUPL	ICATE: 2547	249		2547250							
		60321516004	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Мах	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	976	1000	1000	2080	2120	110	115	70-130	2	20	
Calcium	ug/L	135000	10000	10000	152000	154000	170	190	70-130	1	20	M1
Iron	ug/L	99.1	10000	10000	9100	9130	90	90	70-130	0	20	
Magnesium	ug/L	28600	10000	10000	40000	40500	114	119	70-130	1	20	
Manganese	ug/L	668	1000	1000	1700	1740	103	107	70-130	3	20	
Potassium	ug/L	5790	10000	10000	16100	16100	103	103	70-130	0	20	
Sodium	ug/L	26100	10000	10000	37400	38100	113	120	70-130	2	20	

MATRIX SPIKE SAMPLE:	2547251						
		60321516006	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Boron	ug/L	<10.7	1000	1030	103	70-130	
Calcium	ug/L	<50.0	10000	9480	95	70-130	
Iron	ug/L	<14.0	10000	9300	93	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

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

MATRIX SPIKE SAMPLE:	2547251						
		60321516006	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Magnesium	ug/L	<13.0	10000	9910	99	70-130	
Manganese	ug/L	<2.1	1000	1010	101	70-130	
Potassium	ug/L	<79.0	10000	9980	100	70-130	
Sodium	ug/L	<144	10000	10100	100	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.



Project: Pace Project No.:	AMER 60321		ENERGY CTR S	CL4A						
QC Batch:	6242	93		Analysis Me	ethod:	SM 2320B				
QC Batch Method:	SM 2	320B		Analysis De	escription:	2320B Alkali	nity			
Associated Lab San	nples:	60321516	6032151600	02, 60321516003,	60321516004,	6032151600	5, 60321	1516006		
METHOD BLANK:	25454	62		Matrix	: Water					
Associated Lab San	nples:	60321516	6001, 6032151600	02, 60321516003,	60321516004,	6032151600	5, 60321	1516006		
				Blank	Reporting					
Paran	neter		Units	Result	Limit	MDL		Analyz	ed	Qualifiers
Alkalinity, Total as C	aCO3		mg/L	<6.5	20	.0	6.5	11/22/19	16:12	
LABORATORY COM	NTROL	SAMPLE:	2545463							
				Spike	LCS	LCS	%	Rec		
Paran	neter		Units	Conc.	Result	% Rec	Lin	nits	Qua	alifiers
Alkalinity, Total as C	aCO3		mg/L	500	510	102		90-110		
SAMPLE DUPLICA	TE: 25	545464								
				60321303002	Dup			Max		
Paran	neter		Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as C	aCO3		mg/L	1500	15	10	0		10	
SAMPLE DUPLICA	TE: 25	545466								
				60321516004	Dup			Max		
Paran	neter		Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as C	CaCO3		mg/L	360	3:	55	1		10	

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



Project: AMEREN SIO Pace Project No.: 60321516	UX ENERGY CTR SCI	-47						
QC Batch: 624580		Analysis M	ethod:	SM 2320B				
QC Batch Method: SM 2320B		Analysis De	escription:	2320B Alkalin	ity			
Associated Lab Samples: 60321	513010, 60321513011							
METHOD BLANK: 2546893		Matrix	: Water					
Associated Lab Samples: 60321	513010, 60321513011							
		Blank	Reporting					
Parameter	Units	Result	Limit	MDL		Analyz	zed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	5 20.	0	6.5	11/25/19	15:29	
LABORATORY CONTROL SAMPL	E: 2546894							
		Spike	LCS	LCS		Rec		
Parameter	Units	Conc.	Result	% Rec	Li	imits	Qua	alifiers
Alkalinity, Total as CaCO3	mg/L	500	488	98		90-110		
SAMPLE DUPLICATE: 2546895								
		60321513010	Dup			Max		
Parameter	Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as CaCO3	mg/L	428	3 42	9	0		10	
SAMPLE DUPLICATE: 2546897								
		60321518006	Dup			Max		
Parameter	Units	Result	Result	RPD		RPD		Qualifiers
Alkalinity, Total as CaCO3	mg/L	381	40	6	6		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.



Project: Pace Project No.:	AMEREN SIOUX 60321516	ENERGY CTR S	CL4A					
QC Batch:	624015		Analysis Me	ethod:	SM 2540C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total D	issolved Solids		
Associated Lab San	mples: 6032151	6001, 603215160	02, 60321516003,	60321516004	60321516005	, 60321516006		
METHOD BLANK:	2544577		Matrix	: Water				
Associated Lab San	mples: 6032151	6001, 603215160	02, 60321516003,		60321516005	, 60321516006		
Paran	neter	Units	Blank Result	Reporting Limit	MDL	Analy	zed	Qualifiers
Total Dissolved Soli		mg/L				5.0 11/21/19		
		0						
LABORATORY CON	NTROL SAMPLE:	2544578						
			Spike	LCS	LCS	% Rec		
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qua	alifiers
Total Dissolved Soli	ds	mg/L	1000	1010	101	80-120		
SAMPLE DUPLICA	TE: 2544579							
			60321516004	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Soli	ids	mg/L	721	7:	24	0	10	
SAMPLE DUPLICA	TE: 2544580							
	2011000		60321518004	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Soli	do	mg/L	512	5		2	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.



Project: AMEREN SIOUX	ENERGY CTR SC	L4A					
Pace Project No.: 60321516							
QC Batch: 624081		Analysis M	ethod:	SM 2540C			
QC Batch Method: SM 2540C		Analysis De	escription:	2540C Total D	Dissolved So	lids	
Associated Lab Samples: 60321513	8010, 60321513011						
METHOD BLANK: 2544812		Matrix	k: Water				
Associated Lab Samples: 60321513	8010, 60321513011						
		Blank	Reporting				
Parameter	Units	Result	Limit	MDL	Ar	nalyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	) 5.	0	5.0 11/22	2/19 08:51	
LABORATORY CONTROL SAMPLE:	2544813						
LABORATORT CONTROL SAMPLE.	2044013	Spike	LCS	LCS	% Rec		
Parameter	Units	Conc.	Result	% Rec	Limits	Qua	alifiers
Total Dissolved Solids	mg/L	1000	990	99	80-1	20	
SAMPLE DUPLICATE: 2544814							
		60321433002	Dup		N	lax	
Parameter	Units	Result	Result	RPD	R	PD	Qualifiers
Total Dissolved Solids	mg/L	2440	) 247	0	1	10	
SAMPLE DUPLICATE: 2544815							
		60321513002	Dup		Ν	lax	
Parameter	Units	Result	Result	RPD	R	PD	Qualifiers
Total Dissolved Solids	mg/L	927	95	 ٩	3	10	

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



Project:AMEREN SIOUXPace Project No.:60321516	ENERGY CTR S	CL4A					
QC Batch: 623168		Analysis Me	ethod:	SM 3500-Fe B	#4		
QC Batch Method: SM 3500-Fe B#4	4	Analysis De	escription:	Iron, Ferrous			
Associated Lab Samples: 60321516	007						
METHOD BLANK: 2541161		Matrix	k: Water				
Associated Lab Samples: 60321516	007						
		Blank	Reporting				
Parameter	Units	Result	Limit	MDL	Analyz	ed Qualifiers	
Iron, Ferrous	mg/L	<0.034	<u>ا</u> 0.2	20 0.0	034 11/19/19	11:28 H6	
LABORATORY CONTROL SAMPLE:	2541162			LCS			
		Spike	LCS		% Rec		
Parameter	Units	Conc.	Result	% Rec	% Rec Limits	Qualifiers	
	Units mg/L	•					
Parameter Iron, Ferrous SAMPLE DUPLICATE: 2541163		Conc2	Result 2.2	% Rec	Limits 90-110		
Iron, Ferrous SAMPLE DUPLICATE: 2541163	mg/L	Conc. 2	Result 2.2 Dup	% Rec 110	Limits 90-110 Max	H6	
Iron, Ferrous		Conc2	Result 2.2	% Rec	Limits 90-110		

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



QC Batch:625047QC Batch Method:EPA 300.0Associated Lab Samples:60321513	3010, 60321513011	Analysis M Analysis D	lethod: Description:	EPA 300. 300.0 IC				
METHOD BLANK: 2548479		Matr	ix: Water					
Associated Lab Samples: 60321513	8010, 60321513011							
Parameter	Units	Blank Result	Reportin Limit		1DL	Applyz	od	Qualifiers
		<0.2				Analyz	·	Qualifiers
Chloride Fluoride	mg/L mg/L	<0.2 <0.08		1.0 ).20	0.22 0.085	11/27/19 11/27/19		
Sulfate	mg/L	<0.08		1.0	0.085	11/27/19		
ounate	ing/L	<0.Z	.0	1.0	0.20	11/21/15	10.10	
METHOD BLANK: 2550027		Matr	ix: Water					
Associated Lab Samples: 60321513	8010, 60321513011							
		Blank	Reportin	g				
Parameter	Units	Result	Limit	Ν	1DL	Analyz	ed	Qualifiers
Chloride	mg/L	<0.2	2	1.0	0.22	11/29/19	20:37	
Fluoride	mg/L	<0.08		0.20	0.085	11/29/19		
Sulfate	mg/L	<0.2	3	1.0	0.23	11/29/19	20:37	
METHOD BLANK: 2550207		Matri	ix: Water					
	8010, 60321513011							
	010,00021010011	Blank	Reportin	a				
Parameter	Units	Result	Limit	-	1DL	Analyz	ed	Qualifiers
Chloride	mg/L	<0.2	2	1.0	0.22	12/02/19		
Fluoride	mg/L	<0.08		0.20	0.085	12/02/19		
Sulfate	mg/L	<0.2		1.0	0.23	12/02/19		
	5	-	-	-				
LABORATORY CONTROL SAMPLE:	2548480							
		Spike	LCS	LCS		6 Rec	0 ""	
Parameter	Units	Conc.	Result	% Rec	L	_imits	Qualifie	ers
Chloride	mg/L	5	4.8		96	90-110		
Fluoride	mg/L	2.5	2.5		99	90-110		
Sulfate	mg/L	5	4.5		90	90-110		
LABORATORY CONTROL SAMPLE:	2550028							
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec		6 Rec ₋imits	Qualifie	ers
Chloride	mg/L	5	4.8		96	90-110		
Fluoride	mg/L	2.5	2.4		95	90-110		
Sulfate	mg/L	5	4.9		99	90-110		

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



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

LABORATORY CONTROL SAMPLE:	2550208					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SP	VIKE DUPL	ICATE: 2548		2548482								
			MS	MSD								
		60321513002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	102	100	100	218	210	116	108	80-120	4	15	
Fluoride	mg/L	0.31	2.5	2.5	3.1	3.1	110	112	80-120	1	15	
Sulfate	mg/L	317	250	250	568	565	100	99	80-120	0	15	

MATRIX SPIKE SAMPLE:	2548483						
		60321513010	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	6.4	5	11.6	103	80-120	
Fluoride	mg/L	0.28	2.5	3.0	110	80-120	
Sulfate	mg/L	26.5	10	37.2	107	80-120	

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.



QC Batch: 625048		Analysis M	lethod:	EPA 300.0			
QC Batch Method: EPA 300.0		Analysis D	escription:	300.0 IC Anior	าร		
Associated Lab Samples: 60321516	001, 6032151600	2, 60321516003	, 6032151600	4, 60321516005	, 60321516006		
METHOD BLANK: 2548493		Matri	x: Water				
Associated Lab Samples: 60321516	001, 6032151600	02, 60321516003	, 6032151600 <sub>/</sub>	4, 60321516005	, 60321516006		
		Blank	Reporting	5			
Parameter	Units	Result	Limit	MDL	Analy	zed	Qualifiers
Chloride	mg/L	<0.22	2	1.0 0	).22 11/27/19	10:45	
Fluoride	mg/L	<0.08	5 C	0.20 0.	085 11/27/19	10:45	
Sulfate	mg/L	<0.23	3	1.0 (	).23 11/27/19	10:45	
METHOD BLANK: 2550023		Matri	x: Water				
Associated Lab Samples: 60321516	001, 6032151600	2. 60321516003	. 60321516004	4. 60321516005	. 60321516006		
		Blank	Reporting		,		
Parameter	Units	Result	Limit	MDL	Analy	zed	Qualifiers
Chloride	mg/L	<0.22	2	1.0	).22 12/02/19	09:31	
	ma/l	< 0.08	5 0	0.20 0.	085 12/02/19	00.31	
Fluoride	mg/L	<0.00	5	.20 0.		00.01	
Sulfate METHOD BLANK: 2551117	mg/L	<0.23			0.23 12/02/19		
Fluoride Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter		<0.23	3 x: Water	4, 60321516005	).23 12/02/19	09:31	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter	mg/L 001, 6032151600 Units	<0.2 Matri 02, 60321516003, Blank Result	3 x: Water , 6032151600 Reporting Limit	1.0 ( 4, 60321516005 9 MDL	).23 12/02/19 , 60321516006 	09:31	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride	mg/L 001, 6032151600 Units mg/L	<0.23 Matri 02, 60321516003, Blank Result <0.23	3 x: Water , 6032151600 Reporting Limit 2	1.0 ( 4, 60321516005 g <u>MDL</u> 1.0 (	0.23 12/02/19 , 60321516006 	09:31 zed 09:27	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter	mg/L 001, 6032151600 Units	<0.2 Matri 02, 60321516003, Blank Result	3 x: Water , 6032151600- Reporting 	1.0 ( 4, 60321516005 9 <u>MDL</u> 1.0 ( 0.20 0.	).23 12/02/19 , 60321516006 	09:31 zed 09:27 09:27	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride	mg/L 001, 6032151600 Units mg/L mg/L	<0.2 Matri )2, 60321516003, Blank Result <0.2 <0.08	3 x: Water , 6032151600- Reporting 	1.0 ( 4, 60321516005 9 <u>MDL</u> 1.0 ( 0.20 0.	0.23 12/02/19 , 60321516006 	09:31 zed 09:27 09:27	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride	mg/L 001, 6032151600 Units mg/L mg/L	<0.2 Matri 02, 60321516003 Blank Result <0.2 <0.2 <0.2	3 x: Water , 6032151600 Reporting Limit 2 5 00 3	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 (	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19	09:31 zed 09:27 09:27	Qualifiers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE:	mg/L 3001, 6032151600 Units mg/L mg/L mg/L 2548494	<0.2 Matri 02, 60321516003, Blank Result <0.2 <0.2 <0.2 <0.2	3 x: Water , 6032151600 Reporting Limit 5 5 0 3 LCS	1.0 ( 4, 60321516005 9 MDL 1.0 ( 1.0 ( LCS	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec	09:31 zed 09:27 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter	mg/L 3001, 6032151600 Units mg/L mg/L mg/L	<0.2 Matri 02, 60321516003 Blank Result <0.2 <0.2 <0.2	3 x: Water , 6032151600 Reporting Limit 2 5 00 3	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 (	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19	09:31 zed 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride	mg/L 0001, 6032151600 Units mg/L mg/L 2548494 Units mg/L	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.23 <0.23 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24	3 x: Water , 6032151600- Reporting Limit 5 5 0 3 LCS Result 4.7	$ \begin{array}{c} 1.0 \\ 4, 60321516005 \\ 9 \\ \hline 1.0 \\ 0.20 \\ 1.0 \\ \hline LCS \\ \% Rec \\ \hline 94 \\ \hline \end{array} $	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110	09:31 zed 09:27 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride Fluoride	mg/L 3001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.24 <0.25	3 x: Water , 6032151600- Reporting Limit 5 5 0 3 LCS Result 4.7 2.7	1.0 ( 4, 60321516005 9 <u>MDL</u> 1.0 ( 0.20 0. 1.0 ( <u>LCS</u> % Rec 94 108	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110	09:31 zed 09:27 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter	mg/L 0001, 6032151600 Units mg/L mg/L 2548494 Units mg/L	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.23 <0.23 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24 <0.24	3 x: Water , 6032151600- Reporting Limit 5 5 0 3 LCS Result 4.7	$ \begin{array}{c} 1.0 \\ 4, 60321516005 \\ 9 \\ \hline 1.0 \\ 0.20 \\ 1.0 \\ \hline LCS \\ \% Rec \\ \hline 94 \\ \hline \end{array} $	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110	09:31 zed 09:27 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride Fluoride	mg/L 3001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.24 <0.25	3 x: Water , 6032151600- Reporting Limit 5 5 0 3 LCS Result 4.7 2.7	1.0 ( 4, 60321516005 9 <u>MDL</u> 1.0 ( 0.20 0. 1.0 ( <u>LCS</u> % Rec 94 108	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110	09:31 zed 09:27 09:27 09:27	
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride Fluoride Sulfate	mg/L 5001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L mg/L mg/L mg/L	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.24 <0.25	3 x: Water , 6032151600- Reporting Limit 5 5 0 3 LCS Result 4.7 2.7	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 ( LCS 94 108 94 LCS	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110 90-110 90-110	09:31 zed 09:27 09:27 09:27	ers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride Fluoride Sulfate	mg/L 3001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L mg/L mg/L	<0.23 Matri 12, 60321516003 Blank Result <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.5 <0.	3 x: Water , 6032151600. Reporting Limit 5 5 0 3 LCS Result 4.7 2.7 4.7	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 ( LCS % Rec 94 108 94	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110 90-110	09:31 zed 09:27 09:27 09:27	ers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter Chloride Fluoride Sulfate	mg/L 5001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L mg/L mg/L mg/L	<0.23 Matri 12, 60321516003 Blank Result <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.23 <0.24 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.55 <0.55 <0.55 <0.55 <0.55 <	3 x: Water , 6032151600 Reporting Limit 5 5 0 3 LCS Result 4.7 2.7 4.7 LCS	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 ( LCS 94 108 94 LCS	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110 90-110 90-110	09:31 zed 09:27 09:27 09:27	ers
Sulfate METHOD BLANK: 2551117 Associated Lab Samples: 60321516 Parameter Chloride Fluoride Sulfate LABORATORY CONTROL SAMPLE: Parameter LABORATORY CONTROL SAMPLE: Parameter	mg/L 5001, 6032151600 Units mg/L mg/L 2548494 Units mg/L mg/L mg/L mg/L mg/L mg/L Mg/L mg/L mg/L M	<0.23 Matri 12, 60321516003, Blank Result <0.23 <0.23 <0.23 <0.23 <0.23 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.25 <0.55 <0.55 <0.55 <0.55 <0.55	3 x: Water , 6032151600 Reporting Limit 2 5 5 0 3 LCS Result 4.7 2.7 4.7 4.7	1.0 ( 4, 60321516005 9 MDL 1.0 ( 0.20 0. 1.0 ( LCS % Rec 94 108 94 108 94	0.23 12/02/19 , 60321516006 Analy 0.22 12/03/19 0.23 12/03/19 0.23 12/03/19 0.23 12/03/19 % Rec Limits 90-110 90-110 90-110 % Rec Limits	09:31 zed 09:27 09:27 09:27	ers

# REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



#### Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

LABORATORY CONTROL SAMPLE:	2551118					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	5	5.1	101	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SP	PIKE DUPL	ICATE: 2548	495		2548496							
			MS	MSD								
		60321515006	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	12.5	5	5	17.9	17.8	108	107	80-120	0	15	
Fluoride	mg/L	0.45	2.5	2.5	3.1	3.1	105	104	80-120	0	15	
Sulfate	mg/L	71.8	25	25	102	102	123	119	80-120	1	15	E,M1

MATRIX SPIKE & MATRIX SP	PIKE DUPLI	CATE: 2548		2548498								
			MS	MSD								
	6	60321516004	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	83.5	25	25	113	112	117	116	80-120	0	15	E
Fluoride	mg/L	0.33	2.5	2.5	3.0	2.9	105	104	80-120	1	15	
Sulfate	mg/L	185	100	100	229	251	44	65	80-120	9	15	M1

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.



### QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

### DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

**RPD** - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

### LABORATORIES

PASI-K Pace Analytical Services - Kansas City

### ANALYTE QUALIFIERS

- E Analyte concentration exceeded the calibration range. The reported result is estimated.
- H3 Sample was received or analysis requested beyond the recognized method holding time.
- H6 Analysis initiated outside of the 15 minute EPA required holding time.
- M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

### **REPORT OF LABORATORY ANALYSIS**



### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCL4A

Pace Project No.: 60321516

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60321513010	S-BMW-1S	EPA 200.7	624736	EPA 200.7	624858
60321513011	S-BMW-3S	EPA 200.7	624736	EPA 200.7	624858
60321516001	S-TMW-1	EPA 200.7	624739	EPA 200.7	624870
60321516002	S-TMW-2	EPA 200.7	624739	EPA 200.7	624870
60321516003	S-TMW-3	EPA 200.7	624739	EPA 200.7	624870
60321516004	S-UG-3	EPA 200.7	624739	EPA 200.7	624870
60321516005	S-SCL4A-DUP-1	EPA 200.7	624739	EPA 200.7	624870
60321516006	S-SCL4A-FB-1	EPA 200.7	624739	EPA 200.7	624870
60321513010	S-BMW-1S	SM 2320B	624580		
60321513011	S-BMW-3S	SM 2320B	624580		
60321516001	S-TMW-1	SM 2320B	624293		
60321516002	S-TMW-2	SM 2320B	624293		
60321516003	S-TMW-3	SM 2320B	624293		
60321516004	S-UG-3	SM 2320B	624293		
60321516005	S-SCL4A-DUP-1	SM 2320B	624293		
60321516006	S-SCL4A-FB-1	SM 2320B	624293		
60321513010	S-BMW-1S	SM 2540C	624081		
60321513011	S-BMW-3S	SM 2540C	624081		
60321516001	S-TMW-1	SM 2540C	624015		
60321516002	S-TMW-2	SM 2540C	624015		
60321516003	S-TMW-3	SM 2540C	624015		
60321516004	S-UG-3	SM 2540C	624015		
60321516005	S-SCL4A-DUP-1	SM 2540C	624015		
60321516006	S-SCL4A-FB-1	SM 2540C	624015		
60321513010	S-BMW-1S	EPA 300.0	625047		
60321513011	S-BMW-3S	EPA 300.0	625047		
60321516001	S-TMW-1	EPA 300.0	625048		
60321516002	S-TMW-2	EPA 300.0	625048		
60321516003	S-TMW-3	EPA 300.0	625048		
603215160 <b>0</b> 4	S-UG-3	EPA 300.0	625048		
60321516005	S-SCL4A-DUP-1	EPA 300.0	625048		
60321516006	S-SCL4A-FB-1	EPA 300.0	625048		

**REPORT OF LABORATORY ANALYSIS** 

		W0#:60321516
Pace Analytical Sample Condition	Upon Receipt	60321516
Client Name: Galder		
Courier: FedEx UPS VIA Clay		Pace 🗆 Xroads 🗹 Client 🗆 Other 🗆
Tracking #: Pa	ace Shipping Label Used	
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	1
Packing Material: Bubble Wrap D Bubble Bags		None 🗆 Other 🗆
Thermometer Used: 7-299 Type	of Ice: Wet Blue None	
Cooler Temperature (°C): As-read <u>2.2</u> Corr. Fa	ctor or Correcte	d Z.4 Date and initials of person examining contents: 3/1/5/19
Temperature should be above freezing to 6°C		
Chain of Custody present:	Tres ONO ON/A	
Chain of Custody relinquished:	Thes INO IN/A	
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):	TYes No DN/A	
Rush Turn Around Time requested:	TYes DNO DN/A	
Sufficient volume:		
Correct containers used:		
Pace containers used:		
Containers intact:		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?		
Filtered volume received for dissolved tests?		
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix:		
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) Cyanide water sample checks:	Yes No DN/A L	ist sample IDs, volumes, lot #'s of preservative and the ate/time added.
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/ ØN/A	
Samples from USDA Regulated Area: State:		
Additional labels attached to 5035A / TX1005 vials in the field Client Notification/ Resolution: Copy COC t		Field Data Required? Y / N
Person Contacted: Date/		
Comments/ Resolution:		
Project Manager Review: Janni Churh	Date:	– 11/20/19 – – – – – – – – – – – – – – – – – – –

.

.

.

.....

	nalytical	WWW.Decelebs.com
E	PaceAl	24

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Company: GC Address: 13			vequired Project Information:	יו האברו זי	Intormati	ion:					Invoice Information	Invoice Informatio	÷									Page:		of	-
	Golder Associates		Report To: Jeffrey Ingram	Jeffre	sy Ingra	am				Ath	Attention:							Г							-
	13515 Barrett Parkway Dr., Ste 260	ly Dr., Ste 260	Copy To:							රී	Company Name:	Name:											1		
Ba	Ballwin, MO 63021									Ad	Address:							2							
Email To: jef	jeffrey ingram@golder.com	er.com	Purchase Order No.	Order No						Pa	te Quote							. L		٦ ۲			L	URINKING WALER	WAIEK
Phone: 636-724-9191		Fax 636-724-9323	Project Name:		Amerer	Ameren Sioux Energy Cen	Energy C	center SCL4A	L4A	Pal	Pace Project		Jamie Church	Jurch					Site Location						
Requested Due Date/TAT:	ate/TAT: Standard		Project Number.	nber.						Par	Pace Profile #.	1 12	9285						STATE:	l ju	MO				
										-					F	A.	saups	ted An	alvsis F	Requested Analysis Filtered (Y/N)	IN.				
Section Required	Section D Required Client Information	Valid Matrix Codes MATRIX COI	odes CODE		(aw		COLLECTED	CTED		-	-	Pre	Preservatives	ives	<b>1</b> N /A	Z	z	z							
		DRINKING WATER WATER WASTE WATER PRODUCT SOIL/SOLID	WW WW SI	) seboo bilav e	ор=р вая	COMPOSITE START	ш	COMPOSITE END/GRAB	We	гестіои												(N//			
WITEM #	SAMPLE ID (A-Z, 0-9/) Sample IDs MUST BE UNIQUE	5	48 P 01 8							OF CONTAINERS	npreserved	00 <sup>3</sup> \$20	ଞ୍ଚ <del>ପା</del> CI	ethanol s2S <sub>2</sub> O <sub>3</sub>	ther Analysis Test <b>I</b>	*slate	)S Sloride/Fluoride/	kalinity				() eninolital Chlorine ()	l 0321512	1512	
-	S-TMW-1	1VI	1	-	-	DATE	TIME	DATE	TIME		n -		н	N	-	W		IA				ษ	Pace P	Pace Project No./ Lab I.D.	o./ Lab I
2	S-TMW-2	W-2		-					11	8 0	-	-			T			3			-				8
m	S-TMW-3	W-3		-	0				25	10	-						5	1							
4	S-UG-3	6-3		WT 0	U	1		14	644	G	-	-			Γ	2	7	1							3 8
S	S-SCL4A-DUP-1	V-DUP-1		۲.	U	-		-	-	n	-	-				5	1	3							
9	S-SCL4A-FB-1	A-FB-1		M	U	1			212	a		-				2	2	2							
7	SM.			MT 0	U	-		1	454	a	-	-	-			7	2	2							
80	MSD	~		WT 0	ß			-1	1	C		-				2	2	1							8
6				MT 0	U	-				-	1,	-			1	L		-							
10					U				312	-					Г	E									
11				WT 0	U		-			-					et s	L	-								
12				WT 0	U		-			-		-			Г	L									
	ADDITIONAL COMMENTS	VTS		RELINC	QUISHE	RELINQUISHED BY / AFFILIATION	FILATION		DATE		TIME	-		ACCEP	TED BY	ACCEPTED BY / AFFILIATION	LIATION		DATE	TIME	- u		SAMPLE	SAMPLE CONDITIONS	SNO
EPA 200,7: B, Ca,	*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na		Annie	7.	Uwh	NWNIBarth	1 / Galde		-15-19		1540		M	B	a	MM	NOW		1115	154	10	-	-		
			(MVVQ)	60	Z	WM	CINA	2	1112		5	5	G	>W	The second	a			Set filler	0226	2	2	2	2	X
						ts	AMPLER	SAMPLER NAME AND SIGNATURE	) SIGNAT	URE		_										$\vdash$		( pe	to
							H H	PRINT Name of SAMPLER:	f SAMPLE	i iii	TUP		Wig	A,16	D		DATE Simed			10	1	O° ni qme	сеіvеd оі (V\Y) ез	tody Seal	nples Inta (Y/N)
	SIGNA						5	SIGNATURE OF SAMPLER:	I SAMPL	R: C	<b>WULL</b>			1NI	R	WW)	(WW/DD/WW)	3	7	2		-		o Sn O	ns2

.

Pace Analytical Sample Condition U	lpon Receipt	WO#:60321513
Tracking #:       Pac         Custody Seal on Cooler/Box Present:       Yes I         No I       Packing Material:         Bubble Wrap I       Bubble Bags I	fice: Wet Blue N	No  None  Other  Date and initials of person
Temperature should be above freezing to 6°C		6.0, 63 (Channing contents. // //2//7
Chain of Custody present:		
Chain of Custody relinquished	/ Chres INO IN/A	
Samples arrived within holding time:	Vies INO IN/A	
Short Hold Time analyses (<72hr):	DYes No DNA	
Rush Turn Around Time requested:		
	11	
Sufficient volume:		
Correct containers used:	′ ØYes □No □N/A 1	
Pace containers used:	/ DYes No N/A	
Containers intact:		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?		
Filtered volume received for dissolved tests?	UYes DNO DN/A	
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix:		
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	Yes INO IN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	DYes DNo DN/A	
Headspace in VOA vials ( >6mm):		8
Samples from USDA Regulated Area: State:	Dyes DNO DN/A	
Additional labels attached to 5035A / TX1005 vials in the field?		
Client Notification/ Resolution: Copy COC to	Client? Y 1 N	Field Data Required? Y / N
Person Contacted: Date/T	ime:	:
Comments/ Resolution:		

Project Manager Review:

Janui Churh

-

\_ 11/20/19 Date

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

	E
	ica s co
	No.
	Analytical
~	e
( )	ac
0	7
	1

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

	www.pacelabs.com																						
Section A Required C	Section A Required Client Information:	Section B Required Project Information:	ct Info	irmation:					Sectu	Section C Invoice Information:	ation:					1			Page:	e:	of	ų.	X
Company:	ny: Golder Associates	Report To: Jeffrey Ingram	ffrey I	Ingram					Attention:	ion:													
Address:	s: 13515 Barrett Parkway Dr., Ste 260	Copy To:							Comp	Company Name:	Je:					REG	SULATO	REGULATORY AGENCY	сY			8	-
	Ballwin, MO 63021								Address:	ss:						L	NPDES	T GRO	GROUND WATER	ATER	- DRIN	DRINKING WATER	ATER
Email To:	o: jeffrey ingram@golder.com	Purchase Order No :	r No :						Pace Quote Reference:	Quote							UST	RCRA	٨	۲.,	- OTHER	н.	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	A	Jeren S	Ameren Sioux Energy Center S(	<b>IV Cent</b>	er SCPB		Pace	Pace Project	Jamie	Jamie Church				Sit	Site Location						
Reques		Project Number.							Pace F	Manager. Pace Profile #:	9285						STATE:		MO				
												-		R	equest	ed Anal	ysis Filte	Requested Analysis Filtered (Y/N)	211				
	Section D Valid Matrix Codes Resulted Client Information MATRIX COL				CO	COLLECTED	 				Preservatives	/atives	∎ N /A		z z	z							
			KAB C=CO		COMPOSITE START		COMPOSITE	TECTION		0			-dimensional		-Sulfate					(N/4)			
1	SamPLE ID (A-Z, 0-9 /,-) Sample IDs MUST BE UNIQUE	AR AR TS TS						CO TA MAT 3.	SABNIATNOC	¢ pərrəs		5O3			ide/Fluoride	٦ity				dual Chlorine	40321513	n Võ	
# MƏTI		ATAM		DATE	TE TIME		DATE	IGM 42		angnU O2 <sub>s</sub> H	HCI HИO <sup>3</sup>	HOBN S <sub>2</sub> 6N Metha	Ofper	Metal	TDS Chlor	ilsala			0		Pace Project No./ Lab I.D.	ect No./	Lab I.D.
-	S-LMW-1S	ΤW	0	-			1-5-19 13	14	n	-	-			2	1	7							100
. ~	S-LMW-2S	3	<u> </u>	1			12	100	0	1				7	7	5							La Car
6	S-TMM-3S	WT	D L C	-			1/1	5	n	-	-			2	7	2				_			500
4	S-LMW-4S	WT	л С				12	64	0	-	-			2	7	2				_			no
u)	S-LMW-5S	3	MT G	(1)			1050	3	n	-	-		-	2	<i>,</i> <i>,</i> <i>,</i>	2				_			500
9	S-LMW-6S	3	MT G	()	_		11	20	3	-	-		1	7	7	2				_			Ble
7	S-LMW-7S	5	о Т	(1)	/		3	M	a	-	-			7	7	2		_		_			22
80	S-LMW-8S	\$	MT 0	U	-		3	331	3	-	-	_	-	2	7	7	_		+	_			AND
σ	S6-MM-S	\$	MT 0	U	_			AIB	n	-	-		1	5	2	> >	_						602
10	S-BMW-1S	5	٥ ۲	U	-	Âu	2-15 14	1443	3	-	-	_		21	7			_	-	_			ØC
11	S-BMW-3S	5	۲ ۲	U	-	×.	101 2017	×	69	-	-		T	2		2			-	_			10
12	S-LMW-DUP-1	s	WT 0	U		7	1		ሳ	-	-			>		5		_		_			az
	ADDITIONAL COMMENTS	R	ELING	JUISHEL	RELINQUISHED BY / AFFILIATION	ATION		DATE		TIME		ACCE	EPTED I	3Y / AF	ACCEPTED BY / AFFILIATION	N	DATE	TIME		ŝ	SAMPLE CONDITIONS	ONDITION	s
*EPA	•EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na	Annir Munitarth	R	Inhi		Craider	11	-12-11	9 15	(1hSI	M	Angele	20	MOWDA	1m		11-15-10	15.4	5		_		
		amaela	Ø	ANCI	MUMMAUN	Ň	Ξ	1-15-19		15:45	V	1		(A)	1		4/1000	873	5 30	-\	$\lambda$		
		1							•										2.2	10			
Pag		_			SAM	PI FR N	SAMPI FR NAME AND SIGNATURE	SIGNAT	URE										C	uo	-	(N	loe)
je 32					5	PRINT Nai	T Name of	me of SAMPLER:	R: Ann	0.24	Inchild	ach .							i₀ uj du	p bevie	(N/Y) (	ler (Y/	ni sek (N/Y)
? of 3						SIGN	SIGNATURE of SAMPLER:	SAMPLE		ulo.	Made	ATT -		05	DATE Signed (MM/DD/YY):	SI-II and	15-19		neT	рея		000	
3										-	ions my								A-1	E-AII-0-020rev 08		12-Oct-2007	17

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

"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.

li	tical
I	Bbs com
E	Pace Analytical

18

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Page: 2		REGULATORY AGENCY	NPDES CEROUND WATER DRINKING WATER	UST RCRA OTHER	Jamie Church Site Location MO	STATE:	Requested Analysis Filtered (Y/N)	
Section C Invoice Information:	Attention:	Company Name:	Address:	Pace Quote Reference:	Pace Project Jamie Manager:	Pace Profile #: 9285		
Section B Required Project Information:	Report To: Jeffrey Ingram	Copy To:		Purchase Order No :	Project Name: Ameren Sioux Energy Center SCPB	Project Number:		,) ,) ,
Sec Req		13515 Barrett Parkway Dr., Ste 260 Cop	63021	jeffrey ingram@golder.com Pun	Fax: 636-724-9323 Proj	Standard		Valid Matrix Codes
Section A Required Client Information:	Company: Golder Associates	Address: 13515 Barre	Ballwin, MO 63021	Email To: jeffrey ingra	Phone: 636-724-9191	Requested Due Date/TAT:		Section D



### **MEMORANDUM**

Project No. 153140601

DATE January 10, 2020

- TO Project File Golder Associates
- **CC** Amanda Derhake, Jeff Ingram
- **FROM** Tommy Goodwin

EMAIL Tommy\_Goodwin@golder.com

### DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – DATA PACKAGE 60321516

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

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

### **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

	ny Name: Golder Associates		Proj	ect Manag	er: JIngram
	Name: Ameren - Sioux - SCL4A				er:
Review	er: T Goodwin		Valie	dation Date	e:
Labora	tory: Pace Analytical - KS		SDG	; #: 603215	16
	cal Method (type and no.): EPA 200.7 (Metals); SM 2	320B (Alk)	; SM 2540	C (TDS); E	PA 300.0 (Anions)
	🗌 Air 🗌 Soil/Sed. 🔳 Water 🗌 Waste				
Sample	Names <u>S-TMW-1, S-TMW-2, S-TMW-3, S-UG-3, S-SC</u>	L4A-FB-1,	S-SCL4A-	DUP-1, S-B	MW-1S, S-BMW-3S, MS
NOTE:	Please provide calculation in Comment areas	or on the	back (if	on the bac	ck please indicate in comment areas).
Field Ir	nformation	YES	NO	NA	COMMENTS
a)	Sampling dates noted?	×			11/14-15/2019
b)	Sampling team indicated?	×			
c)	Sample location noted?	×			
d)	Sample depth indicated (Soils)?			×	
e)	Sample type indicated (grab)composite)?	×			
f)	Field QC noted?	×			
g)	Field parameters collected (note types)?	×			pH, Sp.Cond, ORP, Temp, DO, Turb
h)	Field Calibration within control limits?	×			
i)	Notations of unacceptable field conditions/perform	nances fro	om field le	ogs or field	notes?
			×		
j)	Does the laboratory narrative Indicate deficiencie	s? 🗌		×	
	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?		×		Page 2 of COC not completed/signed by field staff
c)	Were samples received in good condition?	x			
Genera	al (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?		×		See Notes
c)	Were the correct preservatives used?	×			

e) Were appropriate reporting limits achieved?f) Were any sample dilutions noted?

1)	were any sample dilutions noted?	
g)	Were any matrix problems noted?	

d) Was the correct method used?

x

See Notes

x

x

x

Revised May 2004

### **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

Blanks		YES	NO	NA	COMMENTS
a)	Were analytes detected in the method blank(s)?	×			See Notes
b)	Were analytes detected in the field blank(s)?	×			See Notes
c)	Were analytes detected in the equipment blank(s)?			×	
d)	Were analytes detected in the trip blank(s)?			×	
Labora	tory 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?	×			
Duplica	ates	YES	NO	NA	COMMENTS
a)	Were field duplicates collected (note original and du				DUP-1 @ S-TMW-2
,		×			FB-1 @ S-TMW-3
b)	Were field dup. precision criteria met (note RPD)?	×			See Notes
c)	Were lab duplicates analyzed (note original and du		samples)?		
,		×			-16004 (Alk, TDS); -13010 (Alk)
d)	Were lab dup. precision criteria met (note RPD)?	×			See Notes
Blind S	itandards	YES	NO	NA	COMMENTS
a)	Was a blind standard used (indicate name,		×		COMMENTS
	analytes included and concentrations)?				
b)	Was the %D within control limits?			×	
	Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS See Notes
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?	x			

### Comments/Notes:

FB-1: TDS	6 (10.5)
MB: -1301	0-11: Fe (21.5)
MS/MSD:	-13010: Ca_MS-L (26% of 70-130%); -16004: Ca_MS/MSD-H (170/190% of 70-130%)
	-16004: CI (Exceed MS/MSD Cal Range) no qualification necessary; SO4_MS/MSD-L (44/65% of 80-120%)
Max Field	Duplicate RPD: 7.4% (Limit 20%); Max Lab Duplicate RPD: 1% (Limit 10%)
Hold Time	: Ferrous Iron (-16007); no qualification necessary (MS sample)
Dilution: C	hloride and Sulfate diluted in several samples; no qualification is necessary.

### **QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST**

### Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-UG-3	Calcium (Ca)	135,000	J	MS/MSD Exceeded QC Range
11	Sulfate (SO4)	185	J	11
S-BMW-1S	Са	149,000	J	MS Exceeded QC Range
	1			
				<u>_</u>
		. /	<u> </u>	
_		//		1 1

5m / 400/ // Date: 1/9/2020 Signature: 🗡

Revised May 2004

APPENDIX B

Alternative Source Demonstration-August 2019 Sampling Event



# REPORT SCL4A - Alternative Source Demonstration

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

Submitted to:

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

Submitted by:

### Golder Associates Inc.

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

+1 314 984-8800

153-140601

January 2020

# Table of Contents

1.0	CERTIFICATION STATEMENT1							
2.0	INTRODUCTION							
3.0	SITE	DESCRIPTION AND BACKGROUND2						
	3.1	Geological and Hydrogeological Setting2						
	3.2	Utility Waste Landfill Cell 4A – SCL4A						
	3.3	CCR Rule Groundwater Monitoring						
4.0	REVIE	EW OF THE STATISTICALLY SIGNIFICANT INCREASES4						
5.0	EVIDE	ENCE OF SSI FROM ALTERNATIVE SOURCE5						
	5.1	CCR Indicators						
	5.2	SSIs at UG-36						
	5.2.1	Boron Concentrations6						
	5.2.2	Calcium Concentrations8						
	5.2.3	Chloride Concentrations8						
	5.2.4	Total Dissolved Solids (TDS) Concentrations						
	5.3	SSIs at TMW-2						
	5.3.1	Sulfate Concentrations						
	5.3.2	Total Dissolved Solids (TDS) Concentrations10						
6.0	DEMO	ONSTRATION THAT SSI WERE NOT CAUSED BY SCL4A IMPACT10						
7.0	REFE	RENCES12						

### Tables

- Table 1 Review of Statistically Significant Increases
- Table 2 Types of CCR and Typical Indicator Parameters
- Table 3 Major Cation and Anion Concentrations

### **Figures**

- Figure 1 Site Location and Aerial Map
- Figure 2 UG-3 Boron Timeseries Plot
- Figure 3 Background Groundwater and Pore-Water Piper diagram
- Figure 4 Comparison of UG-3 Groundwater Chemistry Over Time
- Figure 5 Comparison of UG-3 Path and Monitoring Wells Towards the SCPA
- Figure 6 UG-3 Time Series Plot for Calcium
- Figure 7 UG-3 Time Series Plot Comparing Chloride and Sodium
- Figure 8 Time Series Plot for Boron Concentrations
- Figure 9 Time Series Plot of Sulfate Concentrations South of SCL4A
- Figure 10 Pre-CCR Sulfate Plots Downgradient Monitoring Wells
- Figure 11 Time Series Plot for Total Dissolved Solids

### **1.0 CERTIFICATION STATEMENT**

This SCL4A – Alternative Source Demonstration, Sioux Energy Center, St. Charles County, Missouri, USA has been prepared to comply with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this SCL4A – Alternative Source Demonstration, Sioux Energy Center, St. Charles County, *Missouri, USA* located at 8501 Missouri 94, West Alton, Missouri 63386 has been prepared to meet the requirements of 40 CFR §257.94(e)(2).

### GOLDER ASSOCIATES INC.



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

Principal, Practice Leader



### 2.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this SCL4A – Alternative Source Demonstration has been prepared to document an Alternative Source Demonstration (ASD) for Statistically Significant Increases (SSIs) calculated at Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) Cell 4A - SCL4A. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused the SSIs and that the apparent SSIs were the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

### 3.0 SITE DESCRIPTION AND BACKGROUND

Ameren owns and operates the SEC in St. Charles County, Missouri located approximately 12 miles westnorthwest of the confluence of the Mississippi and Missouri Rivers. **Figure 1** depicts the site location and layout, including the location of the SCL4A. The SEC is approximately 1,025 acres and is located in the floodplain between the Mississippi and Missouri Rivers. The SEC is bounded to the north by wooded areas associated with the Mississippi River. The property is bounded to the south by a railroad. The SEC is bounded to the east and west by agricultural fields.

### 3.1 Geological and Hydrogeological Setting

The SCL4A lies between the Mississippi River to the north and the Missouri River to the south. Flow and deposition from these rivers have resulted in thick alluvial deposits which lie unconformably on top of bedrock. These alluvial deposits, which can range from approximately 100 to 130 feet thick, make up the uppermost aquifer called the alluvial aquifer. Overall, this aquifer is described as a fining upwards sequence of stratified sands and gravels with varying amounts of silts and clays. Drilling in the alluvial aquifer identified different sub-units, including floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of these alluvial deposits are highly variable.

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

### 3.2 Utility Waste Landfill Cell 4A – SCL4A

UWL Cell 4A is referred to by Ameren as the SCL4A, or "Landfill Cell 4A." The SCL4A is approximately 15 acres in size and is located south of the generating plant on the south side of Highway 94 (**Figure 1**). The CCR Unit manages Coal Combustion Residuals (CCR) from the SEC including "fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels" (Gredell and Reitz & Jens, 2014). These wastes are managed using a dry disposal



process and are moisture conditioned (30-40% moisture content) to minimize dust and ease in disposal. The CCR waste is trucked across highway 94 from the plant and disposed of in the SCL4A.

The SCL4A was constructed with a composite liner system consisting of two feet of compacted clay soil with a hydraulic conductivity of less than 1 X 10<sup>-7</sup> centimeters per second (cm/sec) overlain by a 60-mil HDPE

geomembrane liner. Information on the design of the UWL is available in the 2014 Proposed Construction Permit Modification, Construction Permit Number 0918301 (Gredell and Reitz & Jens, 2014).

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

The permit for the Sioux UWL was issued July 30, 2010 (permit #0918301) for the SCPC (Cell 1). Nine (9) sampling events were performed prior to July 30, 2010 and represent groundwater quality prior to CCR placement in the SCPC. The SCL4A was the second cell that was constructed at this UWL. The SCL4A construction was not completed until 2014 and no CCR was placed in the unit until after the final revisions to the Proposed Construction Permit Modification on August 16, 2014. The results from these pre-disposal monitoring events are used in conjunction with other site information in the ASD presented below.

### 3.3 CCR Rule Groundwater Monitoring

As required by the CCR Rule, the following were completed prior to the October 17, 2017 deadline; (1) a groundwater monitoring well system was installed and certified by a Professional Engineer, (2) a Statistical Method Certification was prepared and certified by a Professional Engineer, (3) a Groundwater Monitoring Plan (GMP) was prepared recording the design, installation, development, sampling procedures, as well as statistical methods, and placed in the owner's operating record, and eight (8) baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of the CCR Rule.

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

Between May 2016 and June 2017 eight (8) baseline sampling events were completed for the SCL4A. After baseline sampling, the first Detection Monitoring event was completed in November 2017 and Detection Monitoring has continued on a semi-annual basis thereafter. Laboratory testing was performed for the following Appendix III constituents during Detection Monitoring:

- Boron
- Calcium
- Chloride
- 🔹 pH
- Sulfate
- Total dissolved solids (TDS)
- Fluoride

In January 2018, background results from the eight (8) baseline sampling events were used to calculate statistical upper prediction limits (UPLs). These UPLs were then compared to the Detection Monitoring results from the November 2017 samples. If results from Detection Monitoring were higher than the calculated UPL, it was considered an initial exceedance, in which case a verification sample was then collected and tested in accordance with the SCL4A Statistical Analysis Plan. During this process, no Statistically Significant Increases (SSIs) were identified.

In May 2018, another Detection Monitoring event was completed, and three (3) initial exceedances were identified including chloride at UG-3; as well as sulfate and TDS at TMW-2. Verification sampling results confirmed all three (3) SSIs. All three (3) SSIs were determined to be from an alternate source. The ASD for the May 2018 sampling event can be found in the 2018 Annual Report for the SCL4A. In November 2018, another Detection Monitoring event was completed, and one (1) initial exceedance was identified, sulfate at TMW-2. Verification sampling did not confirm the SSI and no SSIs were identified for the November 2018 event.

In May 2019, another Detection Monitoring event was completed, and six (6) initial exceedances were identified including boron, calcium, chloride, and TDS at UG-3; as well as sulfate and TDS at TMW-2. Verification sampling results confirmed all six (6) SSIs.

### 4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

Two (2) monitoring wells had confirmed SSIs during the August 2019 sampling event; boron, calcium, chloride, and TDS at UG-3 and sulfate and TDS at TMW-2. UG-3 and TMW-2 are screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown on **Figure 1**, UG-3 is located north of the SCL4A while TMW-2 is located to the south of the SCL4A. Both monitoring wells are south of Highway 94, the generating plant, and the two (2) surface impoundments near the plant (SCPA and SCPB).

Based on Golder's review of the pre-disposal data discussed in Section 3.2 above and our comparison of those pre-disposal data with the results from the eight (8) CCR-rule baseline events, it was concluded that the groundwater at the SCL4A contained low-level pre-existing impacts from CCR that pre-dated SCL4A operation. As a result of these pre-existing impacts, the SCL4A statistical analysis plan uses intrawell UPLs to determine SSIs. Intrawell UPLs are calculated from historical data within a particular well, and not by pooling data from the background wells, such that individual limits are calculated for each constituent in each well in the monitoring program.

The intrawell UPLs for the SSIs in question are provided below in **Table 1**. This table also displays the range of values obtained during baseline sampling and the values obtained since baseline sampling as a part of the Detection Monitoring program.

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	Baseline Sampling Event Range	State UWL Program Sampling Events Range	August 2019 Results	October 2019 Results
Boron (µg/L)	UG-3	896.5	1027	218 J - 696	72.5 - 906	1040	1120
Calcium (µg/L)	UG-3	154,345	160,085	103,000 - 144,000	99,500 - 183,000	159,000	163,000
Chloride (mg/L)	UG-3	78.76	102.2	28.9 - 71.9	17 - 98	85.0	81.2
Total Dissolved Solids (mg/L)	UG-3	658.7	698.7	426 - 585	424 - 626	710 J	724
Sulfate (mg/L)	TMW-2	37.9	52.1	30.0 - 35.5	N/A	52.1	75.6
Total Dissolved Solids (mg/L)	TMW-2	476.5	495.8	403 - 450	N/A	481 J	512

**Table 1: Review of Statistically Significant Increases** 

Notes:

- 1) mg/L milligrams per liter.
- 2) µg/L micrograms per liter.
- 3) UPL upper prediction limit.
- 4) UPLs calculated using Sanitas<sup>tm</sup> software.
- 5) N/A Not Applicable.
- 6) UWL Utility Waster Landfill.

### 5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

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

- Documentation of pre-existing, low level concentrations of CCR indicators in groundwater that pre-date the SCL4A operation especially on the northern side of the SCL4A.
- Review of concentrations in nearby and background monitoring wells.
- Documentation of the construction of the SCL4A with a 60-mil geomembrane liner and a 2-foot thick clay barrier.
- Preparation of geochemical models displaying groundwater chemisties between the different wells and sources.
- Use of road salt on Highway 94 located near UG-3.

### 5.1 CCR Indicators

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

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.	<ul> <li>Boron</li> <li>Molybdenum</li> <li>Lithium</li> <li>Sulfate</li> </ul>
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.	<ul> <li>Bromide</li> <li>Potassium</li> <li>Sodium</li> <li>Fluoride</li> </ul>
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.	<ul> <li>Sulfate</li> <li>Fluoride</li> <li>Calcium</li> <li>Boron</li> <li>Bromide</li> <li>Chloride</li> </ul>

### Table 2: Types of CCR and Typical Indicator Parameters

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 SSIs at UG-3

### 5.2.1 Boron Concentrations

Boron is a 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.

**Figure 2** displays a plot of boron concentrations over time compared to CCR placement in the SCL4A. Prior to CCR being placed in the unit, boron concentrations began to increase and have continued to be detected since that time. While this does not confirm the source of the impacts, it would be expected that if impacts were from the SCL4A that the increase in boron concentrations would occur after CCR was placed in the unit.

In 2018, an ASD was completed for the SCPB (fly ash pond) unit to the north of the SCL4A and is available in the 2018 Annual Report for the SCPB. In that ASD, pore-water samples were collected from the SCPA and SCPB,

and samples were collected in the shallow, intermediate (middle) and deep zones of the alluvial aquifer just outside of the two units. From this ASD, it was determined that CCR impacts found directly outside of the SCPB are from the SCPA and not the SCPB because impacts were present at their highest concentrations at deeper depths and the groundwater chemistry similarities between the waters of the SCPA and the impacted wells. The SCPB ASD concluded these deeper impacts are from the SCPA because the SCPA is an unlined CCR unit that extends approximately 70 feet below ground surface, while the SCPB is a CCR Unit that has a liner and is much shallower. Therefore, if impacts were from the SCPB, the impacts would be expected to be concentrated in the shallow zone of the alluvial aquifer, whereas impacts from the SCPA would be present across all zones of the alluvial aquifer.

A Piper diagram is a graphical technique used to classify different groundwater chemistry. These ternary diagrams use major cation and anion concentrations to plot the data. In addition to showing instantaneous concentrations, Piper diagrams can be used to determine if groundwater chemistry is changing, either spatially or temporally. **Figure 3** displays a piper diagram from the November 2017 SCPB ASD report that compares the water chemistry of background, SCPA pore-water, and SCPB pore-water. As shown on **Figure 4**, when 2006 results from PZ-36 (a monitoring well near the location of UG-3 installed as part of the DSI prior to any UWL construction, see **Figure 1**) are compared to this chart, they plot in the background area of the diagram. Since 2006, there have only been four (4) samples at UG-3 that have collected all the major cations and anions required to generate a piper diagram. These four (4) samples were collected and tested in 2017 to 2019. When results from these sampling events are plotted on a piper diagram, they display a change from the background groundwater chemistry and have increasing concentrations of pore-water constituents derived from the SCPA. This shift in groundwater chemistry indicates that impacts present in UG-3 are from the SCPA.

In 2018 and 2019, the SCPA moved from Assessment Monitoring into Corrective Action and an investigation into the nature and extent of impacts from the SCPA was completed. As a part of this investigation, samples were collected in the shallow, middle, and deep zones of the alluvial aquifer in multiple locations around the site. One set of piezometers (TP-5) was installed approximately 1,000 feet to the west of UG-3. In the TP-5 piezometers, boron concentrations ranged from 211-263  $\mu$ g/L in the shallow zone of the alluvial aquifer, 3,120-3,190  $\mu$ g/L in the intermediate zone and 5,460-5,780  $\mu$ g/L in the deep zone of the alluvial aquifer.

This increase in boron concentration with depth at TP-5 is indicative of impacts from the SCPA rather than the SCPB, SCPC or SCL4A because the SCPA is unlined and extends downward 70 feet below ground surface, whereas the SCPB, SCPC and SCL4A are constructed with a liner system with a base elevation above the natural groundwater table. If impacts were from the SCL4A, the greatest impacts would be expected in the shallow zone of the alluvial aquifer and would dilute and be expected to decrease with depth. Results from the nature and extent investigation further indicate that impacts in the alluvial aquifer at the SEC are from the SCPA and not the other lined units. Additionally, as displayed in **Figure 5**, when monitoring wells between the SCPA and UG-3 (TP-5S, TP-5M, TP-5D, LMW-5S, LMW-6S and LMW-2S) are plotted on a piper diagram, their trends are similar to UG-3 over time.

Based on the historical trend of boron increasing prior to CCR being placed in the unit and the investigation of impacts from the SCPA, the evidence suggests that the SSI for boron at UG-3 is from CCR impacts from the SCPA and not from the SCL4A.

### 5.2.2 Calcium Concentrations

Calcium is not known to be a key indicator of fly ash or boiler slag/bottom ash (EPRI 2012, EPRI 2017), but can be an indicator for FGD type wastes. At the SEC, FGD waste is managed in the nearby SCPC unit to the west of the SCL4A, therefore, elevated concentrations in calcium alone are not a good indicator of CCR impacts from the SCL4A.

During the August 2019 Detection Monitoring event, the calcium concentration for UG-3 was 159,000  $\mu$ g/L, which was confirmed by a value of 163,000  $\mu$ g/L during the verification sampling. As displayed on **Figure 6**, the initial intrawell UPL for calcium at UG-3 is 154,345  $\mu$ g/L and was calculated using the results of the eight initial CCR Rule baseline sampling events that ranged from 103,000 to 144,000  $\mu$ g/L. The UPLs were updated after the August 2019 sampling event as outlined by the Statistical Analysis Plan. The updated UPL value that will be used for UG-3, starting with the November 2019 sampling event, is 160,085  $\mu$ g/L.

**Figure 6** shows a time series plot of calcium at UG-3 and compares data from historic State UWL sampling and CCR Rule sampling. Current calcium concentrations in monitoring well UG-3 are similar to or lower than those reported prior to the operation of the SCL4A. If only the data collected in the state program prior to the receipt of CCR was used to calculate the prediction limit, the resulting limit would be 188,523  $\mu$ g/L, which is well above the August value of 159,000  $\mu$ g/L.

Based on these data, the variability in calcium concentrations over time is not a result of CCR influence on the groundwater from the SCL4A. The SSI is likely a result of geochemical variability of the aquifer and the limited sample set used for UPL calculation.

### 5.2.3 Chloride Concentrations

Chloride is not known to be a key indicator of fly ash or boiler slag/bottom ash (EPRI 2012), but can be an indicator for FGD type wastes and is commonly found near salt and brine treated roadways. At the SEC, FGD wastes are managed in the SCPC, located west of the SCL4A. Concentrations for the August 2019 sampling event and subsequent verification sampling event are 85.0 and 81.2 milligrams per liter (mg/L), respectively. These values are just above the original calculated UPL of 78.76 mg/L for chloride concentrations at UG-3. This UPL was calculated based on eight baseline sampling events collected in 2016 and 2017 during which time chloride concentrations ranged from 28.9 to 71.9 mg/L. Historically, including state sampling results dating back to June 2008, chloride concentrations have ranged from 17 to 98 mg/L at UG-3. This range during baseline and state sampling events demonstrates that the variability of chloride concentrations at UG-3 is large and the SSI sampled in August 2019 is not out of the typical range for chloride values at this well.

Road salt (NaCl) applied to roadways for ice control is a common alternative source for elevated chloride concentrations. UG-3 is located within 200 feet to the south (downgradient) of Highway 94. **Figure 7** displays a multi-constituent time series plot comparing chloride and sodium values which are the common constituents in road salt. The results from this plot display a good correlation between sodium and chloride and show that these results typically spike and decline together, indicating that these two constituents are moving together through the aquifer. The correlation and seasonal spikes associated with this data are a very clear indication that elevated chloride levels in UG-3 are caused by the road salt application on nearby Highway 94, which subsequently dissolves and infiltrates into the shallow alluvial aquifer. SCL4A is not the source for chloride concentrations in UG-3.

Additionally, as displayed in **Figure 4** and **Table 3**, as impacts from the SCPA have migrated toward UG-3, the groundwater chemistry in UG-3 has increasingly shown signature of that of the SCPA pore-water. As a part of this shift, sulfate, chloride, calcium and magnesium concentrations are becoming a higher percentage of the cation and anion balance for the water and may result in higher concentrations of chloride.

### 5.2.4 Total Dissolved Solids (TDS) Concentrations

TDS alone is not known to be a CCR or FGD indicator (EPRI 2017, EPRI 2012). The concentration of TDS is largely based on the concentration of major ions in groundwater (calcium, magnesium, sodium, potassium, carbonates, chloride, sulfate, etc.). Although TDS alone is not a key indicator of CCR impacts, an increase in some of the major ions can represent CCR impacts.

During baseline sampling at UG-3, TDS results ranged from 426-585 mg/L. During the August 2019 sampling event, TDS was higher at 710 mg/L and 724 mg/L during the subsequent verification sample. Results from the State UWL sampling ranged from 430-626 mg/L prior to the receipt of CCR at the SCL4A.

A review of the major cations and anions (**Table 3**) shows increases in calcium, magnesium, chloride, and sulfate and decreases in alkalinity, potassium and sodium between the November 2018 and August 2019 sampling events. As displayed on **Figure 4**, as groundwater chemistry shifts from background concentrations toward that of the SCPA, an increase in sulfate, chloride, calcium and magnesium would be expected. As discussed above in section 5.2.1, nature and extent investigation results display impacts from the SCPA in monitoring well UG-3. Based on this information, the increase in TDS is not from impacts from the SCL4A, but rather from migrating impacts from the SCPA.

### 5.3 SSIs at TMW-2

### 5.3.1 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 would increase following placement of CCR. Additionally, if sulfate values were to increase, it would be expected that boron values would increase as these two are typically the first indicators of any CCR impacts. **Figure 8** displays that boron concentrations have remained relatively constant throughout the sampling period at TMW-2 and are in the same range as those from the background monitoring wells.

As displayed on **Figure 9**, during baseline sampling at TMW-2, sulfate ranged from 30.0-35.5 mg/L. During the August 2019 sampling event, sulfate was higher at 52.1 mg/L and 75.6 mg/L during the subsequent verification sampling. There are two monitoring wells located with 350 feet to the east and west of TMW-2 as displayed in **Figure 1**; TMW-1 (west) and TMW-3 (east). In these monitoring wells, sulfate concentrations ranged from 23.2 to 60.9 mg/L during the baseline sampling event, and UPLs for these monitoring wells are 46.3 mg/L at TMW-1 and 63.5 mg/L at TMW-3. Based on the sulfate concentration range of the nearby wells, the concentration of the August 2019 SSI at 52.1 mg/L is within the range of results from the adjacent wells. Based on this information, the SSI is likely caused by a limited dataset that didn't capture the geochemical variability within the shallow zone of the alluvial aquifer during the baseline sampling or migration of nearby concentrations.

To further investigate the geochemical variability of sulfate in this area, a review of the data in the state UWL wells located on the south side of the UWL (DG wells, outside of impact from the SCPA) prior to the receipt of CCR at the SCL4A was completed. These monitoring wells are screened at approximately the same depth as TMW-2 in the shallow zone of the alluvial aquifer. **Figure 10** displays a box and whisker plot of the natural variability of sulfate concentrations within the alluvial aquifer prior to the receipt of CCR in the SCL4A for these wells. Additionally, when just the results prior to the receipt of CCR are used to calculate a UPL from the DG wells, the calculated UPL is 83 mg/L. Based on these results, the sampling results from TMW-2 are within these limits prior to the receipt of CCR.

All of the above, indicates that the higher concentration in TMW-2 in August 2019 was not caused by a release from the SCL4A, but instead can be attributed to variability in the alluvial aquifer during the August 2019 sampling event and the use of a limited dataset for calculation of the initial UPL.

### 5.3.2 Total Dissolved Solids (TDS) Concentrations

As stated above, TDS alone is not a key indicator of CCR or WFGD impacts (EPRI 2017, EPRI 2012). As displayed on **Figure 11**, concentrations for the August 2019 sampling event and subsequent verification sampling event are 481 and 512 mg/L respectively. These results are lower than the previous result in May 2018 of 721 mg/L, which was flagged as an outlier. Furthermore, these values are just above the original calculated UPL used for TDS concentrations at TMW-2 of 476.5 mg/L. This UPL is calculated based on eight baseline sampling events collected in 2016 and 2017 during which time TDS concentrations ranged from 403 to 450 mg/L. TMW-2 is not sampled as part of the state UWL sampling program, therefore no historical data prior to the receipt of CCR in the SCL4A is available from this well. However, TMW-1 and TMW-3, which are located within 350 feet to the east and west, ranged from 339-493 mg/L during baseline sampling. The initial UPLs for these wells are 506.2 mg/L (TMW-1) and 514.3 mg/L (TMW-3). As shown in **Figure 11** and described above, results from TMW-2 are within the normal range of TDS concentrations for the area south of the SCL4A. Therefore, the SSI for TDS is not caused by impacts from the SCL4A, but rather a low initial UPL for TMW-2 due to a limited dataset used for the calculation.

In addition, **Figure 11** displays the TDS concentrations of the background monitoring wells BMW-1S and BMW-3S compared to those of TMW-1, TMW-2 and TMW-3. Background TDS results at monitoring wells BMW-1S and BMW-3S ranged between 409-565 mg/L during baseline sampling and a calculated prediction limit of 565 mg/L was calculated as the statistical limit for shallow wells using interwell statistical methods (SCPB). This further demonstrates that the SSI for TDS at TMW-2 was not caused by impacts from the SCL4A, but instead can be attributed to variability in the alluvial aquifer during the August 2019 sampling event, low initial UPL for TMW-2 due to a limited dataset used for the calculation, or possibly laboratory testing variability.

# 6.0 DEMONSTRATION THAT SSIS WERE NOT CAUSED BY SCL4A IMPACT

Based on the information presented in Section 5 above, the SSIs at UG-3 and TMW-2 were not caused by impacts from the SCL4A. These SSIs appear to be caused by the following:

Pre-existing low-level impacts from the upgradient SCPA unit. Geochemical diagrams display the shift over time in groundwater chemistry that trends toward the signature of SCPA pore-water.

- The use of road salt (NaCL) on Highway 94. This causes increases in chloride concentrations in monitoring wells located near the highway such as UG-3. Additionally, UG-3 is located south of Highway 94, which is typically the downgradient direction of groundwater flow in that localized area.
- Relatively low calculated UPLs that do not reflect the full variability within the alluvial aquifer. This is caused because only eight (8) baseline samples were collected and used for the calculation of the UPL prior to Detection Monitoring being initiated.
- The construction of the SCL4A, with 2-feet of compacted clay overlain by a 60-mil HDPE liner, limits the likelihood that the SSI is a result of impact from SCL4A.

As required by the CCR Rule, eight (8) baseline samples were collected prior to the October 2017 deadline which were used to calculate the UPL at each compliance well around the SCL4A. According to the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA 2009), eight (8) samples is the minimum number of samples recommended in order to complete statistical tests and future data will be used to enlarge the dataset for UPL calculation. As shown throughout this ASD, the minimum 8 (eight) baseline samples has not been able to capture the full extent of the spatial and temporal variability of groundwater chemistry. Starting with the November 2019 statistical analysis, the baseline data set will be enlarged to a minimum of 12 samples. At the SCL4A, previous data from State UWL monitoring show pre-existing low-level CCR impacts and put the SSI in context relative to historical groundwater conditions at the site.

In summary, there are no indications to support migration of CCR contaminants from the SCL4A. Instead, the data indicate that the cause for the SSIs is due to alluvial aquifer variability, laboratory method accuracy, limited baseline data available for the calculation of the UPL, the use of road salt on Highway 94, and impacts from the SCPA CCR Unit.

### 7.0 **REFERENCES**

- Ameren Missouri. 2016. Structural Integrity Criteria & Hydrologic/Hydraulic Capacity Assessment, Sioux Energy Center.
- Electric Power Research Institute (EPRI). 1998, Field Evaluation of the Comanagement of Utility Low-Volume Wastes With High-Volume Coal Combustion By-Products: SX Site. Report TRACE-108409. September 1998.
- Electric Power Research Institute (EPRI). 2011, Composition and Leaching of FGD Gypsum and Mined Gypsum, Report 1022146. November 2011.
- Electric Power Research Institute (EPRI). 2012, Groundwater Quality Signatures for Assessing Potential Impacts from Coal Combustion Product Leachate, Report 1017923. October 2012.
- Electric Power Research Institute (EPRI). 2017, Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites, Report 3002010920, October 2017
- Golder Associates Inc., 2017, 40 CFR Part 257 Groundwater Monitoring Plan, SCL4A Sioux Energy Center St. Charles County, Missouri, USA.
- Golder Associates Inc., 2018, 2017 Annual Groundwater Monitoring Report, SCL4A Utility Waste Landfill Cell 4A, Sioux Energy Center St. Charles County, Missouri, USA
- Golder Associates Inc., 2019a, 2018 Annual Groundwater Monitoring Report, SCL4A Utility Waste Landfill Cell 4A, Sioux Energy Center St. Charles County, Missouri, USA
- Golder Associates Inc., 2019b, 2018 Annual Groundwater Monitoring Report, SCPB Surface Impoundment, Sioux Energy Center St. Charles County, Missouri, USA

Golder Associates Inc., 2019b, Updated Statistical Limits With Additional Background Data – SCL4A.

Golder Associates Inc., 2019c, Updated Statistical Limits With Additional Background Data – SCPB.

- GREDELL Engineering Resources, Inc. 2006. Detailed Geologic and Hydrologic Site Investigation Report. AmerenUE Sioux Power Plant Proposed Utility Waste Disposal Area. St. Charles County, Missouri. August 2006.
- GREDELL Engineering Resources, Inc. 2009. Background Groundwater Monitoring Report. AmerenUE Sioux Power Plant. St. Charles County, Missouri. June 2009.
- Johnson, A.I. 1967. Specific Yield Compilation of Specific Yields for Various Materials: U.S. Geological Survey Water-Supply Paper 1662-D. Available at: https://pubs.er.usgs.gov/publication/wsp1662D
- MDNR. 2011. Missouri Well Construction Rules. Missouri Department of Natural Resources Division of Geology and Land Survey. Rolla, MO. August 2011.
- Reitz & Jens, Inc., and GREDELL Engineering Resources, Inc. 2014. Ameren Missouri Sioux Power Plant Utility Waste Landfill Proposed Construction Permit Modification Construction Permit Number 0918301 St. Charles County, Missouri, revised August 2014.
- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery Program Implementation and Information Division. March

USEPA. 2015. Federal Register. Volume 80. No. 74. Friday April 17, 2015. Part II. Environmental Protection Agency. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule/ [EPA-HQ-RCRA-2009-0640; FRL-9919-44-OSWER].

# Tables

### Table 3 Major Cation and Anion Concentrations SCL4A - Alternative Source Demonstration Sioux Energy Center, St. Charles County, MO

		Total		Total		<b>T</b> + 10 K +	Total
Monitoring Well ID	Total Sodium	Potassium	Total Calcium	Magnesium	Total Chloride	Total Sulfate	Alkalinity <sup>(2)</sup>
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
		Detection	n Monitoring - A	August 2019			
S-BMW-1S	5.35	0.383	149	28.4	8.8	34.1	432
S-BMW-3S	5.28	0.648	122	22.4	10.6	25.3	358
S-DG-1	4.23	4.01	135	32.3	6.2	41.7	411
S-DG-2	4.76	5.14	133	33.3	8.2	37.1	425
S-DG-3	4.68	6.47	148	39.1	4.8	49.5	450
S-DG-4	44.6	7.57	136	39.5	103	31.5	403
S-TMW-1	2.76	4.90	99.8	18.2	2.1	40.2	269 J
S-TMW-2	3.18	5.15	123	23.1	3.3	52.1	361 J
S-TMW-3	4.08	5.55	123 J	23.3	2.6	37.2	369 J
S-UG-1A	39.1	9.53	177	42.0	145	57.7	437
S-UG-2	30.4	4.70	116	24.6	30	45.2	362
S-UG-3	24.2	5.75	159	32.3	85	144	337 J
		Histo	orical Data - Jun				
PZ-1	5.2	4.1	140	38	11	69	480
PZ-2	3.8	2.8	120	32	36	6.6	420
PZ-3	5.4	5.2	140	27	12	53	440
PZ-4	16	4.5	140	35	13	220	320
PZ-10	3.4	3.9	99	31	4.6	43	370
PZ-21	8.0	2.9	130	26	25	100	350
PZ-25	4.2	4.9	120	38	19	29	470
PZ-36	7.2	4.2	110	22	21	34	310
PZ-40	3.2	4.0	120	21	1.7	33	370
PZ-50	3.4	3.8	97	24	18	43	290
PZ-55	3.9	4.5	120	24	6.1	52	370
PZ-56	4.4	4.5	110	22	25	49	340
PZ-57	4.8	4.4	120	24	4.0	42	370
· · · ·			torical UG-3 Sa	-			
S-UG-3 - 11/15/2017	32.4	5.82	126	23.0	70.0	45.6	334
S-UG-3 - 5/15/2018	36.0	5.75	130	24.5	84.8	45.3	354
S-UG-3 - 11/14/2018	40.8	6.30	129	23.3	67.0	63.9	365
S-UG-3 - 8/19/2019	24.2	5.75	159	32.3	85.0	144	337 J
S-UG-3 - 11/14/2019	26.1	5.79	135 J	28.6	83.5	185 J	360
	75.4		rby Monitoring		76.0	220	249
S-LMW-2S - 8/6/2019	75.4	8.03	150	25.2	76.9	339	248
S-LMW-2S - 11/15/2019 S-LMW-5S - 8/5/2019	67.1 148	7.71 5.05	170 J 277	29.8 56.5	102 36.6	317 930	277 310
S-LMW-5S - 8/5/2019 S-LMW-5S - 11/15/2019	148	4.76	266	56.0	30.0	852	310
S-LMW-6S - 8/5/2019	142	5.39	268	66.9	3.6	787	377
S-LMW-6S - 11/15/2019	1102	5.22	208	72.5	4.1	917	368
S-TP-5D - 8/2/2019	5.63	1.15	30.4	36.0	27.0	223	285
S-TP-5M - 8/2/2019	16.8	5.30	147	27.2	20.6	171	316 J
S-TP-5S - 8/2/2019	39.6	4.50	135	29.9	35.4 J	7.4 J	438
			Samples From S				
S-LB-2 - 1/25/2018	108	24.9	112	122	25.7	451	133
S-LB4 - 1/24/2018	76.1	25.2	94.1	108	38.2	318	115
S-LB5 - 1/24/2018	267	91.0	40.1	28.4 J	30.5	393	468
S-SCPA-1D - 1/23/2018	27.0	11.8	101	23.9	25.0	200	228
S-SCPA-1S - 1/23/2018	81.4	55.2	825	4.88	26.0	2080	549
S-SCPA-2 - 1/22/2018	13.9	4.35	73.4	20.0	20.5	48.5	219
S-SCPA-3D - 1/24/2018	116	60.3	548	60.2	27.1	1820	185
S-SCPA-3S - 1/22/2018	58.5	40.1	501	9.60	23.1	1290	170
S-SCPB-1 - 1/25/2018	314	74.9	37.2	38.7 J	51.7	630	326

### Notes:

1) 2006 Historical Data from Appendix 13 of the Detailed Site Investigation (DSI).

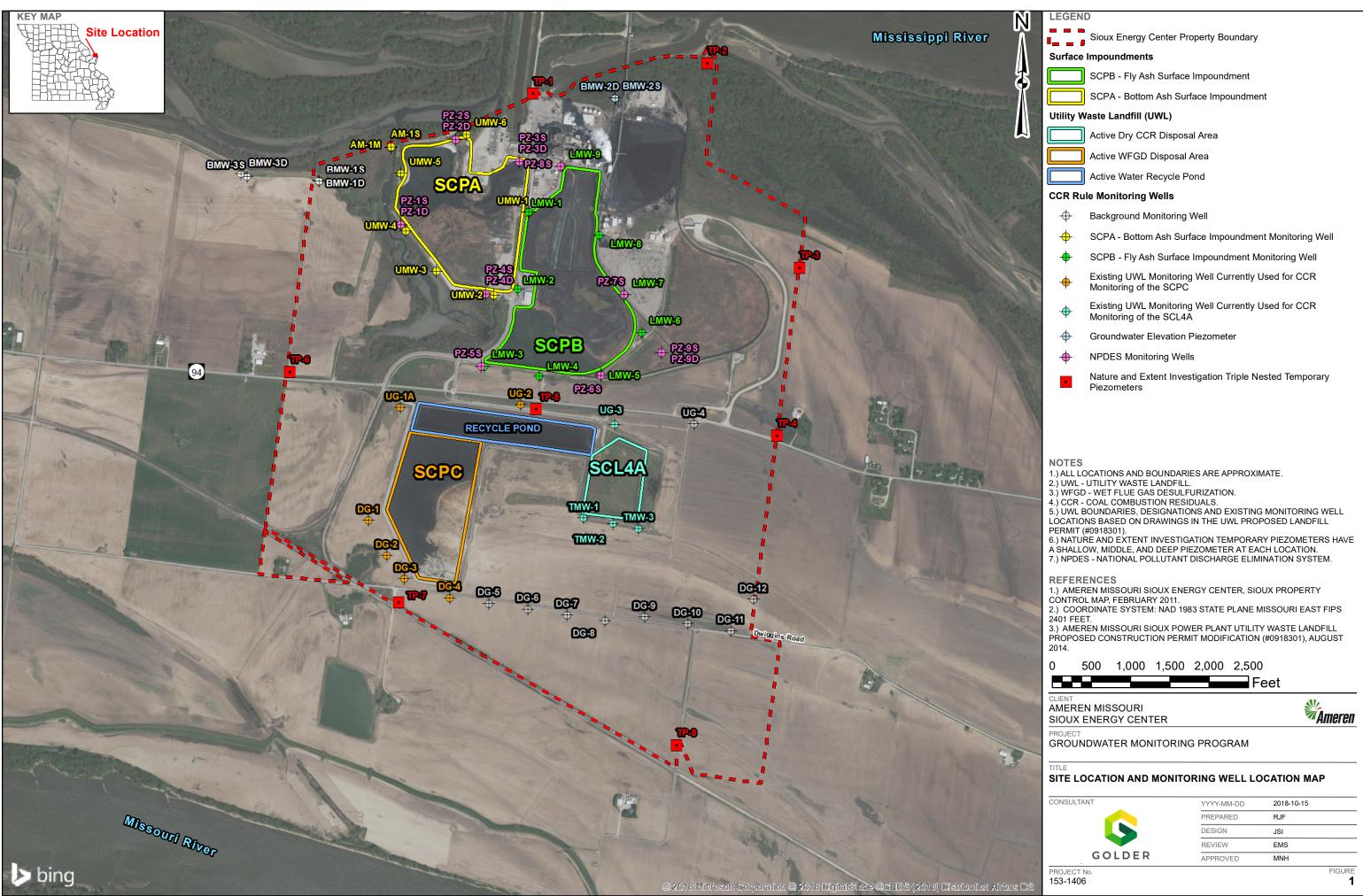
2) Alkalinity is equal to Carbonate + Bicarbonate.

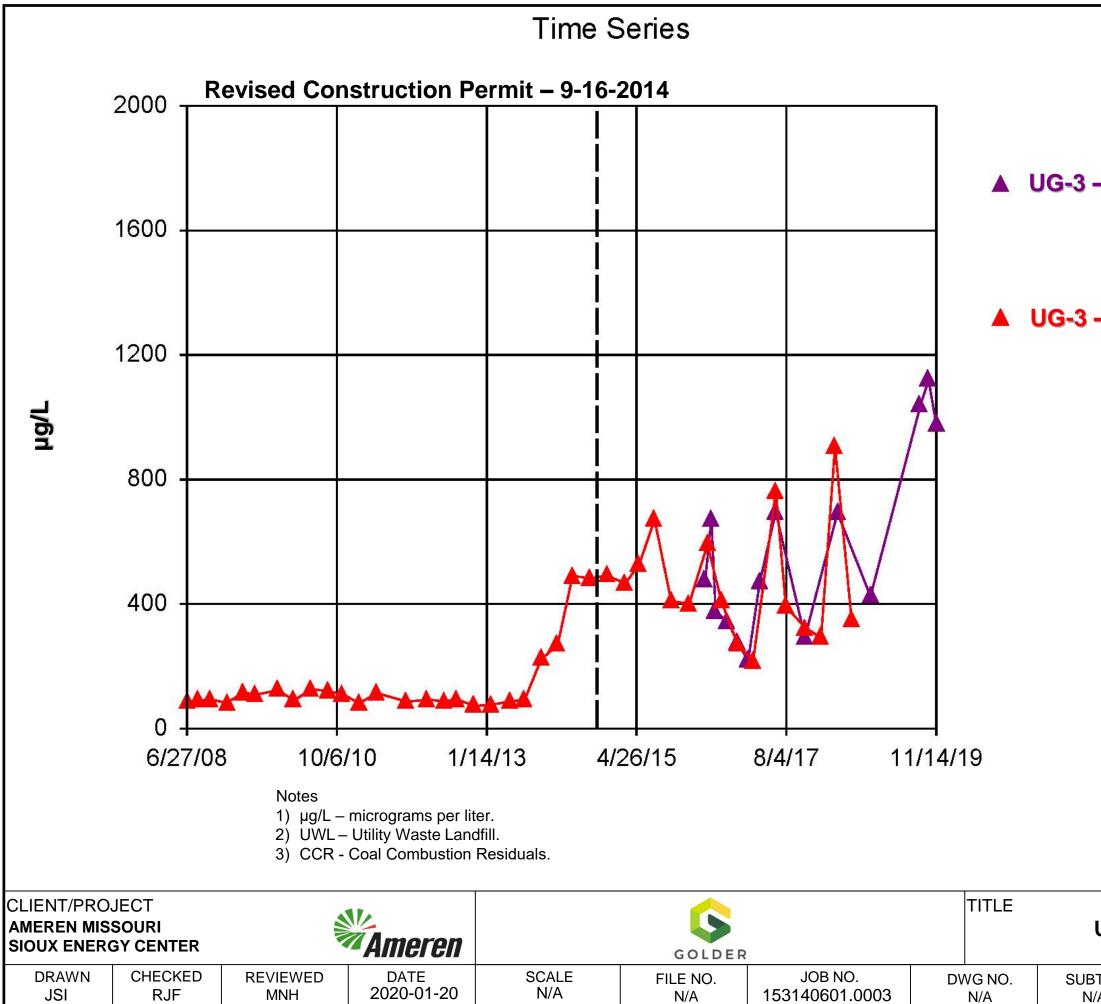
3) mg/L - milligrams per liter.

4) J - Result is an estimated value.

Prepared by: JSI Checked by: KAB Reviewed by: MNH

# Figures



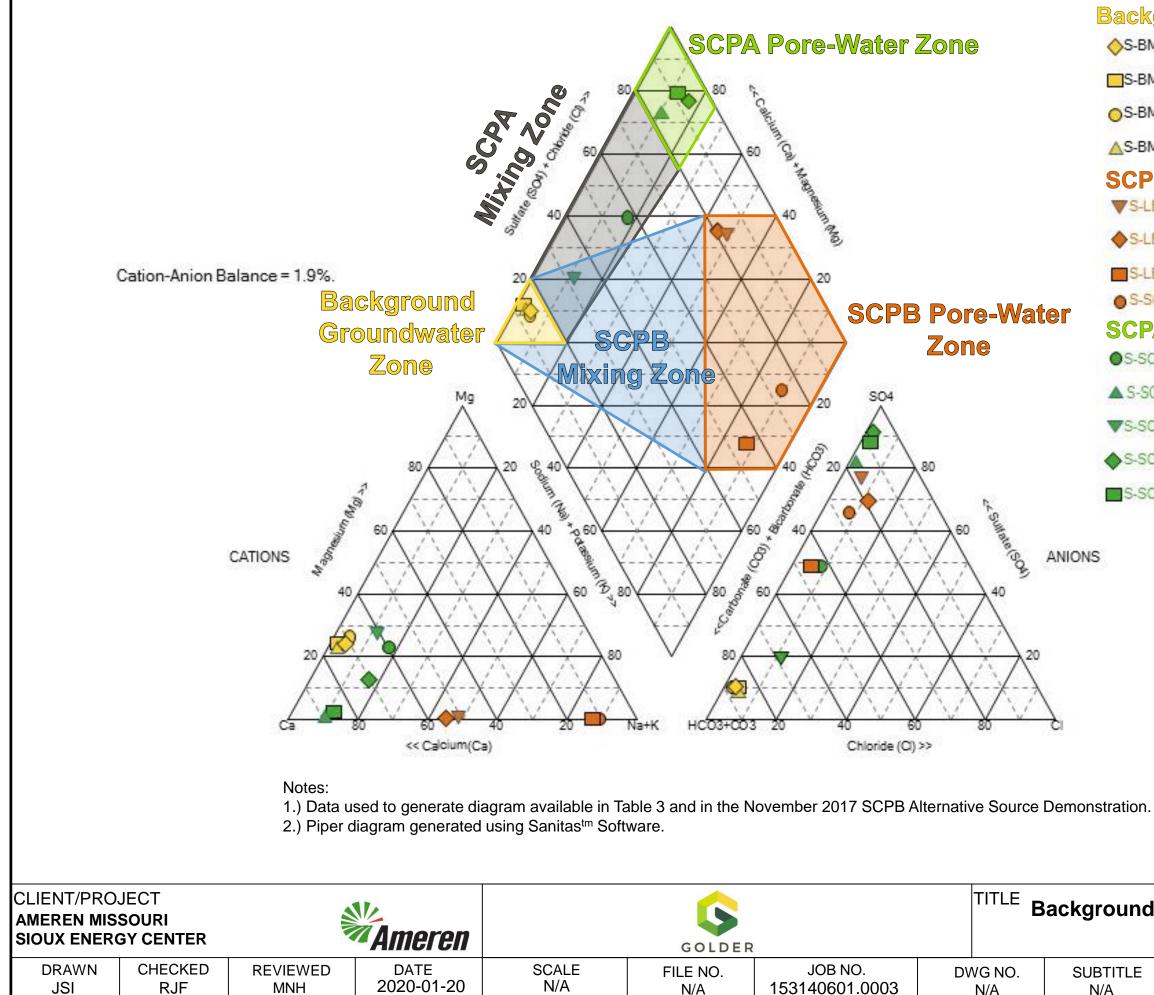


# ▲ UG-3 – CCR Rule Sampling

▲ UG-3 – State UWL Sampling

## **UG-3 Boron Timeseries Plot**

BTITLE I/A	REV. NO. N/A	FIGURE 2	



**Background Groundwater Sample** 

- ♦S-BMW-1D\* 11/13/2017
- S-BMW-1S\* 11/13/2017
- OS-BMW-3D\* 11/13/2017
- AS-BMW-3S\* 11/13/2017

# **SCPB Pore-Water Sample**

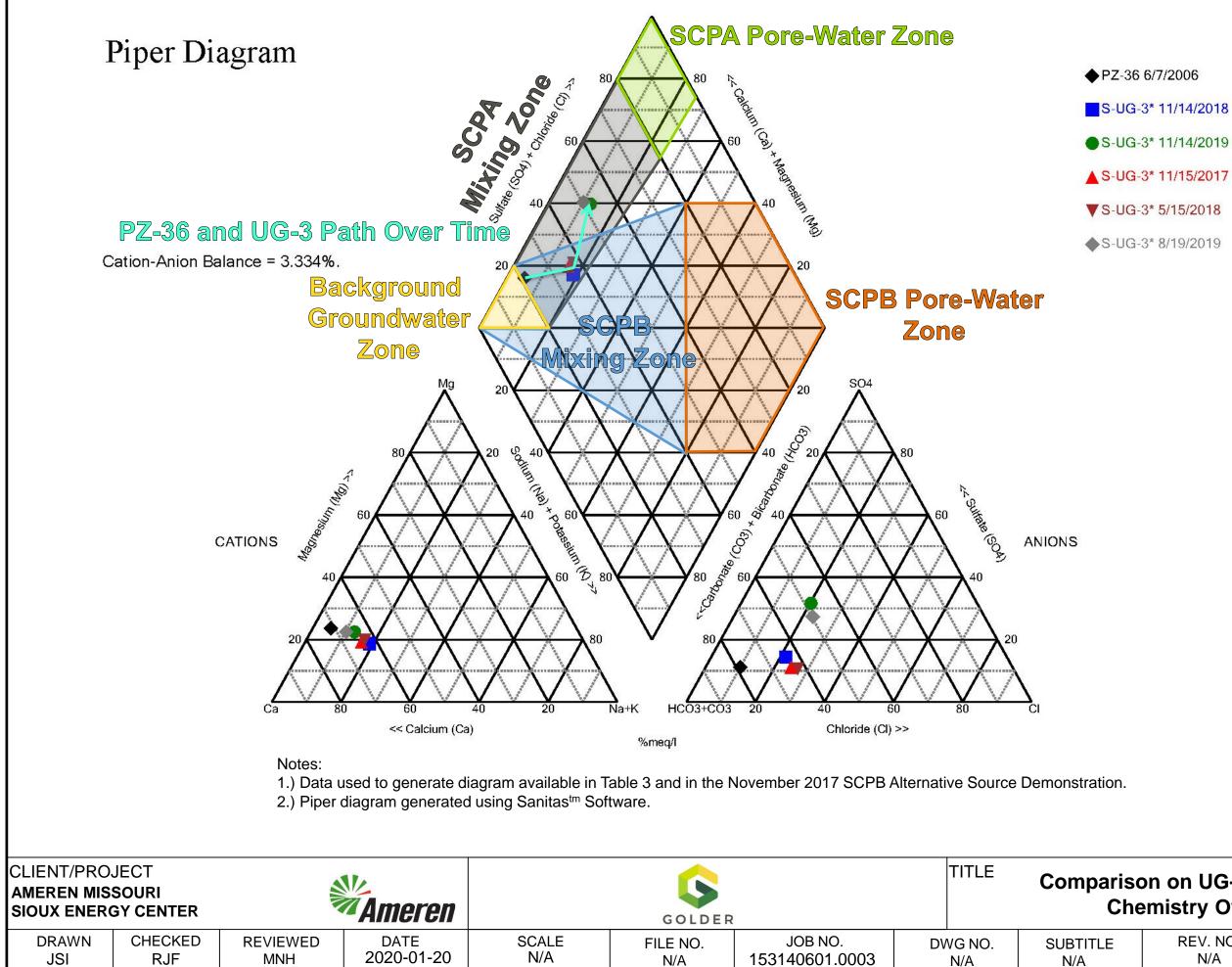
- VS-LB-2 1/25/2018
- S-LB-4 1/24/2018
- S-LB-5 1/24/2018
- OS-SCPB-1 1/25/2018

# **SCPA Pore-Water Sample**

- OS-SCPA-1D 1/23/2018
- ▲ S-SCPA-1S 1/23/2018
- VS-SCPA-2 1/22/2018
- S-SCPA-3D 1/24/2018
- S-SCPA-3S 1/22/2018

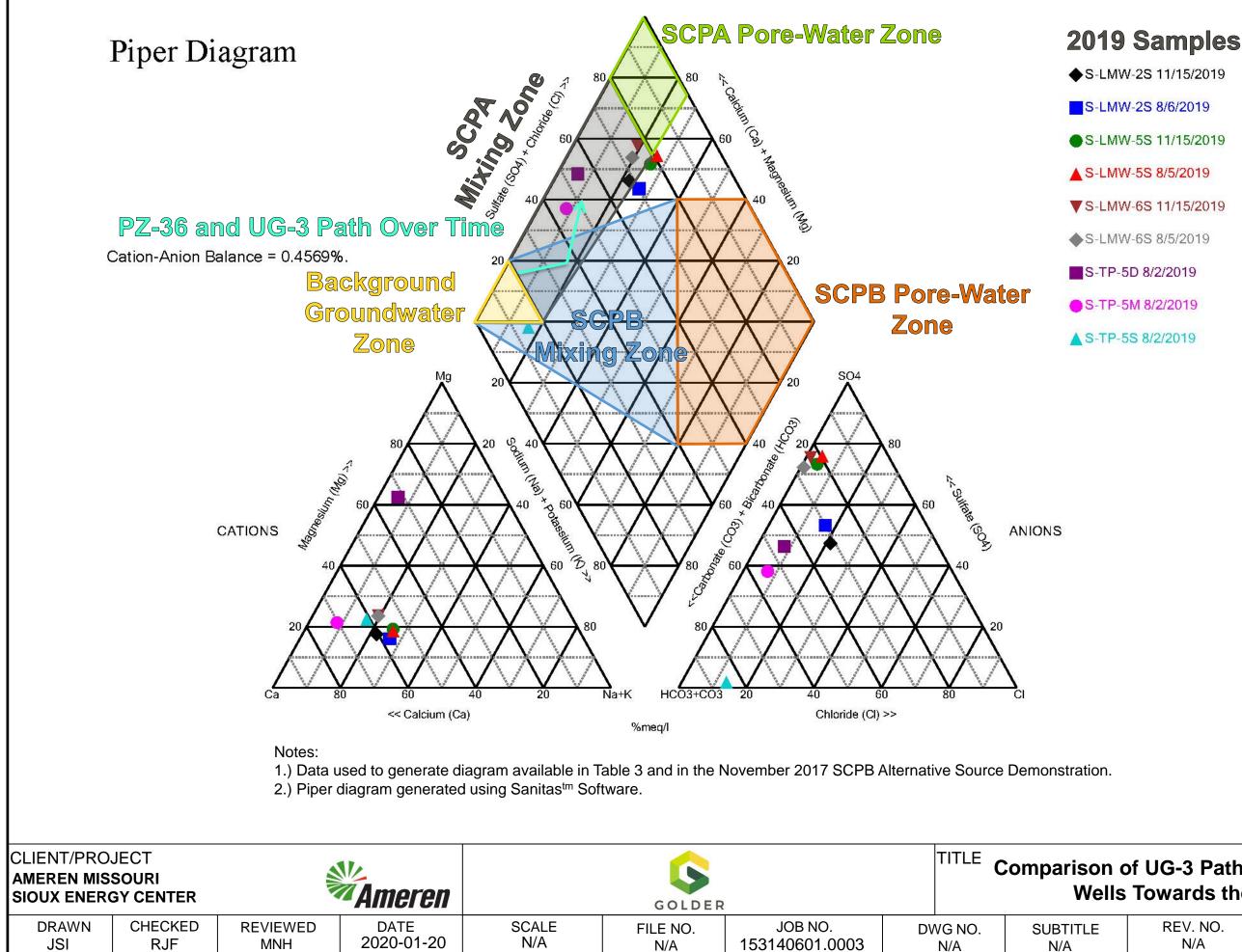
# **Background Groundwater and Pore-water** Piper Diagram

-	Г	Ľ	Г	L	Е	
,	^					

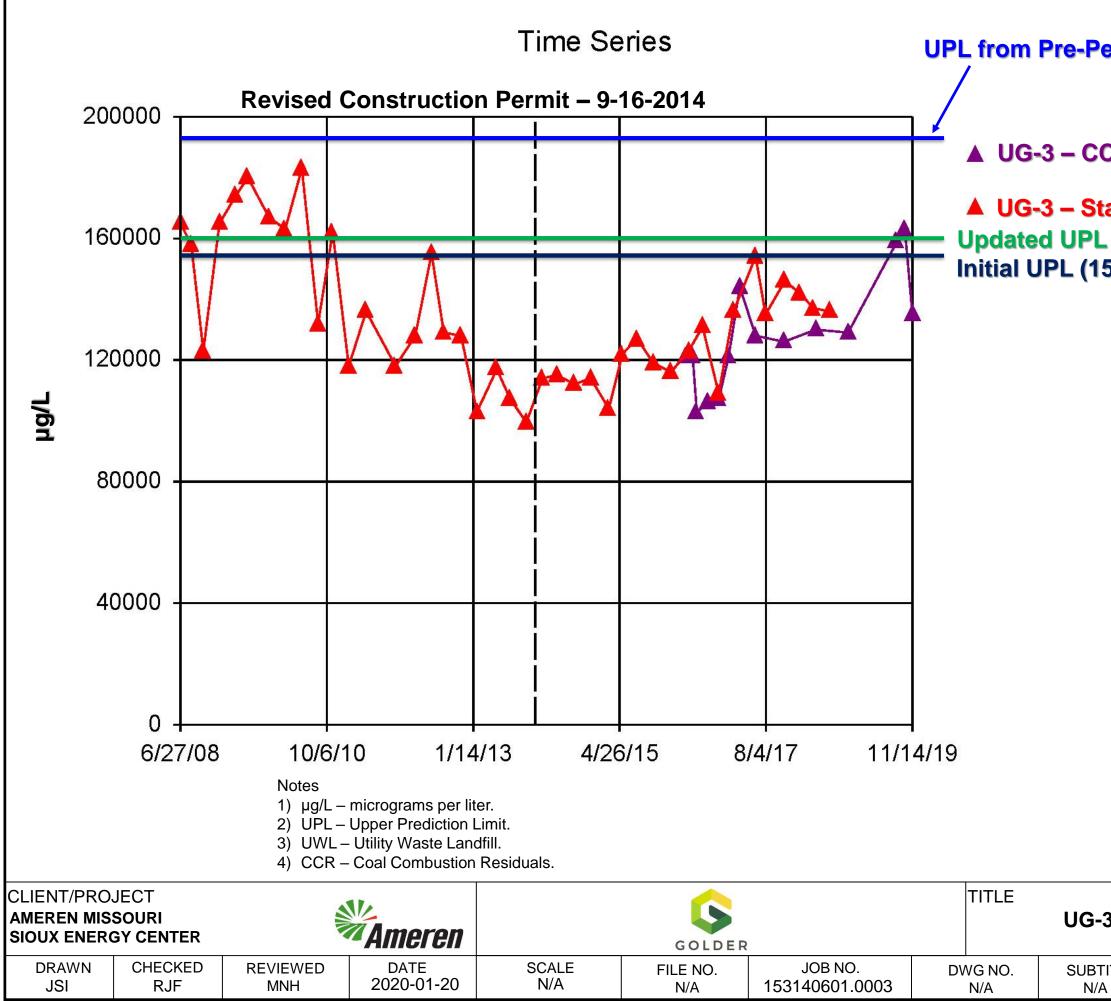


## **Comparison on UG-3 Groundwater Chemistry Over Time**

-	Г	ľ	Т	L	Е
1	٨				



# Comparison of UG-3 Path and Monitoring Wells Towards the SCPA.



### UPL from Pre-Permit Results (188,523 µg/L)

### ▲ UG-3 – CCR Rule Sampling

### ▲ UG-3 – State UWL Sampling Updated UPL (260,085 µg/L) Initial UPL (154,345 µg/L )

### **UG-3 Time Series Plot for Calcium**

	_		_		_
	Г	Г	Г	L	E
,	^				

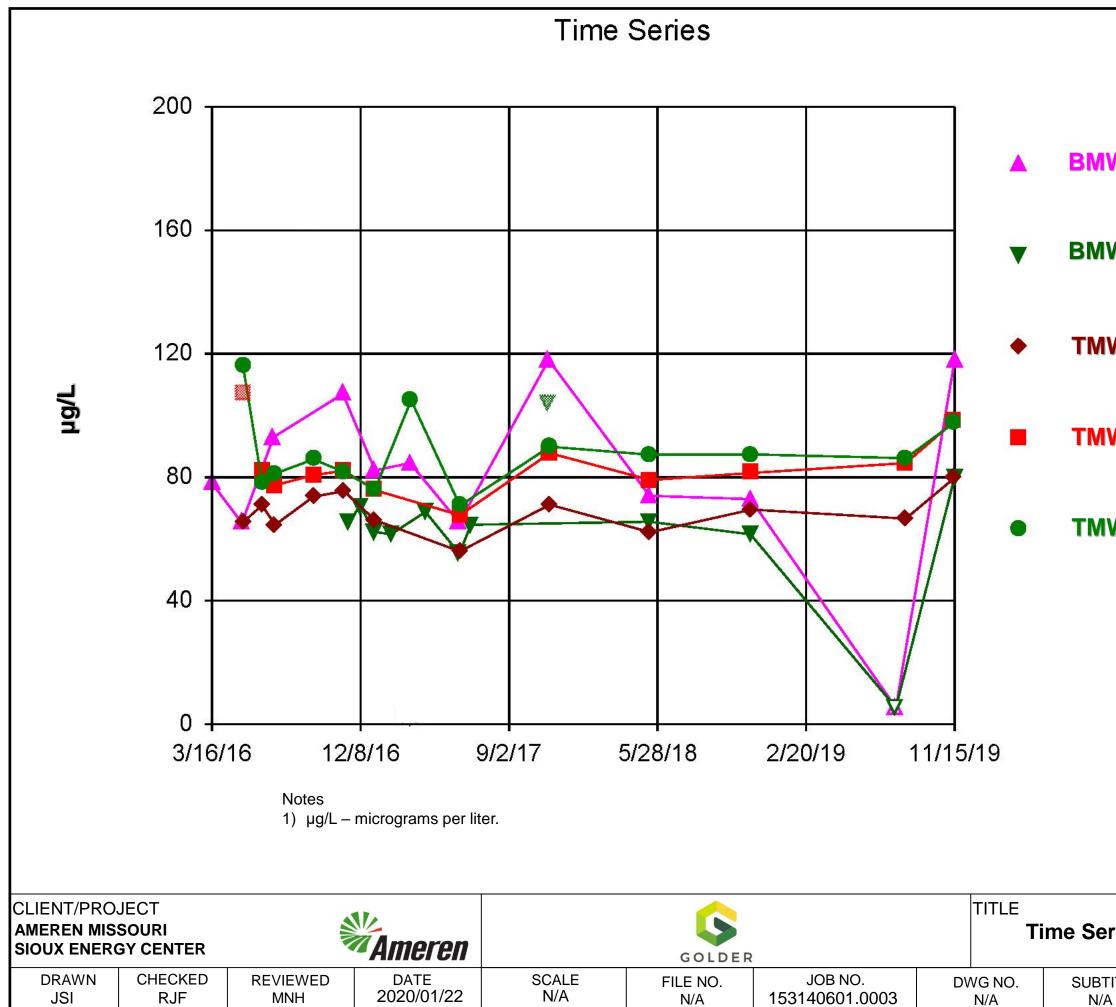
**Time Series** 110 53 45 90 70 Chloride Concentrations (mg/L) 37 Sodium Concentrations (mg/L) 50 29 2′ 30 13 10 11/14/19 6/27/08 10/6/10 1/14/13 4/26/15 8/4/17 Notes 1) mg/L – milligrams per liter. 2) Time series plot generated using Sanitas<sup>tm</sup> Software. CLIENT/PROJECT SV AMEREN MISSOURI **Ameren** SIOUX ENERGY CENTER GOLDER DATE 2020/01/22 CHECKED REVIEWED SCALE N/A FILE NO. JOB NO. DRAWN DWG NO. SUB RJF 153140601.0003 MNH N/A JSI N/A

### CHLORIDE, TOTAL (MG/L)

SODIUM, TOTAL (MG/L)

# TITLE UG-3 Time Series Plot Comparing Chloride and Sodium

UBTI	ΓLΕ
N/A	



### BMW-1

### BMW-3

### **TMW-1**

### **TMW-2**

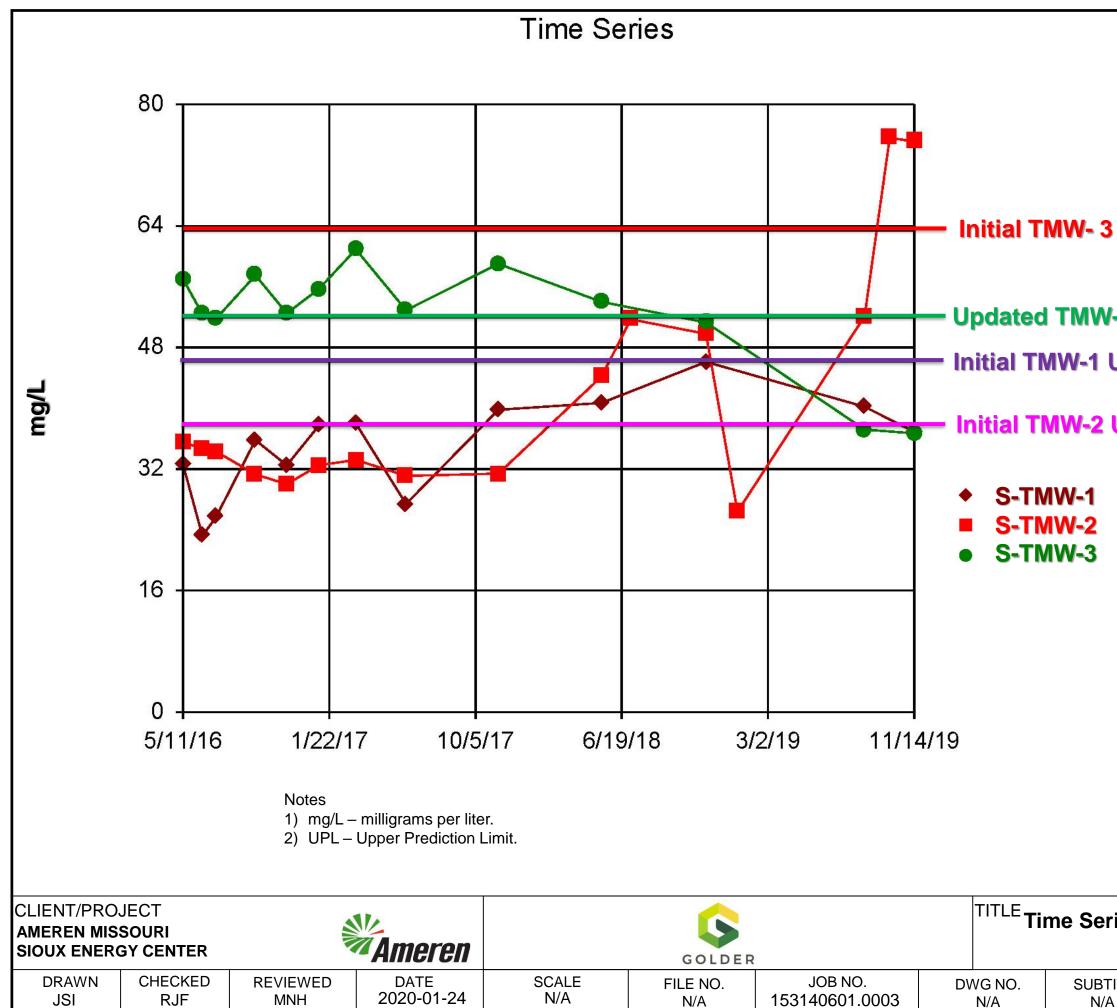
### TMW-3

### **Time Series Plot for Boron Concentrations**

Т	T	T	Ľ	E	
/A	1				

REV. NO. N/A

FIGURE 8



# Initial TMW- 3 UPL (63.5 mg/L)

# Updated TMW-2 UPL (52.1 mg/L)

### Initial TMW-1 UPL (46.3 mg/L)

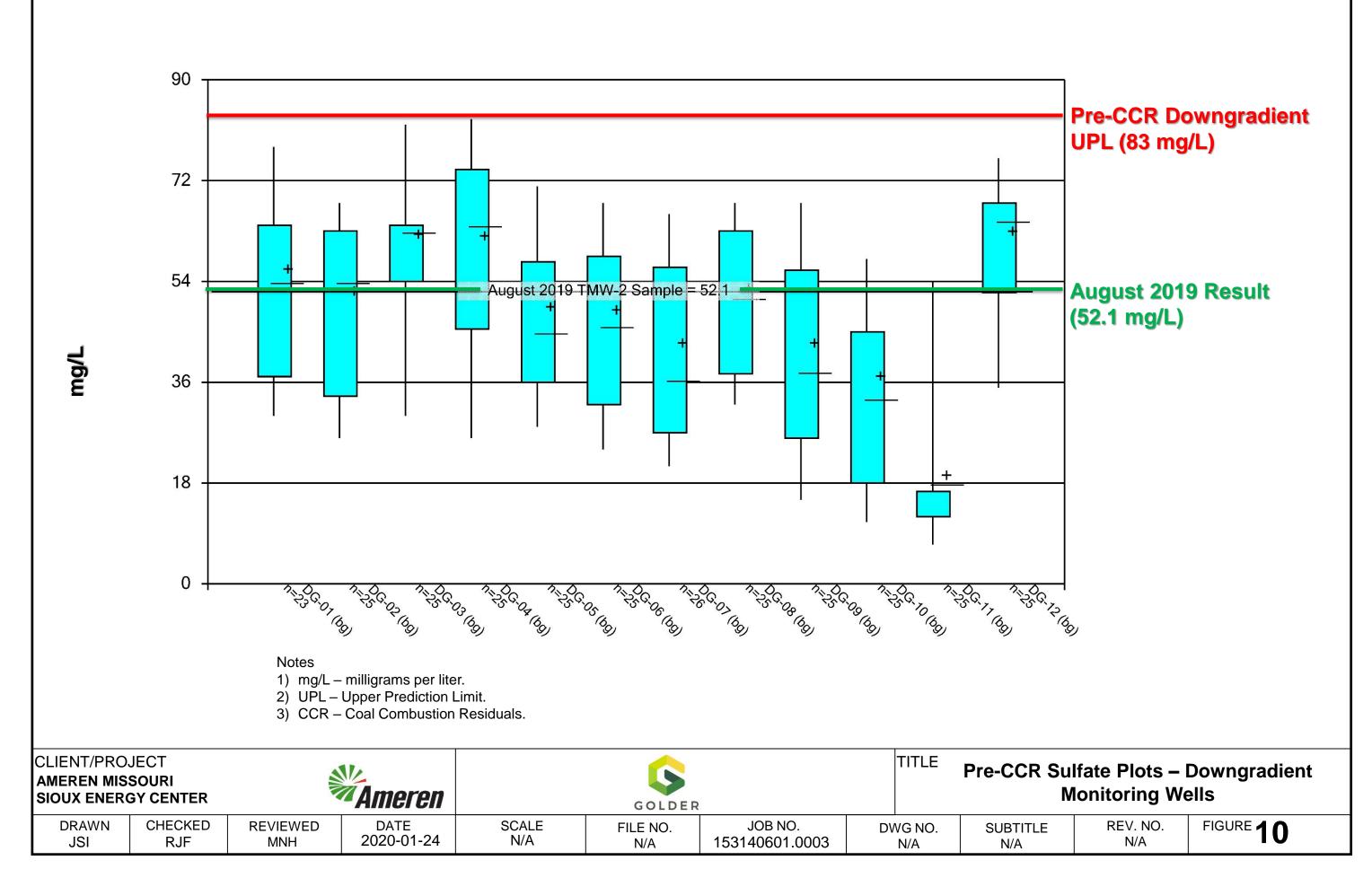
# Initial TMW-2 UPL (37.9 mg/L)

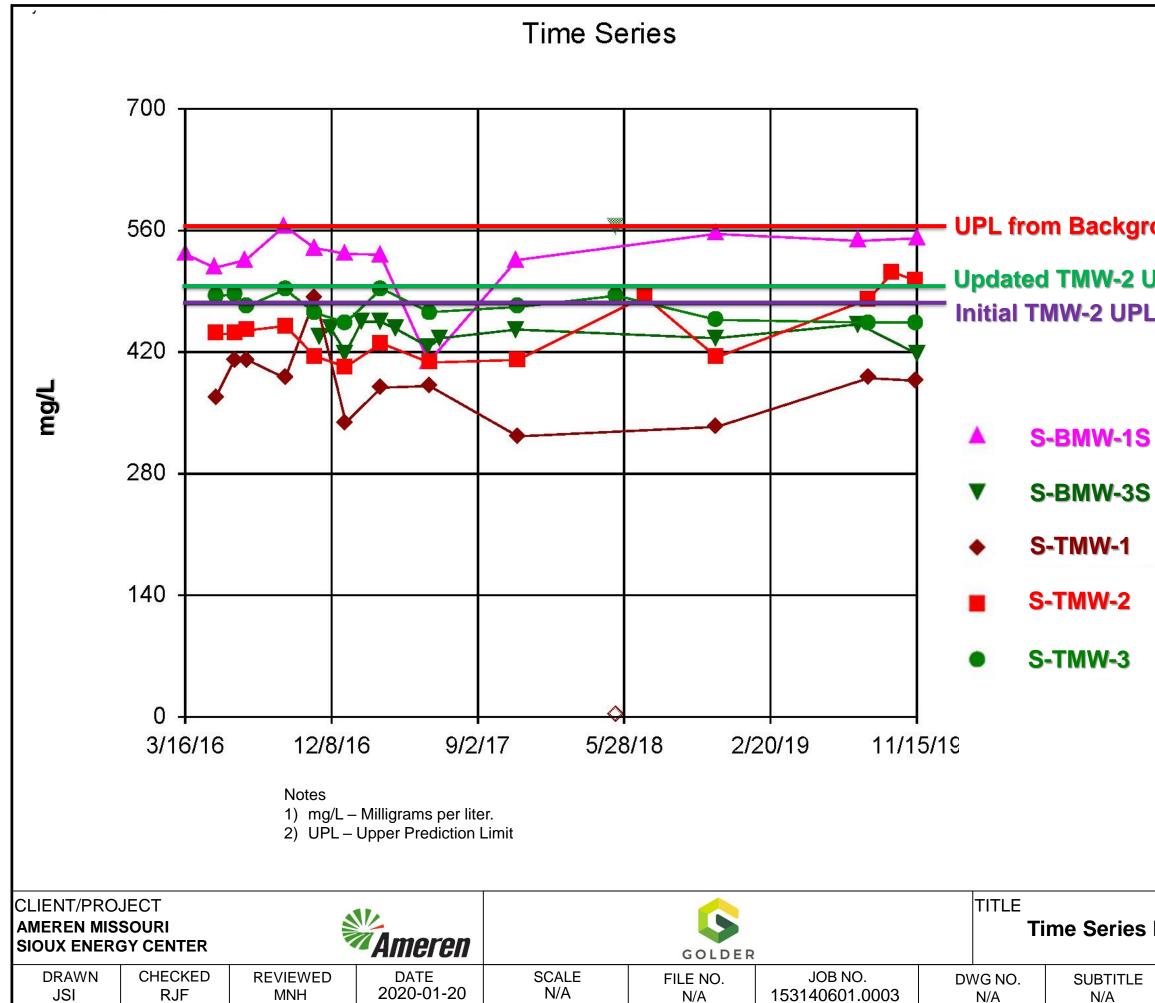
### TITLE Time Series Plot for Sulfate Concentrations South of SCL4A

-	Т	1-	г	L	Е	
1	٨					



### Box & Whiskers Plot



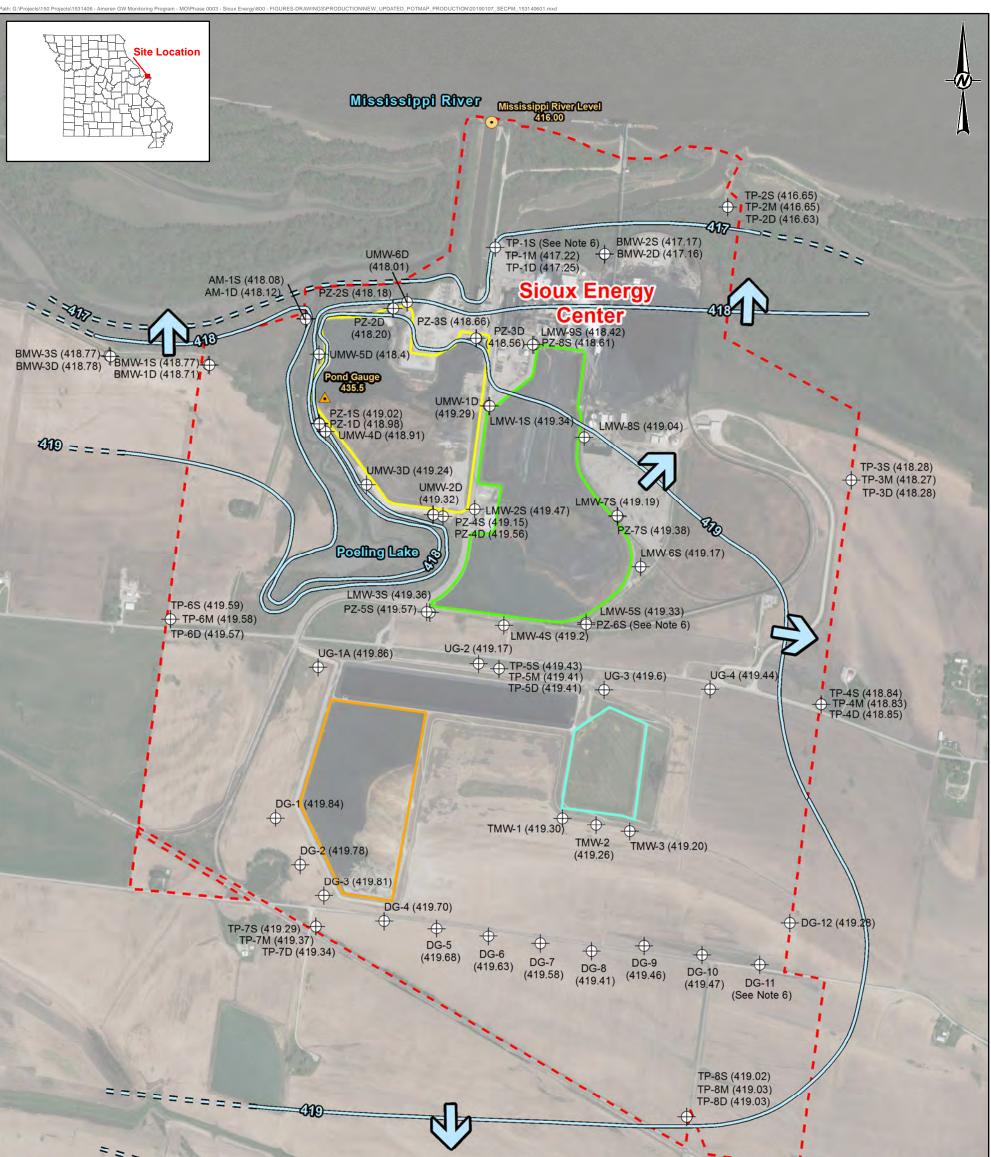


# UPL from Background Wells (565 mg/L) Updated TMW-2 UPL (495.8 mg/L) Initial TMW-2 UPL (476.5 mg/L) **Time Series Plot for Total Dissolved Solids**

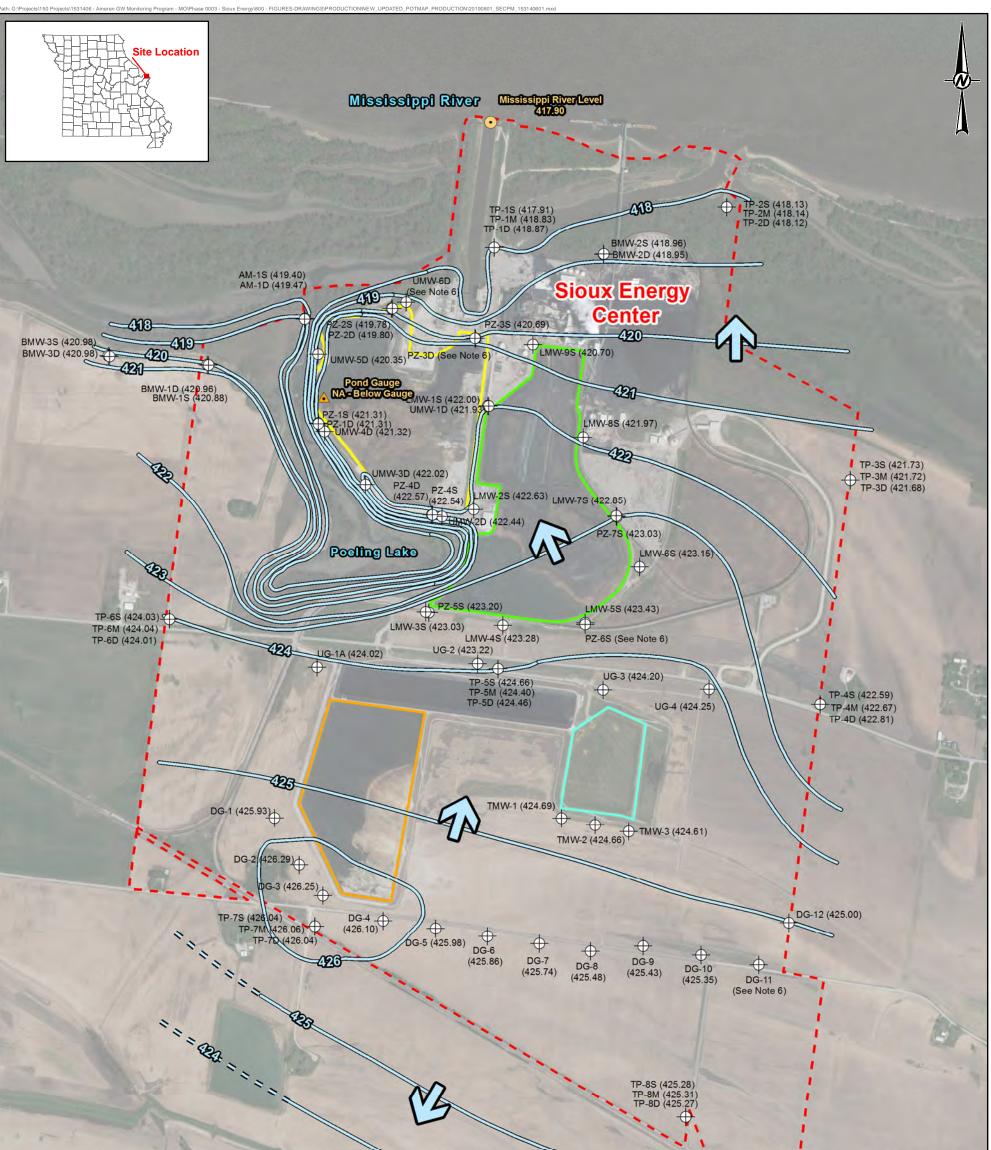
BTITLE REV. NO. FIGURE <b>11</b>	

APPENDIX C

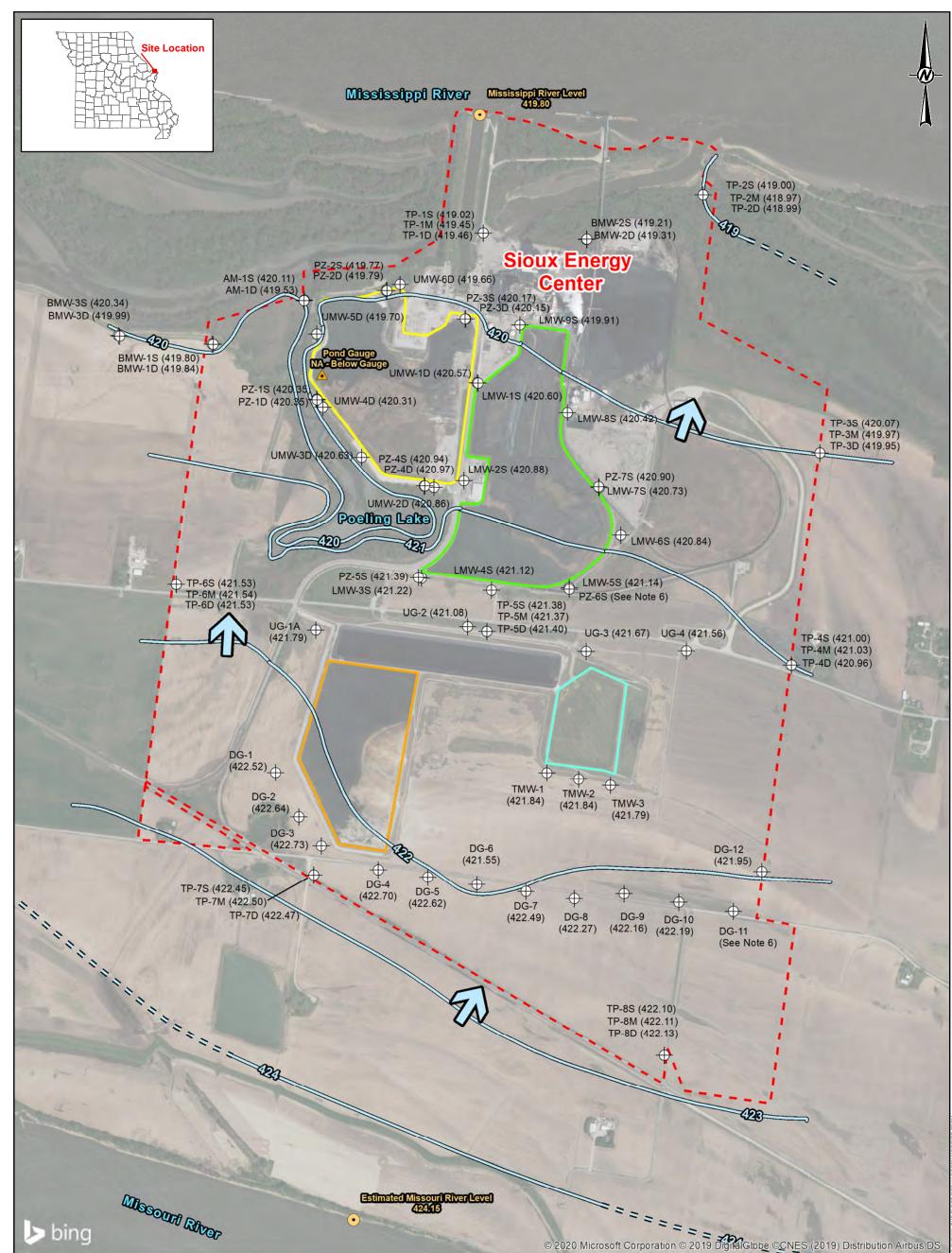
# Potentiometric Surface Maps



and the second s	= = = = = = = = = = = = = = = = = = =	Cilia Estimated Missouri River Level AUX52	soft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus D
LEGEND Sioux Energy Center Property Boundary CCR Units	Groundwater Elevation Contor (FT MSL)	NOTES 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE. 2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL). 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.	CLIENT AMEREN MISSOURI SIOUX ENERGY CENTER PROJECT
SCPA - Bottom Ash Surface Impoundment SCPB - Fly Ash Surface Impoundment	Elevation Contour (FT MSL Groundwater Elevation Contour (FT MSL) Ground/Surface Water	<ul> <li>4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.</li> <li>5.) MISSISIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.</li> <li>6.) TP-1S, PZ-6S, AND DG-11 WERE NOT USED IN POTENTIOMETRIC CONTOURING.</li> </ul> <b>REFERENCE</b>	CCR GROUNDWATER MONITORING PROGRAM
SCPC - WFGD Surface Impoundment SCL4A - Dry CCR Disposal Area	Measurement Locations SCPA Surface Impoundment Pond Gauge River Gauge Location	<ol> <li>AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.</li> <li>COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.</li> <li>USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965</li> </ol>	CONSUL*         YYYY-MM-DD         2020-01-24           PREPARED         JSI           DESIGN         JSI
Groundwater Flow Direction	Monitoring Well or Piezometer	(ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450). 0 500 1,000 1,500 2,000 Feet	GOLDER         REVIEW         AMM           PROJECT No.         PHASE         MNH           153-1406         0003         P1



bing	WI RINGO	Estimated Missouri River/Level L23.83	oft Corporation © 2019 DigitalGlobe ©CNES (2019) E	
LEGEND  Sioux Energy Center  Property Boundary	Groundwater Elevation Contour (FT MSL)		CLIENT AMEREN MISSOURI SIOUX ENERGY CENTER	<b>M</b> Ameren
CCR Units	= = Interred Groundwater	<ol> <li>GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.</li> <li>MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.</li> </ol>	PROJECT CCR GROUNDWATER MONITORING PROGRAM	M
SCPB - Fly Ash Surface	Ground/Surface Water	<ul> <li>5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.</li> <li>6.) DG-11, PZ-3D, PZ-6S, AND UMW-6D WERE NOT USED IN POTENTIOMETRIC CONTOURING.</li> <li>REFERENCE</li> </ul>	TITLE AUGUST 1, 2019 POTENTIOMETRIC SURFACE	MAP
SCPC - WFGD Surface		1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL	CONSULTANT YYYY-MM-DD	2019-10-09
Impoundment	Pond Gauge	MAP, FEBRUARY 2011. 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS	PREPARED	EMS
SCL4A - Dry CCR Disposal Area	-	2,401 FEET. 3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965	DESIGN	JSI
<b>—</b> • • • •		(ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).	REVIEW	AMM
Groundwater Flow Direction	Piezometer	0 500 1,000 1,500 2,000	GOLDER APPROVED	MNH
		Feet	PROJECT No. PHASE 153-1406 0003	FIGUR



### LEGEND

LEGEND			NOTES					
<ul> <li>Sioux Energy Center</li> <li>Property Boundary</li> </ul>	Ground (FT MS	dwater Elevation Contour SL)	2.) GROUN ABOVE ME	NDWATER AN AN SEA LEV	EL (FT MSL).	WATER ELEV	ATIONS DISPLAYED IN FE	
CCR Units	= =	Inferred Groundwater Elevation Contour (FT MSL)	4.) MISSO	URI RIVER E	LEVATION ES	TIMATED BAS	S OBTAINED BY GOLDER. SED ON NEARBY UNITED .UGING LOCATIONS.	
SCPA - Bottom Ash Surface Impoundment		Groundwater Elevation Contour (FT MSL)	5.) MISSIS	SIPPI RIVER	ELEVATION I	PROVIDED BY	AMEREN MISSOURI.	G.
SCPB - Fly Ash Surface Impoundment		d/Surface Water	REFER	ENCE				
SCPC - WFGD Surface	Measu	rement Locations			I SIOUX ENER	GY CENTER,	SIOUX PROPERTY CONT	FROL
Impoundment      SCL4A - Dry CCR Disposal		SCPA Surface Impoundment Pond Gauge	2.) ĆOORE		FEM: NAD 198	3 STATE PLAI	NE MISSOURI EAST FIPS	
Area	•	River Gauge Location		NATIONAL W			EM, USGS GAUGES 0693 ALTON), GRAFTON (05587	
Groundwater Flow Direction	$\oplus$	Monitoring Well or Piezometer	0	500	1,000	1,500	2,000	,
							Feet	

### CLIENT AMEREN MISSOURI SIOUX ENERGY CENTER



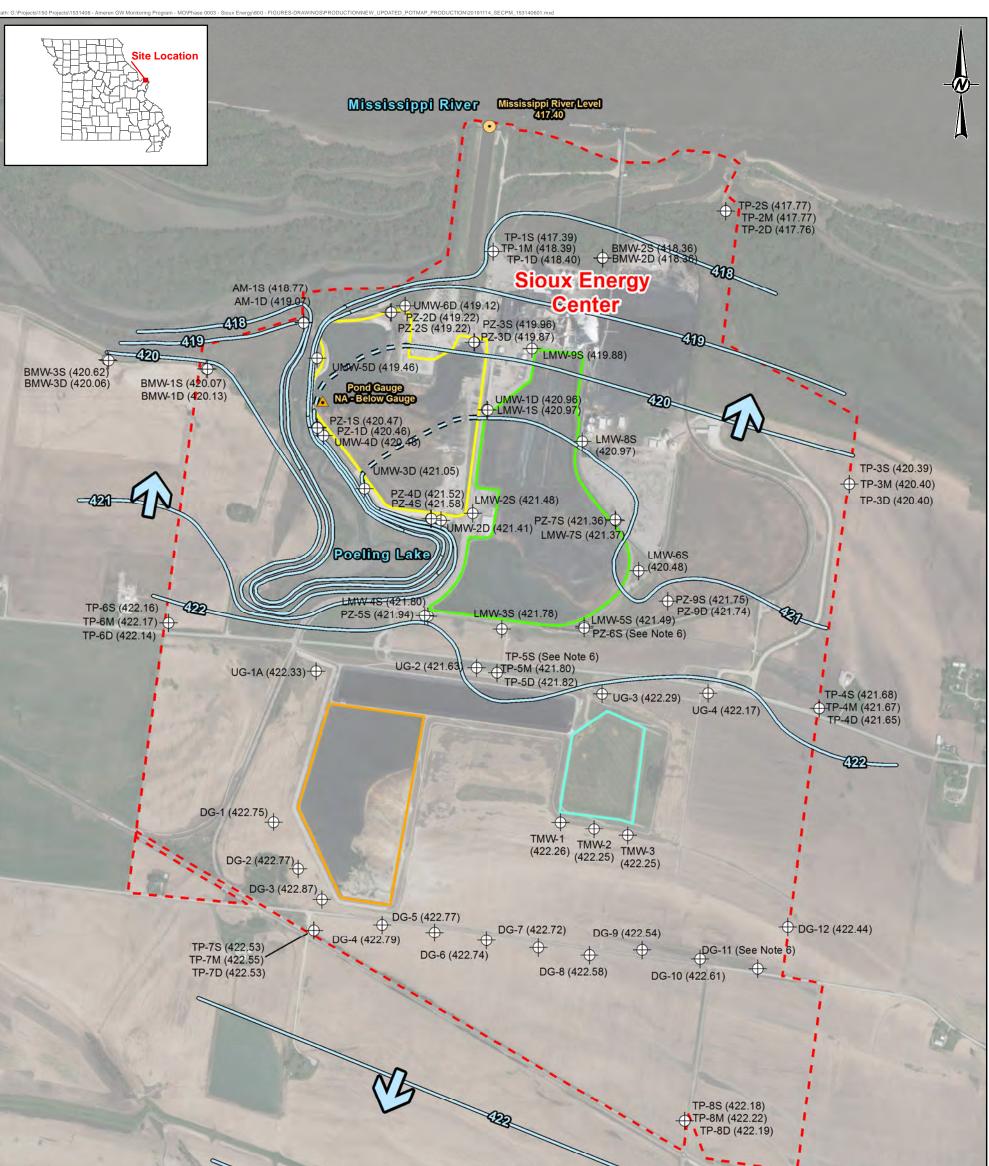
### PROJE

CCR GROUNDWATER MONITORING PROGRAM

TITLE

### **OCTOBER 1, 2019 POTENTIOMETRIC SURFACE MAP**

ITROL	CONSULTANT	<u> </u>	YYYY-MM-DD	2019-10-21	<u>.</u>
6	<b>_</b>		PREPARED	AMM	
35965			DESIGN	JSI	
7450).			REVIEW	BCW	
	GOL	DER	APPROVED	MNH	
	PROJECT No. 153-1406	PHASE 0003			FIGURE



DED.	M	Ca la	
bing	Estimated Missouri River Level 420.67	© 2020 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus D	DS

Ameren

FIGURE P4

LEGEND  Sioux Energy Center  Type Property Boundary		1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.       A         1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.       A         2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).       S         3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.       P         4.) MISSOURI RIVER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.       C         5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.       C         6.) DG-11, PZ-6S AND TP-5S WERE NOT USED IN POTENTIOMETRIC CONTOURING.       TT		CLIENT AMEREN MISSOURI SIOUX ENERGY CENTER PROJECT CCR GROUNDWATER MONITORING PROGRAM TITLE NOVEMBER 13, 2019 POTENTIOMETRIC SURFACE M		
CCR Units SCPA - Bottom Ash Surface	<ul> <li>= Inferred Groundwater Elevation Contour (FT MSL)</li> <li>3.) GROUNDWATER ELEVATION 4.) MISSOURI RIVER ELEVATION STATES GEOLOGICAL SURVEY (I</li> </ul>					
SCPB - Fly Ash Surface	Contour (FT MSL) 6.) DG-11, PZ-6S AND TP-5S WEF Contour (FT MSL) CONTOURING.					
SCPC - WFGD Surface		IERGY CENTER, SIOUX PROPERTY CONTROL	CONSULTANT	YYYY-MM-DD	2020-01-07	
Impoundment     SCL4A - Dry CCR Disposal		983 STATE PLANE MISSOURI EAST FIPS		PREPARED	EMS	
Area		DRMATION SYSTEM, USGS GAUGES 06935965		DESIGN	JSI	
Groundwater Flow	Monitoring Well or	JIS), 05587498 (ALTON), GRAFTON (05587450).	COLDER	REVIEW	TJG	
Direction	$\Psi$ Piezometer 0 500 1,000	1,500 2,000	GOLDER	APPROVED	CMR	
		Feet	PROJECT No. PHASE 153-140601 0003			



golder.com