2019 Annual Groundwater Monitoring and Corrective Action Report

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

Submitted to:

Ameren Missouri

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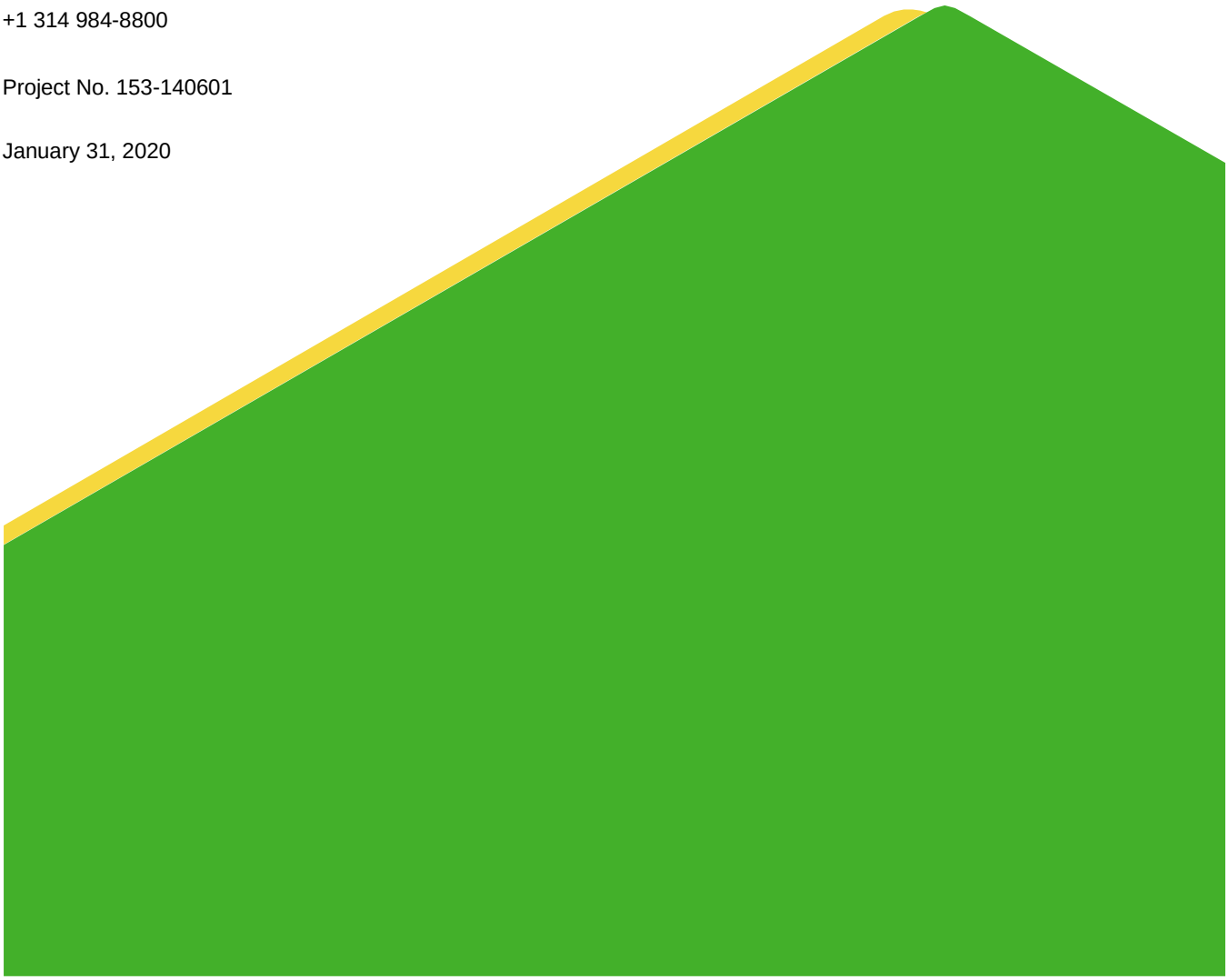

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1.0 INTRODUCTION

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

1.1 Overview of CCR Rule Activities Prior to 2019

The CCR Rule was published in the Federal Register on April 17, 2015. This rule required CCR surface impoundments and landfills to monitor groundwater around these CCR units. Prior to the first major deadline of October 17, 2017, Ameren completed the following tasks: (1) installation of a groundwater monitoring well system; (2) a Statistical Method Certification; (3) a Groundwater Monitoring Plan (GMP) that details design, installation, development, sampling procedures, as well as statistical methods; and (4) eight baseline groundwater sampling events for all Appendix III and Appendix IV parameters of the CCR Rule. In November 2017, the first Detection Monitoring event was completed. Results from this event demonstrated some Appendix III parameters were present at concentrations that were a Statistically Significant Increase (SSI) over background and were then verified in January 2018 testing. In accordance with the CCR Rule, Ameren placed a “Notification of the Establishment of a CCR Assessment Monitoring Program” and began Assessment Monitoring within 90 days. Results from the Assessment Monitoring events for the SCPA indicated the presence of molybdenum at a Statistically Significant Level (SSL) over the site-specific Groundwater Protection Standard (GWPS) in several of the compliance monitoring wells. As required, Ameren placed a “Notification of the Detection of Statistically Significant Levels Above CCR Groundwater Protection Standards” on its website and commenced an assessment of potential Corrective Measures.

2.0 2019 ACTIVITIES AND CURRENT STATUS OF THE SCPA GROUNDWATER MONITORING PROGRAM

The SCPA is currently in Corrective Action with Detection and Assessment Monitoring continuing concurrently. In 2019, Ameren completed a Corrective Measures Assessment (CMA). Due to the complexities of the site, the 60-day extension was used for the completion of the CMA. The CMA was placed on Ameren’s publicly available website (Ameren’s publicly available website is at: https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion) in May 2019 as required by the CCR Rule (§257.96(a)) and is provided in **Appendix A**. On May 31, 2019 Ameren held its public meeting on the findings of the CMA and accepted public comments. Ameren reviewed the comments and in August 2019 provided a response to the public comments, which is provided on Ameren’s publicly available website. After reviewing the options from the CMA and public comments, on August 30, 2019 Ameren selected a final remedy of source control through installation of a low permeability cover system and use of Monitored Natural Attenuation (MNA). As required by the CCR Rule (§257.97(a)), a report discussing this remedy selection as well as a certification by a Professional Engineer was placed in the operating record. After selecting a remedy, a Corrective Action Groundwater Monitoring Program was established within 90 days as required by the CCR Rule (§257.98(a)). Certifications of the Corrective Action Statistical Analysis Plan (SAP) and Groundwater Monitoring System (GMS) are provided on Ameren’s publicly available website. Additionally, Ameren plans to begin closure of the SCPA in December 2020, and closure is

scheduled to be completed by the end of 2021. Detection and Assessment Monitoring continued on a semi-annual basis and the results are discussed in more detail below.

3.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

There are currently two (2) different networks used for monitoring the SCPA, the monitoring well network established under §257.91 used for Detection and Assessment Monitoring and the network established under §257.98 used for Corrective Action Monitoring. **Table 1** (in text) provides a list of the monitoring wells used for each program and the location of the monitoring wells is provided in **Figure 1**. In addition, a summary of well construction details is provided in **Table 2**.

Table 1 - SCPA Groundwater Monitoring Programs Monitoring Wells

Detection and Assessment Groundwater Monitoring Program Wells	Corrective Action Groundwater Monitoring Program Wells	
BMW-1D	BMW-1S	TP-2D
BMW-3D	BMW-3S	TP-3D
UMW-1D	PZ-1S	TP-4D
UMW-2D	PZ-9D	TP-5D
UMW-3D	LMW-1S	TP-6S
UMW-4D	LMW-2S	TP-6D
UMW-5D	LMW-4S	TP-8D
UMW-6D	LMW-5S	
AM-1S (UMW-7S)	LMW-6S	
AM-1M (UMW-7D)	UG-3	

For the Detection and Assessment Groundwater Monitoring Network, all but two (2) monitoring wells are the same as in years past. Well construction diagrams for the previously used wells are provided in the 2017 Annual Report for this CCR Unit. AM-1S and AM-1M (UMW-7S and UMW-7D) were added to the network to satisfy the requirements of §257.95(g)(1), which required at least one (1) additional monitoring well be installed at the downgradient facility boundary. AM-1M (UMW-7D) is also sometimes also referred to as AM-1D. The well construction diagrams for these wells can be found in the 2018 Annual Report for this CCR Unit.

The Corrective Action Groundwater Monitoring Program consists of wells that have been used for different monitoring programs. Well construction diagrams are provided for monitoring wells as follows:

- BMW-1S, BMW-3S, LMW-1S, LMW-2S, LMW-4S, LMW-5S, LMW-6S, and UG-3 are in the 2017 Annual Reports for the SCPB and SCL4A CCR Units.
- TP-2D, TP-3D, TP-4D, TP-5D, TP-6S, TP-6D, and TP-8D are in the 2018 Annual Report for the SCPA CCR Unit.
- PZ-1S and PZ-9D are used in a State Utility Waste Landfill or National Pollutant Discharge Elimination System (NPDES) monitoring programs and are provided in **Appendix B**.

No monitoring wells used for CCR Rule monitoring were abandoned in 2019.

4.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCPA CCR Unit in 2019. **Table 3** provides a summary of the groundwater samples collected in 2019 including the number of samples, the date of the sample collection, and the monitoring program for the samples. **Appendix C** provides laboratory analytical data for CCR Rule sampling events.

4.1 Detection Monitoring Program

A Detection Monitoring event was completed November 12-14, 2018. Verification sampling and the statistical analysis to evaluate for SSIs for the November 2018 event were not completed until 2019 and are included in this report. Detections of Appendix III analytes triggered a verification sampling event, which was completed on January 7-8, 2019 and verified SSIs. **Table 4** summarizes the results and the statistical analysis of the November 2018 Detection Monitoring event.

A Detection Monitoring event was scheduled for May 2019, however due to flooding the event was completed August 1-2, 2019, and testing was completed for all Appendix III analytes. Statistical analysis of the data determined that there were SSIs. Detections of Appendix III analytes triggered a verification sampling event, which was completed October 1-18, 2019. **Table 5** summarizes the results and the statistical analysis of the August 2019 Detection Monitoring event. UMW-7D (AM-1M) and UMW-7S (AM-1S) were added to the Detection and Assessment Monitoring Well Networks for this event.

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. During 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.

A Detection Monitoring event was completed November 13-15, 2019 and testing was performed for all Appendix III analytes. Statistical analyses to evaluate for SSIs in the November 2019 data were not completed in 2019 and this statistical evaluation will be included in the 2020 Annual Report. **Table 6** summarizes the results of the November 2019 Detection Monitoring event.

4.2 Assessment Monitoring Program

An Assessment Monitoring event was completed November 12-14, 2018 and testing was completed for Appendix IV parameters that were detected during the April 2018 sampling event. The statistical evaluation for this event was completed in 2019 and therefore is included in this report. **Table 7** summarizes the results of the November 2018 Assessment Monitoring event. Based on the results from the analysis, there were no new constituents or monitoring wells at which a SSL was detected for the SCPA. The results from this analysis and a table that displays the site-specific GWPS are provided in **Appendix D**. The SSLs for the SCPA continue to be:

- Molybdenum at UMW-2D, UMW-3D, UMW-4D, and UMW-5D

An Assessment Monitoring event was completed August 1-2, 2019, and testing was completed for all Appendix IV analytes. Statistical analysis of the data is provided in **Appendix E** and determined that there were no new SSLs. **Table 8** summarizes the results of the August 2019 Assessment Monitoring event. UMW-7D (AM-1M) and UMW-7S (AM-1S) were added to the Detection and Assessment Monitoring Well Networks for this event.

During the statistical analysis of the August 2019 sampling event, the site specific GWPS used to determine SSLs were updated in accordance with the Statistical Analysis Plan.

Since the August 2019 event was the first Assessment Monitoring sampling event for monitoring wells UMW-7D (AM-1M) and UMW-7S (AM-1S), resampling for all detected Appendix IV parameters was completed in October 2019 and the results for this sampling event are included in the August-October 2019 sampling results shown in **Table 8**.

On November 13-15, 2019, the November 2019 Assessment Monitoring event was completed. This sampling event analyzed the Appendix IV constituents detected in groundwater during the initial assessment monitoring event of 2019 (detected parameters from the August 2019 event). **Table 9** summarizes the results of the November 2019 Assessment Monitoring event; however, statistical analyses to evaluate for SSLs over GWPS were not completed in 2019. Results of the statistical evaluation will be included in the 2020 Annual Report.

Statistical evaluations to determine if there is a concentration at an SSL above the site GWPS at UMW-7D (AM-1M) and UMW-7S (AM-1S) were not completed in 2019. As outlined in the Statistical Analysis Plan for this site, a minimum of four (4) samples are required to complete an SSL statistical evaluation. Statistical analysis for these monitoring wells will begin with the analysis of the November 2019 data, and will be included in the 2020 Annual Report.

4.2.1 Nature and Extent Evaluation

As required by the CCR Rule, after an SSL is determined to be above the site GWPS, an investigation into the nature and extent of impacts to groundwater must be initiated. Groundwater sampling for nature and extent was completed with an initial event in November 2018 and a second event in August 2019. A technical memorandum summarizing the results is provided in **Appendix F**. Results from this investigation were used for the CMA, remedy selection, and to select the Corrective Action monitoring well network.

4.3 Groundwater Elevation, Flow Rate and Direction

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

Groundwater elevations were used to generate potentiometric surface maps included in **Appendix G**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and directly controlled by the river stages of the 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 or 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 SCPA was toward the northeast/east 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 4 feet per year.

4.4 Sampling Issues

Detection and Assessment 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 SCPA Detection and Assessment Monitoring, in addition to the nature and extent investigation. On July 15-17, 2019, Golder performed post-flood monitoring well inspections at the SEC and found that at the SCPA BMW-1D, BMW-3D, UG-3, TP-6S, TP-6M and TP-6D had been impacted by the flood. On July 22-23, 2019, BMW-1D, BMW-3D, TP-6S, TP-6M, and TP-6D were re-developed to remove floodwater impacts to the well prior to any future groundwater elevation measurements or groundwater samples being collected. Gredell Engineering Resources re-developed wells used for the Utility Waste Landfill (including UG-3) on August 12-16, 2019. After successful re-development, BMW-1D, BMW-3D, UG-3, TP-6S, TP-6M, and TP-6D were returned to service.

No other notable sampling issues were encountered in 2019.

5.0 ACTIVITIES PLANNED FOR 2020

Detection and Assessment 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 and Assessment Monitoring data will be completed in 2020 and included in the 2020 Annual Report.

Corrective Action sampling is also scheduled to begin in the second quarter of 2020. After the initial sampling event, a subsequent event for all Appendix III and detected Appendix IV parameters will be completed. A second semi-annual Corrective Action event for all Appendix III and the detected Appendix IV parameters is also scheduled to be completed in the fourth quarter 2020.

Tables

Table 2
Summary of Well Construction Details
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

Monitoring Well ID	Installation Date	Location[4]		Top of Casing Elevation	Ground Surface Elevation	Top of Screen Elevation	Base of Well	Total Depth
		Northing[1]	Easting[1]	(FT MSL)[2]	(FT MSL)[2]	(FT MSL)[2]	(FT MSL)[2]	(FT BGS)[3]
CCR RULE COMPLIANCE NETWORK								
UMW-1D	12/15/2015	1121321.4	879420.0	447.16	445.4	383.9	373.7	71.7
UMW-2D	12/17/2015	1120266.7	878981.6	433.86	431.7	386.6	376.4	55.4
UMW-3D	12/16/2015	1120570.4	878251.1	431.67	430.1	384.3	374.1	56.0
UMW-4D	12/16/2015	1121077.9	877859.9	423.52	421.7	380.7	370.5	51.2
UMW-5D	12/17/2015	1121815.0	877799.1	446.66	444.8	384.8	374.6	70.2
UMW-6D	12/18/2015	1122312.0	878639.5	447.02	444.9	384.1	373.9	71.0
BMW-1D	12/8/2015	1121713.6	876740.9	428.28	426.0	383.1	372.9	53.2
BMW-3D	11/8/2016	1121798.8	875798.3	426.41	424.2	381.8	371.6	52.6
UMW-7S (AM-1S)	7/11/2018	1122151.7	877672.3	425.56	423.3	408.5	398.2	25.1
UMW-7D (AM-1D)	7/11/2018	1122156.7	877672.7	425.47	423.5	378.7	368.4	55.1
CORRECTIVE ACTION MONITORING WELL NETWORK								
LMW-1S	12/15/2015	1121320.4	879427.2	447.10	445.4	414.8	404.6	40.8
LMW-2S	12/16/2015	1120332.8	879283.7	447.16	445.2	414.7	404.5	40.8
LMW-4S	12/8/2015	1119226.6	879561.5	429.40	427.3	412.4	402.2	25.1
LMW-5S	12/14/2015	1119250.6	880348.6	447.36	445.5	410.1	399.9	45.6
LMW-6S	12/14/2015	1119782.0	880867.8	446.00	444.1	414.1	403.9	40.2
BMW-1S	12/8/2015	1121709.2	876755.6	427.77	426.0	412.0	401.8	24.2
BMW-3S	11/8/2016	1121792.9	875809.5	426.69	424.1	410.2	400.0	24.2
PZ-1S	6/17/2018	1121157.5	877799.8	423.94	422.1	402.4	391.7	30.5
PZ-9D	6/19/2018	1119526.8	881125.3	434.30	432.4	377.2	366.5	65.9
UG-3	12/16/2007	1118608.5	880519.4	429.71	427.1	410.0	399.7	27.4
TP-2D	7/9/2018	1123221.1	881698.8	429.26	426.7	347.3	342.2	84.4
TP-3D	7/9/2018	1120614.0	882877.1	434.82	432.1	356.1	351.0	81.1
TP-4D	7/8/2018	1118472.8	882589.0	428.72	426.4	349.3	344.2	82.2
TP-5D	7/6/2018	1118812.3	879517.5	429.60	427.1	352.5	347.4	79.7
TP-6S	7/11/2018	1119284.6	876381.5	428.07	426.1	408.1	403.0	23.0
TP-6D	7/11/2018	1119284.6	876381.5	428.06	426.1	345.6	340.5	85.6
TP-8D	7/14/2018	1114533.1	881307.7	431.30	428.8	351.7	346.6	82.3

Notes:
1) Horizontal Datum: State Plane Coordinates NAD83 (2000) Missouri East Zone feet.
2) FT MSL - Feet above mean sea level.
3) FT BGS - Feet below ground surface.
4) Vertical Datum: NAVD88 feet.

Created By: EMS
Checked By: TJG
Reviewed By: CRM

Table 3
Summary of Groundwater Sampling Dates
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

Groundwater Monitoring Wells	Date of Sample Collection					
	January 2019 Verification Sampling	August 2019 Assessment/ Detection Monitoring Sampling	August 2019 Nature and Extent Sampling	October 2019 Assessment Monitoring/ Verification Sampling	November 2019 Assessment/ Detection Monitoring Sampling	Total Number of Samples
CCR Rule Compliance Monitoring Well Network						
BMW-1D	-	8/2/2019	-	-	11/13/2019	2
BMW-3D	-	8/2/2019	-	-	11/13/2019	2
UMW-1D	-	8/2/2019	-	-	11/15/2019	2
UMW-2D	1/8/2019	8/1/2019	-	-	11/15/2019	3
UMW-3D	1/7/2019	8/1/2019	-	-	11/15/2019	3
UMW-4D	-	8/1/2019	-	-	11/15/2019	2
UMW-5D	-	8/2/2019	-	10/1/2019	11/13/2019	3
UMW-6D	-	8/2/2019	-	10/1/2019	11/13/2019	3
UMW-7S (AM-1S)	-	8/2/2019	-	10/18/2019	11/13/2019	3
UMW-7D (AM-1D)	-	8/2/2019	-	10/18/2019	11/13/2019	3
Nature and Exent Investigation						
BMW-1S	-	-	8/2/2019	-	-	1
BMW-3S	-	-	8/2/2019	-	-	1
LMW-1S	-	-	8/2/2019	-	-	1
LMW-2S	-	-	8/6/2019	-	-	1
LMW-3S	-	-	8/5/2019	-	-	1
LMW-4S	-	-	8/5/2019	-	-	1
LMW-5S	-	-	8/5/2019	-	-	1
LMW-6S	-	-	8/5/2019	-	-	1
LMW-7S	-	-	8/5/2019	-	-	1
LMW-8S	-	-	8/6/2019	-	-	1
LMW-9S	-	-	8/9/2019	-	-	1
UG-1A	-	-	8/19/2019	-	-	1
UG-2	-	-	8/19/2019	-	-	1
DG-1	-	-	8/19/2019	-	-	1
DG-2	-	-	8/19/2019	-	-	1
DG-3	-	-	8/19/2019	-	-	1
DG-4	-	-	8/19/2019	-	-	1
UG-3	-	-	8/19/2019	-	-	1
TMW-1	-	-	8/19/2019	-	-	1
TMW-2	-	-	8/19/2019	-	-	1
TMW-3	-	-	8/19/2019	-	-	1
TP-1S	-	-	8/5/2019	-	-	1
TP-1M	-	-	8/5/2019	-	-	1
TP-1D	-	-	8/6/2019	-	-	1
TP-2S	-	-	8/2/2019	-	-	1
TP-2M	-	-	8/5/2019	-	-	1
TP-2D	-	-	8/6/2019	-	-	1
TP-3S	-	-	8/7/2019	-	-	1
TP-3M	-	-	8/7/2019	-	-	1
TP-3D	-	-	8/7/2019	-	-	1
TP-4S	-	-	8/6/2019	-	-	1
TP-4M	-	-	8/6/2019	-	-	1
TP-4D	-	-	8/6/2019	-	-	1
TP-5S	-	-	8/2/2019	-	-	1
TP-5M	-	-	8/2/2019	-	-	1
TP-5D	-	-	8/2/2019	-	-	1
TP-6S	-	-	8/6/2019	-	-	1
TP-6M	-	-	8/6/2019	-	-	1
TP-6D	-	-	8/7/2019	-	-	1
TP-7S	-	-	8/6/2019	-	-	1
TP-7M	-	-	8/6/2019	-	-	1
TP-7D	-	-	8/6/2019	-	-	1
TP-8S	-	-	8/5/2019	-	-	1
TP-8M	-	-	8/5/2019	-	-	1
TP-8D	-	-	8/5/2019	-	-	1
Detection or Assessment Monitoring	Detection	Assessment/ Detection	Assessment	Assessment/ Detection	Assessment/ Detection	NA

Notes:

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

2.) Verification Sampling Events tested for Appendix III Parameters with initial exceedances that have not already been verified.

3.) Assessment Monitoring Events tested for Appendix IV Parameters.

4.) "-" No sample collected.

5.) NA - Not Applicable

Prepared by: KAB
Checked by: RJF
Reviewed by: CMR

Table 4
November 2018 Detection Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS					
			BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D
November 2018 Detection Monitoring Event										
DATE	NA	NA	11/12/2018	11/12/2018	11/14/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018
pH	SU	6.052-7.934	7.63	7.60	7.60	8.28	8.34	7.35	7.47	6.86
BORON, TOTAL	µg/L	240	140	47.3 J	163	18,400	31,900	16,800	5,530	589
CALCIUM, TOTAL	µg/L	152,297	128,000	108,000	75,300	175,000	248,000	153,000	72,700	123,000
CHLORIDE, TOTAL	mg/L	11.2	5.5	8.4	21.8	20.0	12.8	23.8	24.9	8.6
FLUORIDE, TOTAL	mg/L	0.3722	0.29	0.30	0.19 J	0.46	0.96	0.49	0.49	0.33
SULFATE, TOTAL	mg/L	48.16	13.3	27.5	63.4	522	994	459	12.0	53.4
TOTAL DISSOLVED SOLIDS	mg/L	517.6	474	410	348 J	895	1,410	1,000	375	464
January 2019 Verification Sampling Event										
DATE	NA	NA				1/8/2019	1/7/2019			
pH	SU	6.052-7.934				8.31	7.89			
BORON, TOTAL	µg/L	240								
CALCIUM, TOTAL	µg/L	152,297				181,000				
CHLORIDE, TOTAL	mg/L	11.2								
FLUORIDE, TOTAL	mg/L	0.3722								
SULFATE, TOTAL	mg/L	48.16								
TOTAL DISSOLVED SOLIDS	mg/L	517.6								

NOTES:

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

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Checked By: TJG
Reviewed By: CMR

Table 5
August 2019 Detection Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
			BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D	UMW-7S (AM-1S)	UMW-7D (AM-1M)
August 2019 Detection Monitoring Event												
DATE	NA	NA	8/2/2019	8/2/2019	8/2/2019	8/1/2019	8/1/2019	8/1/2019	8/2/2019	8/2/2019	8/2/2019	8/2/2019
pH	SU	6.308-7.828	7.09	7.11	7.54	8.03	7.69	7.13	7.27	6.92	7.24	7.30
BORON, TOTAL	µg/L	416.3	209	ND	217	12,400	27,600	15,600	13,600	1,120	7,570	12,500
CALCIUM, TOTAL	µg/L	147,892	126,000	105,000	58,100	171,000	236,000	136,000	95,300	83,400	86,600	83,100
CHLORIDE, TOTAL	mg/L	11.2	5.7	7.6	15.6	19.6 J	19.9	23.3	25.9	14.1	26.9	24.8
FLUORIDE, TOTAL	mg/L	0.3646	0.33	0.35	0.27	0.51	0.32	0.74	0.71	0.47	0.70	0.59
SULFATE, TOTAL	mg/L	44.89	36.9	30.7	36.2	339	828	521 J	83.3	68.9	23.3	48.1
TOTAL DISSOLVED SOLIDS	mg/L	513	464	445	282	822	1,390	973	501	393	398	439
October 2019 Verification Sampling Event												
DATE	NA	NA							10/1/2019	10/1/2019	10/18/2019	10/18/2019
pH	SU	6.308-7.828							7.27	6.94	7.11	7.19
BORON, TOTAL	µg/L	416.3									9,440	12,000
CALCIUM, TOTAL	µg/L	147,892										
CHLORIDE, TOTAL	mg/L	11.2								14.0	26.8	25.9
FLUORIDE, TOTAL	mg/L	0.3646								0.42	0.70	0.64
SULFATE, TOTAL	mg/L	44.89							154			76.7
TOTAL DISSOLVED SOLIDS	mg/L	513										

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. 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 and that had not already been verified were tested during Verification Sampling.

Created By: EMS
Checked By: KAB
Reviewed By: CMR

Table 6
November 2019 Detection Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D	UMW-7S (AM-1S)	UMW-7D (AM-1M)
November 2019 Detection Monitoring Event											
DATE	NA	11/13/2019	11/13/2019	11/15/2019	11/15/2019	11/15/2019	11/15/2019	11/13/2019	11/13/2019	11/13/2019	11/13/2019
pH	SU	7.14	6.98	7.53	7.93	7.66	7.06	7.37	7.22	7.26	7.16
BORON, TOTAL	µg/L	173	73.6 J	226	13,000	30,500	28,600	19,000	1,370	10,500	11,300
CALCIUM, TOTAL	µg/L	118,000	116,000	63,000	172,000	249,000	203,000	108,000	82,400	84,200	83,000
CHLORIDE, TOTAL	mg/L	5.8	11.1	15.9	19.8	14.7	22.9	26.3	12.5	25.3	25.6
FLUORIDE, TOTAL	mg/L	0.29	0.39	0.25	0.49	1.0	0.79	0.81	0.45	0.63	0.57
SULFATE, TOTAL	mg/L	39.6	ND	42.3	369	755	592	143	71.8 J	ND	72.3
TOTAL DISSOLVED SOLIDS	mg/L	494	512	296	917	1,270	1,130	617	372	423	441

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.

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

Table 7
November 2018 Assessment Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS					
		BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D
Field Parameters									
DATE	NA	11/12/2018	11/12/2018	11/14/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	1.90	1.19	0.23	0.66	0.70	0.67	0.43	0.23
pH	SU	7.63	7.60	7.60	8.28	8.34	7.35	7.47	6.86
REDOX POTENTIAL	mV	-46.2	-1.2	-101.5	-170.3	-177.9	-135.0	-188.9	-89.9
SPECIFIC CONDUCTIVITY	mS/cm	0.773	0.681	0.571	1.139	1.668	1.219	0.593	0.813
TURBIDITY	NTU	-	0.71	4.60	0.21	0.70	0.17	2.02	1.37
Appendix IV Parameters									
ARSENIC, TOTAL	µg/L	0.20 J	ND	1.4	2.8	0.82 J	0.29 J	0.40 J	0.29 J
BARIUM, TOTAL	µg/L	297	645	134	65.7	75.0	56.9	265	182
FLUORIDE, TOTAL	mg/L	0.29	0.30	0.19 J	0.46	0.96	0.49	0.49	0.33
LITHIUM, TOTAL	µg/L	16.2	25.4	15.7	23.4	11.7	38.3	22.9	20.3 J
MOLYBDENUM, TOTAL	µg/L	ND	ND	24.0	1,540	4,000	3,900	181	52.8

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit.
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. Statistical Analysis for the Assessment Monitoring data is provided in Appendix D.
6. "-" Turbidity read underange for the turbidmeter.

Prepared By: JSI
Checked By: TJG
Reviewed By: CMR

Table 8
August 2019 Assessment Monitoring Results SCPA
Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS									
		BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D	AM-1S	AM-1M	AM-1S	AM-1M
Field Parameters													
DATE	NA	8/2/2019	8/2/2019	8/2/2019	8/1/2019	8/1/2019	8/1/2019	8/2/2019	8/2/2019	8/2/2019	8/2/2019	10/18/2019	10/18/2019
DISSOLVED OXYGEN	mg/L	0.60	0.70	0.41	1.35	1.06	0.50	0.18	1.39	0.53	0.38	0.17	0.16
pH	SU	7.09	7.11	7.54	8.03	7.69	7.13	7.27	6.92	7.24	7.30	7.11	7.19
REDOX POTENTIAL	mV	-117.8	-104.3	-107.5	-140.8	-123.8	-119.1	-119.4	-72.6	-135.3	-134.5	128.3	108.5
SPECIFIC CONDUCTIVITY	mS/cm	0.820	0.698	0.486	1.095	1.567	1.236	0.742	0.591	0.61	0.63	0.68	0.71
TURBIDITY	NTU	6.87	6.67	8.00	3.26	2.54	1.94	2.28	6.17	1.65	3.78	4.82	1.69
Appendix IV Parameters													
ANTIMONY, TOTAL	µg/L	ND	ND	0.099 J	ND	ND	ND	ND	ND	ND	ND	-	-
ARSENIC, TOTAL	µg/L	0.26 J	0.14 J	1.5	3.6	0.52 J	0.33 J	0.42 J	0.38 J	1.2	0.27 J	1.7	0.23 J
BARIUM, TOTAL	µg/L	311	685	111	71.3	68.3	53.8	338	136	147	271	155	270
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
CADMIUM, TOTAL	µg/L	ND	ND	0.046 J	0.34 J	1.9	2.1	0.36 J	0.037 J	0.10 J	0.20 J	0.26 J	0.19 J
CHROMIUM, TOTAL	µg/L	ND	0.11 J	0.25 J	0.13 J	0.21 J	0.080 J	0.098 J	ND	ND	0.080 J	-	-
COBALT, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	1.6 J	ND	-	-
FLUORIDE, TOTAL	mg/L	0.33	0.35	0.27	0.51	0.32	0.74	0.71	0.47	0.70	0.59	0.70	0.64
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
LITHIUM, TOTAL	µg/L	17.9	24.6	10.1	21.4	22.5 J	33.7	27.4	18.3	30.9	40.5	28.8	35.4
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
MOLYBDENUM, TOTAL	µg/L	ND	ND	18.2 J	820	4,120	4,280	832	82.3	167	477	292	497
RADIUM [226 + 228]	pCi/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
SELENIUM, TOTAL	µg/L	ND	ND	0.13 J	0.096 J	0.27 J	0.16 J	0.20 J	ND	0.17 J	0.15 J	-	-
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, mV - millivolts, pCi/L - picocuries per liter, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit.
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. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
6. Statistical Analysis for the Assessment Monitoring data is provided in Appendix E.
7. "-" Not sampled.

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

Table 9
November 2019 Assessment Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

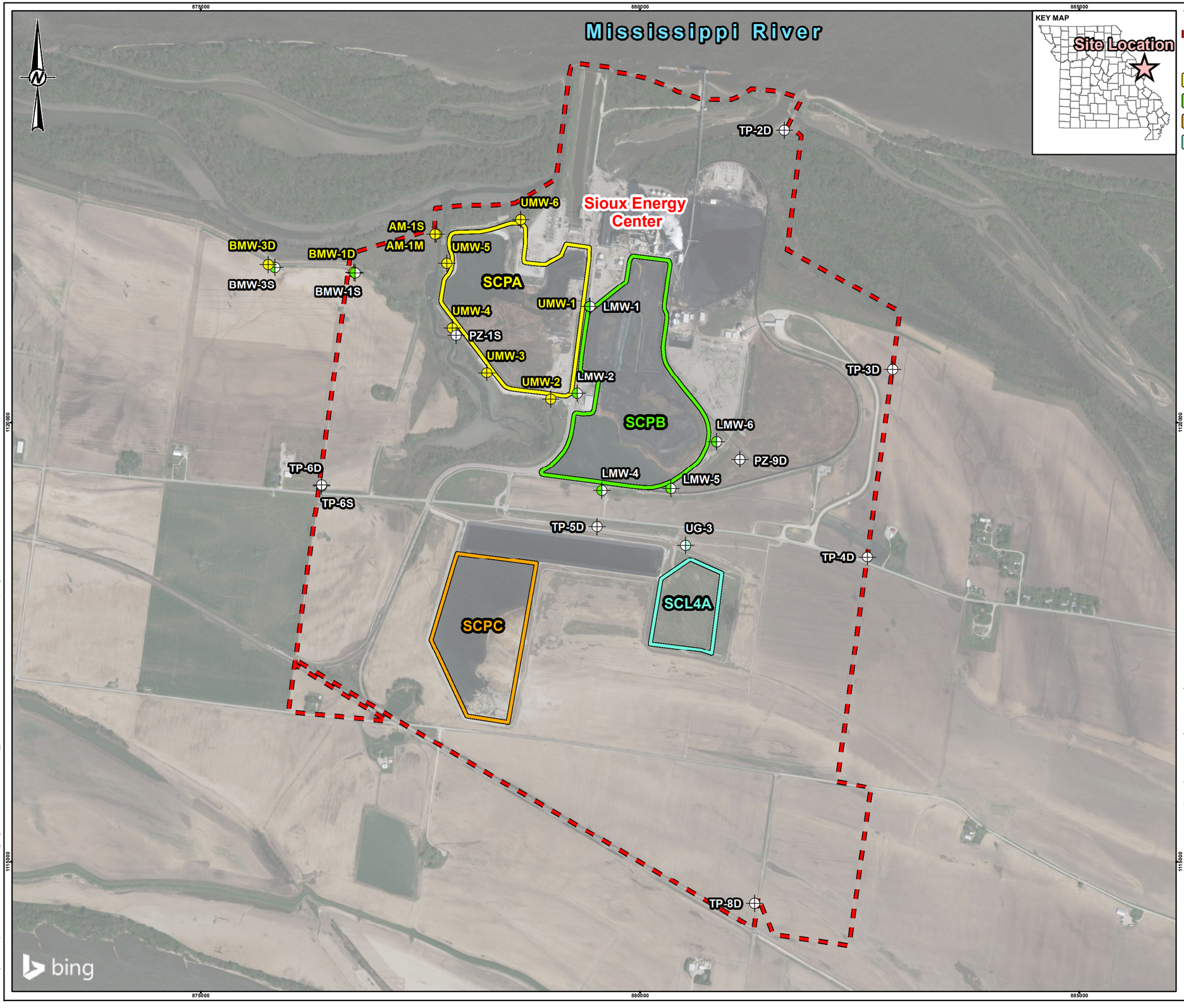
ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D	AM-1S	AM-1M
Field Parameters											
DATE	NA	11/13/2019	11/13/2019	11/15/2019	11/15/2019	11/15/2019	11/15/2019	11/13/2019	11/13/2019	11/13/2019	11/13/2019
DISSOLVED OXYGEN	mg/L	0.23	0.26	0.24	0.11	0.16	0.23	0.23	0.29	0.16	0.21
pH	SU	7.14	6.98	7.53	7.93	7.66	7.06	7.37	7.22	7.16	7.16
REDOX POTENTIAL	mV	111.9	128.3	-26.7	149.4	161.7	173.8	168.8	-114.3	152.7	136.5
SPECIFIC CONDUCTIVITY	mS/cm	0.860	0.780	0.487	1.07	1.53	1.43	0.85	0.619	0.69	0.700
TURBIDITY	NTU	4.71	0.00	4.65	1.14	2.07	1.01	1.84	4.23	1.29	3.09
Appendix IV Parameters											
ARSENIC, TOTAL	µg/L	0.27 J	0.48 J	1.8	3.4	0.43 J	0.41 J	0.50 J	0.30 J	1.2	0.24 J
BARIUM, TOTAL	µg/L	320	173	121	66.7	69.5	74.3	370	126	145	258
CADMIUM, TOTAL	µg/L	ND	0.047 J	0.040 J	0.41 J	1.5	3.1	0.89	0.046 J	0.17 J	0.22 J
FLUORIDE, TOTAL	mg/L	0.29	0.39	0.25	0.49	1.0	0.79	0.81	0.45	0.63	0.57
LITHIUM, TOTAL	µg/L	8.5 J	ND	9.9 J	18.8	21.0	34.9	28.5	9.7 J	25.4	29.2
MOLYBDENUM, TOTAL	µg/L	ND	ND	21.2	943	3,630	7,660	2,230	102	319	501

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit.
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.

Prepared By: JSI
Checked By: TJG/EMS
Reviewed By: CMR

Figures



LEGEND

Sioux Energy Center Property Boundary

Sioux Energy Center CCR Units

- SCPA - Unlined Bottom Ash Surface Impoundment
- SCPB - Lined Fly Ash Surface Impoundment
- SCPC - WFGD Disposal Area
- SCL4A - Landfill Cell 4A

Groundwater Monitoring Wells Used for SCPA CCR Rule Monitoring

- SCPA Detection/Assessment Monitoring Well Network
- SCPA Corrective Action Monitoring Well Network
- SCPB Detection and SCPA Corrective Action Monitoring Well Networks
- SCL4A Detection and SCPA Corrective Action Monitoring Well Networks

0 1,000 2,000 3,000

Feet

NOTE(S)

1.) ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
2.) WFGD - Wet Flue-Gas Desulfurization

REFERENCE(S)

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

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AERIAL MAP AND MONITORING WELL LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-14
DESIGNED	JSI
PREPARED	RJF
REVIEWED	EMS
APPROVED	CMR

PROJECT NO.	CONTROL	REV.	FIGURE
153140601	1240	0	1

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APPENDIX A

Corrective Measures Assessment and Certification

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

April 2019
Project No. 132002

SUBJECT: **Demonstration for 60-Day Extension – Corrective Measures Assessment (CMA) Coal Combustion Residual (CCR) Surface Impoundments (SCPA)**
Ameren Missouri Sioux Energy Center
St. Charles County, Missouri

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.96(a) (CCR Rule), I certify that Ameren Missouri, St. Louis, Missouri (Ameren) has demonstrated the need for additional time beyond the regulatory time period of 90 days to complete the assessment of corrective measures due to site-specific conditions and the evaluation of remedial treatment alternatives in support of an informed CMA process.

In the case of the assessment for the SCPA the site has complex hydrogeological conditions. In addition, Ameren is in the process of reviewing possible groundwater remedies, and ongoing discussions with third-party experts regarding effectivity and implementation of critical steps in the treatment and remedy assessment process. Based on these site-specific conditions and related groundwater treatment alternatives evaluations in support of the CMA by Ameren, the CCR Rule allows for a 60-day extension to complete the CMA process.

This certification as submitted, is to the best of my knowledge, accurate and complete.

Signed:_____
Certifying Engineer

Print Name:	Steven F. Putrich, P.E.
Missouri License No.:	2014035813
Title:	CCR Practice Lead, Senior Consulting Engineer
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal

HALEY ALDRICH

www.haleyaldrich.com

CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST CHARLES COUNTY, MISSOURI

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Ameren Missouri
St. Louis, Missouri

May 2019

Overview

This Corrective Measures Assessment (CMA) was prepared by Haley & Aldrich, Inc. (Haley & Aldrich) for Union Electric Company d/b/a Ameren Missouri (Ameren) for the Coal Combustion Residual (CCR) surface impoundment (SCPA) located at the Sioux Energy Center (SEC). The SEC is a coal-fired power plant located between the Mississippi and Missouri Rivers in St. Charles County, Missouri. The CMA was completed in accordance with requirements stated in the U.S. Environmental Protection Agency's (USEPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21302 (Apr. 17, 2015) (promulgating 40 CFR §257.61); 83 Fed. Reg. 36435 (July 30, 2018) (amending 40 CFR §257.61) (CCR Rule).

Ameren implemented groundwater monitoring under the CCR Rule through a phased approach to allow for a graduated response and evaluation of steps to address groundwater quality. Assessment monitoring completed in 2018 evaluated the presence and concentration of constituents in groundwater specified in the CCR Rule (i.e. Appendix IV). Of the 23 CCR parameters evaluated, only one constituent of concern (COC), molybdenum, exceeds to a very limited extent, the Groundwater Protection Standards (GWPS) established for the SCPA. In fact, as described in **Section 3.3.1**, 96% of Appendix IV parameters tested complied with CCR Rule requirements.

Ameren completed a detailed environmental evaluation of the SCPA and surrounding area, including voluntary, supplemental surface water sampling. In 2018, a risk evaluation was undertaken to identify whether current groundwater conditions pose an unacceptable risk to human health and the environment, and whether corrective measures mitigate such an unacceptable risk, if present. The risk evaluation concluded that there are **no adverse effects on human health or the environment currently or under reasonably anticipated future uses** from either surface water or groundwater due to CCR management practices at SCPA.

In performing this CMA, Haley & Aldrich considered the following: presence and distribution of molybdenum, SCPA configuration, hydrogeologic setting, and the results of the detailed risk evaluation. Within the SCPA, CCR is managed in an impoundment that extends to a depth of approximately 75 feet (ft) below ground surface (bgs). The alluvial aquifer beneath the SCPA is approximately 100 ft in thickness. Although flow within the alluvial aquifer is directly controlled by the river stages of the Mississippi and Missouri Rivers and will generally flow from the higher of the two rivers toward the lower elevation river.

To provide a comprehensive CMA, this effort included surface impoundment closures and groundwater remediation alternatives, including:

- Alternative 1: Closure in place (CIP) with low permeability capping and monitored natural attenuation (MNA);
- Alternative 2: CIP with in-situ stabilization (ISS), low permeability capping and MNA;
- Alternative 3: CIP with low permeability capping and in-situ groundwater treatment;
- Alternative 4: CIP with low permeability capping, hydraulic containment (HC) of groundwater, and ex-situ groundwater treatment; and
- Alternative 5: Closure by removal (CBR) with MNA.

These five alternatives were evaluated based on the threshold criteria provided in the CCR rule and then compared to three of the four balancing criteria stated in the CCR Rule. The four balancing criteria consider:

1. The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful;
2. The effectiveness of the remedy in controlling the source to reduce further releases;
3. The ease or difficulty of implementing a potential remedy; and
4. The degree to which community concerns are addressed by a potential remedy.

Balancing criteria four, which considers community concerns, will be evaluated following a public information session scheduled for May 2019.

The following observations are made regarding closure scenarios and groundwater remedial alternatives for the SCPA and are described more fully in this report:

- **Cap Integrity and Hydrogeologic Conditions:** For all CIP alternatives, Ameren intends to install a geomembrane cap and cover system that exceeds by two orders-of-magnitude the performance criteria set forth in the CCR Rule and is referred to in this CMA as a "low permeability cap." Vertical infiltration via precipitation is virtually eliminated following installation of the geomembrane cover system. Modelling predicts that post-closure, 95% of groundwater will travel horizontally via a preferential pathway around the unit due to permeability differentials in the surrounding soils. In addition, groundwater flow in this area moves very slowly, approximately 11 feet per year, less than the length of a midsized vehicle.

- **No Risk:** Risk assessment evaluations confirm that the SCPA, even prior to closure, presents no **unacceptable risk** to human health or the environment. In fact, concentration levels of molybdenum would need to be **more than 1,000 times higher** than currently measured levels before an adverse impact in the Mississippi River could occur. Therefore, since no adverse risk currently exists, implementation of any of the remedies considered will not result in a meaningful reduction in risk.

- **Groundwater Compliance:** Ameren has retained XDD Environmental (XDD) to evaluate targeted in-situ treatment methods to address elevated levels of molybdenum. Bench-scale testing indicates that certain pH adjustments can reduce concentration levels and that in-situ treatment evaluations, including bio-augmentation, are ongoing at all facilities and will be completed this summer.

- **Excavation Timeframe:** As described in an Extraction & Transportation Study prepared by the Lochmueller Group, removal of large volumes of CCR stored at the SEC creates extensive logistical challenges – including excavation, transportation, and disposal, and could take decades to complete during which time the impoundment would remain open and would be subject to ongoing infiltration from precipitation.

In accordance with §257.98, Ameren will implement a groundwater monitoring program to document the effectiveness of the selected remedial alternative. Corrective measures are considered complete when monitoring reflects groundwater downgradient of the SCPA does not exceed Appendix IV GWPS for three consecutive years. USEPA is in the process of modifying certain CCR Rule requirements and,

depending upon the nature of such changes, assessments made herein could be modified or supplemented to reflect such future regulatory revisions. See *Federal Register (March 15, 2018; 83 FR 11584*).

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List of Acronyms and Abbreviations

Ameren	Ameren Missouri
AMSL	Above Mean Sea Level
bgs	Below Ground Surface
CBR	Closure by Removal
CCR	Coal Combustion Residuals
CIP	Closure In-Place
CMA	Corrective Measures Assessment
cm/sec	Centimeters per Second
COC	Constituents of Concern
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
ft	Feet
Golder	Golder Associates Inc.
GMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standards
Haley & Aldrich	Haley & Aldrich, Inc.
HC	Hydraulic Containment
ISS	In-Situ Stabilization
MM	Million
MM CY	Million Cubic Yards
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter
MNA	Monitored Natural Attenuation
N&E	Nature and Extent
NAS	U.S. National Academy of Sciences
O&M	Operations and Maintenance
ORP	Oxidation Reduction Potential
ppm	Parts per Million
PRB	Permeable Reactive Barrier
RDA	Recommended Daily Allowance
RO	Reverse Osmosis
SCL4A	Dry CCR Disposal Area
SCPA	Bottom Ash Surface Impoundment
SCPB	Fly Ash Surface Impoundment
SCPC	Gypsum Disposal Area
SEC	Sioux Energy Center
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
ug/L	Micrograms per liter
UL	Tolerable Upper Limit
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
XDD	XDD Environmental

1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Corrective Measures Assessment (CMA) for the Coal Combustion Residual (CCR) surface impoundment (SCPA) located at the Ameren Missouri (Ameren) Sioux Energy Center (SEC). Ameren has conducted detailed geologic and hydrogeologic investigations under Missouri's utility and solid waste landfill requirements as well as the USEPA rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21302 (Apr. 17, 2015) (promulgating 40 CFR §257.61); 83 Fed. Reg. 36435 (July 30, 2018) (amending 40 CFR §257.61) (CCR Rule). These investigations were, in part, related to determination of requirements related to the potential for both SCPA closure and groundwater corrective action.

This CMA includes a summary of the results of groundwater and site investigations at the SEC. Groundwater impacted by the SCPA exceeds the statistically-derived GWPS for molybdenum at only four monitoring well locations. This report evaluates potential corrective measures to address these limited exceedance of the GWPS.

1.1 FACILITY DESCRIPTION/BACKGROUND

The SEC is located near the confluence of the Missouri and Mississippi Rivers in rural St. Charles County. Historically, the SEC managed CCR in an unlined bottom ash pond (SCPA), and a lined fly ash (SCPB) pond. The SCPA is approximately 47 acres in size and is the focus of this CMA (**Figure 1-1**). The Mississippi River, Poeling Lake, and the Missouri River are located to the north, southwest and south of the facility, respectively. The facility is surrounded by agricultural fields and in 2008, Ameren constructed a utility waste landfill (UWL) to manage CCR and gypsum waste from the SEC's scrubber system. Site features are illustrated on **Figure 1-2**

Sioux Energy Center

Ameren is constructing wastewater treatment facilities and will terminate usage of the impoundment system in 2020 and commence closure of both the bottom and fly ash ponds in 2021.

1.2 SITE CHARACTERIZATION WORK SUMMARY

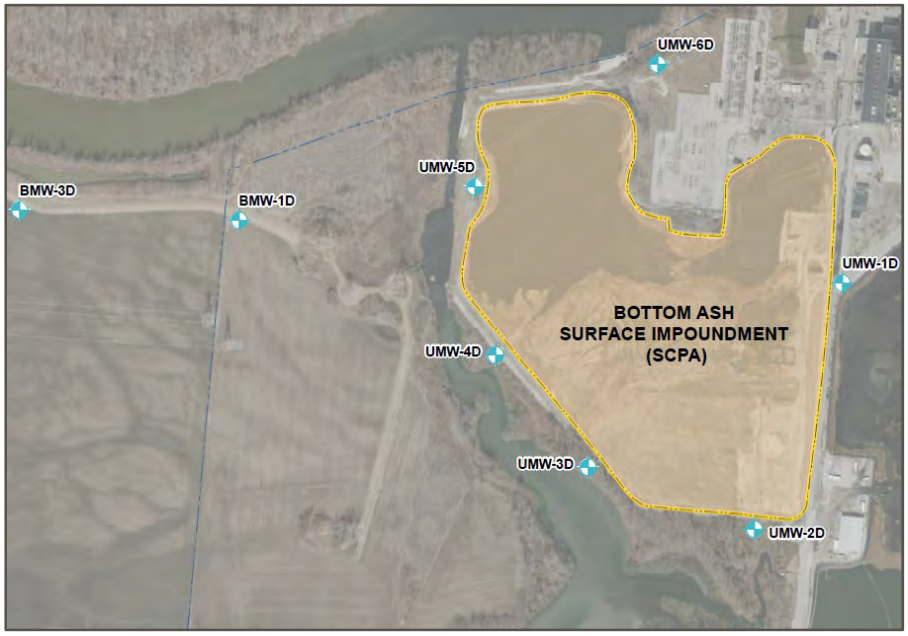
Extensive subsurface investigations have occurred pursuant Missouri's utility and solid waste landfill requirements as well as the CCR Rule. In August 2006, a Detailed Site Investigation (DSI) Report prepared by Gredell Engineering Resourcing, Inc. characterized the geology and hydrogeology of the UWL to support the development of a hydrogeologic Conceptual Site Model (CSM). The DSI investigation at the SEC included:

- Soil borings and sampling;
- Geotechnical testing;
- Rock coring;
- Well and piezometer installation;
- Slug testing; and
- Groundwater sampling.

The CSM has been further enhanced with ongoing CCR groundwater monitoring and supplemental subsurface investigation activities performed by Golder Associates, Inc. (Golder). Findings from these extensive and updated series of geologic, geotechnical, and hydrogeologic investigations, including voluntary surface water sampling conducted, have produced a robust CSM that supports the CMA activities discussed in this report.

1.3 GROUNDWATER MONITORING

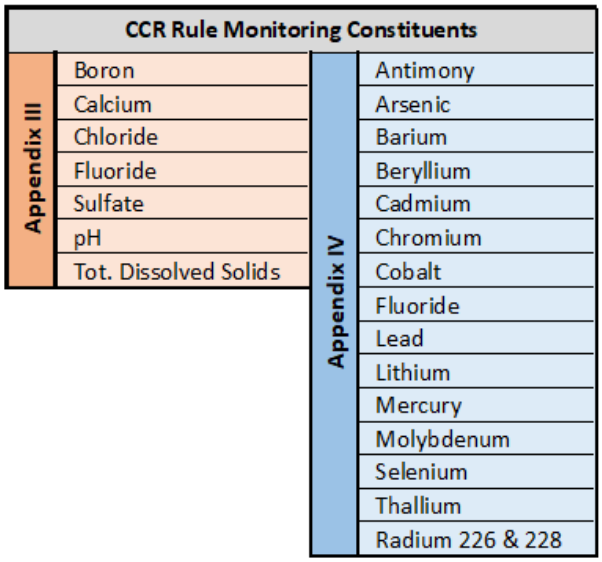
Groundwater monitoring under the CCR Rule occurs through a phased approach to allow for a graduated response (i.e., baseline, detection, and assessment monitoring as applicable) and evaluation of steps to address groundwater quality. Golder prepared a Groundwater Monitoring Plan (GMP) as required by the CCR Rule. The GMP presents the design of the groundwater monitoring system, groundwater sampling and analysis procedures, and groundwater statistical analysis methods.



Groundwater Monitoring Well Locations

Monitoring wells were installed in November and December 2015 and includes two background wells (BMW-1D and BMW-3D) and six downgradient monitoring wells (UMW-1 through UMW-6) located around the perimeter of the SCPA. In general, the monitoring wells are screened in the alluvial aquifer zone near the base elevation of the SCPA.

Detection monitoring sampling events occurred in 2017 and 2018. The results of the sampling events were then compared to background, or natural groundwater values, using statistical methods to determine if Appendix III constituents at the base of the ash basin are present at concentrations above background, called statistically significant increases (SSI). Detection of Appendix III analytes triggered a verification sampling event in January 2018 and verified SSIs. The results of this analysis indicated SSIs necessitating the establishment of an Assessment Monitoring Program and respective notification of the same.



During the Assessment Monitoring phase, CCR groundwater monitoring well samples were collected during April, May and November 2018 and subsequently analyzed for Appendix IV constituents. Appendix IV analytical results for the baseline and Assessment Monitoring events are summarized in **Table I**.

1.4 CORRECTIVE MEASURES ASSESSMENT PROCESS

The CMA process involves development of groundwater remediation technologies that will result in the following threshold criteria: protection of human health and the environment, attainment of GWPS, source control, COC removal and compliance with standards for waste management. Once these technologies are demonstrated to meet these criteria, they are then compared to one another with respect to long- and short-term effectiveness, source control, and implementability. Input from the community on such proposed measures will occur as part of a public meeting scheduled for May 2019.

1.5 RISK REDUCTION AND REMEDY

The CCR Rule at §257.97 (Selection of Remedy) at (b)(1) requires that remedies must be protective of human health and the environment. Further, at (c) the CCR Rule requires that in selecting a remedy, the owner or operator of the CCR unit shall consider specific evaluation factors, including the risk reduction achieved by each of the proposed corrective measures. Each of the evaluation factors listed here and discussed in **Section 4** are those that consider risk to human health or the environment.

> (1)(i) Magnitude of reduction of existing risks;
>
> (1)(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;
>
> (1)(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminant;

(1)(vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment;

(4) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy[1];

(5)(i) Current and future uses of the aquifer;

(5)(ii) Proximity and withdrawal rate of users; and

(5)(iv) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to CCR constituents.

[1] Factors 4 and 5 are not part of the CMA evaluation process as described in §257.97(d)(4), §257.97(d)(5)(i)(ii)(iv); rather they are factors the owner or operator must consider as part of the schedule for remedy implementation.

2. Groundwater Conceptual Site Model

To evaluate the magnitude of risk reduction, the degree of existing risk must first be identified. Prior risk evaluations and data collected are summarized below.

2.1 SITE SETTING

The SEC Site is in St. Charles County, Missouri and located between the Mississippi and Missouri Rivers. The Site is bounded to the north by wooded areas associated with the Mississippi River, to the south by a railroad, and to the east and west is a largely agricultural area that is served by municipal water.

The SCPA is constructed with perimeter berms at an elevation of approximately 446 ft above mean sea level (AMSL). Immediately adjacent to the SEC is a channelized area of the Mississippi River that is referred to as the Mississippi River Chute. Both fly ash and bottom ash have historically been managed and stored in the SCPA surface impoundment. Borings completed in the SCPA indicate a CCR thickness of up to approximately 75 ft bgs around 373 ft AMSL in the center of the unit and thinning out towards the edges.

2.2 GEOLOGY AND HYDROGEOLOGY

The SEC is located in the extreme southeastern corner of the Central Lowland Physiographic Province and the Dissected Till Plains. However, because the SEC lies between two major river systems in an area that has been mostly deposited by flow and deposition of river deposits, the regional physiographic setting is not representative of local Site geology.

Alluvial deposits associated with the Missouri and Mississippi Rivers overlie older sedimentary bedrock. These alluvial deposits comprise the surficial alluvial aquifer, which lies unconformably on top of bedrock and is typically 100 to 120 ft thick with base elevations of approximately 300 to 330 ft AMSL[2]. Overall, this aquifer is described as a fining upwards sequence of stratified sands and gravels with varying amounts of silts and clays. The alluvial deposits are comprised of various sub-units, including flood basin deposits, floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of the alluvial deposits are highly variable.

The alluvial deposits are underlain by bedrock that includes Mississippian-aged rocks of the Meramecian Series. Formations include primarily limestone, dolomite, and shale and are comprised of the Salem Formation, Warsaw Formation, and the Osagean aged Burlington-Keokuk Formation. The depth to bedrock typically increases towards the Mississippi River. Based on regional well logs the upper-most

[2] 40 CFR Part 257, Groundwater Monitoring Plan SCPA, Sioux Energy Center, St. Charles County, Missouri (Golder 2017)

Generalized Geologic Cross Section

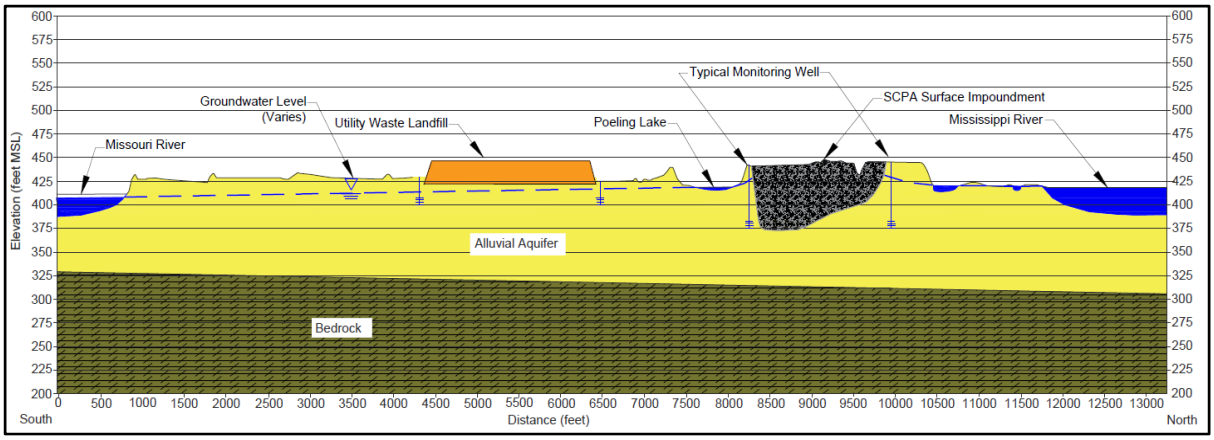


Image from Figure 3, Groundwater Monitoring Plan, SCPA SEC (Golder 2017)

bedrock unit beneath the SEC is the Salem formation. Proceeding northward from St. Louis County, the thickness of this unit thins to about 40 to 60 ft and is describes as a buff limestone with dolomitic limestone, dolomite and shale.

The alluvial aquifer is the uppermost aquifer across the Site and consist primarily of alluvial sands with some silt, clay, and gravel associated with the Missouri and Mississippi River Valley alluvium. Groundwater flow within the alluvial aquifer is directly controlled by the river stages of the Mississippi and Missouri Rivers, since the alluvial aquifer is hydraulically connected to these water bodies. Groundwater will generally flow from the higher of the two rivers toward the lower elevation river. The SCPA and Poeling Lake also locally affect water levels and flow directions. Horizontal groundwater hydraulic gradients in the alluvial aquifer are typically low and flat.

Groundwater Flow Map-November 12, 2018
Image from Figure C3, 2018 Annual Groundwater Monitoring and Corrective Action Report (Golder 2019)

Groundwater flow direction and gradient were estimated for the downgradient SCPA monitoring wells using the USEPA's On-line Tool for Site Assessment Calculation for Hydraulic Gradient (Magnitude and Direction) (USEPA, 2016). Results from this assessment indicate that while groundwater flow direction is variable and gradients are relatively flat, the overall net groundwater flow at the SCPA was slightly toward the north or toward the Mississippi River. Horizontal gradients calculated by the program range from 0.0002 to 0.0011 ft/ft with an estimated net annual groundwater velocity of approximately 11 ft per year[3].

[3] 2018 Annual Groundwater Monitoring and Corrective Action Report, SCPA Surface Impoundment, SEC, St. Charles County, Missouri (Golder 2019)

HALEY ALDRICH

Vertical hydraulic gradients adjacent to the SCPA demonstrate low downward gradients, with the difference in groundwater elevations between the shallow and intermediate/deep groundwater monitoring zones typically less than 0.01 ft. Vertical gradients within the SCPA and the underlying alluvial groundwater zone changes seasonally based on river levels and fluctuating alluvial aquifer groundwater levels.

Groundwater flow modeling completed by Golder evaluated the flux of groundwater passing through the CCR, following closure and dewatering of the SCPA. As shown in the figure below, post-closure 95% of groundwater moving laterally through the alluvial aquifer preferentially flows under (and around) the SCPA, due to the notably lower horizontal hydraulic conductivity of the CCR.

Groundwater Preferentially Flows Under/Around the SCPA

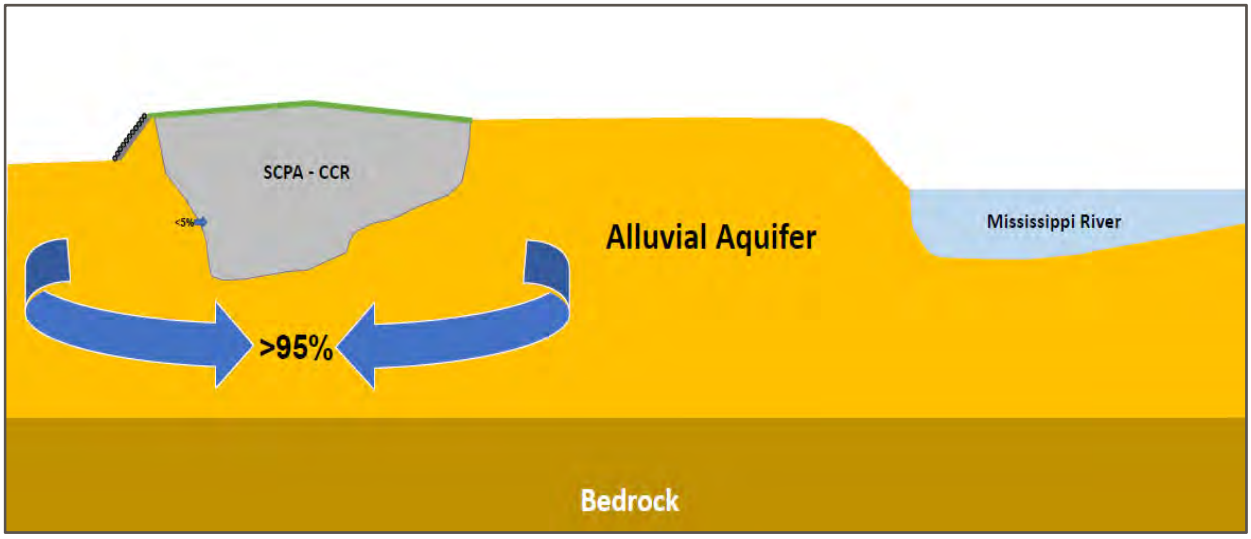


Image provided by Golder 2019

2.3 GROUNDWATER PROTECTION STANDARDS

Golder completed a statistical evaluation of groundwater samples using the methods and procedures outlined in the Groundwater Monitoring Plan's *Statistical Analysis Plan* (Golder 2017) to develop site-specific GWPS for each Appendix IV constituent.

Groundwater results were compared to the site-specific GWPS. Statistically significant levels (SSLs) above the GWPS are limited to four monitoring wells (UMW-2D, UMW-3D, UMW-4D and UMW-5D) and only for one parameter (molybdenum).

Parameter	Site GWPS	Units
Antimony	6	µg/L
Arsenic	10	µg/L
Barium	2000	µg/L
Beryllium	4	µg/L
Cadmium	5	µg/L
Chromium	100	µg/L
Cobalt	6	µg/L
Fluoride	4	mg/l
Lead	15	µg/L
Lithium	40	µg/L
Mercury	2	µg/L
Molybdenum	100	µg/L
Radium 226+228	5	pCi/L
Selenium	50	µg/L
Thallium	2	µg/L

Groundwater Protection Standards
ug/L – micrograms per liter
mg/l – milligrams per liter
pCi/L – picoCuries per liter

2.4 NATURE AND EXTENT OF GROUNDWATER IMPACTS

Ameren initiated a nature and extent (N&E) investigation as required by the CCR Rule in 2018 by installing 26 monitoring wells and piezometers (N&E wells). The N&E wells are screened in three different, generalized zones of the alluvial aquifer: shallow zone, middle/intermediate zone, and deep zone. Well screen lengths range from 5 to 10 ft long and total depths range from approximately 21 to 99 ft bgs.

Analytical results from the N&E wells indicate that molybdenum concentrations are limited in their extent. In the shallow alluvial aquifer zone, the results from monitoring wells at the property boundary are below the GWPS in all directions. In the intermediate and deep alluvial aquifer zone, molybdenum concentrations are below the GWPS in all N&E nested monitoring wells to the south, east, and west of the SCPA. One sample at AM-1D to the northwest of the SCPA has a molybdenum concentration above the GWPS. Concentrations of molybdenum are highest in the intermediate zone of the aquifer to the southwest of the SCPA. Results from the N&E wells were used to develop corrective measures alternatives. Monitoring Well locations are show on **Figure 2-1**.

2.5 SURFACE WATER SAMPLING

Elevated levels of molybdenum have not impacted surface waters. Prior to the CCR Rule, Ameren voluntarily collected samples of surface water from the Mississippi River, Missouri River and Mississippi River Chute to evaluate whether ash management operations at the SEC have impacted these surface water bodies. Surface water sampling locations are shown on **Figure 2-2.**

Surface water samples were collected by Golder from 12 locations in the Mississippi River in September 2017 and May 2018. At each sample location, samples were collected near the surface of the river. Where the depth of water was greater than four feet, a second sample was collected mid-depth in the river. A total of 40 samples were collected from the Mississippi River. Surface water samples were also collected by Golder from 12 locations (total of 20 samples) in the Missouri River and from 12 locations (total of 20 samples) in the Mississippi River Chute in September 2017.

Samples were analyzed for the same Appendix III and Appendix IV constituents listed in **Section 1.3**. There are no analytical results for the Mississippi River or the Missouri River above drinking water screening levels or human health recreational levels, with two exceptions not caused by the SEC[4]. All surface water results are below ecological screening levels.

The results of this investigation demonstrate that the Mississippi River, Missouri River and Mississippi River Chute sampling do not show evidence of impact of constituents derived from the SCPA.

[4] Even though the lithium results for the Missouri River are slightly above the drinking water screening level and arsenic concentrations in the Mississippi and Missouri Rivers are slightly above the human health recreational screening levels, the concentrations are statistically no different in upstream and downstream samples for both arsenic and lithium indicating **that the facility is not the source** of the arsenic and lithium detected in the rivers. With respect to groundwater, arsenic and lithium concentrations comply with GWPS established under the CCR Rule.

3. Risk Assessment and Exposure Evaluation

As described in this report, Ameren has conducted detailed environmental evaluations of the SEC and its environs. These investigations have been detailed in a risk evaluation report available to the public on the Ameren website:

- February 2018: Human Health and Ecological Assessment of the Sioux Energy Center. Available at: https://www.ameren.com/-/media/corporate-site/files/environment/ccr-rule/2017/groundwater-monitoring/sioux-haley-aldrich-report.ashx?la=en&hash=3DE8D6FAA7414CF6D875C5CCC99D1785C720185B

The purpose of the risk evaluations is to identify whether current groundwater conditions pose a risk to human health and the environment and, if so, whether the corrective measures identified in this report mitigate such risk.

3.1 APPROACH

The risk evaluation provided in the 2018 risk assessment report evaluated the environmental setting of the SEC, which has been in operation for over 50 years, including its location and ash management operations at the facility. Golder provided information on groundwater location and direction, the rate(s) of groundwater flow, and where waterbodies may intercept groundwater flow.

A conceptual model was then developed based on this physical setting information and used to identify whether human populations could contact groundwater and/or surface water in the area of the facility. This information was also used to identify locations where ecological populations could come into contact with surface water. Based on this conceptual model approach, Ameren's environmental consultants and risk assessors identified surface water sampling locations to evaluate potential impact to the environment. Sampling results were then evaluated, as appropriate, on both a human health and ecological risk basis.

Human health risk assessment is a process used to estimate the chance that contact with constituents in the environment may result in harm to people. Generally, there are four components to the process (USEPA, 1989): (1) Hazard Identification, (2) Toxicity Assessment, (3) Exposure Assessment, and (4) Risk Characterization.

The USEPA develops “screening levels” of constituent concentrations in groundwater (and other media) that are protective of specific human exposures. These screening levels are referred to as “Regional Screening Levels” and are published by USEPA and updated twice yearly (USEPA, 2018). In developing the screening levels, USEPA uses a specific target risk level (component 4) combined with an assumed exposure scenario (component 3) and toxicity information from USEPA (component 2) to derive an estimate of a concentration of a constituent in an environmental medium, for example groundwater, (component 1) that is protective of a person in that exposure scenario (for example, drinking water). Similarly, ecological screening levels for surface water are developed by Federal and State agencies to be protective of the wide range of potential aquatic ecological resources, or receptors.

Risk-based screening levels are designed to provide a conservative estimate of the concentration to which a receptor (human or ecological) can be exposed without experiencing adverse health effects.

Due to the conservative methods used to derive risk-based screening levels, it can be assumed with reasonable certainty that concentrations below screening levels will not result in adverse health effects, and that no further evaluation is necessary. Concentrations above conservative risk-based screening levels do not necessarily indicate that a potential risk exists but indicate that further evaluation may be warranted.

The surface water and groundwater data were evaluated using human health risk-based and ecological risk-based screening levels drawn from Federal sources. The screening levels are used to determine if the concentration levels of constituents could pose an unacceptable risk to human health or the environment. The evaluation also considers whether constituents are present in groundwater and surface water above screening levels, and if so, if the results could be due to the ash management operations.

3.2 CONCEPTUAL SITE MODEL

There are no on-site users of alluvial groundwater adjacent to SEC. As documented in the 2018 risk assessment report, there are two private wells recorded within a one-mile radius of the facility. One is located at the facility and is not in service, the second private well is screened in bedrock, located near the Missouri River and south of both the plant and nature and extent wells that are unimpacted by CCR. Impacts are not expected in a well that is further from the plant and screened in the less conductive bedrock aquifer.

Based on this CSM and the facility setting shown in **Figure 1-2**, samples have been collected from each of these environmental media – groundwater, Mississippi River surface water, and Missouri River surface water. The samples have been analyzed for constituents that are commonly associated with coal ash.

3.3 RESULTS

3.3.1 Alluvial Aquifer

Figure 1-2 shows the location of the CCR monitoring wells at the SCPA. A summary of the screening results is presented in the table below.

Table: Assessment Monitoring Reflects High Percentage Compliance

	Sioux Energy Center SCPA – Shallow Alluvial Aquifer
Percent of Assessment Monitoring Parameter Compliance	96%
Percent of Assessment Monitoring Parameter Results Requiring Corrective Action (Constituents)	4% Molybdenum

This is striking, given that the wells are located directly adjacent to and at the base of the ash management area, and the facility has been in operation for over 50 years. Over 96% of the groundwater results for the CCR Rule monitoring wells located at the edges of SCPA (UMW-1D, UMW-2D, UMW-3D, UMW-4D, UMW-5D, UMW-6D), are below the GWPS.

3.3.2 Surface Water

The Mississippi River and Missouri River sampling results do not show evidence of impact of constituents derived from the SCPA. There are also no analytical results for the Mississippi River that are above drinking water screening levels. While arsenic concentrations in the Mississippi and Missouri Rivers are slightly above the human health recreational screening levels and lithium concentrations are above the drinking water screening levels in the Missouri River, the concentrations are statistically no different in upstream and downstream samples for both arsenic and lithium indicating that **the facility is not the source** of either the arsenic or lithium detected in the rivers. Furthermore, groundwater samples reflect that arsenic and lithium concentrations attain the CCR Rule's GWPS for the SEC.

3.3.3 National Pollutant Discharge Elimination System Outfall

The outfall for the SCPA is identified as 002 and is shown on **Figure 2-2**. This is a permitted outfall under the National Pollutant Discharge Elimination System program. The outfall effluent water is tested for toxicity on a periodic basis as required by the permit. The biological toxicity testing results for Outfall 002 at the SCPA shows no evidence of aquatic toxicity in the outfall effluent.

3.4 CONCLUSION

The sampling results for the Mississippi River and Missouri River are important. Although groundwater at the edge of the SCPA shows that one constituent is present in some wells above the GWPS, less than 4% of the results are above a GWPS, and the adjacent surface water bodies do not show evidence of impact of constituents derived from the SCPA. This is important because the absence of concentrations above risk-based screening levels means that there is not a significant pathway of exposure.

Impacts to groundwater do not mean that surface waters are impaired. The degree of interface between groundwater and surface waters is variable and complex and dependent upon a variety of factors including gradient and flow rate. It is possible, however, to determine the maximum concentration level that would need to be present on-site in groundwater and still be protective of the surface water environment. Groundwater and surface waters flow at very different rates and volumes. The Mississippi River is the largest river system in North America and as groundwater at the facility flows into the river, it is diluted by more than 90,000 times.

This conservative estimate of dilution is used to further understand how high a molybdenum groundwater concentration would have to be to potentially have an adverse impact on the Mississippi River. The following table shows how this factor is applied to the most conservative of the human health and ecological risk-based screening levels for surface water.

CALCULATING RISK-BASED SCREENING LEVELS FOR SCPA GROUNDWATER BASED ON THE MISSISSIPPI RIVER

	Estimated Dilution Factor for the Mississippi River	90,000			
Constituents	**Lowest of the Human Health and Ecological Screening Levels (mg/L)**	**Groundwater Risk-Based Screening Level* (mg/L)**	**Maximum SCPA Groundwater Concentration (mg/L)**		**Ratio Between Groundwater Risk-Based Screening Level and the Maximum SEC Groundwater Concentration**
Molybdenum	0.1	9000	8.3	S-UMW-4D	>1000

*Where the Groundwater Risk-Based Screening Level = Screening Level x Dilution Factor.

The groundwater alternative risk-based screening levels are calculated in units of milligrams of constituent per liter of water (mg/L). One mg/L is equivalent to one part per one million parts.

The table identifies the maximum groundwater concentration of molybdenum detected in the SCPA monitoring wells. The comparison between the target levels and the maximum concentrations indicates that there is a wide margin of safety between the two values. This margin is shown in the last column of the table. To illustrate, concentration levels molybdenum would need to be **more than 1,000 times higher** than currently measured levels before an adverse impact in the Mississippi River could occur.

The comprehensive evaluation summarized here demonstrates that there are no adverse impacts on human health from either surface water or groundwater uses resulting from coal ash management practices at the SCPA.

3.4.1 Trace Elements in Coal Ash

All of the inorganic minerals and elements that are present in coal ash are also present naturally in our environment. Molybdenum is referred to as a trace element, so called because it is present in soils (and in coal ash) at such low concentrations (in the milligrams per kilogram (mg/kg) or part per million (ppm) range). Together, the trace elements generally make up less than 1 percent of the total mass of these materials. To put these concentrations into context, a mg/kg or ppm is equivalent to:

- 1 penny in a large container holding $10,000 worth of pennies, or
- 1 second in 11.5 days, or
- 1 inch in 15.8 miles

All of the constituents present in coal ash occur naturally in our environment. U.S. Geological Survey (USGS) data demonstrate the presence of these constituents in the soils across the U.S. These soils are found in our backyards, schools, parks, etc., and because of their presence in soil, these constituents are also present in the foods we eat. Some of these constituents are present in our vitamins, such as molybdenum. Thus, we are exposed to these trace elements in our natural environment every day, and in many ways.

3.4.2 Molybdenum

Haley & Aldrich has prepared a Fact Sheet (**Appendix B**) that provides information on molybdenum so that the groundwater data can be considered in context. There is no public exposure to groundwater at

the SEC and concentration levels of molybdenum in adjacent surface waters are all well below health-based regulatory standards.

As discussed in more detail in **Appendix B**, molybdenum is an essential nutrient for humans, and the Institute of Medicine of the U.S. National Academy of Sciences (NAS) has provided recommended daily allowances (RDA) and tolerable upper limits (UL) to be used as guidelines for vitamins and supplements and other exposures (NAS, 2001).

The RDA for a nutrient is "the average daily dietary nutrient intake level sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) health individuals" (NAS, 2001). The RDA for molybdenum for adults set by the NAS in 2001 is 0.045 mg/day and is based on the amount of molybdenum needed to achieve a steady healthy balance in the body for the majority of the population.

The UL for molybdenum set by the NAS is 2 mg/day. This level is based on an evaluation of the potential toxicity of molybdenum at high levels of intake. Based on the UL, a safe drinking water level for molybdenum is 0.6 mg/L or 600 ug/L, or six-fold higher than the level set by USEPA of 0.1 mg/L or 100 ug/L in the CCR Rule. This difference serves to underscore the conservatism of the USEPA value when evaluating groundwater under the CCR Rule. As reflected in the chart below, over 90% of the GW results across all four energy centers, including 80% of Sioux samples, are below the standard the National Academy of Science developed for vitamins and supplements.

	Labadie	Meramec	Rush Island	Sioux
Groundwater				
Number of Samples	208	88	77	244
Molybdenum greater than CCR GWPS of 0.1 mg/L (a)	81	35	38	77
Molybdenum greater than NAS standard of 0.6 mg/L (b)	3	1	11	49
Surface Water				
Number of Samples	67	74	50	80
Molybdenum greater than 0.1 mg/L (a)	0	0	0	0

Notes:
mg/L - milligrams per liter.
(a) - Drinking water-based groundwater protection standard specified in the Coal Combustion Residuals Rule.
(b) - Alternative health-protective drinking water screening level based on the National Academy of Sciences review of molybdenum.

3.5 EVALUATION OF RISK IN THE CORRECTIVE MEASURES ASSESSMENT

In summary, there are no adverse impacts resulting from coal ash management practices at the SEC on human health or the environment from either surface water or groundwater uses. There are no users of groundwater near SCPA. In fact, as described above, concentrations of molybdenum detected in groundwater would need to be more than **1,000 times higher** before such an unacceptable risk could exist in the Mississippi River under current and reasonable anticipated future uses.

Although the purpose of this CMA is to evaluate remedies to address assumed risks from the SSLs, the current conditions at the SCPA, even prior to closure, do not pose an unacceptable risk to human health or the environment. Therefore, the risk-based evaluation provides additional support for the selection of a remedy moving forward.

4. Corrective Measures Alternatives

4.1 CORRECTIVE MEASURES ASSESSMENT GOALS

The overall goal of this CMA is to identify and evaluate the appropriateness of potential corrective measures to prevent further releases of Appendix IV constituents above their GWPS, to remediate releases of Appendix IV constituents detected during groundwater monitoring above their GWPS that have already occurred, and to restore groundwater in the affected area to conditions that do not exceed the GWPS for these Appendix IV constituents. The corrective measures evaluation that is discussed below and subsequent sections provides an analysis of the effectiveness of five potential corrective measures in meeting the requirements and objectives of remedies as described under §257.97 (also shown graphically on **Figure 4-1**). This assessment also meets the requirements promulgated in §257.96 which require the assessment to evaluate:

- The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to residual contamination;
- The time required to complete the remedy; and
- The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy.

The criteria listed above are included in the balancing criteria considered during the corrective measures evaluation, described in **Section 5**.

4.2 GROUNDWATER MODELING

Modeling is an analytical tool used to create estimates based on computer-simulated conditions. Groundwater flow and geochemical modeling[5] performed by Golder evaluated the hydrogeologic and geochemical conditions at the SCPA. Golder used the numerical computer code MODFLOW to simulate groundwater flow and the software package MT3DMS to simulate groundwater transport of dissolved phase constituents. Golder used the geochemical modeling software PHREEQC to evaluate groundwater quality and determine the potential for attenuation of molybdenum.

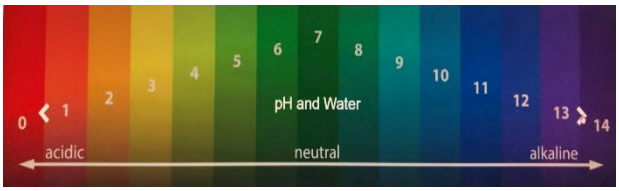
4.3 GROUNDWATER TREATMENT EVALUATION

In-situ treatment to reduce the concentrations of dissolved metals in groundwater can occur via stabilization of metals through precipitation of a metal compound, co-precipitation of the target metal within the structure of another compound, and/or sorption of the target metal onto other compounds in the subsurface. In simple terms, groundwater amendments are injected into the aquifer to create a chemical reaction that attenuates metals through precipitation or sorption.

[5] Groundwater flow modeling was performed using MODFLOW 2000 supported by Groundwater Vistas as the graphical user interface.

Chemical precipitation is an available and demonstrated groundwater treatment technology recognized by USEPA[6]. Groundwater geochemistry (including oxidation reduction potential (ORP)) can greatly impact metals mobility at a site, where some metal compounds may be more soluble under highly oxidative (positive ORP) conditions while others are more soluble under reduced conditions (negative ORP). Also, the solubilities of many metal compounds are highly dependent on pH.

Ameren has retained XDD Environmental (XDD) to research and develop appropriate treatment options for molybdenum and is performing bench-scale treatability studies to demonstrate the effectiveness of treatment options on site-specific basis. Evaluations of the Rush Island and Meramec Energy Centers commenced earlier this year and XDD has collected soil and groundwater samples from the SCPA impoundment area and, based on laboratory results from Rush Island, is developing bench scale studies targeted specific to the SEC. Bench-scale treatment results are expected to be completed in the Summer of 2019.



pH and Water (USGS - Water Science School publication).

4.4 CORRECTIVE MEASURES ALTERNATIVES

Corrective measures can terminate when groundwater impacted by the SCPA does not exceed the Appendix IV GWPS for three consecutive years of groundwater monitoring. In accordance with §257.97, the groundwater corrective measures to be considered must meet, at a minimum, the following threshold criteria:

1. Be protective of human health and the environment;
2. Attain the GWPS;
3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of COCs to the environment;
4. Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, considering factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
5. Comply with standards (regulations) for waste management.

Each of the remedial alternatives assembled as part of this CMA meet the requirements of the threshold criteria listed above.

The remedial alternatives presented below contemplate both CIP (Alternatives 1 through 4) and CBR (Alternative 5) of the SCPA. Both closure methods are expressly authorized under the CCR Rule. Ameren has prepared closure design documents, completed necessary closure notifications, engaged a qualified contractor and is currently in the process of closing the SCPA in place.

4.4.1 Alternative 1 – Closure in Place with Capping and Monitored Natural Attenuation

The SCPA would be closed in place with a geomembrane and soil protective cap system to reduce infiltration of surface water to groundwater thereby isolating source material. This cap selection

[6]EPA, "Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments; Part 7 of 10", SE05958A6, p. 7-20

exceeds regulatory requirements by more than two orders of magnitude (<1 x 10^{-7} centimeters per second (cm/sec) planned versus 1 x 10-5 cm/sec required by the CCR Rule). Over time, depletion of COCs in CCR would allow the concentration of COCs in downgradient groundwater to decline and overall groundwater concentrations of COCs to attenuate. Geochemical modeling results indicate that post-closure 95% of groundwater will flow around and not through the SCPA, thereby isolating the source. The dissolved phase plume of molybdenum remaining above the GWPS post-closure eventually attenuates, albeit very slowly.

CIP can be completed safely, in compliance with applicable federal and state regulations, and be protective of public health and the environment. In general, CIP consists of installing a cap/cover designed to significantly reduce infiltration from surface water or rainwater, resist erosion, contain CCR materials, and prevent exposures to CCR. For this alternative, Ameren would install a geomembrane with a permeability that is 100 times lower than what the CCR Rule requires thus further reducing infiltration. At the SEC, CIP construction activities will take approximately 18-24 months and are expected to be completed in 2021.

MNA is a viable remedial technology recognized by both state and federal regulators that is applicable to inorganic compounds in groundwater. The USEPA defines MNA as "the reliance on natural attenuation processes to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods". The 'natural attenuation processes' that are at work in such a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants (USEPA, 2015). When combined with a low-permeability cap to address the source by limiting the infiltration of precipitation into and through the CCR, MNA can reduce concentrations of molybdenum in groundwater at the SCPA boundary, although the time required to achieve the GWPS would be lengthy due to the low groundwater flux.

Following the installation of the cap system, Ameren would implement post-closure care activities. Post-closure care includes long-term groundwater monitoring until such time that groundwater conditions return to regulatory levels and cap system maintenance. Future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.2 Alternative 2 – CIP with In-Situ Stabilization, Capping and Monitored Natural Attenuation

In-situ stabilization is a technique that uses mixing of the CCR with amendments to solidify the material in place. Amendments typically include Portland Cement and the solidification is completed in-situ using large diameter augers. CCR located beneath the water table would be isolated by ISS, followed by capping of the surface impoundment. Groundwater impacts would be addressed through the processes of natural attenuation. This alternative would isolate the source (through solidification and installation of a low-permeability cap) and over time, allow the concentrations of COCs in downgradient groundwater to decline and overall groundwater concentrations of COCs to attenuate.

In-situ stabilization of the SCPA is predicted to take a number of years to complete, depending on the availability of specialized contractors and equipment. Additionally, implementation of ISS will require a detailed design effort with bench scale testing to determine the appropriate amendment mix. Pilot

testing will also be needed to verify the ability of equipment to solidify material at depth. ISS has not been commonly used to stabilize entire ash units as part of a closure strategy. Changes to groundwater chemistry relative to the mobility of Appendix IV constituents following completion of ISS, where large volumes of amendments (typically Portland cement) are added to the subsurface, are unknown and would require pilot testing.

Following the ISS completion and low-permeability final cover system (<1 x 10^{-7} cm/sec) installation, Ameren would implement post-closure care activities that includes long-term groundwater monitoring and cover system maintenance; future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.3 Alternative 3 – CIP with Capping and In-Situ Groundwater Treatment

Similar to Alternative 1, the SCPA would be CIP with a low-permeability (<1 x 10^{-7} cm/sec) cap to reduce infiltration of surface water to groundwater and to isolate source material. Molybdenum would be addressed through in-situ injection of groundwater amendments downgradient of the SCPA with the objective of accelerating the time required to achieve the GWPS within the treatment zone.

Following the installation of the low-permeability cover and in-situ treatment system, Ameren would implement post-closure care activities that include periodic amendment injections or periodic replenishment of the treatment reagents within a permeable reactive barrier (PRB), long-term groundwater sampling to monitor treatment system performance, and cover system maintenance.

Future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.4 Alternative 4 – CIP with Capping and Hydraulic Containment Through Groundwater Pumping and Ex-situ Treatment

The SCPA would be closed in place with a low-permeability (<1 x 10^{-7} cm/sec) cap to reduce infiltration and isolate source material. Pumping wells would be used to hydraulically control the downgradient migration of molybdenum. However, pumping wells would generate large volumes of effluent that would require ex-situ treatment, likely with an ion exchange or a reverse osmosis (RO) treatment system. Both treatment systems are complex with ongoing operation and maintenance and would generate a secondary waste stream – including regeneration/replacement of the ion exchange media or concentration reject water from the RO system. Approvals and permitting would be required for the construction and installation of the treatment systems and discharge of the treated groundwater.

Implementation of a large-scale hydraulic containment (HC) system will require a detailed design effort with bench scale testing to verify groundwater treatment. Pilot testing, such as pumping tests and additional groundwater modeling, will be needed to verify the hydraulic capture zone. While HC is a widely used remediation technology, it has not been commonly used as part of a large-scale CCR unit closure strategy.

Following the installation of the low-permeability cover, groundwater pumping well network, and ex-situ treatment system, Ameren would implement post-closure care activities that includes operation and maintenance of the HC system, long-term groundwater sampling to monitor HC system

performance, and cover system maintenance. Future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.5 Alternative 5 – Closure by Removal with Monitored Natural Attenuation

This alternative evaluates the removal of CCR from all impoundments at the SEC followed by natural attenuation of molybdenum in groundwater. While this alternative would eliminate (through removal) the source, it takes decades to implement during which time the impounded ash would remain open and subject to ongoing infiltration for the duration of the removal activities. As with Alternative 1, 2, and 3, concentrations of molybdenum in downgradient groundwater would decline via natural attenuation processes.

Lochmueller Group prepared an Extraction and Transportation Study (Lochmueller Study) to evaluate closure by removal excavation and disposal scenarios. On-site and off-site disposal options were considered. The SEC presents unique challenges that can impact cost estimates and closure times. It is important to note that the existing on-site utility waste landfill was designed and permitted to manage ongoing production through the retirement date of the SEC. Accordingly, excavated material would need to be transported off-site to a commercial landfill **or** Ameren would need to permit and construct a new on-site landfill. The regulatory process for construction of an on-site landfill could require multiple levels of approval including environmental permits, conditional use local authorization and, if necessary, certificate issuance from the Missouri Public Service Commission. Opposition to such projects and regulatory approval would take years to resolve *before* construction could commence.

There are also several potential community impacts, safety concerns and project duration challenges associated with the CBR alternative for the off-site disposal option. Given the magnitude of the total estimated haul volume (6.1 MM CY) along with the travel distance required to transport the CCR to one or more landfills, injuries and fatalities would be likely. The Lochmueller Study (**Appendix C)** estimated that the time period needed to transport off-site to a commercial landfill could be 15 plus years. The Lochmueller study bases its time estimate on assumed productivity rates that are subject to significant variability and potential disruptions (e.g., weather conditions, available landfill capacity, travel route traffic congestion, etc.) that could impact the overall CBR timeframe. As the report makes clear, there is simply a limit on how much excavation, and roundtrip truck hauls can occur on a given eight-hour workday.

Excavated CCR materials would not be suitable for beneficial use applications, due to chemical reactions that occurred during the placement of class C fly ash via wet sluicing. Traditional beneficial use applications for class C fly ash, such as replacement for cement in the production of ready-mix concrete and concrete related products require the materials to be capable of reacting chemically to produce cementitious bonds. The capability to produce these chemical reactions have been expended with the wet-sluicing process. In contrast, the chemistry of class F fly ash, produced at other utility sites, does not react with sluice water to create cementitious bonds, and thus may be suitable for recovery and processing for use in ready mix concrete and concrete related products[7].

In addition to the logistical challenges of designing and construction an on-site landfill, technical and logistical challenges of implementing a large-scale ash removal project also need to be considered (removal of CCR over 75-ft deep). Removal activities will be difficult and require full-time dewatering, implementation of CCR stabilization methods and temporary staging/stockpiling of material for drying

[7] Information provided by Ameren technical staff, May 2019.

prior to transportation; these considerations will affect productivity and increase removal duration. Excavation and construction safety during the removal duration is another major concern due to heavy equipment (bulldozers, excavators, front end loaders, off-road trucks) and dump truck operation within the active SEC site. Additional community impacts associated with the use of heavy equipment and truck traffic are also a consideration for this alternative. Lastly, further review of local restrictions and approvals would be required to verify that any selected landfill could receive the ash for disposal.

5. Comparison of Corrective Measures Alternatives

The purpose of this section is to evaluate, compare, and rank the five corrective measures alternatives using the balancing criteria described in §257.97.

5.1 EVALUATION CRITERIA

In accordance with §257.97, remedial alternatives that satisfy the threshold criteria are then compared to four balancing (evaluation) criteria. The balancing criteria allow a comparative analysis for each corrective measure, thereby providing the basis for final corrective measure selection. The four balancing criteria include the following:

1. The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful;
2. The effectiveness of the remedy in controlling the source to reduce further releases;
3. The ease or difficulty of implementing a potential remedy; and
4. The degree to which community concerns are addressed by a potential remedy.

Public input and feedback will be considered following a public information session to be held in May 2019.

5.2 COMPARISON OF ALTERNATIVES

This section compares the alternatives to each other based on evaluation of the balancing criteria listed above. The goal of this analysis is to identify the alternative that is technologically feasible, relevant and readily implementable, provides adequate protection to human health and the environment, and minimizes impacts to the community.

A graphic is provided within each subsection below to provide a visual snapshot of the favorability of each alternative, where green represents favorable, yellow represents less favorable, and red represents unfavorable.

5.2.1 The Long- and Short-Term Effectiveness and Protectiveness of the Potential Remedy, along with the Degree of Certainty that the Remedy Will Prove Successful

This balancing criterion takes into consideration the following sub criteria relative to the long-term and short-term effectiveness of the remedy, along with the anticipated success of the remedy.

5.2.1.1 Magnitude of reduction of existing risks

As summarized in **Section 3**, no unacceptable risk to human health and the environment exists with respect to the SCPA. Therefore, none of the remedial alternatives are necessary to reduce an assumed risk posed by Appendix IV constituents in groundwater because no such adverse risk currently exists. However, other types of impacts can be posed by the various remedial alternatives considered here. The remedial alternatives that pose the lowest risk to human health and the environment is Alternative 1 (CIP with MNA) and 3 (CIP with in-situ treatment) because they are implemented on-site and involve the least amount of construction, operations and maintenance activities and associated impacts.

Alternative 5 (CBR with MNA) has the highest potential impact due to the prolonged truck traffic, which increases the likelihood of roadway accidents during the estimated 15 years needed to complete off-site removal. Construction and material transportation will also be required for Alternative 2 (CIP with ISS) during the process of solidifying the CCR. Construction of the treatment system and cap will be required for Alternative 3 (CIP with in-situ treatment) and 4 (CIP with HC) and a waste stream will be generated for Alternative 4 (CIP with HC) posing additional risk. However, these alternatives, like Alternatives 1 (CIP with MNA) and 2 (CIP with ISS), pose a lesser risk than Alternative 5 (CBR with MNA).

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria i) Magnitude of reduction of risks					

5.2.1.2 Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy

Alternative 5 (CBR with MNA) has the lowest long-term residual risk in that removal of the source material reduces the likelihood of future releases to groundwater. However, implementation of this alternative will take approximately 15 to 20 years (whether by off-site removal or a new on-site landfill) during which time the CCR material will remain open to the environment, thereby increasing the likelihood of releases during the implementation period. For Alternatives 1 through 4, the SCPA would be CIP with the installation of a low permeability ($<1 \times 10^{-7}$ cm/s) cap that would significantly reduce the infiltration of precipitation into the SCPA. The source is isolated under Alternatives 1 through 4, and dissolved phase molybdenum in groundwater is addressed through MNA. Molybdenum concentration in groundwater is not significant because it does not threaten human health or the environment even under current conditions. Alternatives 3 (CIP with in-situ treatment) and 4 (CIP with HC) also provide additional mitigation measures. A low risk for further releases exists with Alternative 2 (CIP with ISS) when completed, however implementation will require several years to complete with the potential for ongoing impacts during construction. The likelihood of a further release during the ISS construction period is high, relative to the other CIP alternatives but Alternative 4 (CIP with HC) will result in an additional waste stream.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria ii) Magnitude of residual risk in terms of likelihood of further release					

5.2.1.3 The type and degree of long-term management required, including monitoring, operation, and maintenance

Alternative 1 (CIP with MNA) is the most favorable alternative with respect to this criterion because it requires the least amount of long-term management and involves no mechanical systems as part of the remedy. Alternative 5 (CBR with MNA) is least favorable because off-site removal and a new on-site landfill are estimated to take 15 to 20 years to complete and are both logistically complex as previously noted. The remaining alternatives fall between Alternatives 1 and 5 because they involve more intensive systems to implement and/or maintain throughout their remediation life cycle.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CBR with MNA
Category 1 - Subcriteria iii) Type and degree of long-term management required					

5.2.1.4 Short-term risks that might be posed to the community or the environment during implementation of such a remedy

The highest short-term impact posed to the community or environment would be during implementation of Alternative 5 (CBR with MNA), followed by Alternative 2 (CIP with ISS), making these alternatives least favorable. Potential environmental impacts include noise and emissions from heavy equipment, the potential for a release during excavation and dewatering, and fugitive dust emissions. Community impacts include general impacts to the community due to increased truck traffic on public roads during the entire project duration, including construction of the on-site landfill (if off-site disposal is not selected), along with an increased potential for traffic accidents and fatalities, noise, and truck emissions. As noted, Alternative 5 (whether off-site disposal or a new onsite landfill) will require a substantial period of time when the CCR material will be open to the environment posing risk during implementation of this remedy.

For Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC), risk to the community during implementation is considered the same and would be minimal compared to the other alternatives. Long-term sampling of the monitoring well network to verify treatment system effectiveness will pose no risk to the community.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CBR with MNA
Category 1 - Subcriteria iv) Short term risk to community or environment during implementation					

5.2.1.5 Time until full protection is achieved

There is currently no unacceptable risk to human health and the environment associated with groundwater at the SCPA; therefore, protection is already achieved. Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC) are anticipated to take a similar period of time until source depletion and natural attenuation reduces COCs to GWPS concentrations, but a waste stream is produced by implementation of Alternative 4. Although the Alternative 4 (CIP with HC) time duration may be slightly shorter due to the increase in groundwater flux through pumping, these three alternatives are considered equivalent due to the similar timeframe.

Alternative 5, (CBR with MNA), could take approximately 15 years or greater for construction with off-site disposal. This timeframe increases to 20 years or greater for on-site landfill disposal due to design, permitting, construction and disposal. Removal construction would be followed by a period of groundwater monitoring to verify natural attenuation of the groundwater plume, which makes this alternative not only unfavorable but will not achieve compliance with the CCR Rule closure time mandates. The period for construction is limited mainly by the construction of an on-site landfill, the amount of material that can be handled in one day (for both on site or off-site disposal), disposal facility capacity (if off-site disposal is selected), and the volume of ash to be handled.

Pending equipment availability, Alternative 2 (CIP with ISS) could take the least amount of time (if multiple mixing machines are available for ISS) at approximately 5 years to complete and a period of groundwater monitoring to verify natural attenuation of the groundwater plume. Implementation of Alternative 2 would require extensive engineering analysis and field testing. Assuming such studies confirm the viability of ISS technology at the SCPA and equipment availability, field implementation could take a significant amount of time to implement.

Due to the extended time frame that will be required to achieve the GWPS for each Alternative, each Alternative was given the same ranking for this balancing sub-criterion.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria v) Time until full protection is achieved					

5.2.1.6 Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC) all have similar, minimal potential for exposure to humans and environmental receptors during regrading and cap construction; monitoring well system installation; and installation of the in-situ treatment system or HC system. Alternative 1 (CIP with MNA) is the most favorable alternative since, aside from capping, no additional contact with CCR or impacted groundwater would be needed. Alternative 3 (CIP with in-situ treatment) is also favorable because treatment occurs below ground and no waste stream is generated. A waste stream would be generated under Alternative 4 (CIP with HC) and need to be managed either onsite or offsite, which creates a potential for exposure.

Alternatives 2 (CIP with ISS) and 5 (CBR with MNA) have moderate and high potential for exposure, respectively, which makes them the least favorable remedy for this criterion. A high potential for exposure exists during the excavation and transport (both off-site and on-site) of the CCR if Alternative 5 is implemented. A moderate potential to exposure exists during ISS construction (Alternative 2) if some CCR needs to be disposed off-site as part of the preliminary removal effort prior to ISS implementation.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria vi) Potential for exposure of humans and environmental receptors to remaining wastes					

5.2.1.7 Long-term reliability of the engineering and institutional controls

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC) are all expected to have high long-term reliability, as capping and long-term monitoring are common methods for long-term waste management. HC and ex-situ treatment (Alternative 4) are considered proven technologies and would have high long-term reliability but create a significant, large-volume waste stream and require bench scale and pilot testing. Alternative 3 will require bench scale (in progress) and pilot scale testing to confirm treatability of molybdenum. Of the CIP alternatives, Alternative 1 (CIP with MNA) is considered the most favorable because no additional ongoing operations and maintenance (O&M)

would be needed, other than periodic groundwater sampling and verification of decreasing concentrations.

For Alternatives 1 through 4, which include CIP, institutional controls, such as recording of an environmental covenant restricting the use of groundwater can easily be implemented because the SCPA is located on property owned by Ameren.

Alternative 5 (CBR with MNA) engineering and institutional controls would have high long-term reliability because the CCR will have been removed from the SCPA and placed in a new on-site or existing off-site permitted landfill. With the CCR no longer in place, no additional engineering and institutional controls are anticipated. Alternative 2 (CIP with ISS) is also expected to have a high long-term reliability because the CCR would be isolated within the ISS monolith.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria vii) Long-term reliability of engineering and institutional controls					

5.2.1.8 Potential need for replacement of the remedy

Closure in place of the SCPA with ISS and closure by removal are both considered permanent and can be effective in appropriate circumstances. Detailed engineering assessments would need to be completed before the viability of such approaches could be considered at a site such as the SCPA given its depth. Field pilot testing would be needed for ISS to confirm the ability of equipment to reach the bottom of CCR. From the perspective of needing to replace the remedy, source removal (Alternative 5) is permanent but takes decades to implement.

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC) are expected to have permanent closures with capping in place. Should monitoring results indicate that the selected remedial alternative is not effective at reducing the concentration of COCs over time, alternate and/or additional active remedial methods for groundwater may be considered in the future.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 1 - Subcriteria viii) Potential need for replacement of the remedy					

5.2.1.9 Long- and short-term effectiveness and protectiveness criterion summary

The following graphic provides a summary of the long- and short-term effectiveness and protectiveness of the potential remedy, along with the degree of certainty that the remedy will prove successful. Alternatives 1 (CIP with MNA) is the most favorable, while Alternative 5 (CBR with MNA) is the least favorable. Alternative 1 does not include additional treatment technology aside from MNA, and therefore long-term management requirements are minimal. Alternative 1 does not rely on mechanical systems aside from low-permeability capping. Alternatives 3 (CIP with in-situ treatment) and 4 (CIP with HC) provide groundwater treatment at the waste boundary but require additional long-term operation maintenance. Alternative 5 (CBR with MNA) includes large-scale construction, and a lengthy permitting and approval period if an on-site landfill is constructed, which adds the potential for exposure to

humans and the environment during the construction period. Alternative 2 (CIP with ISS) also includes potential exposure to humans and environment during construction, although the construction duration is expected to be shorter than Alternative 5. Further, to implement Alternative 5, the CCR material will be open to the environment for decades during the lengthy removal process.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
CATEGORY 1 Long- and Short Term Effectiveness, Protectiveness, and Certainty of Success					

5.2.2 The Effectiveness of the Remedy in Controlling the Source to Reduce Further Releases

This balancing criterion takes into consideration the ability of the remedy to control a future release, and the extensiveness of treatment technologies that will be required.

5.2.2.1 The extent to which containment practices will reduce further releases

For remedial Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC), installation of the low permeability cap will reduce the infiltration of surface water into the SCPA and decrease the flux of molybdenum to groundwater over time. Groundwater mounding, and associated outward hydraulic gradient, present at the SCPA during operation is expected to dissipate after closure. Alternatives 3 and 4 are considered the most favorable because active treatment technologies (in-situ treatment and HC with ex-situ treatment, respectively) will be implemented to limit further down-gradient migration of molybdenum in groundwater.

Under Alternatives 2 (CIP with ISS) and 5 (CBR with MNA), no further releases are anticipated following removal or stabilization of the CCR material. However, the implementation of each alternative is anticipated to require multiple years or decades to complete with MNA monitoring following completion of construction. During the period of design, permitting, and construction for Alternatives 2 and 5, there would be no source control of the Appendix IV constituents.

For Alternatives 3 (CIP with in-situ treatment) and 4 (CIP with HC), additional containment or treatment practices (in-situ treatment and HC with ex-situ treatment) will address COCs in groundwater migrating downgradient from the SCPA, achieving the performance criteria at the waste boundary. Alternative 4, however, will create additional waste streams requiring management on and off site. Alternative 1 will not have an additional containment technology beyond natural attenuation.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 2 - Subcriteria i) Extent to which containment practices will reduce further releases					

5.2.2.2 The extent to which treatment technologies may be used

No groundwater treatment technologies, other than natural attenuation, will be used for Alternatives 1 (CIP with MNA) and 5 (CBR with MNA). There would be no ongoing operation and maintenance of a treatment technology, other than periodic groundwater monitoring. Alternative 1 relies only on low-permeability capping with long-term groundwater monitoring, and therefore is the most favorable.

Alternative 2 (CIP with ISS) uses solidification of the CCR below the water table to address COCs in groundwater.

Alternative 3 will use one additional technology, in-situ treatment, while Alternative 4 will use two additional technologies, HC and ex-situ treatment. The operation of an ex-situ treatment system will create a secondary waste stream, such as concentrated reject water (RO) requiring off-site disposal, or depleted resin (ion exchange) requiring regeneration or off-site disposal.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 2 - Subcriteria ii) Extent to which treatment technologies may be used					

5.2.2.3 Effectiveness of the remedy in controlling the source to reduce further releases summary

The graphic below provides a summary of the effectiveness of the remedial alternatives to control the source to reduce further releases. Alternatives 3 (CIP with in-situ treatment) is the most favorable, while Alternatives 1 (CIP with MNA), 2 (CIP with ISS), 4 (CIP with HC) and 5 (CBR with MNA) are less favorable. The construction period for Alternative 3 (CIP with in-situ treatment) is expected to be brief and will begin treating groundwater at the unit boundary immediately. Further releases under Alternative 2 (CIP with ISS) and Alternative 5 (CBR with MNA) will not be addressed until construction is complete.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
CATEGORY 2 Effectiveness in controlling the source to reduce further releases					

5.2.3 The Ease or Difficulty of Implementing a Potential Remedy

This balancing criterion takes into consideration technical and logistical challenges required to implement a remedy, including practical considerations such as equipment availability and disposal facility capacity.

5.2.3.1 Degree of difficulty associated with constructing the technology

CIP with a low permeability cap will be straightforward and can be implemented with common construction methods for Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), and 4 (CIP with HC). No construction difficulties are anticipated if Alternatives 1, 3, and 4 are implemented. Specialty equipment or contractors are not required. For Alternative 1, no additional treatment technology is needed other than monitoring wells for groundwater monitoring. Installation of an in-situ treatment system (Alternative 3) or groundwater pumping wells with an ex-situ treatment system (Alternative 4) is expected to be straightforward, although with Alternative 4, an additional waste stream will require handling.

Alternatives 2 (CIP with ISS) and 5 (CBR with MNA) will be difficult to implement due to technical and logistical challenges. Alternative 5 will include a deep excavation below the water table, ongoing

excavation, dewatering, CCR stabilization, seasonal impacts to construction due to wet weather and winter weather, and transportation. If the CCR is disposed on-site in a new landfill for Alternative 5, additional effort will be required for the design, permitting, approval, and construction. Under Alternative 2, the successful completion of ISS to target depths will be technically challenging and will require field pilot testing to confirm equipment reach. Alternatives 2 and 5 will both include large-scale construction, extensive permitting, specialty equipment and contractors, long project durations, and significant technical challenges.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 3 - Subcriteria i) Degree of difficulty associated with constructing the technology					

5.2.3.2 Expected operational reliability of the technologies

Alternative 1, (CIP with MNA) is considered the most favorable from an operational perspective because capping with MNA has a proven track record and requires limited O&M. While alternative 2 (CIP with ISS) is a proven technology and isolates the ponded material, pilot testing would be required to ensure ISS will be able to solidify CCR at depth. The potential for geochemical impact on the groundwater aquifer from the solidification amendments would need to be evaluated. Alternatives 3 (CIP with in-situ treatment) and 4 (CIP with HC) are expected to be reliable but will utilize additional groundwater treatment technologies. Alternative 5, CBR with MNA is considered a reliable alternative as all CCR material would be removed, although implementation would be challenging.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 3 - Subcriteria ii) Expected operational reliability of the technologies					

5.2.3.3 Need to coordinate with and obtain necessary approvals and permits from other agencies

Alternative 1, (CIP with MNA), is the most favorable since the implementation of the remedy is straightforward and only includes capping and MNA. Alternatives 2 (CIP with ISS) and 5 (CBR with MNA) will require extensive permitting for large-scale construction whereas the permitting is expected to be straightforward for CIP Alternatives 1, 3, and 4. Alternative 5 in particular, has the potential to present the greatest need for coordination of and obtaining numerous permits and approvals if on-site landfilling is selected. Additional approval and permitting may be required for Alternative 3 (CIP with in-situ treatment) because this alternative may include subsurface treatment via groundwater amendment and permitting will be required for Alternative 4 for the construction and installation of treatment systems and discharge of treated groundwater.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 3 - Subcriteria iii) Need to coordinate with and obtain necessary approvals and permits from other agencies					

5.2.3.4 Availability of necessary equipment and specialists

Alternative 1, (CIP with MNA), is the most favorable since specialty equipment and specialists will not be required to implement the MNA remedy. For Alternative 3, specialists have already been retained by Ameren. Alternative 4 will require equipment for pumping and treatment and is less favorable than Alternatives 1 and 3 but equipment required should not present great challenge.

Alternatives 2 (CIP with ISS) and 5 (CBR with MNA) are the least favorable since both will require specialty remediation contractors to implement full removal or ISS, respectively, which will include large-scale construction dewatering and effluent management and treatment, deep excavations below the water table, transportation of material for disposal, and implementation of ISS at depth (for Alternative 2 only). Alternative 4 does require the availability of necessary equipment so this Alternative is less favorable than Alternative 1. The specialists for Alternative 3 have already been retained so Alternative 3 is favorable as well.

	Alternative 1 CIP with Cap & MNA	**Alternative 2** CIP with Cap, ISS, & MNA	**Alternative 3** CIP with Cap & In-Situ GW Treatment	**Alternative 4** CIP with Cap & Hydraulic Containment	**Alternative 5** CBR with MNA
Category 3 - Subcriteria iv) Availability of necessary equipment and specialists					

5.2.3.5 Available capacity and location of needed treatment, storage, and disposal services

The Lochmueller Study assists in the consideration of the CBR alternative (Alternative 5) by evaluating available capacity at landfills reasonably proximate to the SEC that could potentially receive CCR for disposal if off-site disposal is selected. However, Ameren intends to close ash impoundments at **all** of its energy centers over the next four years and it is uncertain whether nearby landfills have sufficient available capacity to accommodate such massive excavation projects in addition to their general municipal solid waste customers. Additionally, local restrictions will need to be reviewed to determine whether the ash material generated outstate can be accepted at such facilities. If on-site disposal is selected for Alternative 5, a new on-site landfill would need to be designed, permitted, and approved since the existing on-site landfills were designed and permitted to manage production needs of the SEC through the facility's planned retirement date. Due to the disposal requirements, Alternative 5 (CBR with MNA) is the least favorable alternative.

Alternative 2, (CIP with ISS), includes ISS of CCR below the water table. Amendments such as Portland Cement will be imported to the SEC to solidify the material in-situ.

Because the SCPA will be CIP for Alternatives 1, 2, 3, and 4, storage and disposal services for CCR material will not be needed. Temporary stockpiling of CCR during SCPA regrading and capping can be completed within the current boundaries of the ash unit. Alternative 1 is the most favorable alternative since no active treatment is needed. Both Alternatives 2 and 3 include treatment. For Alternative 4, the ex-situ treatment system may also generate a concentrated waste stream which would require onsite treatment or off-site transportation and disposal that the other alternatives would not require. For Alternative 1, the existing on-site UWL was designed and permitted to manage ongoing production through the retirement date of the SEC and not ponded CCR material. As such there is no available on-site capacity. Excavated material would need to be transported off-site to a commercial landfill **or** Ameren Missouri would need to permit and construct a new on-site landfill.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CBR with MNA
Category 3 - Subcriteria v) Available capacity and location of needed treatment, storage, and disposal services					

5.2.3.6 Ease or difficulty of implementation summary

The color ribbon below provides a summary of the ease or difficulty that will be needed to implement each alternative. Alternatives 1 (CIP with MNA) is the most favorable, while Alternatives 2 (CIP with ISS) and 5 (CBR with MNA) are the least favorable.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CBR with MNA
CATEGORY 3 Ease of implementation					

6. Summary

This Corrective Measures Assessment has evaluated the following alternatives:

- Alternative 1 – Closure in Place (CIP) with Capping and Monitored Natural Attenuation
- Alternative 2 – CIP with In-Situ Stabilization, Capping and MNA
- Alternative 3 – CIP with Capping and In-Situ Groundwater Treatment
- Alternative 4 – CIP with Capping and Hydraulic Containment Through Groundwater Pumping and Ex-situ Treatment
- Alternative 5 – Closure by Removal with Monitored Natural Attenuation

In accordance with §257.97, each of these alternatives has been evaluated in the context of the following threshold criteria:

- Be protective of human health and the environment;
- Attain the GWPS;
- Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of COCs to the environment;
- Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, considering factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
- Comply with standards (regulations) for waste management.

In addition, in accordance with §257.96, each of the alternatives has been evaluated in the context of the following balancing criteria:

- The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to residual contamination;
- The time required to complete the remedy; and
- The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy.

This Corrective Measures Assessment, and the input received during the public comment period, will be used to identify a final corrective measure for implementation at the SEC.

References

1. Golder Associates Inc. 2017. 40 CFR Part 257 Groundwater Monitoring Plan, SCPA Sioux Energy Center-St. Charles County, Missouri, USA.

2. Golder Associates Inc. 2018. Technical Memorandum Assessment Monitoring Statistical Evaluation for the SCPA Surface Impoundment, Sioux Energy Center-St. Charles County, Missouri.

3. Golder Associates Inc. 2018. 2017 Annual Groundwater Monitoring Report, SCPA Surface Impoundment, Sioux Energy Center-St. Charles County, Missouri, USA.

4. Golder Associates Inc. 2019. 2018 Annual Groundwater Monitoring and Corrective Action Report, SCPA Surface Impoundment, Sioux Energy Center-St. Charles County, Missouri, USA.

5. Golder Associates Inc. 2019. Technical Memorandum, Groundwater and Geochemical Modeling Summary for Ameren Sioux Energy Center Corrective Measures Assessment.

6. Golder Associates Inc. 2019. Technical Memorandum, Progress Update on SCPA Nature and Extent Investigation, Sioux Energy Center, Missouri.

7. Haley & Aldrich, Inc. 2018. Human Health and Ecological Assessment of the Sioux Energy Center, Ameren Missouri, St. Louis, Missouri. https://www.ameren.com/-/media/corporate-site/files/environment/ccr-rule/2017/groundwater-monitoring/sioux-haley-aldrich-report.ashx?la=en&hash=3DE8D6FAA7414CF6D875C5CCC99D1785C720185B

8. Lochmueller Group 2019. Extraction & Transportation Study: Rush Island Ash Pond Closure Assessment. Rush Island Site, Jefferson County, Missouri and Addendum, Meramec, Labadie and Sioux Ash Pond Closure Extraction & Transportation Assessment.

9. NAS. 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Institute of Medicine. National Academy of Sciences. 2001. National Academy Press. Available at: http://www.nap.edu/catalog/10026.html.

10. USEPA. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response. U.S. Environmental Protection Agency, Washington, D.C. EPA 540/1-89/002. Available at: http://www.epa.gov/oswer/riskassessment/ragsa

11. USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance.

12. USEPA. 2015. Frequent Questions about the 2015 Coal Ash Disposal Ruel. https://www.epa.gov/coalash/frequent-questions-about-2015-coal-ash-disposal-rule

13. USEPA. 2015a. Final Rule: Disposal of Coal Combustion Residuals (CCRs) for Electric Utilities. 80 FR 21301-21501. U.S. Environmental Protection Agency, Washington, D.C. Available at: https://www.govinfo.gov/content/pkg/FR-2015-04-17/pdf/2015-00257.pdf

14. USEPA. 2015b. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites.

15. USEPA. 2018a. USEPA Regional Screening Levels. November 2018, values for tapwater. U.S. Environmental Protection Agency. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

TABLES

TABLE I
GROUNDWATER ANALYTICAL RESULTS - APPENDIX IV CONSTITUENTS
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Fluoride Total	Lead, Total	Lithium, Total	Mercury, Total	Molybdenum, Total	Selenium, Total	Thallium, Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	10	2000	4	5	100	6	4	15	40	2	100	50	2
S-BMW-1D	3/16/2016	1 U	0.20 J	334	1 U	0.5 U	1 U	0.73 J	0.3	5 U	14.2	0.2 U	1.3 J	1 U	1 U
	5/9/2016	1 U	1 U	314	1 U	0.5 U	0.58 J	5 U	0.35	3.7 J	16.8	0.2 U	0.53 J	1 U	1 U
	7/5/2016	1 U	0.17 J	261	1 U	0.5 U	0.35 J	5 U	0.26	5 U	12.8	0.2 U	20 U	1 U	1 U
	9/14/2016	1 U	1 U	309	1 U	0.5 U	0.41 J	5 U		5 U	12.9	0.2 U	20 U	1 U	1 U
	10/20/2016								0.32						
	11/7/2016	1 U	0.15 J	308	1 U	0.5 U	0.35 J	5 U	0.29	5 U	14.8	0.2 U	20 U	1 U	1 U
	1/3/2017	1 U	1 U	334	1 U	0.5 U	0.42 J	5 U	0.27	5 U	15.1	0.2 U	0.75 J	1 U	1 U
	3/8/2017	1 U	1 U	376	1 U	0.5 U	1 U	5 U	0.25	5 U	13.7	0.2 U	20 U	1 U	1 U
	6/6/2017	1 U	0.16 J	332	1 U	0.5 U	0.16 J	5 U	0.24	5 U	10 U	0.1 U	20 U	1 U	1 U
	11/13/2017								0.28						
	4/5/2018	1 U	0.16 J	370	1 U	0.5 U	1 U	5 U	0.078 J	10 U	10.7	0.2 U	20 U	1 U	1 U
	5/14/2018		0.85 J	335					0.3		13.4		1.3 J		
	11/12/2018	1 U	0.20 J	297	1 U	0.5 U	1 U	5 U	0.29	10 U	16.2		20 U	1 U	1 U
S-BMW-3D	11/17/2016	1 U	0.24 J	612	1 U	0.5 U	0.46 J	5 U	0.28	5 U	14.2	0.2 U	20 U	1 U	1 U
	12/8/2016	0.076 J	1 U	667	1 U	0.5 U	0.99 J	5 U	0.34	5 U	20.6	0.2 U	1.8 J	1 U	1 U
	1/3/2017	1 U	1.5	183	1 U	0.5 U	0.59 J	2.8 J	0.34	5 U	7.9 J	0.2 U	6.2 J	1 U	1 U
	2/2/2017	1 U	1 U	650	1 U	0.5 U	0.61 J	5 U	0.34	5 U	20	0.2 U	20 U	1 U	0.082 J
	3/8/2017	1 U	0.086 J	699	1 U	0.5 U	0.70 J	5 U	0.26	5 U	21.5	0.2 U	20 U	1 U	1 U
	4/5/2017	0.041 J	1 U	684	1 U	0.5 U	1 U	5 U	0.31	5 U	23.6	0.2 U	20 U	0.10 J	1 U
	6/5/2017	1 U	1 U	665	1 U	0.5 U	0.17 J	5 U	0.27	5 U	10 U	0.1 U	20 U	1 U	1 U
	6/26/2017	1 U	1 U	668	1 U	0.5 U	1 U	5 U	0.29	5 U	25.3	0.2 U	20 U	1 U	1 U
	11/13/2017								0.29						
	4/5/2018	1 U	1 U	652	1 U	0.5 U	1 U	5 U	0.13 J	10 U	19.5	0.2 U	20 U	1 U	1 U
	5/14/2018		0.63 J	685					0.32		21.6		20 U		
	11/12/2018	1 U	1 U	645	1 U	0.5 U	1 U	5 U	0.3	10 U	25.4		20 U	1 U	1 U
S-UMW-1D	3/17/2016	0.13 J	0.90 J	161	1 U	0.5 U	1 U	5 U	0.34	5 U	13.1	0.2 U	31.7	1 U	1 U
	5/10/2016	0.11 J	0.90 J	120	1 U	0.5 U	0.62 J	5 U	0.31	3.0 J	14.6	0.2 U	38.3	1 U	1 U
	7/5/2016	0.078 J	1.1	138	1 U	0.5 U	1 U	5 U	0.22	5 U	13.7	0.2 U	40.3	1 U	1 U
	9/15/2016	0.066 J	0.98 J	195	1 U	0.5 U	0.36 J	5 U	0.19 J	5 U	14.2	0.2 U	27.9	1 U	1 U
	11/8/2016	1 U	1	184	1 U	0.5 U	1 U	5 U	0.25	5 U	15.5	0.2 U	27.9	1 U	1 U
	1/5/2017	1 U	0.98 J	146	1 U	0.5 U	0.71 J	5 U	0.27	5 U	13.5	0.2 U	40.9	1 U	1 U
	3/9/2017	0.041 J	1.1	123	1 U	0.5 U	1.5	5 U	0.34	5 U	10.1	0.2 U	35.7	1 U	0.17 J
	6/7/2017	1 U	0.98 J	109	1 U	0.5 U	0.22 J	5 U	0.34	5 U	10.7 J	0.1 U	36.4	1 U	1 U
	11/14/2017								0.41						
	1/8/2018								0.42						
	4/5/2018	0.037 J	1.2	130	1 U	0.38 J	0.062 J	5 U	0.15 J	10 U	14.3	0.2 U	31.4	1 U	1 U
	5/16/2018		1.5	133					0.33		11.6		25.7		
	11/14/2018	1 U	1.4	134	1 U	0.5 U	1 U	5 U	0.19 J	10 U	15.7		24	1 U	1 U
S-UMW-2D	3/16/2016	0.067 J	0.87 J	122	1 U	0.5 U	0.35 J	5 U	1.1	3.9 J	24.6	0.2 U	**1,310**	1 U	1 U
	5/10/2016	0.077 J	1.1	121	1 U	0.5 U	0.66 J	5 U	1.3	5 U	29.7	0.2 U	**1,440**	1 U	1 U
	7/6/2016	1 U	1.4	119	1 U	0.5 U	1 U	5 U	1.1	5 U	28.7	0.2 U	**1,360**	1 U	1 U
	9/14/2016	1 U	1.3	105	1 U	0.5 U	1 U	5 U	1	5 U	28	0.2 U	**1,270**	1 U	1 U
	11/7/2016	1 U	1.5	85.8	1 U	0.5 U	0.55 J	5 U	1	5 U	31.1	0.2 U	**989**	1 U	1 U
	1/5/2017	1 U	1.4	92.8	1 U	0.23 J	1 U	5 U	1.1	5 U	29.7	0.2 U	**1,310**	1 U	1 U
	3/9/2017	0.048 J	2.1	131	1 U	0.5 U	1.7 J	5 U	0.72	5 U	30.2	0.2 U	**1,880**	0.12 J	0.25 J
	6/7/2017	0.044 J	1.9	96.8	1 U	0.24 J	0.12 J	5 U	0.78	3.0 J	18.6	0.1 U	**2,170**	1 U	0.10 J
	11/13/2017								0.7						
	1/8/2018								0.58						
	4/6/2018	0.068 J	2.1	57.4	1 U	0.15 J	0.066 J	5 U	0.35	10 U	19.1	0.2 U	**1,590**	0.094 J	1 U
	5/14/2018		2.4	54.3					0.63		12.5		**1,530**		
	11/13/2018	1 U	2.8	65.7	1 U	0.29 J	1 U	5 U	0.46	10 U	23.4		**1,540**	0.11 J	1 U
S-UMW-3D	3/16/2016	0.083 J	0.82 J	88	1 U	1 U	0.56 J	5 U	0.81	4.2 J	14.7	0.2 U	**4,800**	1 U	1 U
	5/10/2016	0.21 J	0.85 J	75.6	1 U	0.5 U	0.62 J	5 U	1.1	5 U	27.2	0.2 U	**4,250**	0.23 J	1 U
	7/6/2016	1 U	0.44 J	70.1	1 U	0.5 U	1 U	5 U	1	2.7 J	26	0.2 U	**3,770**	0.30 J	1 U
	9/14/2016	1 U	0.29 J	71.8	1 U	0.25 J	1 U	5 U	1	3.1 J	18.4	0.2 U	**4,280**	0.30 J	1 U
	11/7/2016	1 U	0.41 J	70.9	1 U	0.12 J	1 U	5 U	0.95	3.5 J	16.2 J	0.2 U	**4,230**	0.27 J	1 U
	1/5/2017	1 U	0.14 J	76.1	1 U	0.79	0.35 J	5 U	1	5 U	18.4	0.2 U	**3,430**	0.21 J	1 U
	3/9/2017	1 U	1 U	79.8	1 U	0.5 U	1 U	5 U	0.99	2.8 J	14.9	0.2 U	**4,120**	0.12 J	0.084 J
	6/7/2017	0.030 J	0.23 J	70.5	1 U	0.53	0.67 J	5 U	0.94	5 U	16.7	0.1 U	**3,920**	0.17 J	0.052 J
	11/13/2017								1						
	1/8/2018								1.1						
	4/6/2018	1 U	0.58 J	90	0.40 J	0.37 J	0.083 J	5 U	0.9	10 U	25.9 J	0.2 U	**4,600**	0.22 J	1 U
	5/14/2018		1.8 J	92.4					0.98		14.8		**4,560**		
	11/13/2018	1 U	0.82 J	75	1 U	1	1 U	5 U	0.96	10 U	11.7		**4,000**	0.20 J	1 U

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AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Fluoride Total	Lead, Total	Lithium, Total	Mercury, Total	Molybdenum, Total	Selenium, Total	Thallium, Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	10	2000	4	5	100	6	4	15	40	2	100	50	2
S-UMW-4D	3/16/2016	1 U	0.70 J	95.9	1 U	1.5 U	0.40 J	5 U	0.75	3.6 J	37.9	0.2 U	**8,300**	1 U	1 U
	5/10/2016	1 U	0.60 J	78.4	1 U	0.5 U	0.48 J	5 U	0.89	5 U	39.6	0.2 U	**7,220**	0.21 J	1 U
	7/6/2016	1 U	0.27 J	83.4	1 U	1 U	1 U	5 U	0.86	5 U	37.9	0.2 U	**7,550**	1 U	1 U
	9/14/2016	1 U	0.20 J	81.2	1 U	0.45 J	1 U	5 U	0.84	6.3	38	0.2 U	**7,200**	0.27 J	1 U
	11/7/2016	1 U	0.18 J	72	1 U	0.13 J	0.34 J	5 U	0.78	5.6	**41.3**	0.2 U	**7,190**	0.22 J	1 U
	1/5/2017	1 U	1 U	90.4	1 U	1.9	1 U	5 U	0.86	4.7 J	**44.2**	0.2 U	**7,830**	0.24 J	1 U
	3/9/2017	1 U	1 U	71.2	1 U	0.5 U	1 U	5 U	0.63	5 U	34.4	0.2 U	**6,480**	0.20 J	0.046 J
	6/7/2017	0.043 J	1 U	67.5	1 U	0.91	0.13 J	5 U	0.7	3.4 J	31.9	0.1 U	**6,120**	0.12 J	0.083 J
	11/13/2017								0.8						
	1/8/2018								0.82						
	4/6/2018	1 U	0.22 J	59.2	1 U	0.063 J	1 U	5 U	0.42	10 U	34	0.2 U	**4,380**	0.14 J	1 U
	5/14/2018		1.1	71.6					0.76		37.3		**5,870**		
	11/13/2018	1 U	0.29 J	56.9	1 U	0.94	1 U	5 U	0.49	10 U	38.3		**3,900**	0.12 J	1 U
S-UMW-5D	3/16/2016	1 U	0.80 J	369	1 U	0.5 U	0.42 J	5 U	0.58	4.8 J	31.4	0.2 U	**264**	0.20 J	1 U
	5/10/2016	1 U	0.88 J	333	1 U	0.5 U	0.56 J	5 U	0.65	2.5 J	32.5	0.2 U	**271**	1 U	1 U
	7/7/2016	1 U	0.65 J	312	1 U	0.5 U	0.46 J	5 U	0.66	3.0 J	29.8	0.2 U	**280**	0.22 J	1 U
	9/16/2016	1 U	0.51 J	300	1 U	0.5 U	0.64 J	5 U	0.63	5 U	31	0.2 U	**259**	0.20 J	1 U
	11/7/2016	1 U	0.62 J	296	1 U	0.5 U	0.44 J	5 U	0.7	5 U	32.5	0.2 U	**253**	0.29 J	1 U
	1/5/2017	1 U	0.26 J	281	1 U	0.041 J	1 U	5 U	0.56	5 U	28.4	0.2 U	**254**	1 U	1 U
	3/8/2017	1 U	1 U	248	1 U	0.5 U	1 U	5 U	0.47	5 U	21.5	0.2 U	**242**	0.091 J	1 U
	6/7/2017	1 U	0.41 J	284	1 U	0.028 J	1 U	5 U	0.53	5 U	24.7	0.2 U	**270**	0.11 J	0.038 J
	11/13/2017								0.55						
	1/8/2018								0.6						
	4/6/2018	1 U	0.32 J	249	1 U	0.5 U	1 U	5 U	0.4	10 U	19.6	0.2 U	**179**	0.094 J	1 U
	5/15/2018		0.64 J	265					0.62		18.9		**177**		
	11/13/2018	1 U	0.40 J	265	1 U	0.054 J	1 U	5 U	0.49	10 U	22.9		**181**	0.12 J	1 U
S-UMW-6D	3/17/2016	1 U	0.31 J	133	1 U	0.5 U	0.37 J	5 U	0.29	5 U	12.6	0.2 U	95.9	1 U	1 U
	5/10/2016	1 U	0.20 J	129	1 U	0.5 U	1 U	5 U	0.37	2.9 J	14.4	0.2 U	**106**	1 U	1 U
	7/7/2016	1 U	0.32 J	118	1 U	0.5 U	0.67 J	5 U	0.34	5 U	12.1	0.2 U	**109**	1 U	1 U
	9/16/2016	1 U	0.34 J	117	1 U	0.5 U	1 U	5 U	0.44	5 U	12	0.2 U	**112**	1 U	1 U
	11/8/2016	1 U	0.38 J	116	1 U	0.5 U	0.37 J	5 U	0.4	5 U	13.6	0.2 U	**114**	1 U	1 U
	1/5/2017	1 U	0.20 J	119	1 U	0.031 J	0.70 J	5 U	0.38	5 U	12.2	0.2 U	**110**	1 U	1 U
	3/8/2017	1 U	1 U	115	1 U	0.5 U	1 U	5 U	0.36	5 U	11.8	0.2 U	**108**	1 U	1 U
	6/6/2017	1 U	0.14 J	112	1 U	0.030 J	0.10 J	5 U	0.37	5 U	13.2	0.2 U	**115**	1 U	1 U
	11/13/2017								0.43						
	1/8/2018								0.47						
	4/6/2018	1 U	0.26 J	126	1 U	0.5 U	1 U	5 U	0.21	10 U	12.5	0.2 U	95.4	1 U	1 U
	5/14/2018		0.72 J	152					0.41		13.6		67.8		
	11/14/2018	1 U	0.29 J	182	1 U	0.5 U	1 U	5 U	0.33	10 U	20.3 J		52.8	1 U	1 U
S-AM-1D	11/13/2018	1 U	0.29 J	244	1 U	0.12 J	1 U	5 U	0.45	10 U	32.6	0.2 U	**446**	0.12 J	1 U
S-AM-1S	11/13/2018	1 U	1.3	112	1 U	0.055 J	1 U	1.5 J	0.6	10 U	19.3	0.2 U	58	1 U	1 U
S-TP-1D	11/16/2018	1 U	0.16 J	98	1 U	0.5 U	0.11 J	5 U	0.38	10 U	16.4	0.2 U	3.5 J	1 U	1 U
S-TP-1M	11/16/2018	1 U	0.12 J	212	1 U	0.5 U	0.19 J	5 U	0.35	10 U	17.5	0.2 U	1.8 J	1 U	1 U
S-TP-1S	11/16/2018	1 U	**25.3**	369	1 U	0.5 U	0.24 J	2.7 J	0.36	10 U	6.5 J	0.2 U	5.8 J	0.16 J	1 U
S-TP-2D	11/12/2018	1 U	0.12 J	87.2	1 U	0.5 U	1 U	5 U	0.2 U	10 U	**47.1**	0.2 U	20 U	0.095 J	1 U
S-TP-2M	11/12/2018	1 U	0.19 J	178	1 U	0.5 U	1 U	5 U	0.2 U	3.5 J	26.7	0.2 U	20 U	1 U	1 U
S-TP-2S	11/12/2018	1 U	**13.9**	283	1 U	0.5 U	1 U	2.9 J	0.2 U	3.3 J	13.2	0.2 U	11.8 J	0.15 J	1 U
S-TP-3D	11/14/2018	1 U	0.17 J	574	1 U	0.5 U	0.16 J	5 U	0.23	10 U	32.1	0.2 U	20 U	1 U	1 U
S-TP-3M	11/14/2018	1 U	0.26 J	434	1 U	0.5 U	0.22 J	5 U	0.29	10 U	21	0.2 U	1.2 J	1 U	1 U
S-TP-3S	11/14/2018	0.18 J	4.2	222	1 U	0.033 J	0.18 J	1.1 J	0.42	10 U	11.9	0.2 U	30.8	0.18 J	1 U
S-TP-4D	11/16/2018	1 U	0.95 J	557	1 U	0.5 U	0.16 J	5 U	0.31	10 U	29.6	0.2 U	20 U	1 U	1 U
S-TP-4M	11/16/2018	1 U	0.33 J	408	0.26 J	0.5 U	0.21 J	5 U	0.37	10 U	24.9	0.2 U	1.8 J	1 U	1 U
S-TP-4S	11/16/2018	1 U	5.8	192	1 U	0.5 U	1 U	1.4 J	0.35	10 U	14.8	0.2 U	33.1	0.21 J	1 U
S-TP-5D	11/13/2018	1 U	0.30 J	183	1 U	0.056 J	1 U	5 U	0.34	10 U	33.0 J	0.2 U	**175**	0.12 J	1 U
S-TP-5M	11/13/2018	1 U	3.5	252	1 U	0.5 U	1 U	5 U	0.3	10 U	31.0 J	0.2 U	12.8 J	1 U	1 U
S-TP-5S	11/13/2018	0.18 J	3.7	440	0.43 J	0.040 J	1 U	0.95 J	0.28 J	10 U	10 U	0.2 U	31.7	0.19 J	1 U
S-TP-6D	11/13/2018	1 U	0.17 J	391	0.33 J	0.5 U	1 U	5 U	0.2 U	10 U	28.0 J	0.2 U	2.0 J	1 U	1 U
S-TP-6M	11/13/2018	1 U	0.52 J	454	1 U	0.034 J	1 U	5 U	0.26	10 U	22.8 J	0.2 U	2.9 J	1 U	1 U
S-TP-6S	11/13/2018	1 U	2	224	1 U	0.5 U	1 U	1.2 J	0.27	10 U	33.7 J	0.2 U	4.3 J	1 U	1 U

TABLE I
GROUNDWATER ANALYTICAL RESULTS - APPENDIX IV CONSTITUENTS
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Fluoride Total	Lead, Total	Lithium, Total	Mercury, Total	Molybdenum, Total	Selenium, Total	Thallium, Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	10	2000	4	5	100	6	4	15	40	2	100	50	2
S-TP-7D	11/14/2018	0.11 J	0.23 J	410	1 U	0.5 U	0.22 J	5 U	0.26	10 U	**43.8**	0.2 U	20 U	1 U	1 U
S-TP-7M	11/14/2018	1 U	0.67 J	382	1 U	0.5 U	0.84 J	5 U	0.33	10 U	**40.2**	0.2 U	2.4 J	1 U	1 U
S-TP-7S	11/14/2018	1 U	8.4	443	1 U	0.5 U	0.083 J	1.0 J	0.38	10 U	25.4	0.2 U	59.2	0.17 J	1 U
S-TP-8D	11/14/2018	1 U	0.88 J	363	1 U	0.5 U	0.36 J	5 U	0.26	10 U	33.1	0.2 U	1.5 J	1 U	1 U
S-TP-8M	11/14/2018	1 U	0.91 J	248	1 U	0.041 J	0.15 J	5 U	0.29	10 U	27.6	0.2 U	1.0 J	1 U	1 U
S-TP-8S	11/14/2018	0.32 J	0.43 J	167	1 U	0.085 J	0.079 J	5 U	0.25	10 U	18.3	0.2 U	16.6 J	3.9	1 U

Notes:
40.2 Bold denotes concentration exceeding the GWPS
Blank cells - Constituent not included in this analysis.
mg/L - milligrams per liter.
ug/L - micrograms per liter.

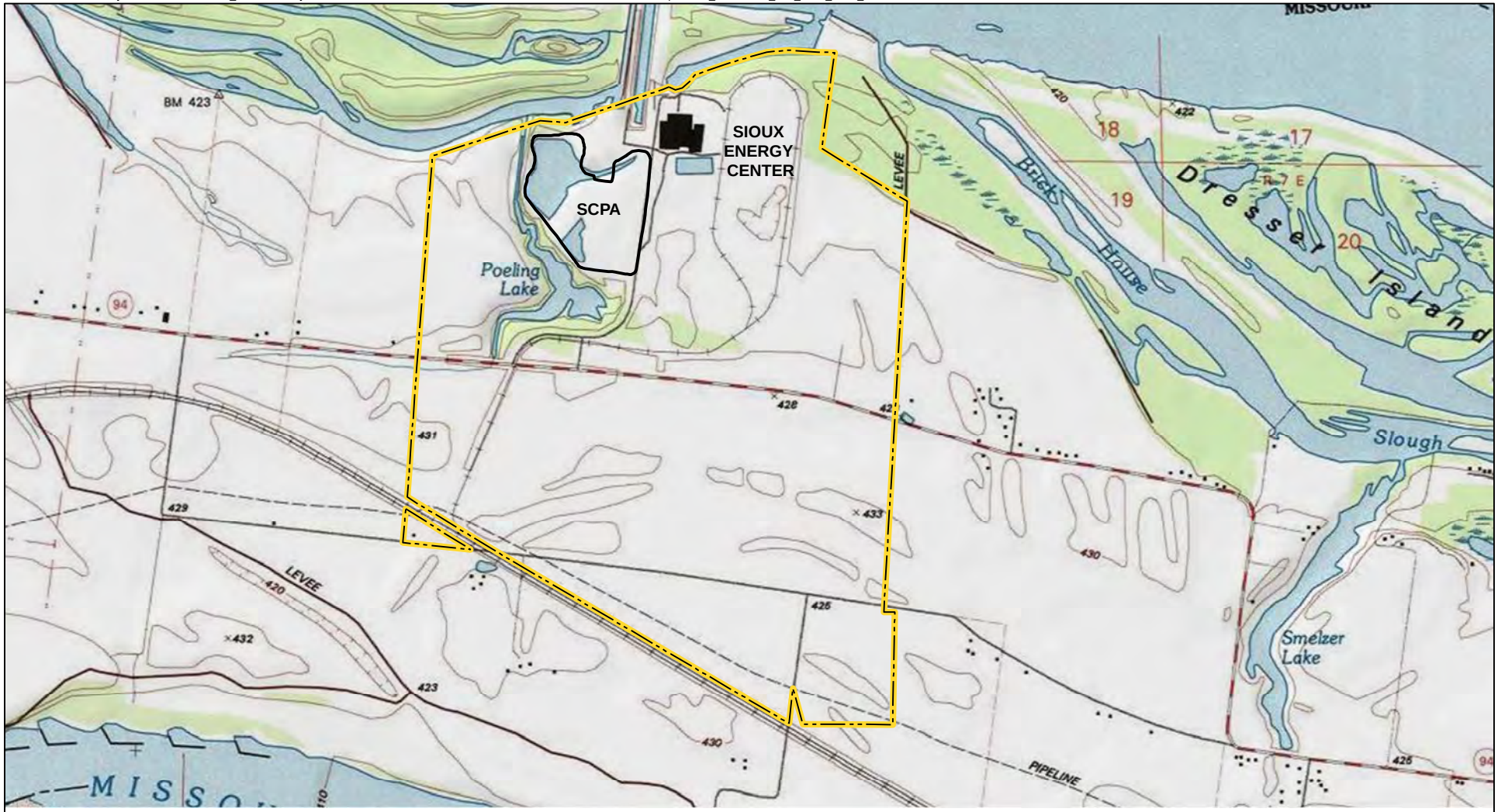
GWPS - Groundwater Protection Standard.
MCL - Maximum Contaminant Level.
RSL - Regional Screening Level.
S.U. - Standard Units.
TDS - Total Dissolved Solids.
USEPA - United States Environmental Protection Agency.

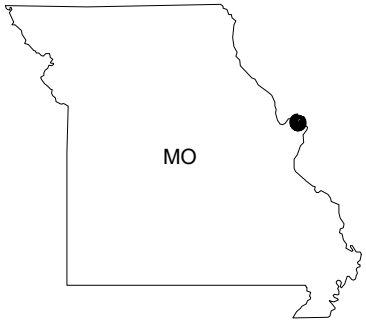
Qualifiers:
J - Value is estimated.
U - Constituent was not detected, value is the reporting limit.

Site GWPS is either the MCL/Health Based GWPS or based on background levels (calculated as described in the Statistical Analysis Plan for Assessment Monitoring), whichever is higher.
GWPS and background values calculated using baseline sampling results from monitoring wells BMW-1D and BMW-3D.

FIGURES

GIS FILE PATH: \\haleyaldrich.com\share\cle_common\Projects\132002 - Ameren Ash Pond Closure Assessment\005-Sioux\GIS\Maps\2019_04\132002_005_0001_SITE_LOCUS2.mxd — USER: hwachholz — LAST SAVED: 5/1/2019 3:36:26 PM





LEGEND

BOTTOM ASH SURFACE IMPOUNDMENT (SCPA)

SIOUX ENERGY CENTER PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

2. IMAGERY SOURCE: ESRI

N

0 1,000 2,000

SCALE IN FEET

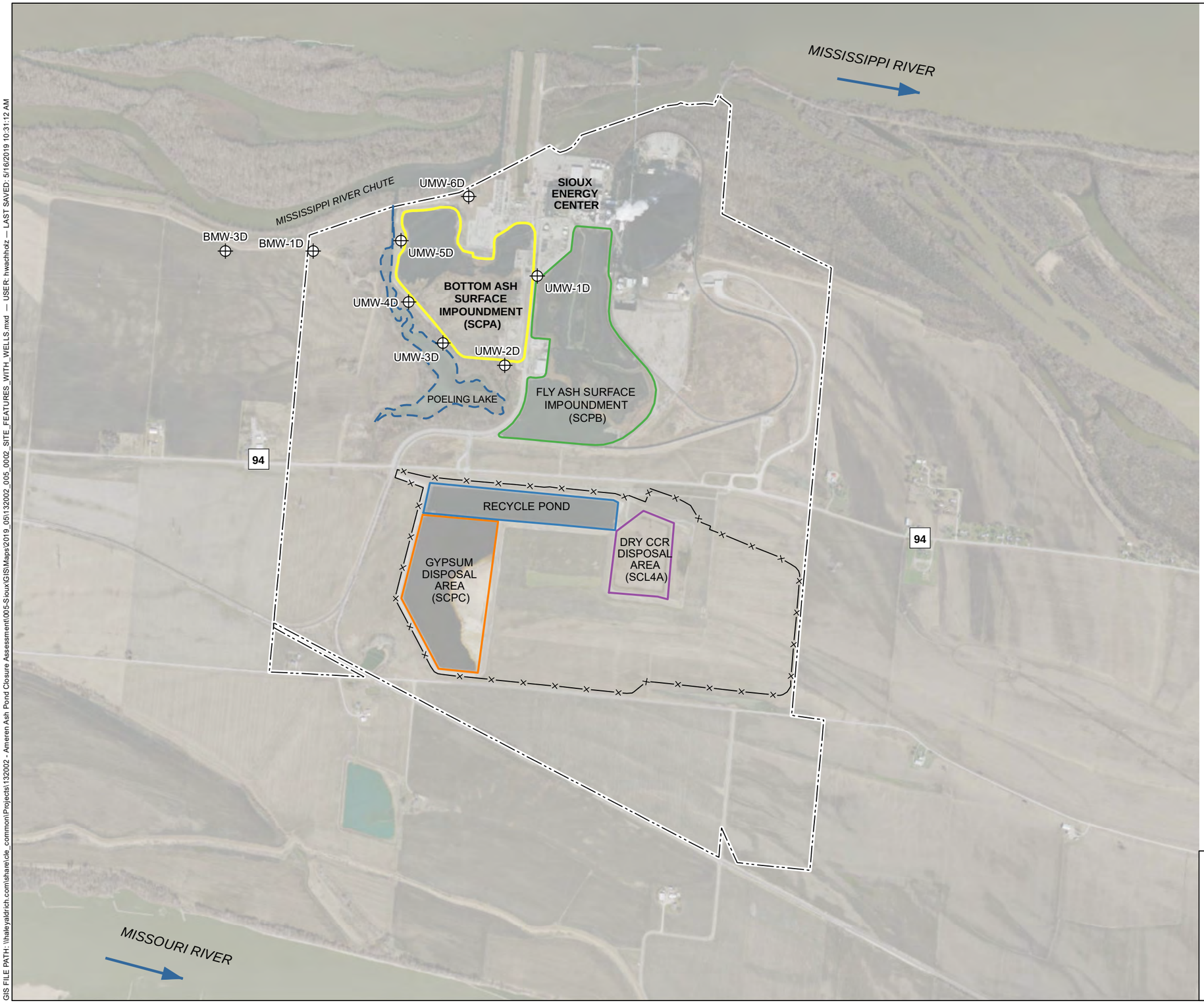
HALEY ALDRICH

CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

SITE LOCATION MAP

MAY 2019

FIGURE 1-1



LEGEND

- SCPA BOTTOM ASH SURFACE IMPOUNDMENT MONITORING WELL LOCATION
- SIOUX ENERGY CENTER PROPERTY BOUNDARY
- UTILITY WASTE LANDFILL PERIMETER FENCE

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

SITE FEATURES

MAY 2019

FIGURE 1-2

GIS FILE PATH: \\haleyaldrich.com\share\cle_common\Projects\132002 - Ameren Ash Pond Closure Assessment\005-SiouxGIS\Maps\2019_05\132002_005_0002_SITE_FEATURES_WITH_WELLS.mxd — USER: hwachholz — LAST SAVED: 5/16/2019 10:31:12 AM

LEGEND

- NATURE AND EXTENT MONITORING WELL
- SCPA BOTTOM ASH SURFACE IMPOUNDMENT MONITORING WELL LOCATION
- SIOUX ENERGY CENTER PROPERTY BOUNDARY
- BOTTOM ASH SURFACE IMPOUNDMENT (SCPA)
- UTILITY WASTE LANDFILL PERIMETER FENCE

MOLYBDENUM CONCENTRATIONS - 2018 DATA

- NO MOLYBDENUM DETECTED
- MOLYBDENUM CONCENTRATION BELOW GWPS (<100 µg/L)
- MOLYBDENUM CONCENTRATION ABOVE GWPS (101-1000 µg/L)
- MOLYBDENUM CONCENTRATION ABOVE GWPS (>1000 µg/L)

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI
3. MOLYBDENUM CONCENTRATIONS SHOWN BASED ON 2018 GROUNDWATER ANALYTICAL RESULTS.

N

0 1,000 2,000
SCALE IN FEET

HALEY ALDRICH

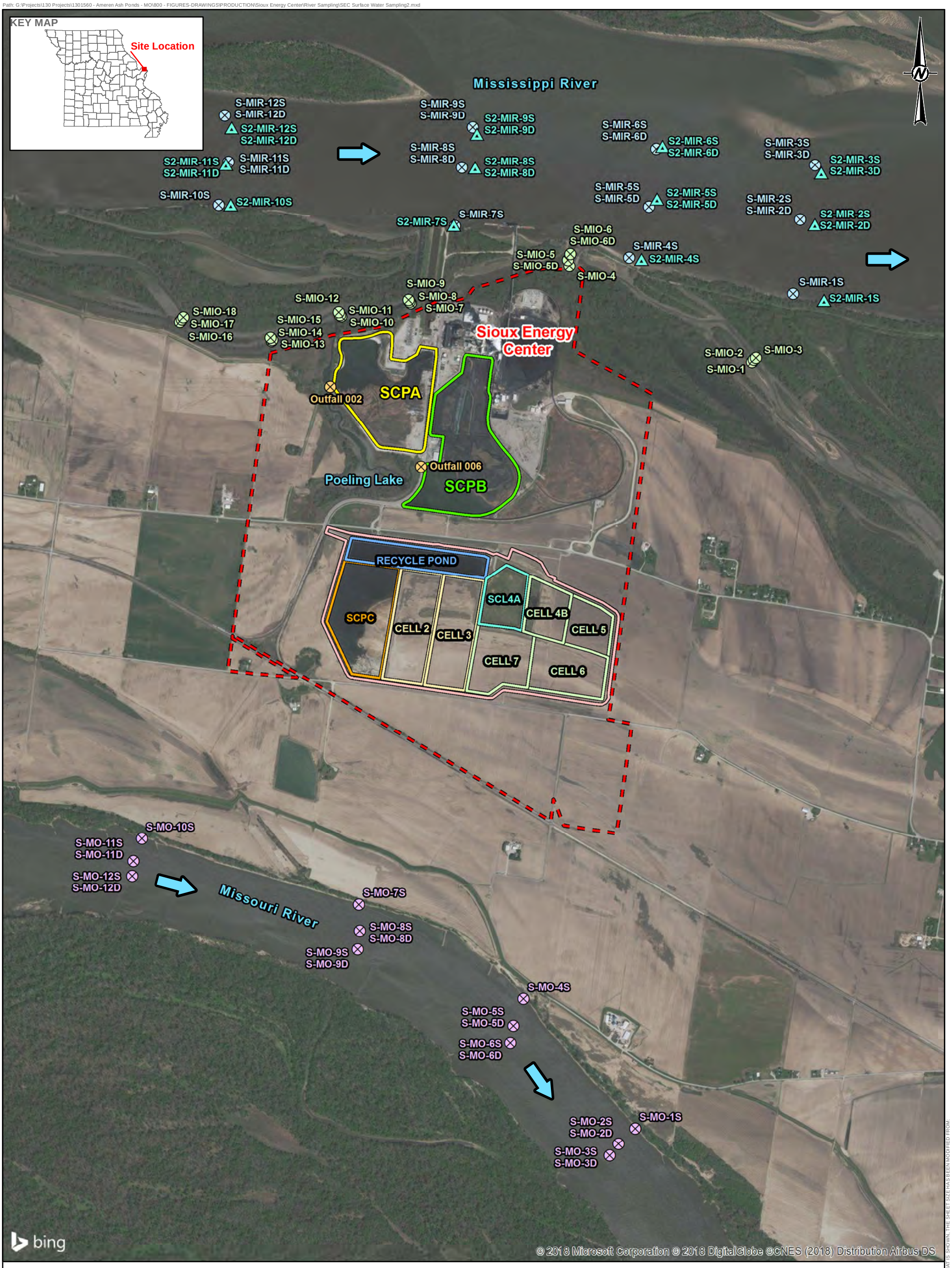
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

MONITORING WELL LOCATIONS

MAY 2019

FIGURE 2-1

Path: G:\Projects\130 Projects\1301560 - Ameren Ash Ponds - MO\800 - FIGURES-DRAWINGS\PRODUCTION\Sioux Energy Center\River Sampling\SEC Surface Water Sampling2.mxd



LEGEND

- Sioux Energy Center Property Boundary
- NPDES Outfalls

Surface Impoundments

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

Utility Waste Landfill (UWL)

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

Surface Water Sampling Locations

- September 2017 Missouri River Sample
- September 2017 Mississippi River Sample
- September 2017 Mississippi River chute Sample
- May 2018 Mississippi River Sample

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. NPDES - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM.
3. SAMPLE LOCATIONS BASED ON HANDHELD TRIMBLE GPS MEASUREMENTS. SAMPLE LOCATION REPRESENTS CENTERPOINT BETWEEN SAMPLE STARTING AND ENDING LOCATION.
4. PREFIX S- USED FOR SAMPLES COLLECTED IN SEPTEMBER 2017 AND S2- USED FOR SAMPLES COLLECTED IN MAY 2018.

REFERENCE

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

0 500 1,000 2,000 3,000 4,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
AMEREN HYDROGEOLOGICAL CONSULTING

TITLE
SURFACE WATER SAMPLING LOCATIONS
SIOUX ENERGY CENTER

CONSULTANT
GOLDER

YYYY-MM-DD	2018-05-25
PREPARED	JS
DESIGN	JSI
REVIEW	JSI
APPROVED	MNH

PROJECT No. 130-1560
PHASE 0006

Figure 2-2

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

FIGURE 4-1
REMEDIAL ALTERNATIVE ROADMAP
CORRECTIVE MEASURES ASSESSMENT
BOTTOM ASH SURFACE IMPOUNDMENT (SCPA)
SIOUX ENERGY CENTER - ST. CHARLES COUNTY, MISSOURI

Alternative Number	Remedial Alternative Description	SCPA Closure Description	Groundwater Remedy Components		
			A. Groundwater Remedy Approach	B. Groundwater Treatment Method	C. Post-Closure Actions
1	**Closure In Place (CIP) with Capping and Monitored Natural Attenuation (MNA)**	**CIP with Geomembrane and Soil Cap**	**Natural Attenuation with Monitoring** Mitigate off-site migration of groundwater with CCR constituents above GWPS through process of natural attenuation	**No Active Treatment** No active treatment technologies for groundwater to address CCR constituents	**MNA** Long-term groundwater monitoring to confirm reduction of CCR constituents
2	**CIP with In-Situ Stabilization (ISS), Capping and MNA**	**CIP with ISS, Geomembrane and Soil Cap**			
3	**CIP with Capping and In-Situ Groundwater Treatment**	**CIP with Geomembrane and Soil Cap**	**Subsurface Treatment System** Mitigate off-site migration of groundwater with CCR constituents above GWPS using in-situ amendments	**In-Situ Treatment** Subsurface treatment to reduce Appendix IV constituent concentrations in groundwater	**In-Situ Treatment Long-Term** Continue periodic in-situ treatment of groundwater long-term to maintain reduction of CCR constituents in groundwater
4	**CIP with Capping and Hydraulic Containment through Groundwater Pumping and Ex-Situ Treatment**	**CIP with Geomembrane and Soil Cap**	**Hydraulic Containment** Mitigate off-site migration of groundwater with CCR constituents above GWPS using extraction wells	**Ex-Situ Treatment** Treatment system (ion exchange or reverse osmosis) to remove CCR constituents from groundwater	**Pump & Treat Long-Term** Operate groundwater treatment system long-term to maintain reduction of CCR constituents in groundwater.
5	**Closure by Removal (CBR) with MNA**	**CBR**	**Natural Attenuation with Monitoring** Mitigate off-site migration of groundwater with CCR constituents above GWPS through process of natural attenuation	**No Active Treatment** No active treatment technologies for groundwater to address CCR constituents	**MNA** Long-term groundwater monitoring to confirm reduction of CCR constituents

APPENDIX A

Surface Water Screening Tables

Appendix A
Sioux Energy Center Surface Water Screening Tables – TOC

TABLES

Appendix A
Sioux Energy Center Surface Water Screening Tables – TOC

TABLE 1
HUMAN HEALTH SCREENING LEVELS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

		Drinking Water Screening Levels (mg/L)				Surface Water Screening Levels (mg/L)	
Constituent	**CASRN**	**MCLs (b)**	**SMCLs (b)**	**November 2018 USEPA Tapwater RSLs (c)**	**Site-Specific Groundwater Protection Standards (d)**	**Drinking Water (e)**	**Recreational Use (a) (f)**
Antimony	7440-36-0	0.006	NA	0.0078 (m)	0.006	0.006	0.64
Arsenic	7440-38-2	0.01	NA	0.000052	0.03	0.01	0.00014 (i)
Barium	7440-39-3	2	NA	3.8	2	2	NA
Beryllium	7440-41-7	0.004	NA	0.025	0.004	0.004	NA
Boron	7440-42-8	NA	NA	4	NA	4	NA
Cadmium	7440-43-9	0.005	NA	0.0092	0.005	0.005	NA
Calcium	7440-70-2	NA	NA	NA	NA	NA	NA
Chloride	7647-14-5	NA	250	NA	NA	250	NA
Chromium	16065-83-1 (g)	0.1 (j)	NA	22 (n)	0.1	0.1	NA
Cobalt	7440-48-4	NA	NA	0.006	0.006	0.006	NA
Fluoride	16984-48-8	4	2	0.8	4	4	NA
Lead	7439-92-1	0.015 (k)	NA	0.015	0.015	0.015	NA
Lithium	7439-93-2	NA	NA	0.04	0.0647	0.04	NA
Mercury	7487-94-7 (h)	0.002 (l)	NA	0.0057 (o)	0.002	0.002	NA
Molybdenum	7439-98-7	NA	NA	0.1	0.1	0.1	NA
Radium 226/228 (pCi/L)	RADIUM226228	5	NA	NA	5	5	NA
Selenium	7782-49-2	0.05	NA	0.1	0.05	0.05	4.2
Sulfate	7757-82-6	NA	250	NA	NA	250	NA
Thallium	7440-28-0	0.002	NA	0.0002 (p)	0.002	0.002	0.00047
Total Dissolved Solids	TDS	NA	500	NA	NA	500	NA
pH (std)	PHFLD	NA	6.5 - 8.5	NA	NA	6.5 - 8.5	NA

Notes:

AWQC - Ambient Water Quality Criteria. NA - not available.
CASRN - Chemical Abstracts Service Re pCi/L - picoCurie per liter.
GWPS - Groundwater Protection Standar RSL - Risk-based Screening Levels (USEPA).
HI - Hazard Index (noncancer child). TR - Target Risk (carcinogenic).
MCL - Maximum Contaminant Level. USEPA - United States Environmental Protection Agency.
mg/L - milligram per liter.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.
https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table
USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - The site GWPS is either the MCL/Health Based GWPS or based on background levels, whichever is higher. GWPS and background values calculated using baseline sampling results from monitoring wells MW-B1 and MW-B2. See text for additional information.
(e) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.
(f) - The selected Human Health Recreational Use Screening Level is the Federal USEPA AWQC for Human Health Consumption of Organism Only.
(g) - CAS number for Trivalent Chromium.
(h) - CAS number for Mercuric Chloride.
(i) - Value applies to inorganic form of arsenic only.
(j) - Value for Total Chromium.
(k) - Lead Treatment Technology Action Level is 0.015 mg/L.
(l) - Value for Inorganic Mercury.
(m) - RSL for Antimony (metallic) used for Antimony.
(n) - RSL for Chromium (III), Insoluble Salts used for Chromium.
(o) - RSL for Mercuric Chloride used for Mercury.
(p) - RSL for Thallium (Soluble Salts) used for Thallium.

TABLE 2
ECOLOGICAL SCREENING LEVELS - MISSISSIPPI RIVER
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

		Federal Water Quality Criteria (mg/L)							
		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Acute (a)		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Chronic (a)		Site-Specific USEPA Aquatic Life AWQC - 2017 Hardness Data Freshwater Acute (b)		Site-Specific USEPA Aquatic Life AWQC - 2017 Hardness Data Freshwater Chronic (b)	
Constituent	**CASRN**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	0.34	0.34	0.15	0.15	0.34	0.34	0.15	0.15
Barium	7440-39-3	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	7440-41-7	NA	NA	NA	NA	NA	NA	NA	NA
Boron	7440-42-8	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	0.0043 (c)	0.0039 (d)	0.0015 (c)	0.0013 (d)	0.0046 (f)	0.004 (g)	0.0016 (f)	0.0014 (g)
Calcium	7440-70-2	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	16887-00-6	860	NA	230	NA	860	NA	230	NA
Chromium	7440-47-3	3.6 (e,c)	1.1 (e,d)	0.17 (e,c)	0.15 (e,d)	3.8 (e,f)	1.2 (e,g)	0.18 (e,f)	0.16 (e,g)
Cobalt	7440-48-4	NA	NA	NA	NA	NA	NA	NA	NA
Fluoride	16984-48-8	NA	NA	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	0.23 (c)	0.16 (d)	0.009 (c)	0.0061 (d)	0.26 (f)	0.17 (g)	0.0101 (f)	0.0066 (g)
Lithium	7439-93-2	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	7439-97-6	0.0016	0.0014	0.001	0.00077	0.0016	0.001	0.00091	0.00077
Molybdenum	7439-98-7	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	7782-49-2	NA	NA	3.1	NA	NA	NA	3.1	NA
Sulfate	14808-79-8	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	TDS	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
AWQC - USEPA Ambient Water Quality Criteria.
CASRN - Chemical Abstracts Service Registry Number.
CMC - Criterion Maximum Concentration.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness using hardness data collected in May 2018 - see note (c).
USEPA provides AWQC for both total and dissolved results.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness using hardness data collected in April 2014 - see note (f).
USEPA provides AWQC for both total and dissolved results.

(c) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 229 mg/L as CaCO3 used.

(d) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value for the Mississippi River of 229 mg/L as CaCO3 used.

(e) - Value for trivalent chromium used.

(f) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 247 mg/L as CaCO3 used.

(g) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value for the Mississippi River of 247 mg/L as CaCO3 used.

TABLE 3
SUMMARY OF SCREENING RESULTS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

	Mississippi River - Human Health Drinking Water						Mississippi River - Human Health Recreational					
	Dissolved			Total			Dissolved			Total		
Constituent	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic							10 : 10 100%	20 : 20 100%	10 : 10 100%	10 : 10 100%	20 : 20 100%	10 : 10 100%
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead												
Lithium												
Mercury												
Molybdenum												
pH												
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

Notes:
Blank cells - no results above screening levels for the specified constituent / media.
Number of exceedences : total number of samples.

TABLE 3
SUMMARY OF SCREENING RESULTS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

	Mississippi River - Ecological						Mississippi River Chute - Human Health Drinking Water					
	Dissolved			Total			Dissolved			Total		
Constituent	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic												
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead												
Lithium												
Mercury												
Molybdenum												
pH												
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

Notes:
Blank cells - no results above screening levels for the specified constituent / media.
Number of exceedences : total number of samples.

TABLE 3
SUMMARY OF SCREENING RESULTS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

	Mississippi River Chute - Human Health Recreational						Mississippi River Chute - Ecological					
	Dissolved			Total			Dissolved			Total		
Constituent	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic	3 : 3 100%	14 : 14 100%	3 : 3 100%	3 : 3 100%	14 : 14 100%	3 : 3 100%						
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead												
Lithium												
Mercury												
Molybdenum												
pH												
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

Notes:
Blank cells - no results above screening levels for the specified constituent / media.
Number of exceedences : total number of samples.

TABLE 3
SUMMARY OF SCREENING RESULTS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

	Missouri River - Human Health Drinking Water						Missouri River - Human Health Recreational					
	Dissolved			Total			Dissolved			Total		
Constituent	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic							5 : 5 100%	10 : 10 100%	5 : 5 100%	5 : 5 100%	10 : 10 100%	5 : 5 100%
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead												
Lithium	5 : 5 100%	9 : 10 90%	5 : 5 100%	5 : 5 100%	10 : 10 100%	5 : 5 100%						
Mercury												
Molybdenum												
pH												
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

Notes:
Blank cells - no results above screening levels for the specified constituent / media.
Number of exceedences : total number of samples.

TABLE 3
SUMMARY OF SCREENING RESULTS
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

	Missouri River - Ecological					
	Dissolved			Total		
Constituent	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chloride						
Chromium						
Cobalt						
Fluoride						
Lead						
Lithium						
Mercury						
Molybdenum						
pH						
Selenium						
Sulfate						
Thallium						
TDS						
Radium 226/228						

Notes:
Blank cells - no results above screening levels for the specified constituent / media.
Number of exceedences : total number of samples.

TABLE 4a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Upstream					Mississippi River Adjacent										Mississippi River Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0017	0.0015	0.0016	0.0022	0.0021	0.0016	0.0016	0.0016	0.0017	0.0015	0.0015	0.0016	0.0015	0.0017	0.0015	0.0018	0.0016	0.0015	0.0015	0.0016
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0969	0.0937	0.0991	0.0966	0.0952	0.0901	0.0969	0.0932	0.0919	0.0767	0.0909	0.092	0.0904	0.0905	0.0908	0.108	0.0968	0.0861	0.0883	0.0868
Beryllium	7440-41-7	mg/L	0.004	NA	0.025	0.004																	0.00035 J			
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0296 J	0.0276 J	0.0301 J	0.0285 J	0.0309 J	0.0313 J	0.0303 J	0.0289 J	0.0461 J	0.0437 J	0.0312 J	0.0286 J	0.0285 J	0.0366 J	0.0367 J	0.0338 J	0.0337 J	0.0273 J	0.0465 J	0.047 J
Cadmium	7440-43-9	mg/L	0.005	NA	0.0092	0.005											0.00058 J				0.00046 J					
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	56	53.3	56	53.1	54.6	55	54.6	53.5	56.5	54.2	55.8	53	53.4	55.6	55.9	56.6	54.9	52.5	58.5	58
Chloride	16887-00-6	mg/L	NA	250	NA	250	22.7	22.2	22.4	25.2	24.5	22.5	23	22.6	40.7	38.4	22.6	24.1	23.1	32.8	32	23	23.2	22.6	41	40.9
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1	0.0023 J	0.0026 J	0.0029 J	0.003 J	0.0023 J		0.0029 J	0.0023 J	0.0032 J	0.0013 J	0.0016 J	0.0014 J	0.0019 J	0.0021 J	0.0017 J	0.003 J	0.0019 J	0.0021 J	0.0012 J	0.0016 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.0013 J	0.0016 J	0.0016 J	0.002 J	0.0018 J	0.0012 J	0.0023 J	0.0017 J	0.0018 J		0.0014 J	0.0016 J	0.0014 J	0.0014 J	0.0019 J	0.002 J	0.0021 J	0.0015 J	0.0013 J	0.0012 J
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.22	0.22	0.23	0.22	0.21	0.23	0.22	0.22	0.23	0.21 J	0.23	0.21	0.21	0.21	0.21	0.23	0.24	0.23	0.22	0.23
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015	0.0047 J	0.0048 J	0.0055 J	0.0046 J	0.0034 J		0.005 J	0.0052 J	0.005 J	0.0034 J	0.0033 J	0.0045 J	0.0034 J	0.0046 J		0.0049 J	0.0038 J			0.004 J
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.009 J	0.0089 J	0.0089 J	0.0088 J	0.0091 J	0.009 J	0.0091 J	0.0104	0.0089 J	0.0059 J	0.0092 J	0.0086 J	0.0104	0.0075 J	0.0085 J	0.0099 J	0.0089 J	0.0084 J	0.0074 J	0.0093 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.001 J		0.00098 J	0.0011 J	0.0011 J	0.0011 J	0.0012 J	0.0011 J	0.0014 J	0.0018 J	0.0012 J		0.0013 J	0.0012 J	0.0012 J	0.0012 J	0.0015 J	0.001 J	0.0018 J	0.0018 J
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05																				
Sulfate	14808-79-8	mg/L	NA	250	NA	250	33.6	33	32.8	33.8	33.7	33.9	33.4	33.2	40.1	39.1	34	33.4	33.1	37.3	36.6	34.5	34	33.4	40.3	40.5
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002																				
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	229	219	228	219	228	224	224	220	243	234	227	219	220	234	234	229	224	215	250	250
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	302	268	250	282	258	218	224	250	232 J	324	282	344	280	280	342	290	244	280	321	272

Notes:

Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level.

(a) - Surface water samples collected in May 2018.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Upstream					Mississippi River Adjacent										Mississippi River Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	5.2E-05	0.01	0.0011	0.001	0.00096 J	0.0013	0.0014	0.0012	0.0011	0.0011	0.0011	0.0011 J	0.0011	0.0011	0.0011	0.0011	0.0011	0.0013	0.0012	0.0011	0.0012	0.0012
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0698	0.0659	0.0645	0.0619	0.0614	0.0727	0.0666	0.067	0.0614	0.0604	0.0719	0.0629	0.0654	0.0632	0.0614	0.0757	0.0657	0.0679	0.0629	0.0652
Beryllium	7440-41-7	mg/L	0.004	NA	0.025	0.004																				
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0275 J	0.0278 J	0.0272 J	0.03 J	0.027 J	0.0323 J	0.0274 J	0.0299 J	0.0441 J	0.0427 J	0.0294 J	0.0271 J	0.0289 J	0.037 J	0.035 J	0.0315 J	0.0304 J	0.0305 J	0.0469 J	0.048 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	52.8	50.4	49.8	48.5	48.3	55.6	52.5	52.1	53.3	52.6	52.3	49.3	50.7	52.3	50.3	54.7	52	52.8	55.1	56.6
Chromium*	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1																				
Cobalt*	7440-48-4	mg/L	NA	NA	0.006	0.006																				
Lead*	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015							0.0035 J													
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0075 J	0.009 J	0.0083 J	0.0071 J	0.007 J	0.008 J	0.0085 J	0.0077 J	0.0074 J	0.0065 J	0.0083 J	0.0069 J	0.0067 J	0.0072 J	0.0067 J	0.0088 J	0.0088 J	0.0081 J	0.0074 J	0.0057 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0012 J			0.001 J		0.0013 J	0.001 J	0.0011 J	0.0016 J	0.0014 J	0.0015 J	0.00098 J		0.0014 J	0.0015 J	0.0018 J	0.0017 J	0.0014 J	0.0016 J	0.0018 J
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05																				
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002																				

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level.

(a) - Surface water samples collected in May 2018.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Chute			Mississippi River Chute														Mississippi River Chute		
							River Upstream			River Adjacent															River Downstream		
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006													0.0037 J							
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0064	0.0062	0.0066	0.0025	0.002	0.002	0.002	0.0021	0.0072	0.0069	0.0062	0.0077	0.0078	0.0077	0.0066	0.006	0.0067	0.0024	0.0024	0.0023
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.204	0.2	0.199	0.0746	0.0695	0.0669	0.0705	0.0668	0.263	0.256	0.235	0.288	0.278	0.285	0.212	0.193	0.232	0.0677	0.065	0.065
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004									0.00023 J	0.00035 J		0.0004 J								
Boron	7440-42-8	mg/L	NA	NA	4	4	0.75	0.746	0.718	0.0402 J	0.0461 J	0.0379 J	0.041 J	0.034 J	0.805	0.782	0.705	0.859	0.839	0.838	0.651	0.654	0.715	0.0361 J	0.0351 J	0.0358 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	80.8	84.8	82	44.6	45	45.2	45.3	44.6	82.5	81.8	78	84.3	83.2	84	76.2	74.4	77.5	44.3	44.4	44
Chloride	16887-00-6	mg/L	NA	250	NA	250	24.7	24.9	25	23	22.9	23.2	22.9	23.4	23.3	23.5	23.5	23.4	23.4	23.3	24	24	24	23.2	23.1	23.2
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1	0.0011 J		0.0013 J	0.0017 J	0.0011 J	0.00079 J		0.0015 J	0.002 J	0.0021 J	0.0018 J	0.0021 J	0.0027 J	0.0028 J	0.0024 J	0.0014 J	0.0024 J	0.00086 J	0.0012 J	0.0013 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.0011 J			0.0012 J	0.0017 J		0.0014 J		0.0011 J	0.001 J		0.0012 J	0.0015 J	0.0011 J	0.0015 J	0.0011 J	0.0016 J	0.0012 J	0.0012 J	0.0013 J
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.56	0.58	0.57	0.17 J	0.17 J	0.17 J	0.17 J	0.17 J	0.59	0.58	0.54	0.63	0.6	0.61	0.51	0.51	0.55	0.17 J	0.16 J	0.16 J
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015		0.0044 J	0.0053			0.0032 J			0.0026 J			0.0036 J	0.0033 J				0.0025 J			
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0186	0.0172	0.018	0.0068 J	0.007 J	0.0046 J	0.006 J	0.0049 J	0.0222	0.0214	0.0211	0.024	0.0214	0.0241	0.0174	0.0178	0.0206	0.0058 J	0.0067 J	0.0067 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0527	0.0516	0.0499	0.0018 J	0.0032 J	0.0017 J	0.0018 J	0.0017 J	0.0633	0.0635	0.0553	0.0683	0.0667	0.0656	0.0481	0.0501	0.0546	0.0015 J	0.0015 J	0.0014 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05									0.0093 J	0.0054 J	0.0055 J	0.0077 J	0.0069 J	0.0067 J	0.0039 J	0.0045 J	0.0047 J			
Sulfate	14808-79-8	mg/L	NA	250	NA	250	143	144	144	31.3	32	32.3	31.7	31.5	162	157	143	177	173	169	135	133	146	30.2	30.2	30
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002	0.000071 J	0.000044 J	0.000058 J						0.0001 J	0.00015 J	0.0001 J	0.00015 J	0.00012 J	0.0002 J	0.000085 J	0.000046 J	0.000083 J			
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	NA	NA	312	319	308	204	206	205	208	203	312	311	300	318	313	316	298	292	299	204	204	203
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	467	451	444	254	262	242	256	250	472	460	444	480	496	483	418	419	445	259	256	253

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River					Mississippi River										Mississippi River				
							River Upstream					River Adjacent										River Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0019	0.0018	0.0016	0.0019	0.0019	0.0021	0.0018	0.0017	0.0021	0.002	0.0019	0.0019	0.0017	0.002	0.0019	0.002	0.0019	0.0018	0.0022	0.0022
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0599	0.0628	0.0566	0.064	0.0582	0.066	0.0607	0.0548	0.0642	0.0609	0.0596	0.0614	0.0557	0.0687	0.0584	0.0681	0.0646	0.0582	0.07	0.0668
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004							0.00023 J			0.00022 J					0.00024 J				0.00027 J	
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0271 J	0.033 J	0.0274 J	0.0404 J	0.0412 J	0.0391 J	0.0362 J	0.0328 J	0.0492 J	0.0513 J	0.0279 J	0.0348 J	0.0303 J	0.0404 J	0.0369 J	0.0404 J	0.0385 J	0.0387 J	0.0534 J	0.0599 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	44.5	44	45	44.4	47	44.6	44.4	42.5	46.7	46	44.8	44.4	45.2	46	47.2	44.7	46.1	44.3	48.9	48.5
Chloride	16887-00-6	mg/L	NA	250	NA	250	23.9	23.2	24.9	26.5	31.6	23.7	22.8	24	31.1	34.1	24.1	23.5	26.2	26.2	28.4	23.9	23.5	23.7	31.6	36
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1		0.00081 J		0.00088 J		0.0013 J	0.00088 J		0.0011 J	0.0011 J		0.00081 J		0.00093 J		0.0018 J	0.0013 J	0.0013 J	0.0015 J	0.0015 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006		0.00095 J				0.0016 J	0.0018 J	0.001 J	0.0012 J	0.00077 J		0.00088 J		0.00091 J		0.0013 J	0.0013 J		0.0011 J	0.0014 J
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.17 J	0.16 J	0.17 J	0.17 J	0.18 J	0.17 J	0.16 J	0.16 J	0.17 J	0.18 J	0.17 J	0.16 J	0.17 J	0.18 J	0.17 J	0.17 J	0.16 J	0.17 J	0.18 J	0.19 J
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015	0.0033 J		0.0024 J		0.0026 J				0.003 J						0.0025 J	0.0025 J				
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0031 J	0.005 J		0.006 J	0.0033 J	0.0063 J	0.0055 J	0.0053 J	0.0056 J	0.0047 J		0.0056 J	0.003 J	0.0047 J		0.0048 J	0.0079 J	0.0053 J	0.0049 J	0.0063 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1		0.0018 J			0.0017 J	0.0019 J	0.0023 J	0.002 J	0.0021 J	0.0021 J	0.0013 J			0.0014 J	0.0018 J	0.002 J	0.0021 J	0.0022 J	0.0023 J	0.0021 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05									0.0037 J											
Sulfate	14808-79-8	mg/L	NA	250	NA	250	31.3	30.4	31.9	32.4	36.3	31.6	29.9	31.4	35.1	37.7	31.7	30.5	33.1	32.3	34.3	31.8	30.5	32.1	35.5	39.6
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002											0.000069 J			0.000037 J	0.000058 J		0.000065 J		0.000078 J	
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	NA	NA	203	204	206	206	214	209	205	200	214	214	204	205	206	212	215	207	211	206	223	225
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	248	247	256	265	266	249	251	252	279	280	256	256	258	251	271	244	248	253	288	297

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Missouri River					Missouri River										Missouri River				
							River Upstream					River Adjacent										River Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-5D	S-MO-5S	S-MO-6D	S-MO-6S	S-MO-7S	S-MO-8D	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0036	0.0035	0.0035	0.0036	0.0035	0.0036	0.0036	0.0035	0.0035	0.0036	0.0034	0.0035	0.0036	0.0036	0.0035	0.0034	0.0036	0.0034	0.0035	0.0036
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.117	0.117	0.113	0.118	0.114	0.118	0.118	0.115	0.115	0.118	0.114	0.116	0.116	0.116	0.117	0.113	0.115	0.114	0.116	0.116
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004																				
Boron	7440-42-8	mg/L	NA	NA	4	4	0.113	0.111	0.111	0.111	0.112	0.115	0.117	0.112	0.111	0.112	0.11	0.113	0.113	0.111	0.112	0.11	0.113	0.114	0.111	0.114
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	65.1	64.4	63.4	64.9	64.2	64.8	65.4	63.2	63.8	65.4	63.4	65	65.3	64.3	65	63	64.8	63.4	64.2	64.7
Chloride	16887-00-6	mg/L	NA	250	NA	250	23.5	23.4	23.6	23.6	23.7	23.3	23.4	23.9	23.3	23.3	23.9	23.5	23.4	23.4	23.6	23.3	23.3	23.4	23.4	23.3
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1		0.0012 J	0.00076 J	0.00099 J	0.00075 J	0.0011 J	0.0012 J	0.0013 J	0.00097 J	0.0011 J		0.00095 J	0.00098 J	0.00073 J	0.00074 J	0.0013 J				0.00075 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006				0.00083 J				0.00086 J	0.00074 J		0.00087 J	0.00085 J								0.00087 J
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.45	0.44	0.44	0.44	0.44	0.45	0.43	0.45	0.44	0.44	0.45	0.44	0.45	0.43	0.45	0.45	0.44	0.45	0.43	0.46
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015									0.0026 J				0.003 J						0.0028 J	
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0435	0.044	0.0429	0.0441	0.0436	0.0442	0.0444	0.0422	0.0427	0.0431	0.042	0.0428	0.0449	0.042	0.0423	0.042	0.0431	0.0427	0.0434	0.0435
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0031 J	0.0026 J	0.0028 J	0.0026 J	0.0027 J	0.003 J	0.0036 J	0.0026 J	0.003 J	0.0028 J	0.0031 J	0.003 J	0.0028 J	0.0028 J	0.003 J	0.0035 J	0.0029 J	0.0036 J	0.0028 J	0.0031 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05	0.0042 J																			
Sulfate	14808-79-8	mg/L	NA	250	NA	250	195	192	194	191	191	192	192	193	193	188	192	196	192	193	190	193	194	189	192	190
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002			0.000064 J			0.000047 J	0.000063 J		0.000037 J			0.000045 J				0.000055 J				0.000064 J
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	NA	NA	266	263	259	265	262	266	267	259	260	267	259	265	267	263	265	258	265	259	262	264
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	475	496	492	497	490	493	490	491	491	488	478	496	482	476	473	487	496	485	484	465

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Chute			Mississippi River Chute															Mississippi River Chute		
							River Upstream			River Adjacent															River Downstream		
			USEPA MCLs (c)	USEPA SMCLs (c)	USEPA Tapwater RSLs (d)		S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006		0.0037 J																			
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0055	0.0053	0.0053	0.0021	0.0017	0.0016	0.0017	0.0017	0.0064	0.0061	0.0056	0.0072	0.0071	0.0065	0.0052	0.0053	0.0057	0.0021	0.002	0.0021
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.185	0.192	0.191	0.0592	0.0558	0.0553	0.0564	0.0544	0.25	0.246	0.219	0.267	0.266	0.252	0.182	0.182	0.209	0.0599	0.0595	0.0583
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004												0.00019 J	0.0002 J							0.00026 J
Boron	7440-42-8	mg/L	NA	NA	4	4	0.755	0.769	0.769	0.039 J	0.0421 J	0.0431 J	0.0395 J	0.0406 J	0.805	0.796	0.715	0.853	0.849	0.812	0.652	0.657	0.734	0.0338 J	0.0351 J	0.0357 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium (f)	7440-70-2	mg/L	NA	NA	NA	NA	79.8	81.4	82.1	44.8	44.5	44.1	45.2	43.8	83	82.1	77.2	82.9	83.2	81	73.9	74.2	76.8	45.1	44.7	44
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (h)	0.1									0.00087 J			0.00095 J	0.0016 J	0.0008 J			0.00075 J			
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.00089 J	0.0012 J	0.0013 J		0.00078 J				0.001 J	0.0013 J	0.00074 J	0.00088 J		0.00098 J	0.0013 J					
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015		0.0031 J																		
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0161	0.018	0.0197	0.0055 J	0.0056 J	0.0044 J	0.0059 J	0.0051 J	0.0218	0.0209	0.0189	0.0213	0.023	0.0229	0.0166	0.0166	0.0201	0.0054 J	0.0058 J	0.0067 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0524	0.0576	0.0561	0.0018 J	0.0026 J	0.0019 J	0.0022 J	0.002 J	0.064	0.0633	0.057	0.068	0.0685	0.0638	0.0478	0.0489	0.055	0.0019 J	0.0019 J	0.0023 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05		0.0061 J							0.0048 J	0.0046 J	0.0049 J	0.0052 J	0.0091 J	0.0062 J						
Silver*	7440-22-4	mg/L	NA	0.1	0.094	0.1																				
Thallium	7440-28-0	mg/L	0.002	NA	0.0002	0.002	0.000037 J						0.000039 J		0.000092 J	0.00014 J	0.000096 J	0.00011 J	0.00011 J	0.000096 J			0.0001 J	0.000055 J		

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River River Upstream					Mississippi River River Adjacent										Mississippi River River Downstream				
			USEPA MCLs (c)	USEPA SMCLs (c)	USEPA Tapwater RSLs (d)		S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0016	0.0016	0.0015	0.0017	0.0016	0.0017	0.0015	0.0015	0.0018	0.0018	0.0016	0.0014	0.0016	0.0016	0.0016	0.0017	0.0016	0.0016	0.0018	0.0018
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0504	0.0417	0.0439	0.0447	0.0467	0.0525	0.042	0.0421	0.0453	0.0464	0.0508	0.0422	0.0429	0.0438	0.0457	0.0534	0.043	0.0475	0.047	0.049
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004									0.00025 J		0.00018 J			0.00029 J	0.00032 J		0.00025 J			
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0332 J	0.0333 J	0.0372 J	0.0392 J	0.0476 J	0.0368 J	0.0329 J	0.0338 J	0.0489 J	0.0522 J	0.0374 J	0.0354 J	0.0398 J	0.0396 J	0.0409 J	0.0395 J	0.0391 J	0.0398 J	0.0559 J	0.0603 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium (f)	7440-70-2	mg/L	NA	NA	NA	NA	44.8	44.4	44.9	45.7	45.9	45	43.4	44.4	45.8	46.2	43.8	43.9	43.6	45.4	44.8	44.4	45	44.3	47.4	48
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (h)	0.1													0.00097 J							
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006		0.0009 J		0.00091 J		0.0013 J	0.0013 J	0.00075 J		0.0012 J	0.00082 J		0.00078 J	0.0013 J	0.00091 J				0.00094 J	
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015																				
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0058 J	0.0063 J	0.0054 J	0.005 J	0.0068 J	0.0041 J	0.0043 J	0.0051 J	0.0033 J	0.0037 J	0.004 J	0.0041 J	0.0041 J	0.0043 J	0.0048 J	0.0059 J	0.0052 J	0.0033 J	0.0043 J	0.0078 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0015 J	0.0016 J	0.0019 J	0.002 J	0.0014 J	0.0022 J	0.0019 J	0.0014 J	0.002 J	0.0018 J	0.0027 J	0.0021 J	0.0026 J	0.0018 J	0.0023 J	0.002 J	0.0019 J	0.0016 J	0.0031 J	0.0022 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05																	0.0036 J			
Silver*	7440-22-4	mg/L	NA	0.1	0.094	0.1																				
Thallium	7440-28-0	mg/L	0.002	NA	0.0002	0.002	0.000059 J																0.00004 J			0.000047 J

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 4d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Missouri River					Missouri River										Missouri River				
							River Upstream					River Adjacent										River Downstream				
			USEPA MCLs (c)	USEPA SMCLs (c)	USEPA Tapwater RSLs (d)		S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-5D	S-MO-5S	S-MO-6D	S-MO-6S	S-MO-7S	S-MO-8D	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0034	0.0034	0.0032	0.0033	0.0033	0.0033	0.0034	0.0033	0.0032	0.0033	0.0032	0.0033	0.0033	0.0034	0.0032	0.0033	0.0034	0.0033	0.0032	0.0033
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.108	0.11	0.108	0.109	0.109	0.11	0.11	0.107	0.106	0.109	0.109	0.109	0.107	0.108	0.108	0.112	0.107	0.111	0.107	0.109
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004																				
Boron	7440-42-8	mg/L	NA	NA	4	4	0.115	0.12	0.116	0.118	0.118	0.119	0.12	0.114	0.115	0.116	0.117	0.118	0.117	0.118	0.116	0.12	0.115	0.122	0.115	0.119
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium (f)	7440-70-2	mg/L	NA	NA	NA	NA	59.5	60.9	59.9	60.6	60.3	60.3	61.1	59.2	59.1	60	60.8	60.7	59.8	60	59.9	61.6	59.7	60.6	59.7	59.4
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (h)	0.1																				0.00074 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006																				
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015																				
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0422	0.0423	0.0435	0.0423	0.0417	0.0422	0.0422	0.0428	0.0412	0.0421	0.0432	0.0424	0.044	0.042	0.04	0.0441	0.0421	0.0446	0.0405	0.0437
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0039 J	0.004 J	0.0044 J	0.0036 J	0.0038 J	0.0037 J	0.0049 J	0.0037 J	0.004 J	0.0046 J	0.0038 J	0.0038 J	0.0036 J	0.0035 J	0.0038 J	0.0046 J	0.0038 J	0.0047 J	0.0032 J	0.0037 J
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05																				
Silver*	7440-22-4	mg/L	NA	0.1	0.094	0.1																				
Thallium	7440-28-0	mg/L	0.002	NA	0.0002	0.002			0.000063 J				0.000072 J		0.000037 J							0.000048 J				0.000075 J

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
CAS - Chemical Abstracts Service.
J - Estimated value.
MCL - Maximum Contaminant Level.
mg/L - milligrams per liter.
NA - Not Available.
RSL - Regional Screening Level.
SMCL - Secondary Maximum Contaminant Level.
USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level

(a) - Surface water samples collected in September 2017.
(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
http://water.epa.gov/drink/contaminants/index.cfm
(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
(d) - RSL for Mercuric Chloride used for Mercury.
(e) - The drinking water standard or MCL for chromium is based on total chromium.
(f) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
(h) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 5a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO HUMAN HEALTH AWQC SCREENING LEVELS -
TOTAL (UNFILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

				Mississippi River Upstream					Mississippi River Adjacent									Mississippi River Downstream				
Constituent	CAS	Units	USEPA AWQC (b)	S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0017	0.0015	0.0016	0.0022	0.0021	0.0016	0.0016	0.0016	0.0017	0.0015	0.0015	0.0016	0.0015	0.0017	0.0015	0.0018	0.0016	0.0015	0.0015	0.0016
Barium	7440-39-3	mg/L	NA	0.0969	0.0937	0.0991	0.0966	0.0952	0.0901	0.0969	0.0932	0.0919	0.0767	0.0909	0.092	0.0904	0.0905	0.0908	0.108	0.0968	0.0861	0.0883	0.0868
Beryllium*	7440-41-7	mg/L	NA																	0.00035 J			
Boron	7440-42-8	mg/L	NA	0.0296 J	0.0276 J	0.0301 J	0.0285 J	0.0309 J	0.0313 J	0.0303 J	0.0289 J	0.0461 J	0.0437 J	0.0312 J	0.0286 J	0.0285 J	0.0366 J	0.0367 J	0.0338 J	0.0337 J	0.0273 J	0.0465 J	0.047 J
Cadmium	7440-43-9	mg/L	NA											0.00058 J				0.00046 J					
Calcium	7440-70-2	mg/L	NA	56	53.3	56	53.1	54.6	55	54.6	53.5	56.5	54.2	55.8	53	53.4	55.6	55.9	56.6	54.9	52.5	58.5	58
Chloride	16887-00-6	mg/L	NA	22.7	22.2	22.4	25.2	24.5	22.5	23	22.6	40.7	38.4	22.6	24.1	23.1	32.8	32	23	23.2	22.6	41	40.9
Chromium	7440-47-3	mg/L	NA	0.0023 J	0.0026 J	0.0029 J	0.003 J	0.0023 J		0.0029 J	0.0023 J	0.0032 J	0.0013 J	0.0016 J	0.0014 J	0.0019 J	0.0021 J	0.0017 J	0.003 J	0.0019 J	0.0021 J	0.0012 J	0.0016 J
Cobalt	7440-48-4	mg/L	NA	0.0013 J	0.0016 J	0.0016 J	0.002 J	0.0018 J	0.0012 J	0.0023 J	0.0017 J	0.0018 J		0.0014 J	0.0016 J	0.0014 J	0.0014 J	0.0019 J	0.002 J	0.0021 J	0.0015 J	0.0013 J	0.0012 J
Fluoride	16984-48-8	mg/L	NA	0.22	0.22	0.23	0.22	0.21	0.23	0.22	0.22	0.23	0.21 J	0.23	0.21	0.21	0.21	0.21	0.23	0.24	0.23	0.22	0.23
Lead	7439-92-1	mg/L	NA	0.0047 J	0.0048 J	0.0055 J	0.0046 J	0.0034 J		0.005 J	0.0052 J	0.005 J	0.0034 J	0.0033 J	0.0045 J	0.0034 J	0.0046 J		0.0049 J	0.0038 J			0.004 J
Lithium	7439-93-2	mg/L	NA	0.009 J	0.0089 J	0.0089 J	0.0088 J	0.0091 J	0.009 J	0.0091 J	0.0104	0.0089 J	0.0059 J	0.0092 J	0.0086 J	0.0104	0.0075 J	0.0085 J	0.0099 J	0.0089 J	0.0084 J	0.0074 J	0.0093 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.001 J		0.00098 J	0.0011 J	0.0011 J	0.0011 J	0.0012 J	0.0011 J	0.0014 J	0.0018 J	0.0012 J		0.0013 J	0.0012 J	0.0012 J	0.0012 J	0.0015 J	0.001 J	0.0018 J	0.0018 J
Selenium*	7782-49-2	mg/L	4.2																				
Sulfate	14808-79-8	mg/L	NA	33.6	33	32.8	33.8	33.7	33.9	33.4	33.2	40.1	39.1	34	33.4	33.1	37.3	36.6	34.5	34	33.4	40.3	40.5
Thallium*	7440-28-0	mg/L	0.00047																				
Total Hardness as CaCO3	471-34-1	mg/L	NA	229	219	228	219	228	224	224	220	243	234	227	219	220	234	234	229	224	215	250	250
Total Dissolved Solids	TDS	mg/L	NA	302	268	250	282	258	218	224	250	232 J	324	282	344	280	280	342	290	244	280	321	272

Notes:
Blank cells - Non-detect value.
J - Estimated value.
* - Constituent was not detected in any samples.
mg/L - milligrams per liter.
AWQC - Ambient Water Quality Criteria.
NA - Not Available.
CAS - Chemical Abstracts Service.
USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in May 2018.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only
apply to total concentrations.
(c) - Value applies to inorganic form of arsenic only.

TABLE 5b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO HUMAN HEALTH AWQC SCREENING LEVELS -
DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Constituent	CAS	Units	USEPA AWQC (b)	Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Adjacent					Mississippi River Downstream				
				S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0011	0.001	0.00096 J	0.0013	0.0014	0.0012	0.0011	0.0011	0.0011	0.0011 J	0.0011	0.0011	0.0011	0.0011	0.0011	0.0013	0.0012	0.0011	0.0012	0.0012
Barium	7440-39-3	mg/L	NA	0.0698	0.0659	0.0645	0.0619	0.0614	0.0727	0.0666	0.067	0.0614	0.0604	0.0719	0.0629	0.0654	0.0632	0.0614	0.0757	0.0657	0.0679	0.0629	0.0652
Beryllium	7440-41-7	mg/L	NA																				
Boron	7440-42-8	mg/L	NA	0.0275 J	0.0278 J	0.0272 J	0.03 J	0.027 J	0.0323 J	0.0274 J	0.0299 J	0.0441 J	0.0427 J	0.0294 J	0.0271 J	0.0289 J	0.037 J	0.035 J	0.0315 J	0.0304 J	0.0305 J	0.0469 J	0.048 J
Cadmium*	7440-43-9	mg/L	NA																				
Calcium	7440-70-2	mg/L	NA	52.8	50.4	49.8	48.5	48.3	55.6	52.5	52.1	53.3	52.6	52.3	49.3	50.7	52.3	50.3	54.7	52	52.8	55.1	56.6
Chromium*	7440-47-3	mg/L	NA																				
Cobalt*	7440-48-4	mg/L	NA																				
Lead*	7439-92-1	mg/L	NA							0.0035 J													
Lithium	7439-93-2	mg/L	NA	0.0075 J	0.009 J	0.0083 J	0.0071 J	0.007 J	0.008 J	0.0085 J	0.0077 J	0.0074 J	0.0065 J	0.0083 J	0.0069 J	0.0067 J	0.0072 J	0.0067 J	0.0088 J	0.0088 J	0.0081 J	0.0074 J	0.0057 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0012 J			0.001 J		0.0013 J	0.001 J	0.0011 J	0.0016 J	0.0014 J	0.0015 J	0.00098 J		0.0014 J	0.0015 J	0.0018 J	0.0017 J	0.0014 J	0.0016 J	0.0018 J
Selenium*	7782-49-2	mg/L	4.2																				
Thallium*	7440-28-0	mg/L	0.00047																				

Notes:
Blank cells - Non-detect value.
* - Constituent was not detected in any samples.
AWQC - Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in May 2018.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only
apply to total concentrations.
(c) - Value applies to inorganic form of arsenic only.

TABLE 5c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO HUMAN HEALTH AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River Chute River Upstream			Mississippi River Chute River Adjacent													Mississippi River Chute River Downstream		
			AWQC (b)	S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony*	7440-36-0	mg/L	0.64													0.0037 J							
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0064	0.0062	0.0066	0.0025	0.002	0.002	0.002	0.0021	0.0072	0.0069	0.0062	0.0077	0.0078	0.0077	0.0066	0.006	0.0067	0.0024	0.0024	0.0023
Barium	7440-39-3	mg/L	NA	0.204	0.2	0.199	0.0746	0.0695	0.0669	0.0705	0.0668	0.263	0.256	0.235	0.288	0.278	0.285	0.212	0.193	0.232	0.0677	0.065	0.065
Beryllium*	7440-41-7	mg/L	NA									0.00023 J	0.00035 J		0.0004 J								
Boron	7440-42-8	mg/L	NA	0.75	0.746	0.718	0.0402 J	0.0461 J	0.0379 J	0.041 J	0.034 J	0.805	0.782	0.705	0.859	0.839	0.838	0.651	0.654	0.715	0.0361 J	0.0351 J	0.0358 J
Cadmium*	7440-43-9	mg/L	NA																				
Calcium	7440-70-2	mg/L	NA	80.8	84.8	82	44.6	45	45.2	45.3	44.6	82.5	81.8	78	84.3	83.2	84	76.2	74.4	77.5	44.3	44.4	44
Chloride	16887-00-6	mg/L	NA	24.7	24.9	25	23	22.9	23.2	22.9	23.4	23.3	23.5	23.5	23.4	23.4	23.3	24	24	24	23.2	23.1	23.2
Chromium	7440-47-3	mg/L	NA	0.0011 J		0.0013 J	0.0017 J	0.0011 J	0.00079 J		0.0015 J	0.002 J	0.0021 J	0.0018 J	0.0021 J	0.0027 J	0.0028 J	0.0024 J	0.0014 J	0.0024 J	0.00086 J	0.0012 J	0.0013 J
Cobalt	7440-48-4	mg/L	NA	0.0011 J			0.0012 J	0.0017 J		0.0014 J		0.0011 J	0.001 J		0.0012 J	0.0015 J	0.0011 J	0.0015 J	0.0011 J	0.0016 J	0.0012 J	0.0012 J	0.0013 J
Fluoride	16984-48-8	mg/L	NA	0.56	0.58	0.57	0.17 J	0.17 J	0.17 J	0.17 J	0.17 J	0.59	0.58	0.54	0.63	0.6	0.61	0.51	0.51	0.55	0.17 J	0.16 J	0.16 J
Lead	7439-92-1	mg/L	NA		0.0044 J	0.0053			0.0032 J			0.0026 J			0.0036 J	0.0033 J				0.0025 J			
Lithium	7439-93-2	mg/L	NA	0.0186	0.0172	0.018	0.0068 J	0.007 J	0.0046 J	0.006 J	0.0049 J	0.0222	0.0214	0.0211	0.024	0.0214	0.0241	0.0174	0.0178	0.0206	0.0058 J	0.0067 J	0.0067 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0527	0.0516	0.0499	0.0018 J	0.0032 J	0.0017 J	0.0018 J	0.0017 J	0.0633	0.0635	0.0553	0.0683	0.0667	0.0656	0.0481	0.0501	0.0546	0.0015 J	0.0015 J	0.0014 J
Selenium	7782-49-2	mg/L	4.2									0.0093 J	0.0054 J	0.0055 J	0.0077 J	0.0069 J	0.0067 J	0.0039 J	0.0045 J	0.0047 J			
Sulfate	14808-79-8	mg/L	NA	143	144	144	31.3	32	32.3	31.7	31.5	162	157	143	177	173	169	135	133	146	30.2	30.2	30
Thallium*	7440-28-0	mg/L	0.00047	0.000071 J	0.000044 J	0.000058 J						0.0001 J	0.00015 J	0.0001 J	0.00015 J	0.00012 J	0.0002 J	0.000085 J	0.000046 J	0.000083 J			
Total Hardness as CaCO3	HARDNESS	mg/L	NA	312	319	308	204	206	205	208	203	312	311	300	318	313	316	298	292	299	204	204	203
Total Dissolved Solids	TDS	mg/L	NA	467	451	444	254	262	242	256	250	472	460	444	480	496	483	418	419	445	259	256	253

Notes:
* Constituent was not detected in any samples.
AWQC - Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
mg/L - milligrams per liter.
NA - Not Analyzed/Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in September 2017.
(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. Accessed November 2014.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.
(c) - Value applies to inorganic form of arsenic only.

TABLE 5c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO HUMAN HEALTH AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River River Upstream					Mississippi River River Adjacent										Mississippi River River Downstream				
			AWQC (b)	S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0019	0.0018	0.0016	0.0019	0.0019	0.0021	0.0018	0.0017	0.0021	0.002	0.0019	0.0019	0.0017	0.002	0.0019	0.002	0.0019	0.0018	0.0022	0.0022
Barium	7440-39-3	mg/L	NA	0.0599	0.0628	0.0566	0.064	0.0582	0.066	0.0607	0.0548	0.0642	0.0609	0.0596	0.0614	0.0557	0.0687	0.0584	0.0681	0.0646	0.0582	0.07	0.0668
Beryllium*	7440-41-7	mg/L	NA							0.00023 J			0.00022 J					0.00024 J				0.00027 J	
Boron	7440-42-8	mg/L	NA	0.0271 J	0.033 J	0.0274 J	0.0404 J	0.0412 J	0.0391 J	0.0362 J	0.0328 J	0.0492 J	0.0513 J	0.0279 J	0.0348 J	0.0303 J	0.0404 J	0.0369 J	0.0404 J	0.0385 J	0.0387 J	0.0534 J	0.0599 J
Cadmium*	7440-43-9	mg/L	NA																				
Calcium	7440-70-2	mg/L	NA	44.5	44	45	44.4	47	44.6	44.4	42.5	46.7	46	44.8	44.4	45.2	46	47.2	44.7	46.1	44.3	48.9	48.5
Chloride	16887-00-6	mg/L	NA	23.9	23.2	24.9	26.5	31.6	23.7	22.8	24	31.1	34.1	24.1	23.5	26.2	26.2	28.4	23.9	23.5	23.7	31.6	36
Chromium	7440-47-3	mg/L	NA		0.00081 J		0.00088 J		0.0013 J	0.00088 J		0.0011 J	0.0011 J		0.00081 J		0.00093 J		0.0018 J	0.0013 J	0.0013 J	0.0015 J	0.0015 J
Cobalt	7440-48-4	mg/L	NA		0.00095 J				0.0016 J	0.0018 J	0.001 J	0.0012 J	0.00077 J		0.00088 J		0.00091 J		0.0013 J	0.0013 J		0.0011 J	0.0014 J
Fluoride	16984-48-8	mg/L	NA	0.17 J	0.16 J	0.17 J	0.17 J	0.18 J	0.17 J	0.16 J	0.16 J	0.17 J	0.18 J	0.17 J	0.16 J	0.17 J	0.18 J	0.17 J	0.17 J	0.16 J	0.17 J	0.18 J	0.19 J
Lead	7439-92-1	mg/L	NA	0.0033 J		0.0024 J		0.0026 J				0.003 J						0.0025 J	0.0025 J				
Lithium	7439-93-2	mg/L	NA	0.0031 J	0.005 J		0.006 J	0.0033 J	0.0063 J	0.0055 J	0.0053 J	0.0056 J	0.0047 J		0.0056 J	0.003 J	0.0047 J		0.0048 J	0.0079 J	0.0053 J	0.0049 J	0.0063 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA		0.0018 J			0.0017 J	0.0019 J	0.0023 J	0.002 J	0.0021 J	0.0021 J	0.0013 J			0.0014 J	0.0018 J	0.002 J	0.0021 J	0.0022 J	0.0023 J	0.0021 J
Selenium	7782-49-2	mg/L	4.2									0.0037 J											
Sulfate	14808-79-8	mg/L	NA	31.3	30.4	31.9	32.4	36.3	31.6	29.9	31.4	35.1	37.7	31.7	30.5	33.1	32.3	34.3	31.8	30.5	32.1	35.5	39.6
Thallium*	7440-28-0	mg/L	0.00047											0.000069 J			0.000037 J	0.000058 J		0.000065 J		0.000078 J	
Total Hardness as CaCO3	HARDNESS	mg/L	NA	203	204	206	206	214	209	205	200	214	214	204	205	206	212	215	207	211	206	223	225
Total Dissolved Solids	TDS	mg/L	NA	248	247	256	265	266	249	251	252	279	280	256	256	258	251	271	244	248	253	288	297

Notes:

* Constituent was not detected in any samples.
mg/L - milligrams per liter.
AWQC - Ambient Water Quality Criteria.
NA - Not Analyzed/Not Available.
CAS - Chemical Abstracts Service.
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Detected Concentration > AWQC.

(a) - Surface water samples collected in September 2017.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. Accessed November 2014.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

(c) - Value applies to inorganic form of arsenic only.

TABLE 5c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO HUMAN HEALTH AWQC SCREENING LEVELS -
TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Missouri River River Upstream					Missouri River River Adjacent								Missouri River River Downstream				
			AWQC (b)	S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-5D	S-MO-5S	S-MO-6D	S-MO-6S	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony*	7440-36-0	mg/L	0.64																		
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0036	0.0035	0.0035	0.0036	0.0035	0.0036	0.0036	0.0035	0.0035	0.0036	0.0036	0.0036	0.0035	0.0034	0.0036	0.0034	0.0035	0.0036
Barium	7440-39-3	mg/L	NA	0.117	0.117	0.113	0.118	0.114	0.118	0.118	0.115	0.115	0.118	0.116	0.116	0.117	0.113	0.115	0.114	0.116	0.116
Beryllium*	7440-41-7	mg/L	NA																		
Boron	7440-42-8	mg/L	NA	0.113	0.111	0.111	0.111	0.112	0.115	0.117	0.112	0.111	0.112	0.113	0.111	0.112	0.11	0.113	0.114	0.111	0.114
Cadmium*	7440-43-9	mg/L	NA																		
Calcium	7440-70-2	mg/L	NA	65.1	64.4	63.4	64.9	64.2	64.8	65.4	63.2	63.8	65.4	65.3	64.3	65	63	64.8	63.4	64.2	64.7
Chloride	16887-00-6	mg/L	NA	23.5	23.4	23.6	23.6	23.7	23.3	23.4	23.9	23.3	23.3	23.4	23.4	23.6	23.3	23.3	23.4	23.4	23.3
Chromium	7440-47-3	mg/L	NA		0.0012 J	0.00076 J	0.00099 J	0.00075 J	0.0011 J	0.0012 J	0.0013 J	0.00097 J	0.0011 J	0.00098 J	0.00073 J	0.00074 J	0.0013 J				0.00075 J
Cobalt	7440-48-4	mg/L	NA				0.00083 J				0.00086 J	0.00074 J									0.00087 J
Fluoride	16984-48-8	mg/L	NA	0.45	0.44	0.44	0.44	0.44	0.45	0.43	0.45	0.44	0.44	0.45	0.43	0.45	0.45	0.44	0.45	0.43	0.46
Lead	7439-92-1	mg/L	NA									0.0026 J		0.003 J						0.0028 J	
Lithium	7439-93-2	mg/L	NA	0.0435	0.044	0.0429	0.0441	0.0436	0.0442	0.0444	0.0422	0.0427	0.0431	0.0449	0.042	0.0423	0.042	0.0431	0.0427	0.0434	0.0435
Mercury*	7439-97-6	mg/L	NA																		
Molybdenum	7439-98-7	mg/L	NA	0.0031 J	0.0026 J	0.0028 J	0.0026 J	0.0027 J	0.003 J	0.0036 J	0.0026 J	0.003 J	0.0028 J	0.0028 J	0.0028 J	0.003 J	0.0035 J	0.0029 J	0.0036 J	0.0028 J	0.0031 J
Selenium	7782-49-2	mg/L	4.2	0.0042 J																	
Sulfate	14808-79-8	mg/L	NA	195	192	194	191	191	192	192	193	193	188	192	193	190	193	194	189	192	190
Thallium*	7440-28-0	mg/L	0.00047			0.000064 J			0.000047 J	0.000063 J		0.000037 J					0.000055 J				0.000064 J
Total Hardness as CaCO3	HARDNESS	mg/L	NA	266	263	259	265	262	266	267	259	260	267	267	263	265	258	265	259	262	264
Total Dissolved Solids	TDS	mg/L	NA	475	496	492	497	490	493	490	491	491	488	482	476	473	487	496	485	484	465

Notes:

* Constituent was not detected in any samples.
mg/L - milligrams per liter.
AWQC - Ambient Water Quality Criteria.
NA - Not Analyzed/Not Available.
CAS - Chemical Abstracts Service.
USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in September 2017.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. Accessed November 2014.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

(c) - Value applies to inorganic form of arsenic only.

TABLE 5d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO HUMAN HEALTH AWQC SCREENING LEVELS -
DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River Chute			Mississippi River Chute													Mississippi River Chute		
				River Upstream			River Adjacent													River Downstream		
			AWQC (b)	S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony*	7440-36-0	mg/L	0.64		0.0037 J																	
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0055	0.0053	0.0053	0.0021	0.0017	0.0016	0.0017	0.0017	0.0064	0.0061	0.0056	0.0072	0.0071	0.0065	0.0052	0.0053	0.0057	0.0021	0.002	0.0021
Barium	7440-39-3	mg/L	NA	0.185	0.192	0.191	0.0592	0.0558	0.0553	0.0564	0.0544	0.25	0.246	0.219	0.267	0.266	0.252	0.182	0.182	0.209	0.0599	0.0595	0.0583
Beryllium*	7440-41-7	mg/L	NA												0.00019 J	0.0002 J							0.00026 J
Boron	7440-42-8	mg/L	NA	0.755	0.769	0.769	0.039 J	0.0421 J	0.0431 J	0.0395 J	0.0406 J	0.805	0.796	0.715	0.853	0.849	0.812	0.652	0.657	0.734	0.0338 J	0.0351 J	0.0357 J
Cadmium*	7440-43-9	mg/L	NA																				
Calcium	7440-70-2	mg/L	NA	79.8	81.4	82.1	44.8	44.5	44.1	45.2	43.8	83	82.1	77.2	82.9	83.2	81	73.9	74.2	76.8	45.1	44.7	44
Chromium	7440-47-3	mg/L	NA									0.00087 J			0.00095 J	0.0016 J	0.0008 J			0.00075 J			
Cobalt	7440-48-4	mg/L	NA	0.00089 J	0.0012 J	0.0013 J		0.00078 J				0.001 J	0.0013 J	0.00074 J	0.00088 J		0.00098 J	0.0013 J					
Lead	7439-92-1	mg/L	NA		0.0031 J																		
Lithium	7439-93-2	mg/L	NA	0.0161	0.018	0.0197	0.0055 J	0.0056 J	0.0044 J	0.0059 J	0.0051 J	0.0218	0.0209	0.0189	0.0213	0.023	0.0229	0.0166	0.0166	0.0201	0.0054 J	0.0058 J	0.0067 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0524	0.0576	0.0561	0.0018 J	0.0026 J	0.0019 J	0.0022 J	0.002 J	0.064	0.0633	0.057	0.068	0.0685	0.0638	0.0478	0.0489	0.055	0.0019 J	0.0019 J	0.0023 J
Selenium	7782-49-2	mg/L	4.2		0.0061 J							0.0048 J	0.0046 J	0.0049 J	0.0052 J	0.0091 J	0.0062 J						
Silver*	7440-22-4	mg/L	NA																				
Thallium*	7440-28-0	mg/L	0.00047	0.000037 J						0.000039 J		0.000092 J	0.00014 J	0.000096 J	0.00011 J	0.00011 J	0.000096 J			0.0001 J	0.000055 J		

Notes:

* Constituent was not detected in any samples.
AWQC - Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
mg/L - milligrams per liter.
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Detected Concentration > AWQC.

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TABLE 5d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO HUMAN HEALTH AWQC SCREENING LEVELS -
DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River					Mississippi River										Mississippi River				
				River Upstream					River Adjacent										River Downstream				
			AWQC (b)	S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0016	0.0016	0.0015	0.0017	0.0016	0.0017	0.0015	0.0015	0.0018	0.0018	0.0016	0.0014	0.0016	0.0016	0.0016	0.0017	0.0016	0.0016	0.0018	0.0018
Barium	7440-39-3	mg/L	NA	0.0504	0.0417	0.0439	0.0447	0.0467	0.0525	0.042	0.0421	0.0453	0.0464	0.0508	0.0422	0.0429	0.0438	0.0457	0.0534	0.043	0.0475	0.047	0.049
Beryllium*	7440-41-7	mg/L	NA									0.00025 J		0.00018 J			0.00029 J	0.00032 J		0.00025 J			
Boron	7440-42-8	mg/L	NA	0.0332 J	0.0333 J	0.0372 J	0.0392 J	0.0476 J	0.0368 J	0.0329 J	0.0338 J	0.0489 J	0.0522 J	0.0374 J	0.0354 J	0.0398 J	0.0396 J	0.0409 J	0.0395 J	0.0391 J	0.0398 J	0.0559 J	0.0603 J
Cadmium*	7440-43-9	mg/L	NA																				
Calcium	7440-70-2	mg/L	NA	44.8	44.4	44.9	45.7	45.9	45	43.4	44.4	45.8	46.2	43.8	43.9	43.6	45.4	44.8	44.4	45	44.3	47.4	48
Chromium	7440-47-3	mg/L	NA													0.00097 J							
Cobalt	7440-48-4	mg/L	NA		0.0009 J		0.00091 J		0.0013 J	0.0013 J	0.00075 J		0.0012 J	0.00082 J		0.00078 J	0.0013 J	0.00091 J				0.00094 J	
Lead	7439-92-1	mg/L	NA																				
Lithium	7439-93-2	mg/L	NA	0.0058 J	0.0063 J	0.0054 J	0.005 J	0.0068 J	0.0041 J	0.0043 J	0.0051 J	0.0033 J	0.0037 J	0.004 J	0.0041 J	0.0041 J	0.0043 J	0.0048 J	0.0059 J	0.0052 J	0.0033 J	0.0043 J	0.0078 J
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0015 J	0.0016 J	0.0019 J	0.002 J	0.0014 J	0.0022 J	0.0019 J	0.0014 J	0.002 J	0.0018 J	0.0027 J	0.0021 J	0.0026 J	0.0018 J	0.0023 J	0.002 J	0.0019 J	0.0016 J	0.0031 J	0.0022 J
Selenium	7782-49-2	mg/L	4.2																	0.0036 J			
Silver*	7440-22-4	mg/L	NA																				
Thallium*	7440-28-0	mg/L	0.00047	0.000059 J																0.00004 J			0.000047 J

Notes:

* Constituent was not detected in any samples.

AWQC - Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Analyzed/Not Available.

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Detected Concentration > AWQC.

(a) - Surface water samples collected in September 2017.

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DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Missouri River					Missouri River								Missouri River				
				River Upstream					River Adjacent								River Downstream				
			AWQC (b)	S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-5D	S-MO-5S	S-MO-6D	S-MO-6S	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony*	7440-36-0	mg/L	0.64																		
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0034	0.0034	0.0032	0.0033	0.0033	0.0033	0.0034	0.0033	0.0032	0.0033	0.0033	0.0034	0.0032	0.0033	0.0034	0.0033	0.0032	0.0033
Barium	7440-39-3	mg/L	NA	0.108	0.11	0.108	0.109	0.109	0.11	0.11	0.107	0.106	0.109	0.107	0.108	0.108	0.112	0.107	0.111	0.107	0.109
Beryllium*	7440-41-7	mg/L	NA																		
Boron	7440-42-8	mg/L	NA	0.115	0.12	0.116	0.118	0.118	0.119	0.12	0.114	0.115	0.116	0.117	0.118	0.116	0.12	0.115	0.122	0.115	0.119
Cadmium*	7440-43-9	mg/L	NA																		
Calcium	7440-70-2	mg/L	NA	59.5	60.9	59.9	60.6	60.3	60.3	61.1	59.2	59.1	60	59.8	60	59.9	61.6	59.7	60.6	59.7	59.4
Chromium	7440-47-3	mg/L	NA																		0.00074 J
Cobalt	7440-48-4	mg/L	NA																		
Lead	7439-92-1	mg/L	NA																		
Lithium	7439-93-2	mg/L	NA	0.0422	0.0423	0.0435	0.0423	0.0417	0.0422	0.0422	0.0428	0.0412	0.0421	0.044	0.042	0.04	0.0441	0.0421	0.0446	0.0405	0.0437
Mercury*	7439-97-6	mg/L	NA																		
Molybdenum	7439-98-7	mg/L	NA	0.0039 J	0.004 J	0.0044 J	0.0036 J	0.0038 J	0.0037 J	0.0049 J	0.0037 J	0.004 J	0.0046 J	0.0036 J	0.0035 J	0.0038 J	0.0046 J	0.0038 J	0.0047 J	0.0032 J	0.0037 J
Selenium	7782-49-2	mg/L	4.2																		
Silver*	7440-22-4	mg/L	NA																		
Thallium*	7440-28-0	mg/L	0.00047			0.000063 J				0.000072 J		0.000037 J					0.000048 J				0.000075 J

Notes:

* Constituent was not detected in any samples.
AWQC - Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
mg/L - milligrams per liter.
NA - Not Analyzed/Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in September 2017.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. Accessed November 2014.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

(c) - Value applies to inorganic form of arsenic only.

TABLE 6a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Upstream					Mississippi River Adjacent										Mississippi River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0017	0.0015	0.0016	0.0022	0.0021	0.0016	0.0016	0.0016	0.0017	0.0015	0.0015	0.0016	0.0015	0.0017	0.0015	0.0018	0.0016	0.0015	0.0015	0.0016
Barium	7440-39-3	mg/L	NA	NA	0.0969	0.0937	0.0991	0.0966	0.0952	0.0901	0.0969	0.0932	0.0919	0.0767	0.0909	0.092	0.0904	0.0905	0.0908	0.108	0.0968	0.0861	0.0883	0.0868
Beryllium*	7440-41-7	mg/L	NA	NA																	0.00035 J			
Boron	7440-42-8	mg/L	NA	NA	0.0296 J	0.0276 J	0.0301 J	0.0285 J	0.0309 J	0.0313 J	0.0303 J	0.0289 J	0.0461 J	0.0437 J	0.0312 J	0.0286 J	0.0285 J	0.0366 J	0.0367 J	0.0338 J	0.0337 J	0.0273 J	0.0465 J	0.047 J
Cadmium	7440-43-9	mg/L	0.0043 (d)	0.0015 (d)											0.00058 J				0.00046 J					
Calcium	7440-70-2	mg/L	NA	NA	56	53.3	56	53.1	54.6	55	54.6	53.5	56.5	54.2	55.8	53	53.4	55.6	55.9	56.6	54.9	52.5	58.5	58
Chloride	16887-00-6	mg/L	860	230	22.7	22.2	22.4	25.2	24.5	22.5	23	22.6	40.7	38.4	22.6	24.1	23.1	32.8	32	23	23.2	22.6	41	40.9
Chromium	7440-47-3	mg/L	3.55 (c,d)	0.170 (c,d)	0.0023 J	0.0026 J	0.0029 J	0.003 J	0.0023 J		0.0029 J	0.0023 J	0.0032 J	0.0013 J	0.0016 J	0.0014 J	0.0019 J	0.0021 J	0.0017 J	0.003 J	0.0019 J	0.0021 J	0.0012 J	0.0016 J
Cobalt	7440-48-4	mg/L	NA	NA	0.0013 J	0.0016 J	0.0016 J	0.002 J	0.0018 J	0.0012 J	0.0023 J	0.0017 J	0.0018 J		0.0014 J	0.0016 J	0.0014 J	0.0014 J	0.0019 J	0.002 J	0.0021 J	0.0015 J	0.0013 J	0.0012 J
Fluoride	16984-48-8	mg/L	NA	NA	0.22	0.22	0.23	0.22	0.21	0.23	0.22	0.22	0.23	0.21 J	0.23	0.21	0.21	0.21	0.21	0.23	0.24	0.23	0.22	0.23
Lead	7439-92-1	mg/L	0.23 (d)	0.009 (d)	0.0047 J	0.0048 J	0.0055 J	0.0046 J	0.0034 J		0.005 J	0.0052 J	0.005 J	0.0034 J	0.0033 J	0.0045 J	0.0034 J	0.0046 J		0.0049 J	0.0038 J			0.004 J
Lithium	7439-93-2	mg/L	NA	NA	0.009 J	0.0089 J	0.0089 J	0.0088 J	0.0091 J	0.009 J	0.0091 J	0.0104	0.0089 J	0.0059 J	0.0092 J	0.0086 J	0.0104	0.0075 J	0.0085 J	0.0099 J	0.0089 J	0.0084 J	0.0074 J	0.0093 J
Mercury*	7439-97-6	mg/L	0.0016	0.001																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.001 J		0.00098 J	0.0011 J	0.0011 J	0.0011 J	0.0012 J	0.0011 J	0.0014 J	0.0018 J	0.0012 J		0.0013 J	0.0012 J	0.0012 J	0.0012 J	0.0015 J	0.001 J	0.0018 J	0.0018 J
Selenium*	7782-49-2	mg/L	NA	3.1																				
Sulfate	14808-79-8	mg/L	NA	NA	33.6	33	32.8	33.8	33.7	33.9	33.4	33.2	40.1	39.1	34	33.4	33.1	37.3	36.6	34.5	34	33.4	40.3	40.5
Thallium*	7440-28-0	mg/L	NA	NA																				
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	229	219	228	219	228	224	224	220	243	234	227	219	220	234	234	229	224	215	250	250
Total Dissolved Solids	TDS	mg/L	NA	NA	302	268	250	282	258	218	224	250	232 J	324	282	344	280	280	342	290	244	280	321	272

Notes:

Blank cells - Non-detect value.
J - Estimated value.
* Constituent was not detected in any samples.
mg/L - milligrams per liter.
AWQC - USEPA Ambient Water Quality Criteria.
NA - Not Available.
CAS - Chemical Abstracts Service.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in May 2018.

(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.

(c) - Value for trivalent chromium used.

(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 229 mg/L as CaCO3 used.

TABLE 6b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
AMEREN MISSOURI SIOUX ENERGY CENTER
ST. CHARLES COUNTY, MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Upstream					Mississippi River Adjacent										Mississippi River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	S2-MIR-10S	S2-MIR-11M	S2-MIR-11S	S2-MIR-12M	S2-MIR-12S	S2-MIR-4S	S2-MIR-5M	S2-MIR-5S	S2-MIR-6M	S2-MIR-6S	S2-MIR-7S	S2-MIR-8M	S2-MIR-8S	S2-MIR-9M	S2-MIR-9S	S2-MIR-1S	S2-MIR-2M	S2-MIR-2S	S2-MIR-3M	S2-MIR-3S
Antimony*	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0011	0.001	0.00096 J	0.0013	0.0014	0.0012	0.0011	0.0011	0.0011	0.0011 J	0.0011	0.0011	0.0011	0.0011	0.0011	0.0013	0.0012	0.0011	0.0012	0.0012
Barium	7440-39-3	mg/L	NA	NA	0.0698	0.0659	0.0645	0.0619	0.0614	0.0727	0.0666	0.067	0.0614	0.0604	0.0719	0.0629	0.0654	0.0632	0.0614	0.0757	0.0657	0.0679	0.0629	0.0652
Beryllium	7440-41-7	mg/L	NA	NA																				
Boron	7440-42-8	mg/L	NA	NA	0.0275 J	0.0278 J	0.0272 J	0.03 J	0.027 J	0.0323 J	0.0274 J	0.0299 J	0.0441 J	0.0427 J	0.0294 J	0.0271 J	0.0289 J	0.037 J	0.035 J	0.0315 J	0.0304 J	0.0305 J	0.0469 J	0.048 J
Cadmium*	7440-43-9	mg/L	0.0039 (d)	0.0013 (d)																				
Calcium	7440-70-2	mg/L	NA	NA	52.8	50.4	49.8	48.5	48.3	55.6	52.5	52.1	53.3	52.6	52.3	49.3	50.7	52.3	50.3	54.7	52	52.8	55.1	56.6
Chromium*	7440-47-3	mg/L	1.12 (c,d)	0.15 (c,d)																				
Cobalt*	7440-48-4	mg/L	NA	NA																				
Lead*	7439-92-1	mg/L	0.157 (d)	0.0061 (d)							0.0035 J													
Lithium	7439-93-2	mg/L	NA	NA	0.0075 J	0.009 J	0.0083 J	0.0071 J	0.007 J	0.008 J	0.0085 J	0.0077 J	0.0074 J	0.0065 J	0.0083 J	0.0069 J	0.0067 J	0.0072 J	0.0067 J	0.0088 J	0.0088 J	0.0081 J	0.0074 J	0.0057 J
Mercury*	7439-97-6	mg/L	0.0014	0.00077																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0012 J			0.001 J		0.0013 J	0.001 J	0.0011 J	0.0016 J	0.0014 J	0.0015 J	0.00098 J		0.0014 J	0.0015 J	0.0018 J	0.0017 J	0.0014 J	0.0016 J	0.0018 J
Selenium*	7782-49-2	mg/L	NA	NA																				
Thallium*	7440-28-0	mg/L	NA	NA																				

Notes:
Blank cells - Non-detect value.
J - Estimated value.
* Constituent was not detected in any samples.
mg/L - milligrams per liter.
AWQC - USEPA Ambient Water Quality Criteria.
NA - Not Available.
CAS - Chemical Abstracts Service.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in May 2018.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 229 mg/L as CaCO3 used.

TABLE 6c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Chute			Mississippi River Chute														Mississippi River Chute		
					River Upstream			River Adjacent														River Downstream		
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony	7440-36-0	mg/L	NA	NA													0.0037 J							
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0064	0.0062	0.0066	0.0025	0.002	0.002	0.002	0.0021	0.0072	0.0069	0.0062	0.0077	0.0078	0.0077	0.0066	0.006	0.0067	0.0024	0.0024	0.0023
Barium	7440-39-3	mg/L	NA	NA	0.204	0.2	0.199	0.0746	0.0695	0.0669	0.0705	0.0668	0.263	0.256	0.235	0.288	0.278	0.285	0.212	0.193	0.232	0.0677	0.065	0.065
Beryllium*	7440-41-7	mg/L	NA	NA									0.00023 J	0.00035 J		0.0004 J								
Boron	7440-42-8	mg/L	NA	NA	0.75	0.746	0.718	0.0402 J	0.0461 J	0.0379 J	0.041 J	0.034 J	0.805	0.782	0.705	0.859	0.839	0.838	0.651	0.654	0.715	0.0361 J	0.0351 J	0.0358 J
Cadmium*	7440-43-9	mg/L	0.0046 (d)	0.00163 (d)																				
Calcium	7440-70-2	mg/L	NA	NA	80.8	84.8	82	44.6	45	45.2	45.3	44.6	82.5	81.8	78	84.3	83.2	84	76.2	74.4	77.5	44.3	44.4	44
Chloride	16887-00-6	mg/L	860	230	24.7	24.9	25	23	22.9	23.2	22.9	23.4	23.3	23.5	23.5	23.4	23.4	23.3	24	24	24	23.2	23.1	23.2
Chromium	7440-47-3	mg/L	3.8 (c,d)	0.181 (c,d)	0.0011 J		0.0013 J	0.0017 J	0.0011 J	0.00079 J		0.0015 J	0.002 J	0.0021 J	0.0018 J	0.0021 J	0.0027 J	0.0028 J	0.0024 J	0.0014 J	0.0024 J	0.00086 J	0.0012 J	0.0013 J
Cobalt	7440-48-4	mg/L	NA	NA	0.0011 J			0.0012 J	0.0017 J		0.0014 J		0.0011 J	0.001 J		0.0012 J	0.0015 J	0.0011 J	0.0015 J	0.0011 J	0.0016 J	0.0012 J	0.0012 J	0.0013 J
Fluoride	16984-48-8	mg/L	NA	NA	0.56	0.58	0.57	0.17 J	0.17 J	0.17 J	0.17 J	0.17 J	0.59	0.58	0.54	0.63	0.6	0.61	0.51	0.51	0.55	0.17 J	0.16 J	0.16 J
Lead	7439-92-1	mg/L	0.258 (d)	0.0101 (d)		0.0044 J	0.0053			0.0032 J			0.0026 J			0.0036 J	0.0033 J				0.0025 J			
Lithium	7439-93-2	mg/L	NA	NA	0.0186	0.0172	0.018	0.0068 J	0.007 J	0.0046 J	0.006 J	0.0049 J	0.0222	0.0214	0.0211	0.024	0.0214	0.0241	0.0174	0.0178	0.0206	0.0058 J	0.0067 J	0.0067 J
Mercury*	7439-97-6	mg/L	0.0016	0.001																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0527	0.0516	0.0499	0.0018 J	0.0032 J	0.0017 J	0.0018 J	0.0017 J	0.0633	0.0635	0.0553	0.0683	0.0667	0.0656	0.0481	0.0501	0.0546	0.0015 J	0.0015 J	0.0014 J
Selenium	7782-49-2	mg/L	NA	3.1									0.0093 J	0.0054 J	0.0055 J	0.0077 J	0.0069 J	0.0067 J	0.0039 J	0.0045 J	0.0047 J			
Sulfate	14808-79-8	mg/L	NA	NA	143	144	144	31.3	32	32.3	31.7	31.5	162	157	143	177	173	169	135	133	146	30.2	30.2	30
Thallium	7440-28-0	mg/L	NA	NA	0.000071 J	0.000044 J	0.000058 J						0.0001 J	0.00015 J	0.0001 J	0.00015 J	0.00012 J	0.0002 J	0.000085 J	0.000046 J	0.000083 J			
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	312	319	308	204	206	205	208	203	312	311	300	318	313	316	298	292	299	204	204	203
Total Dissolved Solids	TDS	mg/L	NA	NA	467	451	444	254	262	242	256	250	472	460	444	480	496	483	418	419	445	259	256	253

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

TABLE 6c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River					Mississippi River										Mississippi River				
					River Upstream					River Adjacent										River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0019	0.0018	0.0016	0.0019	0.0019	0.0021	0.0018	0.0017	0.0021	0.002	0.0019	0.0019	0.0017	0.002	0.0019	0.002	0.0019	0.0018	0.0022	0.0022
Barium	7440-39-3	mg/L	NA	NA	0.0599	0.0628	0.0566	0.064	0.0582	0.066	0.0607	0.0548	0.0642	0.0609	0.0596	0.0614	0.0557	0.0687	0.0584	0.0681	0.0646	0.0582	0.07	0.0668
Beryllium*	7440-41-7	mg/L	NA	NA							0.00023 J			0.00022 J					0.00024 J				0.00027 J	
Boron	7440-42-8	mg/L	NA	NA	0.0271 J	0.033 J	0.0274 J	0.0404 J	0.0412 J	0.0391 J	0.0362 J	0.0328 J	0.0492 J	0.0513 J	0.0279 J	0.0348 J	0.0303 J	0.0404 J	0.0369 J	0.0404 J	0.0385 J	0.0387 J	0.0534 J	0.0599 J
Cadmium*	7440-43-9	mg/L	0.0046 (d)	0.00163 (d)																				
Calcium	7440-70-2	mg/L	NA	NA	44.5	44	45	44.4	47	44.6	44.4	42.5	46.7	46	44.8	44.4	45.2	46	47.2	44.7	46.1	44.3	48.9	48.5
Chloride	16887-00-6	mg/L	860	230	23.9	23.2	24.9	26.5	31.6	23.7	22.8	24	31.1	34.1	24.1	23.5	26.2	26.2	28.4	23.9	23.5	23.7	31.6	36
Chromium	7440-47-3	mg/L	3.8 (c,d)	0.181 (c,d)		0.00081 J		0.00088 J		0.0013 J	0.00088 J		0.0011 J	0.0011 J		0.00081 J		0.00093 J		0.0018 J	0.0013 J	0.0013 J	0.0015 J	0.0015 J
Cobalt	7440-48-4	mg/L	NA	NA		0.00095 J				0.0016 J	0.0018 J	0.001 J	0.0012 J	0.00077 J		0.00088 J		0.00091 J		0.0013 J	0.0013 J		0.0011 J	0.0014 J
Fluoride	16984-48-8	mg/L	NA	NA	0.17 J	0.16 J	0.17 J	0.17 J	0.18 J	0.17 J	0.16 J	0.16 J	0.17 J	0.18 J	0.17 J	0.16 J	0.17 J	0.18 J	0.17 J	0.17 J	0.16 J	0.17 J	0.18 J	0.19 J
Lead	7439-92-1	mg/L	0.258 (d)	0.0101 (d)	0.0033 J		0.0024 J		0.0026 J				0.003 J						0.0025 J	0.0025 J				
Lithium	7439-93-2	mg/L	NA	NA	0.0031 J	0.005 J		0.006 J	0.0033 J	0.0063 J	0.0055 J	0.0053 J	0.0056 J	0.0047 J		0.0056 J	0.003 J	0.0047 J		0.0048 J	0.0079 J	0.0053 J	0.0049 J	0.0063 J
Mercury*	7439-97-6	mg/L	0.0016	0.001																				
Molybdenum	7439-98-7	mg/L	NA	NA		0.0018 J			0.0017 J	0.0019 J	0.0023 J	0.002 J	0.0021 J	0.0021 J	0.0013 J			0.0014 J	0.0018 J	0.002 J	0.0021 J	0.0022 J	0.0023 J	0.0021 J
Selenium	7782-49-2	mg/L	NA	3.1									0.0037 J											
Sulfate	14808-79-8	mg/L	NA	NA	31.3	30.4	31.9	32.4	36.3	31.6	29.9	31.4	35.1	37.7	31.7	30.5	33.1	32.3	34.3	31.8	30.5	32.1	35.5	39.6
Thallium	7440-28-0	mg/L	NA	NA											0.000069 J			0.000037 J	0.000058 J		0.000065 J		0.000078 J	
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	203	204	206	206	214	209	205	200	214	214	204	205	206	212	215	207	211	206	223	225
Total Dissolved Solids	TDS	mg/L	NA	NA	248	247	256	265	266	249	251	252	279	280	256	256	258	251	271	244	248	253	288	297

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

TABLE 6c
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS -
TOTAL (UNFILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Missouri River					Missouri River								Missouri River				
					River Upstream					River Adjacent								River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-6D	S-MO-6S	S-MO-7S	S-MO-8D	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony	7440-36-0	mg/L	NA	NA																		
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0036	0.0035	0.0035	0.0036	0.0035	0.0036	0.0035	0.0036	0.0034	0.0035	0.0036	0.0036	0.0035	0.0034	0.0036	0.0034	0.0035	0.0036
Barium	7440-39-3	mg/L	NA	NA	0.117	0.117	0.113	0.118	0.114	0.118	0.115	0.118	0.114	0.116	0.116	0.116	0.117	0.113	0.115	0.114	0.116	0.116
Beryllium*	7440-41-7	mg/L	NA	NA																		
Boron	7440-42-8	mg/L	NA	NA	0.113	0.111	0.111	0.111	0.112	0.115	0.111	0.112	0.11	0.113	0.113	0.111	0.112	0.11	0.113	0.114	0.111	0.114
Cadmium*	7440-43-9	mg/L	0.0046 (d)	0.00163 (d)																		
Calcium	7440-70-2	mg/L	NA	NA	65.1	64.4	63.4	64.9	64.2	64.8	63.8	65.4	63.4	65	65.3	64.3	65	63	64.8	63.4	64.2	64.7
Chloride	16887-00-6	mg/L	860	230	23.5	23.4	23.6	23.6	23.7	23.3	23.3	23.3	23.9	23.5	23.4	23.4	23.6	23.3	23.3	23.4	23.4	23.3
Chromium	7440-47-3	mg/L	3.8 (c,d)	0.181 (c,d)		0.0012 J	0.00076 J	0.00099 J	0.00075 J	0.0011 J	0.00097 J	0.0011 J		0.00095 J	0.00098 J	0.00073 J	0.00074 J	0.0013 J				0.00075 J
Cobalt	7440-48-4	mg/L	NA	NA				0.00083 J			0.00074 J		0.00087 J	0.00085 J								0.00087 J
Fluoride	16984-48-8	mg/L	NA	NA	0.45	0.44	0.44	0.44	0.44	0.45	0.44	0.44	0.45	0.44	0.45	0.43	0.45	0.45	0.44	0.45	0.43	0.46
Lead	7439-92-1	mg/L	0.258 (d)	0.0101 (d)							0.0026 J				0.003 J						0.0028 J	
Lithium	7439-93-2	mg/L	NA	NA	0.0435	0.044	0.0429	0.0441	0.0436	0.0442	0.0427	0.0431	0.042	0.0428	0.0449	0.042	0.0423	0.042	0.0431	0.0427	0.0434	0.0435
Mercury*	7439-97-6	mg/L	0.0016	0.001																		
Molybdenum	7439-98-7	mg/L	NA	NA	0.0031 J	0.0026 J	0.0028 J	0.0026 J	0.0027 J	0.003 J	0.003 J	0.0028 J	0.0031 J	0.003 J	0.0028 J	0.0028 J	0.003 J	0.0035 J	0.0029 J	0.0036 J	0.0028 J	0.0031 J
Selenium	7782-49-2	mg/L	NA	3.1	0.0042 J																	
Sulfate	14808-79-8	mg/L	NA	NA	195	192	194	191	191	192	193	188	192	196	192	193	190	193	194	189	192	190
Thallium	7440-28-0	mg/L	NA	NA			0.000064 J			0.000047 J	0.000037 J			0.000045 J				0.000055 J				0.000064 J
Total Hardness as CaCO3	HARDNESS	mg/L	NA	NA	266	263	259	265	262	266	260	267	259	265	267	263	265	258	265	259	262	264
Total Dissolved Solids	TDS	mg/L	NA	NA	475	496	492	497	490	493	491	488	478	496	482	476	473	487	496	485	484	465

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

TABLE 6d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO
ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Chute			Mississippi River Chute														Mississippi River Chute		
					River Upstream			River Adjacent														River Downstream		
			USEPA Aquatic Life AWQC Freshwater Acute (c)	USEPA Aquatic Life AWQC Freshwater Chronic (c)	S-MIO-16	S-MIO-17	S-MIO-18	S-MIO-4	S-MIO-5	S-MIO-5D	S-MIO-6	S-MIO-6D	S-MIO-7	S-MIO-8	S-MIO-9	S-MIO-10	S-MIO-11	S-MIO-12	S-MIO-13	S-MIO-14	S-MIO-15	S-MIO-1	S-MIO-2	S-MIO-3
Antimony*	7440-36-0	mg/L	NA	NA		0.0037 J																		
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0055	0.0053	0.0053	0.0021	0.0017	0.0016	0.0017	0.0017	0.0064	0.0061	0.0056	0.0072	0.0071	0.0065	0.0052	0.0053	0.0057	0.0021	0.002	0.0021
Barium	7440-39-3	mg/L	NA	NA	0.185	0.192	0.191	0.0592	0.0558	0.0553	0.0564	0.0544	0.25	0.246	0.219	0.267	0.266	0.252	0.182	0.182	0.209	0.0599	0.0595	0.0583
Beryllium*	7440-41-7	mg/L	NA	NA												0.00019 J	0.0002 J							0.00026 J
Boron	7440-42-8	mg/L	NA	NA	0.755	0.769	0.769	0.039 J	0.0421 J	0.0431 J	0.0395 J	0.0406 J	0.805	0.796	0.715	0.853	0.849	0.812	0.652	0.657	0.734	0.0338 J	0.0351 J	0.0357 J
Cadmium*	7440-43-9	mg/L	0.0042 (b)	0.00142 (b)																				
Calcium	7440-70-2	mg/L	NA	NA	79.8	81.4	82.1	44.8	44.5	44.1	45.2	43.8	83	82.1	77.2	82.9	83.2	81	73.9	74.2	76.8	45.1	44.7	44
Chromium	7440-47-3	mg/L	1.19 (c,d)	0.155 (c,d)									0.00087 J			0.00095 J	0.0016 J	0.0008 J			0.00075 J			
Cobalt	7440-48-4	mg/L	NA	NA	0.00089 J	0.0012 J	0.0013 J		0.00078 J				0.001 J	0.0013 J	0.00074 J	0.00088 J		0.00098 J	0.0013 J					
Lead	7439-92-1	mg/L	0.170 (b)	0.0066 (b)		0.0031 J																		
Lithium	7439-93-2	mg/L	NA	NA	0.0161	0.018	0.0197	0.0055 J	0.0056 J	0.0044 J	0.0059 J	0.0051 J	0.0218	0.0209	0.0189	0.0213	0.023	0.0229	0.0166	0.0166	0.0201	0.0054 J	0.0058 J	0.0067 J
Mercury*	7439-97-6	mg/L	0.0014	0.00077																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0524	0.0576	0.0561	0.0018 J	0.0026 J	0.0019 J	0.0022 J	0.002 J	0.064	0.0633	0.057	0.068	0.0685	0.0638	0.0478	0.0489	0.055	0.0019 J	0.0019 J	0.0023 J
Selenium	7782-49-2	mg/L	NA	NA		0.0061 J							0.0048 J	0.0046 J	0.0049 J	0.0052 J	0.0091 J	0.0062 J						
Thallium	7440-28-0	mg/L	NA	NA	0.000037 J						0.000039 J		0.000092 J	0.00014 J	0.000096 J	0.00011 J	0.00011 J	0.000096 J			0.0001 J	0.000055 J		

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
(b) - USEPA National Recommended Water Quality Criteria.
USEPA Office of Water and Office of Science and Technology.
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

TABLE 6d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO
ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River					Mississippi River										Mississippi River				
					River Upstream					River Adjacent										River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (c)	USEPA Aquatic Life AWQC Freshwater Chronic (c)	S-MIR-10S	S-MIR-11D	S-MIR-11S	S-MIR-12D	S-MIR-12S	S-MIR-4S	S-MIR-5D	S-MIR-5S	S-MIR-6D	S-MIR-6S	S-MIR-7S	S-MIR-8D	S-MIR-8S	S-MIR-9D	S-MIR-9S	S-MIR-1S	S-MIR-2D	S-MIR-2S	S-MIR-3D	S-MIR-3S
Antimony*	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0016	0.0016	0.0015	0.0017	0.0016	0.0017	0.0015	0.0015	0.0018	0.0018	0.0016	0.0014	0.0016	0.0016	0.0016	0.0017	0.0016	0.0016	0.0018	0.0018
Barium	7440-39-3	mg/L	NA	NA	0.0504	0.0417	0.0439	0.0447	0.0467	0.0525	0.042	0.0421	0.0453	0.0464	0.0508	0.0422	0.0429	0.0438	0.0457	0.0534	0.043	0.0475	0.047	0.049
Beryllium*	7440-41-7	mg/L	NA	NA									0.00025 J		0.00018 J			0.00029 J	0.00032 J		0.00025 J			
Boron	7440-42-8	mg/L	NA	NA	0.0332 J	0.0333 J	0.0372 J	0.0392 J	0.0476 J	0.0368 J	0.0329 J	0.0338 J	0.0489 J	0.0522 J	0.0374 J	0.0354 J	0.0398 J	0.0396 J	0.0409 J	0.0395 J	0.0391 J	0.0398 J	0.0559 J	0.0603 J
Cadmium*	7440-43-9	mg/L	0.0042 (b)	0.00142 (b)																				
Calcium	7440-70-2	mg/L	NA	NA	44.8	44.4	44.9	45.7	45.9	45	43.4	44.4	45.8	46.2	43.8	43.9	43.6	45.4	44.8	44.4	45	44.3	47.4	48
Chromium	7440-47-3	mg/L	1.19 (c,d)	0.155 (c,d)													0.00097 J							
Cobalt	7440-48-4	mg/L	NA	NA		0.0009 J		0.00091 J		0.0013 J	0.0013 J	0.00075 J		0.0012 J	0.00082 J		0.00078 J	0.0013 J	0.00091 J				0.00094 J	
Lead	7439-92-1	mg/L	0.170 (b)	0.0066 (b)																				
Lithium	7439-93-2	mg/L	NA	NA	0.0058 J	0.0063 J	0.0054 J	0.005 J	0.0068 J	0.0041 J	0.0043 J	0.0051 J	0.0033 J	0.0037 J	0.004 J	0.0041 J	0.0041 J	0.0043 J	0.0048 J	0.0059 J	0.0052 J	0.0033 J	0.0043 J	0.0078 J
Mercury*	7439-97-6	mg/L	0.0014	0.00077																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0015 J	0.0016 J	0.0019 J	0.002 J	0.0014 J	0.0022 J	0.0019 J	0.0014 J	0.002 J	0.0018 J	0.0027 J	0.0021 J	0.0026 J	0.0018 J	0.0023 J	0.002 J	0.0019 J	0.0016 J	0.0031 J	0.0022 J
Selenium	7782-49-2	mg/L	NA	NA																	0.0036 J			
Thallium	7440-28-0	mg/L	NA	NA	0.000059 J																0.00004 J			0.000047 J

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
USEPA - United States Environmental Protection Agency.

Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
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http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

TABLE 6d
COMPARISON OF SEPTEMBER 2017 SURFACE WATER RESULTS TO
ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
SIOUX ENERGY CENTER, ST CHARLES COUNTY, WEST ALTON, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Missouri River					Missouri River										Missouri River				
					River Upstream					River Adjacent										River Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (c)	USEPA Aquatic Life AWQC Freshwater Chronic (c)	S-MO-10S	S-MO-11D	S-MO-11S	S-MO-12D	S-MO-12S	S-MO-4S	S-MO-5D	S-MO-5S	S-MO-6D	S-MO-6S	S-MO-7S	S-MO-8D	S-MO-8S	S-MO-9D	S-MO-9S	S-MO-1S	S-MO-2D	S-MO-2S	S-MO-3D	S-MO-3S
Antimony*	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0034	0.0034	0.0032	0.0033	0.0033	0.0033	0.0034	0.0033	0.0032	0.0033	0.0032	0.0033	0.0033	0.0034	0.0032	0.0033	0.0034	0.0033	0.0032	0.0033
Barium	7440-39-3	mg/L	NA	NA	0.108	0.11	0.108	0.109	0.109	0.11	0.11	0.107	0.106	0.109	0.109	0.109	0.107	0.108	0.108	0.112	0.107	0.111	0.107	0.109
Beryllium*	7440-41-7	mg/L	NA	NA																				
Boron	7440-42-8	mg/L	NA	NA	0.115	0.12	0.116	0.118	0.118	0.119	0.12	0.114	0.115	0.116	0.117	0.118	0.117	0.118	0.116	0.12	0.115	0.122	0.115	0.119
Cadmium*	7440-43-9	mg/L	0.0042 (b)	0.00142 (b)																				
Calcium	7440-70-2	mg/L	NA	NA	59.5	60.9	59.9	60.6	60.3	60.3	61.1	59.2	59.1	60	60.8	60.7	59.8	60	59.9	61.6	59.7	60.6	59.7	59.4
Chromium	7440-47-3	mg/L	1.19 (c,d)	0.155 (c,d)																				0.00074 J
Cobalt	7440-48-4	mg/L	NA	NA																				
Lead	7439-92-1	mg/L	0.170 (b)	0.0066 (b)																				
Lithium	7439-93-2	mg/L	NA	NA	0.0422	0.0423	0.0435	0.0423	0.0417	0.0422	0.0422	0.0428	0.0412	0.0421	0.0432	0.0424	0.044	0.042	0.04	0.0441	0.0421	0.0446	0.0405	0.0437
Mercury*	7439-97-6	mg/L	0.0014	0.00077																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0039 J	0.004 J	0.0044 J	0.0036 J	0.0038 J	0.0037 J	0.0049 J	0.0037 J	0.004 J	0.0046 J	0.0038 J	0.0038 J	0.0036 J	0.0035 J	0.0038 J	0.0046 J	0.0038 J	0.0047 J	0.0032 J	0.0037 J
Selenium	7782-49-2	mg/L	NA	NA																				
Thallium	7440-28-0	mg/L	NA	NA			0.000063 J				0.000072 J		0.000037 J							0.000048 J				0.000075 J

Notes:
Blank cells - Non-detect value.
* Constituent was not detected in any samples.
AWQC - USEPA Ambient Water Quality Criteria.
CAS - Chemical Abstracts Service.
J - Estimated value.
mg/L - milligrams per liter.
NA - Not Available.
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Detected Concentration> USEPA Aquatic Life AWQC Chronic.
Detected Concentration> USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in September 2017.
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Total values provided. Values adjusted for site-specific hardness - see note (d).
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(c) - Value for trivalent chromium used.
(d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Mississippi and Missouri River of 247 mg/L as CaCO3 used.

APPENDIX B

What You Need to Know About Molybdenum

WHAT YOU NEED TO KNOW ABOUT MOLYBDENUM

Molybdenum is the one constituent that is present in at least one groundwater sample at each of the four Ameren energy centers in Missouri above the screening level used by the U.S. Environmental Protection Agency (USEPA) under the Coal Combustion Residuals (CCR) Rule. The purpose of this fact sheet is to provide information on molybdenum so that data can be considered in context. There is no public exposure to groundwater at the Ameren energy centers and concentration levels of molybdenum in adjacent surface waters are all well below health-based regulatory standards.

SOURCES OF INFORMATION ON MOLYBDENUM

Molybdenum had been evaluated by regulatory and health agencies in the U.S. As discussed below, molybdenum is an essential nutrient for humans, and the Institute of Medicine of the U.S. National Academy of Sciences (NAS) has provided recommended daily allowances and tolerable upper limits to be used as guidelines for vitamins and supplements and other exposures (NAS, 2001).

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency within the U.S. Department of Health and Human Services. The ATSDR Toxicological Profile for Molybdenum (ATSDR, 2017) provides a comprehensive summary and interpretation of available toxicological and epidemiological information on molybdenum and provides information on the naturally occurring levels in our environment and in our diet.

The U.S. Environmental Protection Agency (USEPA) published an oral toxicity value for molybdenum in 1992 (USEPA, 1992); this value serves as the basis for the tapwater screening level for molybdenum of 0.1 milligrams per liter (mg/L) or 100 micrograms per liter (ug/L) that was included in the Phase 1 Part update to the CCR Rule (USEPA, 2018a).

MOLYBDENUM IS NATURALLY OCCURRING AND AN ESSENTIAL NUTRIENT FOR PLANTS AND HUMANS

Molybdenum is a naturally occurring trace element that can be found extensively in nature. Biologically, molybdenum plays an important role as a micronutrient in plants and animals, including humans.

Molybdenum in Our Natural Environment

Molybdenum naturally accumulates in poorly drained soils and soils with high organic content (for example, peat bogs and wetlands). It is also present at high concentrations in “black shales,” which are shale deposits with high organic content. The U.S. Geological Survey (USGS, 2013) reports that the average concentration in U.S. soils is approximately 1 milligram per kilogram of soil (mg/kg). USGS (2011) estimates the median concentration of molybdenum in groundwater is 0.001 milligrams per liter (mg/L), with most concentrations below 0.008 mg/L.

Molybdenum in Our Diet

Molybdenum is considered an essential nutrient or trace element for living beings. It is required in several mammalian enzyme systems and is present in most adult multi-vitamins. A deficiency syndrome has only been seen in people with a genetic defect that prevents the synthesis of a specific enzyme for which molybdenum is a cofactor. The deficiency leads to severe neurological damage and early death.

Because it is present in soils, it is also present in our diet. Food derived from above ground plants, such as legumes, leafy vegetables, and cauliflower generally has a relatively higher concentration of molybdenum in comparison to food from tubers or animals. Beans, cereal grains, leafy vegetables, legumes, liver, and milk are reported as the richest sources of molybdenum in the average diet (ATSDR, 2017). The amount of molybdenum in plants varies according to the amount in the soil. The National Academy of Sciences (NAS) has estimated that the average dietary intakes of molybdenum by adult men and women are 0.109 and 0.076 milligrams per day (mg/day), respectively. A study of the dietary intake of adult residents in Denver, Colorado reported a mean molybdenum ingestion rate of 180 g/day (range 120–240 g/day) (ATSDR, 2017).

Molybdenum for Health

How Much Do You Need - Daily Allowance:

The Institute of Medicine of the NAS sets dietary intake values for essential nutrients. The recommended dietary allowance (RDA) for a nutrient is "the average daily dietary nutrient intake level sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) health individuals" (NAS, 2001). The RDA for molybdenum for adults set by the NAS in 2001 is 0.045 milligram per day (mg/day) and is based on the amount of molybdenum needed to achieve a steady healthy balance in the body for the majority of the population.

How Much is Too Much - Upper Limits:

In addition to the RDA, the NAS also defines a Tolerable Upper Intake Level (UL) for essential nutrients. The UL is "the highest average daily nutrient intake level that is likely to pose no risk of adverse health effects to almost all individuals in the general population." Thus, the RDA is a level that is considered to be sufficient for the health of the general population, while intake can be as high as the UL and pose no adverse health effects.

The UL for molybdenum set by the NAS is 2 mg/day. This level is based on an evaluation of the potential toxicity of molybdenum at high levels of intake. The most sensitive effect in the literature is associated with reproductive outcomes in rats, and the study was used to develop an oral toxicity value for humans of 0.03 milligrams of molybdenum ingested per day per kilogram of body weight (mg/kg-day). This value is used with an average adult body weight of 68-70 kg (154 lbs) to set the UL[1].

[1] The oral toxicity value identifies a level of intake in terms of milligrams of constituent per kilogram of body weight per day (mg/kg-day) that is considered to be safe for daily exposure for a lifetime. The oral toxicity value is used to calculate a safe drinking water level as follows: if the oral toxicity value is 0.03 mg/kg-day, and a 70 kg adult that consumes 2 liters of water per day, then the safe drinking water level = (0.03 mg/kg-day) x (70 kg) ÷ (2 liters water/day) = 1.05 milligrams per liter (mg/L).

USEPA'S ORAL TOXICITY VALUE FOR MOLYBDENUM

USEPA developed a lower oral toxicity value for molybdenum of 0.005 mg/kg-day (USEPA, 1992) based on a 1962 study of a small population (52 exposure subjects) in Armenia that had a high level of molybdenum in their diet. This population had high levels of uric acid and experienced gout. The findings from the Armenian study have not been replicated, and other regulatory bodies such as the NAS and ATSDR have rejected the study due to its many deficiencies. [It is likely that the observance of gout in the Armenian population had some other cause.]

The NAS concluded that there were "serious methodological difficulties with the [Armenian] study" and noted that no other studies in humans or animals have replicated this effect. The NAS toxicity value is 0.03 mg/kg-day, six-fold higher than the USEPA value. Based on the NAS toxicity value and USEPA assumptions (for body weight and drinking water intake) results in a calculated safe drinking water level of 0.6 mg/L or 600 ug/L.

ATSDR noted the study of the Armenian population was not considered suitable for derivation of a chronic-duration oral toxicity value for molybdenum due to deficiencies in the control group size and composition, and a lack of controlling for confounders, such as diet and alcohol, that could affect the results. ATSDR developed an oral toxicity value of 0.008 mg/kg-day, using the same study reproductive outcomes in rats as the NAS, but applying different assumptions, most notably a 3-fold higher uncertainty factor. Based on the ATSDR toxicity value and USEPA assumptions (for body weight and drinking water intake) results in a calculated safe drinking water level of 0.16 mg/L or 160 ug/L.

MOLYBDENUM UNDER THE CCR RULE

When the CCR Rule was published in 2015, groundwater standards were provided only for those Appendix IV constituents that have primary drinking water standards published by the USEPA under the Safe Drinking Water Act – values known as MCLs or maximum contaminant levels. Molybdenum does not have an MCL[2]. In a subsequent 2018 CCR rule-making, USEPA designated a health-based groundwater protection standard for molybdenum of 0.1 mg/L or 100 ug/L. That is the value used to evaluate groundwater at the Ameren facilities. This level is very conservative and could be much higher and still protective of human health, as described above. [Note that in its March 3, 2019 report the Environmental Integrity Project used a screening level for molybdenum of 0.04 mg/L (or 40 ug/L), which is not the level USEPA has required in the CCR Rule.]

However, based on the USEPA toxicity value, the drinking water levels USEPA has developed for molybdenum are:

[2] USEPA is in the process of gathering information on the occurrence of molybdenum in public drinking water systems. The decision to develop an MCL (which is a multi-year process) is based on occurrence in public drinking water systems, the severity of adverse health effects, whether the constituent is present in public drinking water systems at levels of public health concern, and whether regulation would provide a meaningful opportunity for health risk reduction. No decision has yet been made as to whether molybdenum will be a candidate for the development of a drinking standard. Note that when USEPA included molybdenum for public water supply testing, it cited USEPA 1992, ATSDR 2017, and NAS 2001 as toxicity references. No mention was made of the differences in toxicity studies used or the values developed.

- 0.1 mg/L – The USEPA tapwater value in its Regional Screening Level (RSL) table and the value identified by USEPA for the CCR Rule (USEPA, 2018b). This is the value USEPA uses in the CCR Rule (USEPA, 2018a).
- 0.2 mg/L – The USEPA Office of Water value for the Drinking Water Equivalent Level (DWEL), which is a *lifetime exposure* concentration protective of adverse, non-cancer health effects, that assumes all of the exposure to a constituent is from drinking water (USEPA, 2018c).
- 0.04 mg/L – The USEPA Office of Water value for the Health Advisory Level (HA), which is based on the DWEL, but using a default assumption that only 20% of intake can come from water (USEPA, 2018c).

Therefore, drinking water concentrations of molybdenum up to 0.2 mg/L to are expected to be **without** adverse health effects. Based on the NAS review, daily exposure to drinking water concentrations of molybdenum up to 0.6 mg/L would be **without** adverse health effects.

WHAT THIS MEANS FOR THE AMEREN ENERGY CENTERS

This information from the NAS has been used to evaluate the levels of molybdenum in groundwater at the Ameren Energy Centers and in nearby surface waters. A total of 930 groundwater and surface water samples were collected from the four energy centers. The concentration levels in approximately 866 samples were below the screening level based on the National Academy of Science Tolerable Upper Intake Level (UL), while 241 are above the GWPS established by USEPA in the CCR Rule.

	Labadie	Meramec	Rush Island	Sioux
Groundwater				
Number of Samples	208	88	77	244
Molybdenum greater than CCR GWPS of 0.1 mg/L (a)	81	35	38	77
Molybdenum greater than NAS standard of 0.6 mg/L (b)	3	1	11	49
Surface Water				
Number of Samples	67	74	50	80
Molybdenum greater than 0.1 mg/L (a)	0	0	0	0

Notes:
mg/L - milligrams per liter.
(a) - Drinking water-based groundwater protection standard specified in the Coal Combustion Residuals Rule.
(b) - Alternative health-protective drinking water screening level based on the National Academy of Sciences review of molybdenum.

The groundwater results were collected from monitoring wells placed as close as practical to the ash basins' boundaries and provide near-source groundwater monitoring results. The groundwater downgradient of each of the Ameren ash basins is not used as a source of drinking water. Deep bedrock groundwater used as drinking water in the vicinity of Labadie and in the vicinity of Rush Island was sampled and demonstrated no impacts from CCR.

Surface water adjacent to each of the energy centers was sampled and all results for molybdenum in surface water are well below the USEPA drinking water screening level of 0.1 mg/L.

Thus, although there are some results for molybdenum in groundwater that are above the USEPA drinking water screening level, the groundwater at these facilities is not used as a source of drinking water, and molybdenum is not present in any of the adjacent water bodies above the drinking water screening level. These results confirm that molybdenum does not pose a risk to human health or the environment at any of the Ameren facilities.

REFERENCES

ATSDR. 2017. Toxicological Profile for Molybdenum. Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services. Available at: https://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=1482&tid=289

NAS. 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Institute of Medicine. National Academy of Sciences. 2001. National Academy Press. Available at: http://www.nap.edu/catalog/10026.html

USEPA. 1992. Chemical Assessment Summary for Molybdenum. Integrated Risk Information System (IRIS). National Center for Environmental Assessment. U.S. Environmental Protection Agency. Available at: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?&substance_nmbr=425

USEPA. 2018a. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One). Available at: https://www.federalregister.gov/documents/2018/07/30/2018-16262/hazardous-and-solid-waste-management-system-disposal-of-coal-combustion-residuals-from-electric

USEPA. 2018b. USEPA Regional Screening Levels. U.S. Environmental Protection Agency. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls

USEPA. 2018c. 2018 Edition of the Drinking Water Standards and Health Advisories. March 2018. EPA 822-F-18-001. Office of Water. U.S. Environmental Protection Agency Washington, DC. Available at: https://www.epa.gov/sites/production/files/2018-03/documents/dwtable2018.pdf

USGS. 2011. Trace Elements National Synthesis Project: Trace Elements and Radon in Groundwater Across the United States, 1992-2003. U.S. Department of the Interior. U.S. Geological Survey (USGS). Scientific Investigations Report 2011-5059. Available at: https://water.usgs.gov/nawqa/trace/pubs/sir2011-5059/index.html

USGS. 2013. Geochemical and mineralogical data for soils of the conterminous United States: U.S. Geological Survey Data Series 801, 19 p. Available at: http://pubs.usgs.gov/ds/801/

APPENDIX C

Extraction & Transportation Study

ADDENDUM

Meramec, Labadie and Sioux Ash Pond Closure: Extraction and Transportation Assessment

Lochmueller Group applied the methodology from the Extraction and Transportation Study for the Rush Island Energy Center to develop high-level estimates of the costs and timeframes associated with hypothetical CCR excavation processes at the Labadie, Sioux and Meramec Energy Centers. Specifically, the formula used to estimate daily productivity (i.e. number of trucks hauling excavated material offsite) was adapted for use at Labadie, Sioux and Meramec along with site-specific considerations.

Estimates from the Rush Island Study assumed a maximum of 192 truck loads per day over an 8-hour work day (24 per hour), with 155 to 193 days of annual operation. Once loaded, trucks would make multiple roundtrips to the closest available commercial landfill. Such estimates assume that the excavation, staging, and loading process is capable of accommodating a steady stream of trucks loading **every 2.5 minutes** and that such material can be quickly unloaded at the receiving commercial landfill without significant delay. While such productivity rates are undoubtedly optimistic, the resulting estimates nevertheless are useful in capturing the enormity of such projects and are sufficient at a planning-level.

It is important to note that the existing onsite utility waste landfills (UWLs) at Labadie and Sioux were designed and permitted to manage production needs of the energy centers through each facility's retirement date. To facilitate permanent storage, excavated CCR material would need to be transported offsite to a commercial landfill **or** Ameren Missouri would need to permit and construct new onsite landfills. Given the absence of an existing utility waste landfill at Meramec, onsite disposal options were considered for the Labadie and Sioux locations only.

Each facility presents unique challenges that are likely to impact cost estimates and closure times beyond the scope of this assessment. For example, the regulatory process for construction of an onsite landfill would require multiple levels of approval, including environmental permits, zoning or land use authorization, and potentially a certificate of issuance from the Missouri Public Service Commission. Opposition to such projects may further delay the regulatory approval process such that it would be years *before* construction could commence.[1]

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[1] Efforts to permit and construct the Labadie UWL commenced in 2008 with the completion of Preliminary Site Investigation (PSI). The landfill was placed in service in 2016 after years of opposition from environmental groups and litigation. See *Petition for Writ of Certiorari [to invalidate county landfill ordinance] Franklin County Circ. Ct., 11/23/11, Case # 11AB-C286; Appeal to Franklin County Board of Adjustment, #14-00002, Filed 1/8/14 (of Land Use Administrator 10/10/13 and 12/10/13 Decisions), Denied by BZA 6/24/14; Appealed to Circ. Ct. by Writ of Certiorari, Cause # 14AB-CC00155, 7/24/14; Intervention and Motion to Dismiss in PSC Case EA 2012-0281, Ameren Application to PSC for CCN to operate landfill (PSC overruled Motion to Dismiss on 4/17/13); Administrative Hearing Commission Petition for Review [of MDNR Solid Waste Disposal Construction Permit], Filed 1-30-15, #15-0136, dismissed by AHC 3/5/15. See also Campbell v. County Commission of Franklin County, 453 S.W.3d 762 (Mo. banc 2015).*

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Based on experience, it would be virtually impossible to sustain productivity at the planning level rate over extended, multi-year timeframe due to a variety of unpredictable factors. Excavation activities could be limited or precluded for several days following weather events. Other potential disruptions could include:

- loading equipment failure
- site restrictions that limit the number of excavation equipment
- traffic congestion on travel route
- truck breakdown
- staffing
- weather conditions
- commercial landfill available capacity in Illinois and Missouri
- landfill unloading equipment failure

In addition, site specific conditions can impact productivity. For example, an elementary school is located along Fine Road between the Meramec Energy Center and Telegraph Road. To accommodate local safety concerns, the hauling company would likely limit trips during the beginning and end of the school day, thereby limiting effective hauling hours to 5-6 per day during the school year.

Route 94 east of the Sioux Energy Center travels beneath multiple narrow, low-clearance railroad overpasses in the West Alton area. An entirely new roadway by-passing West Alton would avoid the railroad entirely, but would require regulatory approvals, land acquisition, and potentially eminent domain. Assumptions were adjusted to account for these impacts, but it is not possible to foresee every challenge and quantify every impact likely to surface.

Scenarios:

The following summarizes the assessment of five scenarios for CCR removal for the Meramec, Labadie and the Sioux Energy Centers. The assessment utilized the same methodology, assumptions, and unit costing information as for Rush Island. The volume of ash, hauling distances, and the anticipated infrastructure upgrades were adjusted for each site.

For each scenario, the total volume of excavated ash, total cost of removal, and closure duration are summarized. The reported volume of ash incorporates a swell factor. The closure duration is measured from the time the decision is made to close the ponds (i.e. removal from service) until such time that the CCR material is fully removed. It was assumed that 5 years of preparation time would be needed in advance of starting an offsite removal operation, whereas an onsite removal operation would require 10 years of preparation time to account for the regulatory process to secure approvals for construction of new onsite landfills.

The five scenarios are as follows:

1. Labadie Bottom Ash and Fly Ash Pond CCR Removal to an Offsite Landfill
2. Labadie Bottom Ash and Fly Ash Pond CCR Removal to an Onsite Landfill

3. Sioux Bottom Ash and Fly Ash Pond CCR Removal to an Offsite Landfill
4. Sioux Bottom Ash and Fly Ash Pond CCR Removal to an Onsite Landfill
5. Meramec Bottom Ash and Fly Ash Pond CCR Removal to an Offsite Landfill

Scenario 1: Offsite CCR Removal for Labadie

This scenario assumes offsite removal for the Labadie ash pond sites and includes the following:

- Pre-CCR removal preparation (5 years, included on a prorated basis in the Closure Duration for each pond);
- Stabilization, loading, and pond restoration;
- Seasonal impacts from wet and winter weather conditions impeding productivity;
- Hauling to an offsite landfill in Missouri;
- Landfill placement; and
- Loading and transportation infrastructure.

Labadie Energy Center	Estimated Ash Volume (CY) [2]	Estimated Total Removal Cost	Closure Duration (Years)
	17,325,126	**$2,440 M – $2,930 M**	**35 plus years**

Scenario 2: Onsite CCR Removal for Labadie

This scenario assumes onsite disposal the Labadie ash pond sites and includes the following:

- Pre-CCR removal preparation (10 years, included on a prorated basis in the Closure Duration for each pond);
- Stabilization, loading, and pond restoration;
- Hauling to an onsite landfill located near the existing ponds;
- Seasonal impacts from wet and winter weather conditions impeding productivity;
- Landfill placement; and
- Loading infrastructure.

Labadie Energy Center	Estimated Ash Volume (CY)	Estimated Total Removal Cost	Closure Duration (Years)
	17,325,126	**$1,270 M - $1,520 M**	**40 plus years**

[2]Estimated volumes do not include any dry amendment materials.

Scenario 3: Offsite CCR Removal for Sioux

This scenario assumes offsite removal for the Sioux ash pond sites and includes the following:

- Pre-CCR removal preparation (5 years, included on a prorated basis in the Closure Duration for each pond);
- Stabilization, loading, and pond restoration;
- Hauling to an offsite landfill in Illinois[3];
- Seasonal impacts from wet and winter weather conditions impeding productivity;
- Landfill placement; and
- Loading and transportation infrastructure.

Sioux Energy Center	Estimated Ash Volume (CY)	Estimated Total Removal Cost	Closure Duration (Years)
	6,079,808	**$890 M - $1,060 M**	**15 plus years**

Scenario 4: Onsite CCR Removal for Sioux

This scenario assumes onsite disposal the Sioux ash pond sites and includes the following:

- Pre-CCR removal preparation (10 years, included on a prorated basis in the Closure Duration for each pond);
- Stabilization, loading, and pond restoration;
- Hauling to an onsite landfill located near the existing ponds;
- Seasonal impacts from wet and winter weather conditions impeding productivity;
- Landfill placement; and
- Loading infrastructure.

Sioux Energy Center	Estimated Ash Volume (CY)	Estimated Total Removal Cost	Closure Duration (Years)
	6,079,808	**$470 M - $570 M**	**20 plus years**

Scenario 5: Onsite CCR Removal for Meramec

This scenario assumes offsite removal for the Meramec ash pond sites and includes the following:

- Pre-CCR removal preparation (5 years, included on a prorated basis in the Closure Duration for each pond);

[3] Lochmueller did not review local siting requirements but many Illinois counties contain such restrictions.

- Stabilization, loading, and pond restoration;
- Hauling to an offsite landfill in Illinois;
- Seasonal impacts from wet and winter weather conditions impeding productivity;
- Site specific constraints with transportation access and associated limitations;
- Landfill placement; and
- Loading and transportation infrastructure.

Meramec Energy Center	Estimated Ash Volume (CY)	Estimated Total Removal Cost	Closure Duration (Years)
	5,194,923	**$740 M - $890 M**	**20 plus years**

APRIL 29, 2019

EXTRACTION & TRANSPORTATION STUDY: Rush Island Ash Pond Closure Assessment

Rush Island Site

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Introduction

Lochmueller Group completed the following planning-level assessment of the costs and logistics associated with extracting, stabilizing, and transporting coal combustion residuals (CCR) from the existing ash pond system at the Rush Island Power Generation Center to existing offsite, commercially available landfill facilities. The Rush Island site is located along the Mississippi River in Jefferson County, Missouri approximately nine (9) miles southeast of Festus, Missouri. The purpose of this assessment is to describe the methods, determine the impacts, and quantify the order-of-magnitude costs associated with removing and transporting all CCR from its current disposal location at the Rush Island site to a private landfill for permanent storage.

Extraction & Stabilization

Description of Method

Extraction and stabilization of the CCR material from the CCR unit at Rush Island Energy Center is complicated due to its depth and location. In addition, the CCR unit contains both Class C and F fly ash that complicates excavation methods. CCR material from the unit would need to be excavated at depths of up to 100 feet, dewatered, dried and conditioned, before being and loaded into trucks and transported offsite.

Removal of the CCR material would require multiple phases including dry extraction, partially wet extraction and fully submerged extraction. The various phases are described below:

Dry Extraction:

This phase includes the handling and removal of the existing CCR material from the current surface elevation down to the groundwater elevation (approximately 18' below the ground surface (BGS) elevation) (Geotechnical Investigation and Report, prepared by CEC and dated December 20, 2011). Generally, it is assumed that this material can be direct loaded and transported without additional drying or conditioning procedures (moisture content between approximately 25% and 35%). The work associated with this phase includes the extraction, on-site transportation to Staging/Loading Areas, storage, and loading onto transportation for off-site removal. Standard earth-moving equipment and procedures would be utilized including dozers, loaders, and excavators. In general, dozers would be used to excavate and move the CCR material into piles and loaders would be used to load the CCR material into the waiting trucks for transport off-site. Excavators would be used in a support role to dig in areas where dozers are not efficient. Sub-areas of the pond area would need to be established to facilitate extraction operations. The general size of these sub-areas, laterally and vertically, will be determined based on on-site conditions as the operation progresses and the CCR material is removed.

Partially Wet Extraction:

This phase includes the handling and removal of the existing CCR material from the groundwater elevation to a point in which hydraulic excavation is feasible (18' below ground surface to 28' below ground surface). This material is assumed to be in acceptable condition for loading and transportation with no additional drying and conditioning after the dewatering procedure described below is completed.

Dewatering of this material would involve excavation of channels to promote material drying prior to excavation and transportation. Water would be diverted from excavated depressions utilizing pumps and piping systems to transport the water away from the material excavation area. After sufficient dewatering and drying time, the CCR materials would be removed using the same means as described for dry excavation.

Fully Submerged Extraction:

CCR materials located further down in the pond (28' below ground surface to 100' below ground surface) may be saturated and would require drying and conditioning prior to off-site transport. Such materials would need to be extracted via hydraulic dredging methods. The complexities and potential costs associated with such dredging efforts are significantly higher per unit volume than the "Dry Extraction" and "Partially Wet Extraction" phases. In fact, successful pond closures at the depths

required for the Rush Island site could were not discovered. Removal operations for CCR ponds with depths up to 50 feet were found.

This method employs equipment that removes the CCR material directly from the bottom of the CCR unit and pumps the “slurry” through a piping system to “geotubes” located in nearby drying areas. Geotubes are a geotextile filtration “bag” manufactured by sewing together multiple sheets of geotextiles using polyester or polypropylene. As the dredged water enters the geotubes, the geotextile captures the CCR materials as the water drains. Chemical addition during the pumping and piping operation using coagulants and flocculants will be necessary to aid in the dewatering process. The specific makeup of CCR materials are site specific. Therefore, selection of the most effective and efficient coagulants and flocculants will require bench testing. Maintenance of the dredging equipment, piping system, drying areas, settling ponds, and temporary roads will be necessary to facilitate the operation.

Significantly large drying areas will be required to accommodate the multi-week week drying procedure. After dewatering is complete, the geotubes are opened and the CCR material is loaded onto transportation for off-site removal. The transportation of material for off-site removal was the assumed limiting factor for the overall CCR disposal process flow based on the analysis performed in this study. However, extended, unforeseen weather conditions can contribute to additional lost working time due to icy conditions, mechanical system freeze-ups, or flooding.

Site Restoration:

This phase includes the final restoration of the site. This would include removal of all temporary access roads and residual ash in project area. Backfilling would likely need to occur for at least some volume of the remaining pond in conjunction with excavation activities to minimize infiltration from the Mississippi River. The closest source of backfill material would be sand dredged from the Mississippi River. Stabilization of the site with vegetative practices would be required for erosion control. The river banks and the remaining embankment along the river would require additional analysis and appropriate stabilization, but may include a combination of vegetation, large rocks or manufactured concrete products.

Extraction and Stabilization Impacts

Safety

Accidents

Workforce safety during the operation is a significant risk factor. With several unit processes operating with heavy machinery, proper safety planning is important. Accidents can be minimized during operations, but the planning and implementation of a safety plan will have significant costs associated with the effort.

Exposure

There is not only immediate physical injury risks, but there is also exposure risk to the people working on the site. Proper safety equipment will be necessary to limit exposure to potentially harmful substances in the CCR material removal process such as flocculants and coagulant used for the dewatering process.

Environment

Floodplain

The project area is currently shown within the 100 year floodplain for both the current and pending FIRM maps. The potential for the area to experience flooding during excavation activities creates additional risk to the extraction and stabilization operations.

River Embankment

The existing ash ponds are adjacent to the Mississippi River. There is a strip of land that separates these surface water bodies and serves and an embankment that separates the pond from the river. Proper excavation techniques and monitoring will need to be employed to ensure the land between the two surface water bodies remains stable during excavation and dredging activities. After dredging activities are complete, the embankment will require analysis to confirm stability. Removal of the embankment and/or significant re-stabilization may be necessary for the restoration of the site.

Emissions

The heavy equipment used during the extraction and stabilization phase of the project includes dozers, loaders, excavators, hydraulic dredges, and onsite hauling trucks. These types of equipment typically utilize diesel fuel and would generate emissions during operations. These emissions are in addition to the emissions discussed in the transportation impacts section of this assessment.

Fugitive Ash Particulate

As the CCR material is being extracted and stabilized, fugitive ash particulate will be created and would need to be managed through an ash management plan.

Capital Projects

Onsite Access Roads

The onsite access road utilized for the offsite hauling trucks is discussed in the transportation section of this assessment. The construction of temporary on-site hauling roads will be required throughout the extraction and stabilization process. These haul roads will need to be modified frequently in order to provide efficient transportation of the CCR to the stabilization and loading areas and to maintain dust control.

Geotube Staging Areas

Geotube staging areas will need to be constructed within the project area that are relatively flat to allow for proper dewatering of the CCR. These staging areas will be temporary and will need to be moved throughout the closure process as CCR is removed during different phases of the operation. Filtrate from the geotubes would be directed back to the settling ponds for treatment.

Water Treatment Facilities

The existing ponds could be utilized throughout the CCR removal process for settling any remaining solids from the filtrate from the drying process. There may be a need for the construction of new settling ponds toward the end of the process to fully remove CCR from the existing ponds. The filtrate will likely contain suspended solids and some form of treatment or settling may need to be evaluated depending on the final characteristics of the filtrate.

Loading Areas

Once the CCR is stabilized, the material may require some additional layout and loading area to ensure the material is dry enough for offsite hauling and ultimate placement in a landfill. The loading areas will need to be constructed as appropriate for the CCR removal areas that are active. The loading areas will require the construction of scales for measuring the weight of trucks and truck washing facilities to wash down tires of residual ash material.

Restoration of Former Ash Ponds

The post-CCR-removal condition of the ponds will be dependent on the final planned use of the area. Some options may include backfilling, removing embankment, creating or restoring habitat, etc. Achieving the desired future use may include utilizing the soil material that would remain between the pond and the river to backfill some of the remaining pond area. Sand backfill material could also be dredged from the Mississippi river for additional backfill material. Overall stabilization of the site would be required and would include vegetative, natural rock, and manufactured products to meet regulatory requirements.

Transportation & Disposal

This section addresses the transportation of CCR material from the site and its permanent disposal at a private landfill.

Modal Options (Truck, Rail, Barge)

The Rush Island site is located along the Mississippi River. Additionally, a BNSF rail line runs adjacent to the site. Therefore, the ability to haul CCR by barge and rail from Rush Island may be possible. However, significant infrastructure improvements would be required at the Rush Island site to provide ash loading capabilities for these modes.

The preferred landfill locations are all located within 80 miles of Rush Island. None of the sites have direct water access. Therefore, any CCR transported by barge from Rush Island would need to be transferred from barge to truck to reach the landfill destinations. The inefficiency of this transfer would render barge transportation considerably more costly than truck hauling. Moreover, most of the landfill sites are located further inland (east or west) from Rush Island such that north-south travel along the Mississippi River would not be beneficial.

With regards to rail, none of the preferred landfill sites have direct rail access. Several sites are located adjacent to rail corridors but spurs would need to be constructed to facilitate direct landfill access and allow for the temporary storage and unloading of rail cars. Additionally, three of the four preferred landfill sites are located in Illinois, which would require trains to travel through the congested St. Louis rail network to cross the Mississippi River. Rail is most efficient when transporting bulk materials over long distances. Given the relatively short travel distance to each landfill site, rail would not be cost-competitive with truck hauling.

This assessment assumed truck hauling to be the most cost-effective and feasible mode of transport. All subsequent analyses reflect truck hauling.

Truck Hauling

To determine a timeframe for extraction and removal of all CCR from its current, impounded location, the following was assumed:

- Truck hauling via 40-foot end load dump trucks loaded via conventional equipment – each trailer has a payload capacity of 25 tons based on a typical 80,000 lb. gross loaded maximum;
- 8-hour daily operation and a range of 155 to 193 days of annual operation (accounting for weekends, holidays, and time lost due to weather and imperfect execution);
- Loading operations on the Rush Island site occur adjacent to the impoundment and on the south portion of the site; and
- A maximum daily haul rate of 5,000 tons.

The resulting transportation haul assumptions are summarized in **Table 1**.

Table 1: Transportation Haul Summary

Total Tons of CCR Removed	Annual Tons of CCR Removed	Closure Duration*
21.6 million	742,772 to 928,465	28-34 Years

*Measured from the decision to begin extraction until fully removed

To accommodate the volume of truck traffic identified in **Table 1**, roadways internal to the Rush Island site would need to be improved. Specifically, a heavy-duty concrete roadway would need to be constructed along the western perimeter of the site extending from Big Hollow Road south to the ash pond area. Multiple at-grade railroad crossings with the site's rail spur would be required.

In the vicinity of the pond area, staging would need to be provided to accommodate several trucks in queue for multiple loading stations. Hence, a large loading station would need to be constructed. Once loaded, trucks would need to proceed to a washout area and scaled to verify the truck is loaded properly. A quick route back to the loading pad from the scale area would be needed for any overweight trucks.

Landfill Options

Four preferred landfills were identified as potential destinations for the CCR removed from the Rush Island site as shown in **Table 2**. Landfill disposal costs supplied by Ameren are similar across the four locations. With costs paid to the landfill being essentially equal, transportation costs would drive the landfill location decision. Assumed haul rates per ton to each landfill location were also supplied by Ameren. The lowest cost haul rate would be to the Progressive Waste site in Richwoods, which is also significantly closer to Rush Island than the other sites. Therefore, this assessment prioritized CCR disposal at the Progressive Waste landfill.

Table 2: Preferred Landfill Locations

Landfill Site	Address	Distance to Site (mi)	Travel Time to Site (min)
Progressive Waste	12581 State Hwy H, Richwoods, MO	34.7	44
Republic Services	4601 Cahokia Road, Roxana, IL	67.3	67
Waste Management	10400 Hillstown Road, Marissa, IL	73.4	82
Perry Ridge	6305 Sacred Heart Road, DuQuoin, IL	79.8	97

Capacity calculations were performed to determine the total space available for CCR disposal in aggregate. The annual disposal amount currently received by the landfill was assumed to remain constant over time and the incremental annual disposal amount due to the Rush Island CCR was added. Based on the capacity of the Progressive Waste site, at the combined disposal volume, it was estimated that the Progressive Waste landfill would become full upon receiving approximately 80 percent of the total CCR from Rush Island.

It was also assumed that the Progressive Waste site could feasibly accept the maximum daily load of trucks (192) and that Progressive Waste would be willing to receive the maximum amount of CCR possible and dedicate the necessary space on site for monofill construction to isolate the CCR material from other waste on site.

Given these assumptions, the calculations indicate that a second landfill site with available capacity would need to receive the final 20 percent of Rush Island CCR material once Progressive Waste reaches capacity. However, for purposes of the subsequent routing and transportation evaluations, it was assumed that the entire Rush Island CCR volume would be disposed at Progressive Waste.

Transportation Route

Many factors were considered when establishing a preferred route suitable for the removal of the CCR from the Rush Island site to the Progressive Waste landfill, including roadway functional classification and the available connectivity between the two sites using the existing roadway network. The selected route is approximately 36.5 miles long and utilizes the following roadways:

- Begin at the Rush Island site on Big Hollow Road
- Johnson Road west
- Danby Road west
- Highway 61 south
- Highway TT west
- Interstate 55 north
- Highway 67 south
- MO-110 west
- MO-21 south
- Highway H west
- End off Highway H at Progressive Waste

This route prioritizes roadways with the highest functional classifications along a reasonably direct line of travel. While a shorter route may be possible, it would rely upon roadways less suitable for truck traffic and therefore was not considered. The selected route emphasizes major numbered state routes, with the exception of leaving the Rush Island site (via Big Hollow Road, Johnson Road, and Danby Road) and accessing Progressive Waste (via Highway H).

The egress route from the Rush Island site utilizes Johnson Road and Danby Road instead of remaining on Big Hollow Road to Drury Road. Johnson Road/Danby Road is the designated route for truck traffic in and out of the Rush Island site. This route also promotes use of the half diamond interchange on Interstate 55 at Route TT, which was constructed approximately 10 years ago for purposes of serving truck traffic to/from the nearby Holcim Cement Plant.

Transportation Impacts

The following transportation impacts would be anticipated as a result of the hauling operation.

Traffic Flow

The selected route between Rush Island and Progressive Waste was evaluated in terms of its ability to accommodate the additional truck traffic, including both loaded and unloaded trucks. Overall, the truck volume distributed over the course of the day would not be expected to generate significant traffic flow impacts. The route emphasizes major roadways, which would be capable of handling the additional traffic. In fact, no improvements were assumed for Interstate 55 or Highway 67.

That said, the following transportation improvements would be recommended to mitigate anticipated impacts of the additional truck traffic at select locations:

- Big Hollow Road, Johnson Road, and Danby Road, which connect the Rush Island site with Highway 61, are not suitable for the volume of truck traffic anticipated. These roadways typically have 11-foot lanes and no shoulders. The horizontal and vertical geometry is substandard in places. The existing asphalt pavement would not likely withstand the effects of heavy truck traffic. It is recommended that this corridor be upgraded to provide an appropriate truck route between Rush Island and Highway 61. The assumed improvements consist of heavy-duty concrete pavement and alignment corrections along the existing roadway.
- The intersection of Danby Road with Highway 61 should be improved to include a dedicated northbound right-turn lane on Highway 61 and enlarged right-turn radius. This turn lane would serve trucks en route to Rush Island from Interstate 55. This intersection would be expected to remain unsignalized.
- The intersection of Route TT with Highway 61 should be improved to include a dedicated southbound right-turn lane on Highway 61 and enlarged right-turn radius. This turn lane would serve trucks en route to Progressive Waste. This intersection would be expected to remain unsignalized.
- The intersection of Highway 21 and Highway 110 was recently realigned and upgraded to current standards, so it should be well-equipped to serve truck turning maneuvers. However, the intersection remains unsignalized. Installation of a signal would be recommended in order to safely and efficiently serve trucks turning from westbound Highway 110 to southbound Highway 21 en route to Progressive Waste.
- The intersection of Highway 21 with Route H is signalized and currently includes a dedicated southbound right-turn lane and dedicated eastbound left-turn lane to serve truck turning movements along the selected route. It is recommended that the eastbound left-turn lane be extended to provide additional storage capacity. The existing turn lane is approximately 75 feet in length, which would accommodate only a single truck and possibly one additional vehicle.
- Route H is a low-volume and narrow two-lane highway with lane widths of approximately 10 feet, low shoulders, and substandard alignment in select areas. While upgrades to this corridor would be beneficial, given the length of the route, significant upgrades for purposes of the hauling operation would likely be deemed cost prohibitive.

Safety & Environment

The safety implications of the truck hauling operation were evaluated using information provided in the Highway Safety Manual (HSM), published by the American Association of State Highway and Transportation Officials (AASHTO). The HSM relates traffic volumes and roadway character to crash expectancy. Changes in volumes would then cause an increase or decrease in the crash expectancy. It is anticipated that the additional truck traffic would result in an increase of 6 crashes total on an annual basis along the entirety of the haul route, as follows:

- Net increase of 2 Severe (Fatal or Injury) Crashes per year
- Net increase of 4 PDO (Property Damage Only) Cashes per year

Additional environmental costs would also be incurred as a result of the hauling operation.[1] In total, transportation safety and environmental costs are estimated to be approximately $490 million to $611 million over the duration of the hauling operation. These costs would not be borne directly by Ameren but instead would be incurred by the general population.

Pavement

The additional truck volume would depreciate the pavement design life and accelerate pavement deterioration along the selected route. To compensate for the increased wear, pavement mill and overlay were assumed at 5-year increments along all segments of the route, with the exception of Interstate 55 (which as an interstate should be build to withstand truck traffic) and the upgraded access route to the Rush Island site (which would be reconstructed with heavy duty concrete).

[1] According to the Environmental Protection Agency's (EPA) publication on National Average In-Use Emissions from Heavy-Duty Trucks, semi-tractor trailer rigs are responsible for emitting 12.5 grams of pollutants per mile into the air. The economic cost attributable to truck emissions using EPA's methodology was estimated to be $434M. This accounts for increased healthcare costs, lost productivity, welfare costs, environmental remediation, etc.

Conclusion

Lochmueller Group completed the preceding planning-level assessment of the methods and impacts associated with extracting, stabilizing, and transporting CCR from the existing Rush Island Power Generation Center. The purpose of this assessment was to determine the impacts and quantify the order-of-magnitude costs associate with completely removing all CCR from the Rush Island site and transporting it to a private landfill for permanent storage. The information contained herein is provided at a planning-level.

This study assumed that 12,725,000 cubic yards of coal combustion residuals would ultimately need to be removed from the Rush Island site. This would equate to approximately 21,650,000 tons of material to transport. This transport weight was calculated by multiplying the in place cubic yards by a swell factor to account for the uncompacted volume after excavation. The weight of the uncompacted unit volume was established from geotechnical testing data that provided the pounds per cubic foot and the percent moisture content. Based on a range of operating days per calendar year, it would take from 28 to 34 years to extract all material from the site.

Restoration of the site would include backfilling and stabilization with vegetative and structural practices. Restoration costs could be significant in that the resulting 70 – 100 foot depression may need to be backfilled via a dredging operation within the Mississippi River.

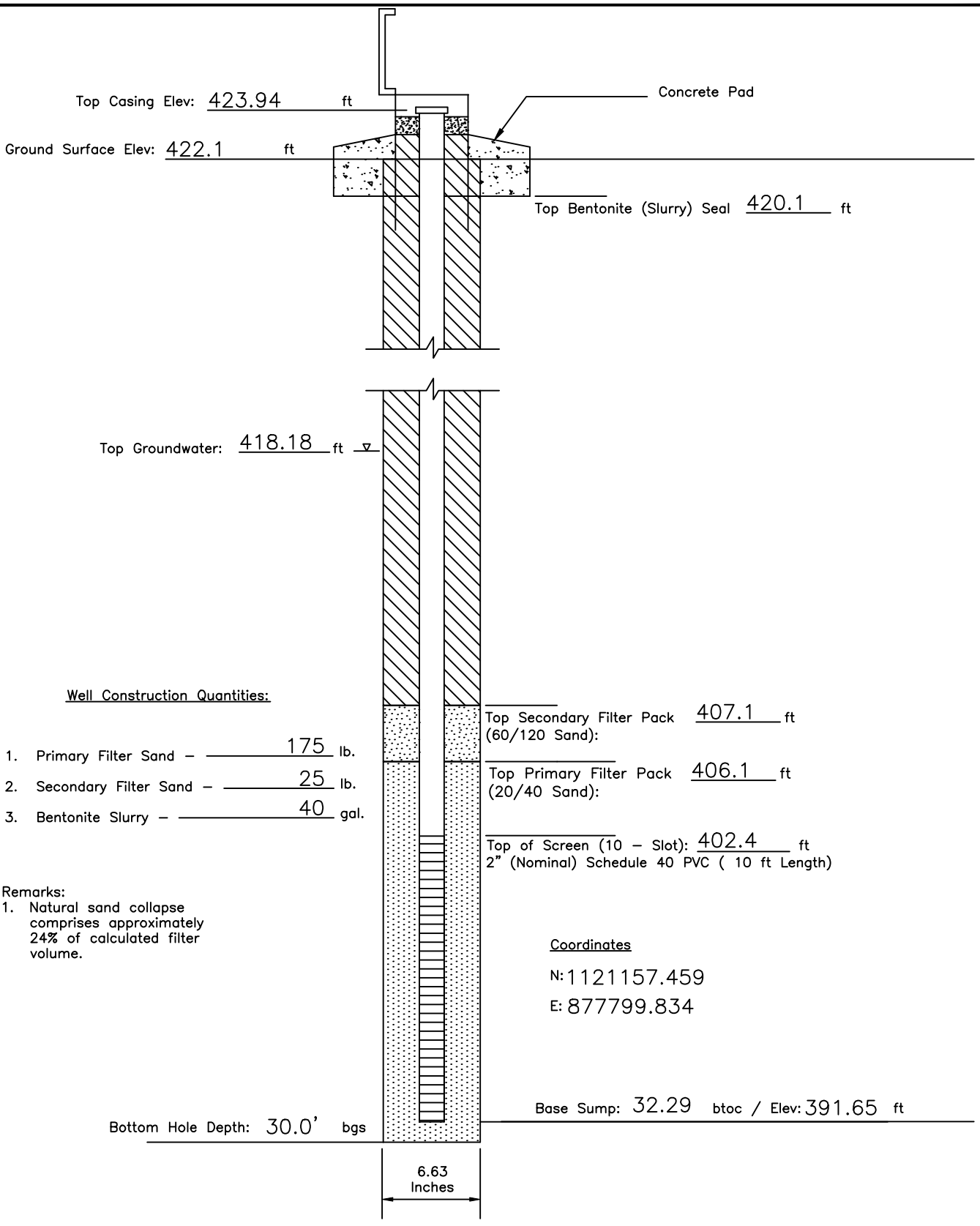
The total cost to extract, stabilize, transport, and dispose of the CCR material is summarized below in 2019 dollars. The total cost to Ameren could range from $1.9 to $2.1 Billion, depending upon the total period of removal operations. This includes transportation infrastructure upgrades both internal and external to the Rush Island site as discussed.

Extraction of CCR and Transport to Offsite Landfill	
Ameren Project Costs	
Extraction, Stabilization, Loading, and Restoration	$773-891 Million
Hauling	$372-375 Million
Landfill Placement Costs	$691-757 Million
Transportation Infrastructure (on and off-site)	$66-77 Million
Project Cost Total	**$1.9-$2.1 Billion**

Costs in 2019 Dollars

APPENDIX B

Well Construction Diagrams



Well Construction Quantities:

1. Primary Filter Sand – 175 lb.
2. Secondary Filter Sand – 25 lb.
3. Bentonite Slurry – 40 gal.

Remarks:
1. Natural sand collapse comprises approximately 24% of calculated filter volume.

Coordinates

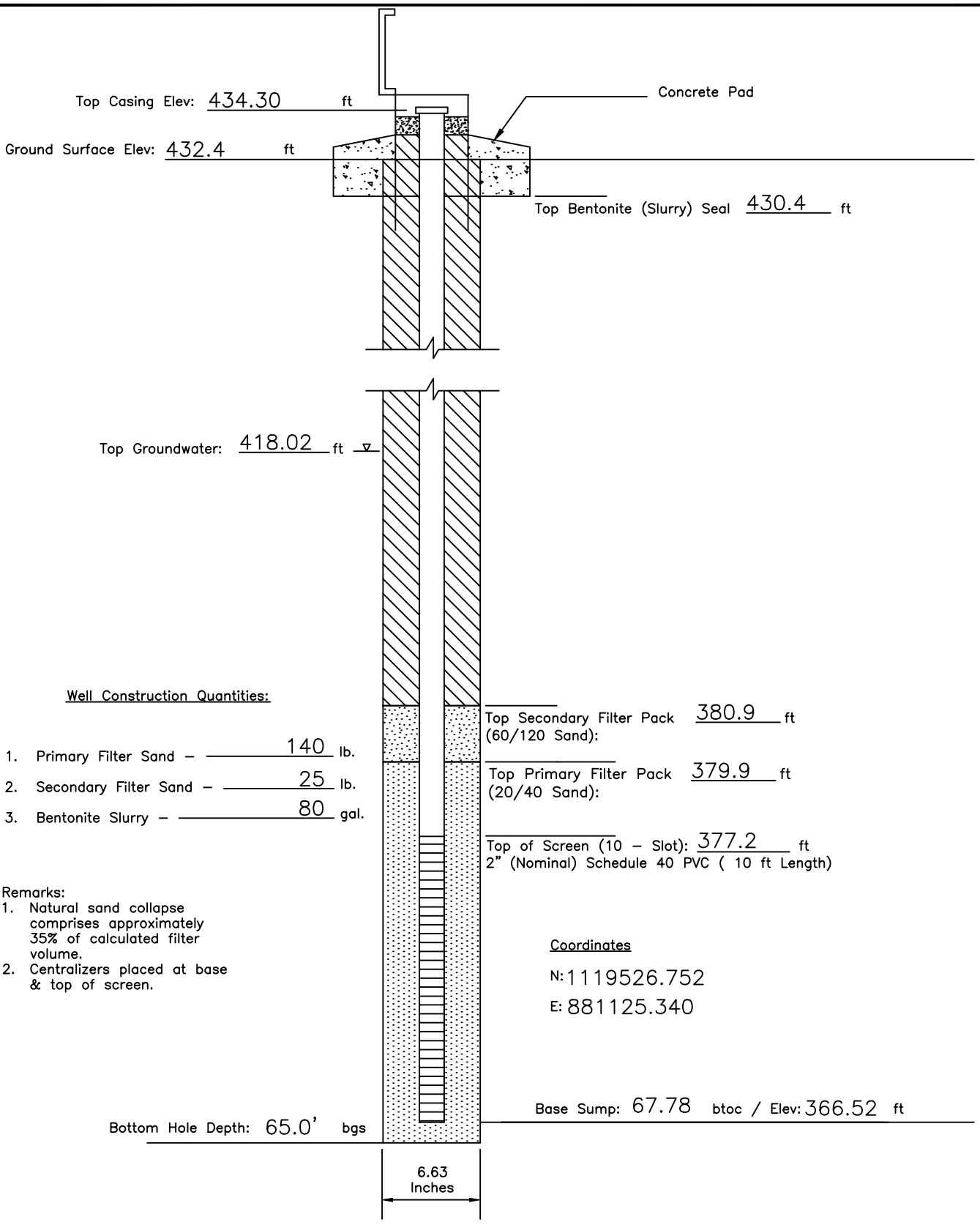
N: 1121157.459

E: 877799.834

PZ-1S	**PIEZOMETER CONSTRUCTION DIAGRAM**	**GREDELL Engineering Resources, Inc.** **ENVIRONMENTAL ENGINEERING** LAND AIR WATER
Date Piezometer Installed: 6-17-18	**Ameren Sioux Energy Center** **NPDES Site Characterization**	1505 East High Street Jefferson City, Missouri 65101 Telephone: (573) 659-9078 Facsimile: (573) 659-9079

DATE	SCALE	DRAWN BY:	CHECKED BY:	APPROVED BY:
7/2018	N.T.S.	CP	TAD	KE

M:\Share\CADDFiles\AMEREN-UE\SIOUX-PLANT\ASH POND NPDES\SITE CHARACTERIZATION REPORT.dwg, 11/5/2018 7:42:03 AM, _DWG To PDF.pc3



Well Construction Quantities:

1. Primary Filter Sand – 140 lb.
2. Secondary Filter Sand – 25 lb.
3. Bentonite Slurry – 80 gal.

Remarks:
1. Natural sand collapse comprises approximately 35% of calculated filter volume.
2. Centralizers placed at base & top of screen.

Coordinates

N: 1119526.752

E: 881125.340

PZ-9D	**PIEZOMETER CONSTRUCTION DIAGRAM**	**GREDELL Engineering Resources, Inc.** **ENVIRONMENTAL ENGINEERING** LAND AIR WATER
Date Piezometer Installed: 6-19-18	**Ameren Sioux Energy Center** **NPDES Site Characterization**	1505 East High Street Jefferson City, Missouri 65101 Telephone: (573) 659-9078 Facsimile: (573) 659-9079

DATE	SCALE	DRAWN BY:	CHECKED BY:	APPROVED BY:
7/2018	N.T.S.	CP	TAD	KE

APPENDIX C

Laboratory Analytical Data

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

December 28, 2018

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

RE: Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on November 14, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

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

Enclosures

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

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

CERTIFICATIONS

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Arkansas Drinking Water
Missouri Certification Number: 10090
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

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

SAMPLE SUMMARY

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286569007	**S-AM-1S**	Water	11/13/18 10:15	11/14/18 03:40
60286569008	**S-AM-1D**	Water	11/13/18 11:10	11/14/18 03:40

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286569007	**S-AM-1S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286569008	**S-AM-1D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Sample: S-AM-1S **Lab ID: 60286569007** Collected: 11/13/18 10:15 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**112**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:32	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:32	7440-41-7	
Boron	**432**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:32	7440-42-8	
Calcium	**67500**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:32	7440-70-2	
Cobalt	**1.5J**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:32	7440-48-4	
Iron	**1700**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:32	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:32	7439-92-1	
Lithium	**19.3**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:32	7439-93-2	
Magnesium	**14400**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:32	7439-95-4	
Manganese	**576**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:32	7439-96-5	
Molybdenum	**58.0**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:32	7439-98-7	
Potassium	**10200**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:32	7440-09-7	
Sodium	**17300**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:32	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:30	7440-36-0	
Arsenic	**1.3**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:30	7440-38-2	
Cadmium	**0.055J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:30	7440-43-9	
Chromium	**0.26J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:30	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:30	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:03	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**260**	mg/L	20.0	4.9	1		11/20/18 18:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**326**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**1.6**	mg/L	0.050	0.012	1		12/03/18 14:22	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.11J**	mg/L	0.20	0.012	1		11/17/18 10:38		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.8**	mg/L	2.0	0.58	2		12/02/18 10:56	16887-00-6	
Fluoride	**0.60**	mg/L	0.20	0.19	1		12/02/18 10:40	16984-48-8	
Sulfate	**11.4**	mg/L	1.0	0.24	1		12/02/18 10:40	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.68**	mg/L	0.10	0.050	1		11/20/18 18:19	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Sample: S-AM-1D **Lab ID: 60286569008** Collected: 11/13/18 11:10 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**244**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:37	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:37	7440-41-7	
Boron	**11700**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:37	7440-42-8	
Calcium	**75000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:37	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:37	7440-48-4	
Iron	**3330**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:37	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:37	7439-92-1	
Lithium	**32.6**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:37	7439-93-2	
Magnesium	**16100**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:37	7439-95-4	
Manganese	**389**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:37	7439-96-5	
Molybdenum	**446**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:37	7439-98-7	
Potassium	**8080**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:37	7440-09-7	
Sodium	**21600**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:37	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:31	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:31	7440-38-2	
Cadmium	**0.12J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:31	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:31	7440-47-3	B
Selenium	**0.12J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:31	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:31	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:05	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**250**	mg/L	20.0	4.9	1		11/20/18 18:46		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**430**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**3.1**	mg/L	0.050	0.012	1		12/03/18 14:23	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.24**	mg/L	0.20	0.012	1		11/17/18 10:39		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.7**	mg/L	10.0	2.9	10		12/02/18 11:28	16887-00-6	
Fluoride	**0.45**	mg/L	0.20	0.19	1		12/02/18 11:12	16984-48-8	
Sulfate	**40.1**	mg/L	10.0	2.4	10		12/02/18 11:28	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.28**	mg/L	0.10	0.050	1		11/20/18 18:28	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 557517 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2287229 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/30/18 09:54	

LABORATORY CONTROL SAMPLE: 2287230

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287231 2287232

Parameter	Units	60286571009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	5.0	100	100	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287233 2287234

Parameter	Units	60287184003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.1	5.1	102	102	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 557358
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2286636
Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/29/18 16:21	
Beryllium	ug/L	0.36J	1.0	0.16	11/29/18 16:21	
Boron	ug/L	<12.5	100	12.5	11/29/18 16:21	
Calcium	ug/L	<53.5	200	53.5	11/29/18 16:21	
Cobalt	ug/L	<0.87	5.0	0.87	11/29/18 16:21	
Iron	ug/L	16.7J	50.0	6.1	11/30/18 13:58	
Lead	ug/L	<3.0	10.0	3.0	11/29/18 16:21	
Lithium	ug/L	<4.6	10.0	4.6	11/29/18 16:21	
Magnesium	ug/L	<14.0	50.0	14.0	11/29/18 16:21	
Manganese	ug/L	<0.73	5.0	0.73	11/29/18 16:21	
Molybdenum	ug/L	<0.90	20.0	0.90	11/29/18 16:21	
Potassium	ug/L	<79.3	500	79.3	11/29/18 16:21	
Sodium	ug/L	<157	500	157	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	955	96	85-115	
Beryllium	ug/L	1000	962	96	85-115	
Boron	ug/L	1000	986	99	85-115	
Calcium	ug/L	10000	9430	94	85-115	
Cobalt	ug/L	1000	964	96	85-115	
Iron	ug/L	10000	9440	94	85-115	
Lead	ug/L	1000	961	96	85-115	
Lithium	ug/L	1000	936	94	85-115	
Magnesium	ug/L	10000	9720	97	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Molybdenum	ug/L	1000	952	95	85-115	
Potassium	ug/L	10000	9760	98	85-115	
Sodium	ug/L	10000	9450	94	85-115	

MATRIX SPIKE SAMPLE: 2286638

Parameter	Units	60286569007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	112	1000	1060	94	70-130	
Beryllium	ug/L	<0.16	1000	969	97	70-130	
Boron	ug/L	432	1000	1410	98	70-130	
Calcium	ug/L	67500	10000	76700	91	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

MATRIX SPIKE SAMPLE: 2286638

Parameter	Units	60286569007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	ug/L	1.5J	1000	951	95	70-130	
Iron	ug/L	1700	10000	11000	93	70-130	
Lead	ug/L	<3.0	1000	949	95	70-130	
Lithium	ug/L	19.3	1000	941	92	70-130	
Magnesium	ug/L	14400	10000	23800	94	70-130	
Manganese	ug/L	576	1000	1550	98	70-130	
Molybdenum	ug/L	58.0	1000	1020	96	70-130	
Potassium	ug/L	10200	10000	19600	95	70-130	
Sodium	ug/L	17300	10000	26400	92	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286639 2286640

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	287	1000	1000	1230	1230	94	94	70-130	0	20	
Beryllium	ug/L	<0.16	1000	1000	980	974	98	97	70-130	1	20	
Boron	ug/L	145	1000	1000	1160	1160	102	101	70-130	0	20	
Calcium	ug/L	105000	10000	10000	113000	114000	76	82	70-130	1	20	
Cobalt	ug/L	<0.87	1000	1000	951	946	95	95	70-130	1	20	
Iron	ug/L	8.3J	10000	10000	9390	9330	94	93	70-130	1	20	
Lead	ug/L	<3.0	1000	1000	947	943	95	94	70-130	0	20	
Lithium	ug/L	19.3	1000	1000	951	948	93	93	70-130	0	20	
Magnesium	ug/L	22100	10000	10000	31300	31300	92	93	70-130	0	20	
Manganese	ug/L	266	1000	1000	1260	1250	99	98	70-130	1	20	
Molybdenum	ug/L	2.4J	1000	1000	973	969	97	97	70-130	0	20	
Potassium	ug/L	5110	10000	10000	14600	14600	95	95	70-130	0	20	
Sodium	ug/L	38400	10000	10000	46800	47000	84	86	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 557460 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2286955 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/29/18 16:21	
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 16:21	
Cadmium	ug/L	<0.033	0.50	0.033	11/29/18 16:21	
Chromium	ug/L	0.19J	1.0	0.078	11/29/18 16:21	
Selenium	ug/L	<0.085	1.0	0.085	11/29/18 16:21	
Thallium	ug/L	<0.099	1.0	0.099	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286956

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.3	98	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	39.2	98	85-115	
Selenium	ug/L	40	37.5	94	85-115	
Thallium	ug/L	40	37.8	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286959 2286960

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.32J	40	40	39.2	39.1	97	97	70-130	0	20	
Arsenic	ug/L	0.56J	40	40	40.6	40.5	100	100	70-130	0	20	
Cadmium	ug/L	0.13J	40	40	39.0	39.0	97	97	70-130	0	20	
Chromium	ug/L	0.30J	40	40	38.7	38.6	96	96	70-130	0	20	
Selenium	ug/L	5.4	40	40	43.2	42.1	95	92	70-130	3	20	
Thallium	ug/L	<0.099	40	40	38.6	38.8	96	97	70-130	1	20	

MATRIX SPIKE SAMPLE: 2286961

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	39.2	98	70-130	
Arsenic	ug/L	0.52J	40	40.4	100	70-130	
Cadmium	ug/L	0.034J	40	39.0	97	70-130	
Chromium	ug/L	0.20J	40	38.5	96	70-130	
Selenium	ug/L	<0.085	40	36.0	90	70-130	
Thallium	ug/L	<0.099	40	39.2	98	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

SAMPLE DUPLICATE: 2288579

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	<0.078	<0.078		20	
Arsenic	ug/L	0.52J	0.53J		20	
Cadmium	ug/L	0.034J	<0.033		20	
Chromium	ug/L	0.20J	0.28J		20	
Selenium	ug/L	<0.085	0.11J		20	
Thallium	ug/L	<0.099	<0.099		20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 556367 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2282759 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/20/18 16:40	

LABORATORY CONTROL SAMPLE: 2282760

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	505	101	90-110	

SAMPLE DUPLICATE: 2282761

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	457	456	0	10	

SAMPLE DUPLICATE: 2282762

Parameter	Units	60286592001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	856		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 555738 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2280010 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/17/18 10:12	

LABORATORY CONTROL SAMPLE: 2280011

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	994	99	80-120	

SAMPLE DUPLICATE: 2280012

Parameter	Units	60286597006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	567	587	3	10	

SAMPLE DUPLICATE: 2280013

Parameter	Units	60287051001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	504	505	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 555661 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2279572 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/17/18 10:32	H6

LABORATORY CONTROL SAMPLE: 2279573

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	100	90-110	H6

SAMPLE DUPLICATE: 2279574

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.048J	0.048J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 557819
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2288548 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/01/18 16:31	
Fluoride	mg/L	<0.19	0.20	0.19	12/01/18 16:31	
Sulfate	mg/L	<0.24	1.0	0.24	12/01/18 16:31	

LABORATORY CONTROL SAMPLE: 2288549

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.6	96	90-110	
Fluoride	mg/L	5	5.0	100	90-110	
Sulfate	mg/L	10	9.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288550 2288551

Parameter	Units	60286569009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	<0.29	5	5	4.4	4.4	89	88	90-110	1	15	M1
Fluoride	mg/L	<0.19	2.5	2.5	2.5	2.5	100	100	90-110	0	15	
Sulfate	mg/L	<0.24	5	5	4.8	4.8	96	95	90-110	1	15	

MATRIX SPIKE SAMPLE: 2288552

Parameter	Units	60286770001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	24.0	25	50.8	107	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 556193 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 2282073 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/20/18 17:38	

LABORATORY CONTROL SAMPLE: 2282074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	90	90-110	

MATRIX SPIKE SAMPLE: 2282075

Parameter	Units	60286815001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1.2	2	3.0	88	90-110	M1

MATRIX SPIKE SAMPLE: 2282077

Parameter	Units	60286932004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1.8	2	3.5	85	90-110	M1

SAMPLE DUPLICATE: 2282076

Parameter	Units	60286817001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	47.1	54.5	15	10	D6

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Sample: S-AM-1S **Lab ID: 60286569007** Collected: 11/13/18 10:15 Received: 11/14/18 03:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0803 ± 0.472 (0.964) C:NA T:98%**	pCi/L	12/12/18 10:00	13982-63-3	
Radium-228	EPA 904.0	**0.621 ± 0.514 (1.04) C:70% T:82%**	pCi/L	12/07/18 11:20	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Sample: S-AM-1D **Lab ID: 60286569008** Collected: 11/13/18 11:10 Received: 11/14/18 03:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.729 ± 0.741 (1.12) C:NA T:80%**	pCi/L	12/12/18 10:00	13982-63-3	
Radium-228	EPA 904.0	**0.0124 ± 0.332 (0.765) C:74% T:93%**	pCi/L	12/07/18 11:20	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 321140 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 1566289 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.323 ± 0.449 (0.749) C:NA T:95%	pCi/L	12/12/18 10:00	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

QC Batch: 321154 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60286569007, 60286569008

METHOD BLANK: 1566306 Matrix: Water
Associated Lab Samples: 60286569007, 60286569008

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.125 ± 0.292 (0.652) C:80% T:79%	pCi/L	12/07/18 11:19	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
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.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SPCA / SCPA N&E
Pace Project No.: 60290643

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286569007	**S-AM-1S**	EPA 200.7	557358	EPA 200.7	557423
60286569008	**S-AM-1D**	EPA 200.7	557358	EPA 200.7	557423
60286569007	**S-AM-1S**	EPA 200.8	557460	EPA 200.8	557561
60286569008	**S-AM-1D**	EPA 200.8	557460	EPA 200.8	557561
60286569007	**S-AM-1S**	EPA 7470	557517	EPA 7470	557564
60286569008	**S-AM-1D**	EPA 7470	557517	EPA 7470	557564
60286569007	**S-AM-1S**	EPA 903.1	321140		
60286569008	**S-AM-1D**	EPA 903.1	321140		
60286569007	**S-AM-1S**	EPA 904.0	321154		
60286569008	**S-AM-1D**	EPA 904.0	321154		
60286569007	**S-AM-1S**	SM 2320B	556367		
60286569008	**S-AM-1D**	SM 2320B	556367		
60286569007	**S-AM-1S**	SM 2540C	555738		
60286569008	**S-AM-1D**	SM 2540C	555738		
60286569007	**S-AM-1S**	SM 3500-Fe B#4	558081		
60286569008	**S-AM-1D**	SM 3500-Fe B#4	558081		
60286569007	**S-AM-1S**	SM 3500-Fe B#4	555661		
60286569008	**S-AM-1D**	SM 3500-Fe B#4	555661		
60286569007	**S-AM-1S**	EPA 300.0	557819		
60286569008	**S-AM-1D**	EPA 300.0	557819		
60286569007	**S-AM-1S**	EPA 365.4	556193		
60286569008	**S-AM-1D**	EPA 365.4	556193		

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Sample Condition Upon Receipt

WO# : 60286569

60286569

Client Name: Golder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 3.9 3.0 / 4.0 3.4 **Corr. Factor** +0.0 **Corrected** 3.9 3.0 / 4.0 3.4

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Church Date: 11/14/18

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPA	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003E (COC 12)	Pace Profile #:	9285

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N		40286569
1	S-UMW-1D	WT	G																				
2	S-UMW-2D	WT	G			11/13/18	1500		4	2	1	1							✓	✓	✓	2 BPPLA BP3S BP3N	001
3	S-UMW-3D	WT	G				1405		1	1	1	1											002
4	S-UMW-4D	WT	G				1315		1	1	1	1											003
5	S-UMW-5D	WT	G				1550		1	1	1	1											004
6	S-UMW-6D	WT	G																				
7	S-BMW-1D	WT	G																				
8	S-BMW-3D	WT	G																				
9	S-AM-1S	WT	G			11/13/18	1015		6	2	1	3							✓	✓	✓		005
10	S-AM-1D	WT	G			1	1110		6	2	1	3							1	1	1		006
11	S-UMW-DUP-1	WT	G																				
12	S-UMW-FB-1	WT	G			11/13/18	1346		4	2	1	1							✓	✓	✓		007

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: As	Golder	11/13/18	1715		11/14/18	0740

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Works

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/13/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
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Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #13)

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	CCR App IV Metals**+Hg	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N	N	N	N		
1	S-UMW-1D	WT	G																									
2	S-UMW-2D	WT	G			11/13/18	1500		4	2	1	1							✓		✓	✓	✓	✓				
3	S-UMW-3D	WT	G				1405		1	1	1	1							1		1	1	1	1				
4	S-UMW-4D	WT	G				1315																					
5	S-UMW-5D	WT	G				1550		↓	↓	↓	↓							↓		↓	↓	↓	↓				
6	S-UMW-6D	WT	G																									
7	S-BMW-1D	WT	G																									
8	S-BMW-3D	WT	G																									
9	S-AM-1S	WT	G			11/13/18	1015		6	2	1	3							✓	✓	✓	✓	✓	✓	✓	✓		
10	S-AM-1D	WT	G			↓	1110		↓	↓	↓	↓							↓	↓	↓	↓	↓	↓	↓	↓		
11	S-UMW-DUP-1	WT	G																									
12	S-UMW-FB-1	WT	G			11/13/18	1546		4	2	1	1							✓		✓	✓	✓	✓				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Fe, Mg, Mn, K, Na	[signature] / Golder	11/13/18	1715				
**EPA 200.7: Be, Co, Pb **EPA 200.8: Sb, Cd, Cr, Se, Tl							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Works

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 11/13/18

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

MEMORANDUM

DATE January 8, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – NOVEMBER 2018 – CCR – DATA PACKAGE 60290643

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

- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren – SEC-SCPA-CCR-Nov2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/8/19

Laboratory: Pace Analytical
SDG #: 60290643
Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ _____
Sample Names S-AM-1S, S-AM-1D

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/14/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies: _____

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

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☐	☐	☒	
b) Were hold times met for sample analysis?	☐	☑	☐	Fe 21
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☐	☐	☐	
g) Were any matrix problems noted?	☐	☐	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☑	☐	☐	Be(0.36), Fe(16.7), Cr(0.19)
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

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

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-AM-1S	Ferrous Iron (Fe^{2+})	0.11	J	Analyzed outside hold time
S-AM-1D	⊥	0.24	J	⊥
S-AM-1S	Chromium(Cr)	1.0	U	Detected in Method Blank; MDL<Result<PQL
S-AM-1D	⊥	1.0	U	⊥ ⊥

Signature: Tommy McLeod Date: 1/8/19

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

December 13, 2018

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

RE: Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between November 13, 2018 and November 17, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

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

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
John Suozzi, Golder Associates

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

CERTIFICATIONS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

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

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SAMPLE SUMMARY

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286571001	**S-TP-2S**	Water	11/12/18 10:40	11/13/18 03:47
60286571002	**S-TP-2M**	Water	11/12/18 11:30	11/13/18 03:47
60286571003	**S-TP-2D**	Water	11/12/18 12:50	11/13/18 03:47
60286571004	**S-NE-DUP-1**	Water	11/12/18 10:40	11/13/18 03:47
60286571005	**S-TP-5S**	Water	11/13/18 14:30	11/14/18 03:40
60286571006	**S-TP-5M**	Water	11/13/18 15:10	11/14/18 03:40
60286571007	**S-TP-5D**	Water	11/13/18 15:55	11/14/18 03:40
60286571008	**S-TP-6S**	Water	11/13/18 13:40	11/14/18 03:40
60286571009	**S-TP-6M**	Water	11/13/18 14:30	11/14/18 03:40
60286571010	**S-TP-6D**	Water	11/13/18 15:35	11/14/18 03:40
60286571011	**S-NE-DUP-2**	Water	11/13/18 14:30	11/14/18 03:40
60286571012	**S-NE-DUP-3**	Water	11/13/18 14:30	11/14/18 03:40
60286571013	**S-NE-FB-1**	Water	11/13/18 15:05	11/14/18 03:40
60286571014	**S-TP-3S**	Water	11/14/18 15:05	11/15/18 10:00
60286571015	**S-TP-3M**	Water	11/14/18 15:40	11/15/18 10:00
60286571016	**S-TP-3D**	Water	11/14/18 16:10	11/15/18 10:00
60286571017	**S-TP-7S**	Water	11/14/18 10:05	11/15/18 10:00
60286571018	**S-TP-7M**	Water	11/14/18 10:35	11/15/18 10:00
60286571019	**S-TP-7D**	Water	11/14/18 11:20	11/15/18 10:00
60286571020	**S-TP-8S**	Water	11/14/18 13:00	11/15/18 10:00
60286571021	**S-TP-8M**	Water	11/14/18 13:35	11/15/18 10:00
60286571022	**S-TP-8D**	Water	11/14/18 14:10	11/15/18 10:00
60286571023	**S-NE-FB-2**	Water	11/14/18 11:30	11/15/18 10:00
60286571024	**S-NE-FB-3**	Water	11/14/18 14:20	11/15/18 10:00
60287156001	**S-TP-1S**	Water	11/16/18 11:20	11/17/18 04:30
60287156002	**S-TP-1M**	Water	11/16/18 13:50	11/17/18 04:30
60287156003	**S-TP-1D**	Water	11/16/18 12:45	11/17/18 04:30
60287156004	**S-TP-4S**	Water	11/16/18 10:20	11/17/18 04:30
60287156005	**S-TP-4M**	Water	11/16/18 10:50	11/17/18 04:30
60287156006	**S-TP-4D**	Water	11/16/18 11:25	11/17/18 04:30

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286571001	**S-TP-2S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286571002	**S-TP-2M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286571003	**S-TP-2D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286571004	**S-NE-DUP-1**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286571005	**S-TP-5S**	EPA 200.7	EMR	13	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571006	**S-TP-5M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571007	**S-TP-5D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571008	**S-TP-6S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571009	**S-TP-6M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571010	**S-TP-6D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571011	**S-NE-DUP-2**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	LDB, WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571012	**S-NE-DUP-3**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571013	**S-NE-FB-1**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571014	**S-TP-3S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571015	**S-TP-3M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571016	**S-TP-3D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571017	**S-TP-7S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571018	**S-TP-7M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571019	**S-TP-7D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571020	**S-TP-8S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571021	**S-TP-8M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571022	**S-TP-8D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571023	**S-NE-FB-2**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60286571024	**S-NE-FB-3**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287156001	**S-TP-1S**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287156002	**S-TP-1M**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287156003	**S-TP-1D**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287156004	**S-TP-4S**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287156005	**S-TP-4M**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287156006	**S-TP-4D**	EPA 200.7	EMR, JGP	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-2S **Lab ID: 60286571001** Collected: 11/12/18 10:40 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**283**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:59	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 20:59	7440-41-7	
Boron	**80.5J**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 20:59	7440-42-8	
Calcium	**151000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 20:59	7440-70-2	
Cobalt	**2.9J**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 20:59	7440-48-4	
Iron	**12600**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 20:59	7439-89-6	
Lead	**3.3J**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 20:59	7439-92-1	
Lithium	**13.2**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:59	7439-93-2	
Magnesium	**37800**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 20:59	7439-95-4	
Manganese	**4860**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 20:59	7439-96-5	
Molybdenum	**11.8J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:59	7439-98-7	
Potassium	**1140**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 20:59	7440-09-7	B
Sodium	**12900**	ug/L	500	157	1	11/28/18 15:52	11/28/18 20:59	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:34	7440-36-0	
Arsenic	**13.9**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:34	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:34	7440-43-9	
Chromium	**0.37J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:34	7440-47-3	B
Selenium	**0.15J**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:34	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:34	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/28/18 15:13	11/29/18 12:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**502**	mg/L	20.0	4.9	1		11/20/18 13:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**633**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**12.5**	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.090J**	mg/L	0.20	0.012	1		11/17/18 10:40		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.5**	mg/L	1.0	0.29	1		11/28/18 23:48	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/28/18 23:48	16984-48-8	
Sulfate	**50.5**	mg/L	5.0	1.2	5		11/29/18 00:04	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.82**	mg/L	0.10	0.050	1		11/15/18 11:52	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-2M **Lab ID: 60286571002** Collected: 11/12/18 11:30 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**178**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 21:01	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 21:01	7440-41-7	
Boron	**121**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 21:01	7440-42-8	
Calcium	**191000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 21:01	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 21:01	7440-48-4	
Iron	**16800**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 21:01	7439-89-6	
Lead	**3.5J**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 21:01	7439-92-1	
Lithium	**26.7**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 21:01	7439-93-2	
Magnesium	**44500**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 21:01	7439-95-4	
Manganese	**862**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 21:01	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 21:01	7439-98-7	
Potassium	**5160**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 21:01	7440-09-7	
Sodium	**18100**	ug/L	500	157	1	11/28/18 15:52	11/28/18 21:01	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:36	7440-36-0	
Arsenic	**0.19J**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:36	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:36	7440-43-9	
Chromium	**0.36J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:36	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:36	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/28/18 15:13	11/29/18 12:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**435**	mg/L	20.0	4.9	1		11/20/18 13:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**875**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**16.8**	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.050J**	mg/L	0.20	0.012	1		11/17/18 10:40		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.4**	mg/L	2.0	0.58	2		11/29/18 00:37	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 00:21	16984-48-8	
Sulfate	**254**	mg/L	50.0	12.0	50		11/29/18 00:54	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.29**	mg/L	0.10	0.050	1		11/15/18 11:56	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-2D **Lab ID: 60286571003** Collected: 11/12/18 12:50 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**87.2**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 21:08	7440-39-3	
Beryllium	**0.29J**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 21:08	7440-41-7	B
Boron	**70.3J**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 21:08	7440-42-8	
Calcium	**274000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 21:08	7440-70-2	M1
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 21:08	7440-48-4	
Iron	**17400**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 21:08	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 21:08	7439-92-1	
Lithium	**47.1**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 21:08	7439-93-2	
Magnesium	**68900**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 21:08	7439-95-4	
Manganese	**1160**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 21:08	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 21:08	7439-98-7	
Potassium	**6110**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 21:08	7440-09-7	
Sodium	**20700**	ug/L	500	157	1	11/28/18 15:52	11/28/18 21:08	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:37	7440-36-0	
Arsenic	**0.12J**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:37	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:37	7440-43-9	
Chromium	**0.45J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:37	7440-47-3	B
Selenium	**0.095J**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:37	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/28/18 15:13	11/29/18 12:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**457**	mg/L	20.0	4.9	1		11/20/18 16:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1280**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**17.4**	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.048J**	mg/L	0.20	0.012	1		11/17/18 10:42		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**86.6**	mg/L	10.0	2.9	10		11/29/18 01:43	16887-00-6	M1
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 01:10	16984-48-8	
Sulfate	**520**	mg/L	50.0	12.0	50		11/29/18 02:48	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.28**	mg/L	0.10	0.050	1		11/15/18 11:57	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-DUP-1 **Lab ID: 60286571004** Collected: 11/12/18 10:40 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**176**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 21:14	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 21:14	7440-41-7	
Boron	**122**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 21:14	7440-42-8	
Calcium	**188000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 21:14	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 21:14	7440-48-4	
Iron	**16700**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 21:14	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 21:14	7439-92-1	
Lithium	**31.7**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 21:14	7439-93-2	
Magnesium	**44200**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 21:14	7439-95-4	
Manganese	**852**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 21:14	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 21:14	7439-98-7	
Potassium	**5040**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 21:14	7440-09-7	
Sodium	**17800**	ug/L	500	157	1	11/28/18 15:52	11/28/18 21:14	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:42	7440-36-0	
Arsenic	**0.21J**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:42	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:42	7440-43-9	
Chromium	**0.39J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:42	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:42	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/28/18 15:13	11/29/18 12:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**430**	mg/L	20.0	4.9	1		11/20/18 16:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**895**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**16.6**	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.050J**	mg/L	0.20	0.012	1		11/17/18 10:43		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**57.8**	mg/L	50.0	14.5	50		11/29/18 03:38	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 03:21	16984-48-8	
Sulfate	**286**	mg/L	50.0	12.0	50		11/29/18 03:38	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.29**	mg/L	0.10	0.050	1		11/15/18 11:59	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-5S **Lab ID: 60286571005** Collected: 11/13/18 14:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**440**	ug/L	5.0	1.5	1	11/28/18 16:09	11/28/18 23:39	7440-39-3	
Beryllium	**0.43J**	ug/L	1.0	0.16	1	11/28/18 16:09	11/28/18 23:39	7440-41-7	
Boron	**263**	ug/L	100	12.5	1	11/28/18 16:09	11/28/18 23:39	7440-42-8	
Calcium	**124000**	ug/L	200	53.5	1	11/28/18 16:09	11/28/18 23:39	7440-70-2	
Cobalt	**0.95J**	ug/L	5.0	0.87	1	11/28/18 16:09	11/28/18 23:39	7440-48-4	
Iron	**4390**	ug/L	50.0	6.1	1	11/28/18 16:09	11/28/18 23:39	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/28/18 23:39	7439-92-1	
Lithium	**16.6**	ug/L	10.0	4.6	1	11/28/18 16:09	11/28/18 23:39	7439-93-2	B
Magnesium	**27400**	ug/L	50.0	14.0	1	11/28/18 16:09	11/28/18 23:39	7439-95-4	
Manganese	**1120**	ug/L	5.0	0.73	1	11/28/18 16:09	11/28/18 23:39	7439-96-5	
Molybdenum	**31.7**	ug/L	20.0	0.90	1	11/28/18 16:09	11/28/18 23:39	7439-98-7	
Potassium	**5230**	ug/L	500	79.3	1	11/28/18 16:09	11/28/18 23:39	7440-09-7	
Sodium	**30000**	ug/L	500	157	1	11/28/18 16:09	11/28/18 23:39	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.18J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:44	7440-36-0	
Arsenic	**3.7**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:44	7440-38-2	
Cadmium	**0.040J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:44	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:44	7440-47-3	B
Selenium	**0.19J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:44	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:08	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**430**	mg/L	20.0	4.9	1		11/20/18 20:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**567**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**4.1**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.26**	mg/L	0.20	0.012	1		11/17/18 10:44		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**47.7**	mg/L	5.0	1.4	5		12/08/18 21:20	16887-00-6	
Fluoride	**0.28**	mg/L	0.20	0.19	1		12/08/18 21:02	16984-48-8	
Sulfate	**11.3**	mg/L	1.0	0.24	1		12/08/18 21:02	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.054J**	mg/L	0.10	0.050	1		11/24/18 09:55	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-5M **Lab ID: 60286571006** Collected: 11/13/18 15:10 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**252**	ug/L	5.0	1.5	1	11/28/18 16:09	11/28/18 23:41	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/28/18 23:41	7440-41-7	
Boron	**3190**	ug/L	100	12.5	1	11/28/18 16:09	11/28/18 23:41	7440-42-8	
Calcium	**149000**	ug/L	200	53.5	1	11/28/18 16:09	11/28/18 23:41	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/28/18 23:41	7440-48-4	
Iron	**8560**	ug/L	50.0	6.1	1	11/28/18 16:09	11/28/18 23:41	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/28/18 23:41	7439-92-1	
Lithium	**31.0**	ug/L	10.0	4.6	1	11/28/18 16:09	11/28/18 23:41	7439-93-2	B
Magnesium	**26500**	ug/L	50.0	14.0	1	11/28/18 16:09	11/28/18 23:41	7439-95-4	
Manganese	**360**	ug/L	5.0	0.73	1	11/28/18 16:09	11/28/18 23:41	7439-96-5	
Molybdenum	**12.8J**	ug/L	20.0	0.90	1	11/28/18 16:09	11/28/18 23:41	7439-98-7	
Potassium	**5620**	ug/L	500	79.3	1	11/28/18 16:09	11/28/18 23:41	7440-09-7	
Sodium	**17200**	ug/L	500	157	1	11/28/18 16:09	11/28/18 23:41	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:46	7440-36-0	
Arsenic	**3.5**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:46	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:46	7440-43-9	
Chromium	**0.25J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:46	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:46	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**318**	mg/L	20.0	4.9	1		11/20/18 20:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**648**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**8.5**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.026J**	mg/L	0.20	0.012	1		11/17/18 10:45		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.9**	mg/L	2.0	0.58	2		12/08/18 21:56	16887-00-6	B
Fluoride	**0.30**	mg/L	0.20	0.19	1		12/08/18 21:38	16984-48-8	
Sulfate	**170**	mg/L	10.0	2.4	10		12/08/18 22:14	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.20**	mg/L	0.10	0.050	1		11/24/18 09:59	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-5D **Lab ID: 60286571007** Collected: 11/13/18 15:55 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**183**	ug/L	5.0	1.5	1	11/28/18 16:09	11/28/18 23:50	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/28/18 23:50	7440-41-7	
Boron	**5460**	ug/L	100	12.5	1	11/28/18 16:09	11/28/18 23:50	7440-42-8	
Calcium	**141000**	ug/L	200	53.5	1	11/28/18 16:09	11/28/18 23:50	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/28/18 23:50	7440-48-4	
Iron	**10300**	ug/L	50.0	6.1	1	11/28/18 16:09	11/28/18 23:50	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/28/18 23:50	7439-92-1	
Lithium	**33.0**	ug/L	10.0	4.6	1	11/28/18 16:09	11/28/18 23:50	7439-93-2	B
Magnesium	**32400**	ug/L	50.0	14.0	1	11/28/18 16:09	11/28/18 23:50	7439-95-4	
Manganese	**993**	ug/L	5.0	0.73	1	11/28/18 16:09	11/28/18 23:50	7439-96-5	
Molybdenum	**175**	ug/L	20.0	0.90	1	11/28/18 16:09	11/28/18 23:50	7439-98-7	
Potassium	**5160**	ug/L	500	79.3	1	11/28/18 16:09	11/28/18 23:50	7440-09-7	
Sodium	**24800**	ug/L	500	157	1	11/28/18 16:09	11/28/18 23:50	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:47	7440-36-0	
Arsenic	**0.30J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:47	7440-38-2	
Cadmium	**0.056J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:47	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:47	7440-47-3	B
Selenium	**0.12J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:47	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**275**	mg/L	20.0	4.9	1		11/20/18 20:47		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1330**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**10.2**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.068J**	mg/L	0.20	0.012	1		11/17/18 10:45		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.8**	mg/L	2.0	0.58	2		12/08/18 22:49	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.19	1		12/08/18 22:31	16984-48-8	
Sulfate	**218**	mg/L	20.0	4.8	20		12/08/18 23:07	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.31**	mg/L	0.10	0.050	1		11/24/18 10:02	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-6S **Lab ID: 60286571008** Collected: 11/13/18 13:40 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**224**	ug/L	5.0	1.5	1	11/28/18 16:09	11/28/18 23:52	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/28/18 23:52	7440-41-7	
Boron	**104**	ug/L	100	12.5	1	11/28/18 16:09	11/28/18 23:52	7440-42-8	
Calcium	**121000**	ug/L	200	53.5	1	11/28/18 16:09	11/28/18 23:52	7440-70-2	
Cobalt	**1.2J**	ug/L	5.0	0.87	1	11/28/18 16:09	11/28/18 23:52	7440-48-4	
Iron	**1020**	ug/L	50.0	6.1	1	11/28/18 16:09	11/28/18 23:52	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/28/18 23:52	7439-92-1	
Lithium	**33.7**	ug/L	10.0	4.6	1	11/28/18 16:09	11/28/18 23:52	7439-93-2	B
Magnesium	**24600**	ug/L	50.0	14.0	1	11/28/18 16:09	11/28/18 23:52	7439-95-4	
Manganese	**615**	ug/L	5.0	0.73	1	11/28/18 16:09	11/28/18 23:52	7439-96-5	
Molybdenum	**4.3J**	ug/L	20.0	0.90	1	11/28/18 16:09	11/28/18 23:52	7439-98-7	
Potassium	**3450**	ug/L	500	79.3	1	11/28/18 16:09	11/28/18 23:52	7440-09-7	
Sodium	**7870**	ug/L	500	157	1	11/28/18 16:09	11/28/18 23:52	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:49	7440-36-0	
Arsenic	**2.0**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:49	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:49	7440-43-9	
Chromium	**0.12J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:49	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:49	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:49	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**376**	mg/L	20.0	4.9	1		11/20/18 20:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**452**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.97**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.050J**	mg/L	0.20	0.012	1		11/17/18 10:46		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.7**	mg/L	1.0	0.29	1		12/09/18 00:00	16887-00-6	
Fluoride	**0.27**	mg/L	0.20	0.19	1		12/09/18 00:00	16984-48-8	
Sulfate	**50.0**	mg/L	5.0	1.2	5		12/09/18 00:18	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.086J**	mg/L	0.10	0.050	1		11/24/18 10:03	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-6M **Lab ID: 60286571009** Collected: 11/13/18 14:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**454**	ug/L	5.0	1.5	1	11/28/18 16:09	11/28/18 23:54	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/28/18 23:54	7440-41-7	
Boron	**63.8J**	ug/L	100	12.5	1	11/28/18 16:09	11/28/18 23:54	7440-42-8	
Calcium	**132000**	ug/L	200	53.5	1	11/28/18 16:09	11/28/18 23:54	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/28/18 23:54	7440-48-4	
Iron	**10200**	ug/L	50.0	6.1	1	11/28/18 16:09	11/28/18 23:54	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/28/18 23:54	7439-92-1	
Lithium	**22.8**	ug/L	10.0	4.6	1	11/28/18 16:09	11/28/18 23:54	7439-93-2	B
Magnesium	**27000**	ug/L	50.0	14.0	1	11/28/18 16:09	11/28/18 23:54	7439-95-4	
Manganese	**452**	ug/L	5.0	0.73	1	11/28/18 16:09	11/28/18 23:54	7439-96-5	
Molybdenum	**2.9J**	ug/L	20.0	0.90	1	11/28/18 16:09	11/28/18 23:54	7439-98-7	
Potassium	**4130**	ug/L	500	79.3	1	11/28/18 16:09	11/28/18 23:54	7440-09-7	
Sodium	**16300**	ug/L	500	157	1	11/28/18 16:09	11/28/18 23:54	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:50	7440-36-0	M1
Arsenic	**0.52J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:50	7440-38-2	M1
Cadmium	**0.034J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:50	7440-43-9	M1
Chromium	**0.20J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:50	7440-47-3	B,M1
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:50	7782-49-2	M1
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:50	7440-28-0	M1
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**386**	mg/L	20.0	4.9	1		11/21/18 17:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**540**	mg/L	5.0	5.0	1		11/19/18 10:30		D6
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**10.1**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.096J**	mg/L	0.20	0.012	1		11/17/18 10:47		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.3**	mg/L	1.0	0.29	1		12/09/18 00:36	16887-00-6	M1
Fluoride	**0.26**	mg/L	0.20	0.19	1		12/09/18 00:36	16984-48-8	
Sulfate	**80.4**	mg/L	10.0	2.4	10		12/09/18 01:12	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.12**	mg/L	0.10	0.050	1		11/24/18 10:04	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-6D **Lab ID: 60286571010** Collected: 11/13/18 15:35 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**391**	ug/L	5.0	1.5	1	11/28/18 16:09	11/29/18 00:00	7440-39-3	
Beryllium	**0.33J**	ug/L	1.0	0.16	1	11/28/18 16:09	11/29/18 00:00	7440-41-7	
Boron	**70.4J**	ug/L	100	12.5	1	11/28/18 16:09	11/29/18 00:00	7440-42-8	
Calcium	**121000**	ug/L	200	53.5	1	11/28/18 16:09	11/29/18 00:00	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/29/18 00:00	7440-48-4	
Iron	**9130**	ug/L	50.0	6.1	1	11/28/18 16:09	11/29/18 00:00	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/29/18 00:00	7439-92-1	
Lithium	**28.0**	ug/L	10.0	4.6	1	11/28/18 16:09	11/29/18 00:00	7439-93-2	B
Magnesium	**28600**	ug/L	50.0	14.0	1	11/28/18 16:09	11/29/18 00:00	7439-95-4	
Manganese	**472**	ug/L	5.0	0.73	1	11/28/18 16:09	11/29/18 00:00	7439-96-5	
Molybdenum	**2.0J**	ug/L	20.0	0.90	1	11/28/18 16:09	11/29/18 00:00	7439-98-7	
Potassium	**4090**	ug/L	500	79.3	1	11/28/18 16:09	11/29/18 00:00	7440-09-7	
Sodium	**6230**	ug/L	500	157	1	11/28/18 16:09	11/29/18 00:00	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:57	7440-36-0	
Arsenic	**0.17J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:57	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:57	7440-43-9	
Chromium	**0.25J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:57	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:57	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:57	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:28	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**353**	mg/L	20.0	4.9	1		11/20/18 20:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**356**	mg/L	5.0	5.0	1		11/19/18 10:30		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**9.0**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.094J**	mg/L	0.20	0.012	1		11/17/18 10:48		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**13.3**	mg/L	1.0	0.29	1		11/30/18 00:57	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 00:57	16984-48-8	
Sulfate	**78.5**	mg/L	5.0	1.2	5		11/30/18 01:13	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.32**	mg/L	0.10	0.050	1		11/24/18 10:08	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-DUP-2 **Lab ID: 60286571011** Collected: 11/13/18 14:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**466**	ug/L	5.0	1.5	1	11/28/18 16:09	11/29/18 00:03	7440-39-3	
Beryllium	**0.28J**	ug/L	1.0	0.16	1	11/28/18 16:09	11/29/18 00:03	7440-41-7	
Boron	**268**	ug/L	100	12.5	1	11/28/18 16:09	11/29/18 00:03	7440-42-8	
Calcium	**131000**	ug/L	200	53.5	1	11/28/18 16:09	11/29/18 00:03	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/29/18 00:03	7440-48-4	
Iron	**4510**	ug/L	50.0	6.1	1	11/28/18 16:09	11/29/18 00:03	7439-89-6	
Lead	**3.8J**	ug/L	10.0	3.0	1	11/28/18 16:09	11/29/18 00:03	7439-92-1	
Lithium	**18.8**	ug/L	10.0	4.6	1	11/28/18 16:09	11/29/18 00:03	7439-93-2	B
Magnesium	**28600**	ug/L	50.0	14.0	1	11/28/18 16:09	11/29/18 00:03	7439-95-4	
Manganese	**1110**	ug/L	5.0	0.73	1	11/28/18 16:09	11/29/18 00:03	7439-96-5	
Molybdenum	**31.0**	ug/L	20.0	0.90	1	11/28/18 16:09	11/29/18 00:03	7439-98-7	
Potassium	**5140**	ug/L	500	79.3	1	11/28/18 16:09	11/29/18 00:03	7440-09-7	
Sodium	**31400**	ug/L	500	157	1	11/28/18 16:09	11/29/18 00:03	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.15J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:59	7440-36-0	
Arsenic	**3.7**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:59	7440-38-2	
Cadmium	**0.034J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:59	7440-43-9	
Chromium	**0.20J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:59	7440-47-3	B
Selenium	**0.088J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:59	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:30	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**445**	mg/L	20.0	4.9	1		11/20/18 21:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**529**	mg/L	5.0	5.0	1		11/19/18 10:30		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**4.3**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.25**	mg/L	0.20	0.012	1		11/17/18 10:49		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**48.5**	mg/L	5.0	1.4	5		12/09/18 01:47	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 02:03	16984-48-8	
Sulfate	**12.3**	mg/L	1.0	0.24	1		11/30/18 02:03	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 10:09	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-DUP-3 **Lab ID: 60286571012** Collected: 11/13/18 14:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**225**	ug/L	5.0	1.5	1	11/28/18 16:09	11/29/18 00:05	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/29/18 00:05	7440-41-7	
Boron	**90.3J**	ug/L	100	12.5	1	11/28/18 16:09	11/29/18 00:05	7440-42-8	
Calcium	**122000**	ug/L	200	53.5	1	11/28/18 16:09	11/29/18 00:05	7440-70-2	
Cobalt	**1.1J**	ug/L	5.0	0.87	1	11/28/18 16:09	11/29/18 00:05	7440-48-4	
Iron	**1080**	ug/L	50.0	6.1	1	11/28/18 16:09	11/29/18 00:05	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/29/18 00:05	7439-92-1	
Lithium	**31.0**	ug/L	10.0	4.6	1	11/28/18 16:09	11/29/18 00:05	7439-93-2	B
Magnesium	**24600**	ug/L	50.0	14.0	1	11/28/18 16:09	11/29/18 00:05	7439-95-4	
Manganese	**614**	ug/L	5.0	0.73	1	11/28/18 16:09	11/29/18 00:05	7439-96-5	
Molybdenum	**4.2J**	ug/L	20.0	0.90	1	11/28/18 16:09	11/29/18 00:05	7439-98-7	
Potassium	**3630**	ug/L	500	79.3	1	11/28/18 16:09	11/29/18 00:05	7440-09-7	
Sodium	**7880**	ug/L	500	157	1	11/28/18 16:09	11/29/18 00:05	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 17:00	7440-36-0	
Arsenic	**2.1**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:00	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 17:00	7440-43-9	
Chromium	**0.17J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 17:00	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 17:00	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 17:00	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:33	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**364**	mg/L	20.0	4.9	1		11/20/18 21:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**378**	mg/L	5.0	5.0	1		11/19/18 10:30		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**1.0**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.052J**	mg/L	0.20	0.012	1		11/17/18 10:49		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.9**	mg/L	1.0	0.29	1		12/08/18 11:59	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.19	1		12/08/18 11:59	16984-48-8	
Sulfate	**52.4**	mg/L	10.0	2.4	10		11/30/18 02:52	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.093J**	mg/L	0.10	0.050	1		11/24/18 10:12	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-FB-1 **Lab ID: 60286571013** Collected: 11/13/18 15:05 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/28/18 16:09	11/29/18 00:07	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 16:09	11/29/18 00:07	7440-41-7	
Boron	**<12.5**	ug/L	100	12.5	1	11/28/18 16:09	11/29/18 00:07	7440-42-8	
Calcium	**238**	ug/L	200	53.5	1	11/28/18 16:09	11/29/18 00:07	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 16:09	11/29/18 00:07	7440-48-4	
Iron	**32.1J**	ug/L	50.0	6.1	1	11/28/18 16:09	11/29/18 00:07	7439-89-6	B
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 16:09	11/29/18 00:07	7439-92-1	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 16:09	11/29/18 00:07	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/28/18 16:09	11/29/18 00:07	7439-95-4	
Manganese	**0.92J**	ug/L	5.0	0.73	1	11/28/18 16:09	11/29/18 00:07	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 16:09	11/29/18 00:07	7439-98-7	
Potassium	**106J**	ug/L	500	79.3	1	11/28/18 16:09	11/29/18 00:07	7440-09-7	B
Sodium	**518**	ug/L	500	157	1	11/28/18 16:09	11/29/18 00:07	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 17:01	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:01	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 17:01	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 17:01	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 17:01	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 17:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	11/29/18 12:30	11/30/18 10:35	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/20/18 21:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/19/18 10:30		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.032J**	mg/L	0.050		1		12/03/18 12:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 10:50		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		11/30/18 03:08	16887-00-6	CH
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 03:08	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		11/30/18 03:08	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 10:13	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-3S **Lab ID: 60286571014** Collected: 11/14/18 15:05 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**222**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:29	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:29	7440-41-7	
Boron	**71.3J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:29	7440-42-8	
Calcium	**113000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:29	7440-70-2	
Cobalt	**1.1J**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:29	7440-48-4	
Iron	**3440**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:29	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:29	7439-92-1	
Lithium	**11.9**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:29	7439-93-2	
Magnesium	**22200**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:29	7439-95-4	
Manganese	**1810**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:29	7439-96-5	
Molybdenum	**30.8**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:29	7439-98-7	
Potassium	**6370**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:29	7440-09-7	
Sodium	**30200**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:29	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.18J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:40	7440-36-0	
Arsenic	**4.2**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:40	7440-38-2	
Cadmium	**0.033J**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:40	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:40	7440-47-3	
Selenium	**0.18J**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:40	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:40	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:09	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**410**	mg/L	20.0	4.9	1		11/26/18 10:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**468**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**3.2**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.21**	mg/L	0.20	0.012	1		11/17/18 10:50		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.2**	mg/L	1.0	0.29	1		12/11/18 01:25	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.19	1		12/11/18 01:25	16984-48-8	
Sulfate	**30.4**	mg/L	2.0	0.48	2		12/12/18 13:08	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 12:54	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-3M **Lab ID: 60286571015** Collected: 11/14/18 15:40 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**434**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:36	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:36	7440-41-7	
Boron	**48.2J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:36	7440-42-8	
Calcium	**109000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:36	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:36	7440-48-4	
Iron	**9760**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:36	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:36	7439-92-1	
Lithium	**21.0**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:36	7439-93-2	
Magnesium	**23900**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:36	7439-95-4	
Manganese	**600**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:36	7439-96-5	
Molybdenum	**1.2J**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:36	7439-98-7	
Potassium	**4210**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:36	7440-09-7	
Sodium	**12000**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:36	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:41	7440-36-0	
Arsenic	**0.26J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:41	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:41	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:41	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:41	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:41	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:15	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**335**	mg/L	20.0	4.9	1		11/26/18 10:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**428**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**9.6**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.11J**	mg/L	0.20	0.012	1		11/17/18 10:51		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.4**	mg/L	1.0	0.29	1		12/11/18 02:08	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.19	1		12/11/18 02:08	16984-48-8	
Sulfate	**62.5**	mg/L	10.0	2.4	10		12/12/18 13:56	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.27**	mg/L	0.10	0.050	1		11/24/18 12:55	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-3D **Lab ID: 60286571016** Collected: 11/14/18 16:10 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**574**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:38	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:38	7440-41-7	
Boron	**52.0J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:38	7440-42-8	
Calcium	**119000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:38	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:38	7440-48-4	
Iron	**8080**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:38	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:38	7439-92-1	
Lithium	**32.1**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:38	7439-93-2	
Magnesium	**28100**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:38	7439-95-4	
Manganese	**603**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:38	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:38	7439-98-7	
Potassium	**4150**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:38	7440-09-7	
Sodium	**7440**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:38	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:43	7440-36-0	
Arsenic	**0.17J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:43	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:43	7440-43-9	
Chromium	**0.16J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:43	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:43	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:43	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**355**	mg/L	20.0	4.9	1		11/26/18 10:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**495**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**8.0**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.076J**	mg/L	0.20	0.012	1		11/17/18 10:52		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.6**	mg/L	1.0	0.29	1		12/11/18 03:19	16887-00-6	
Fluoride	**0.23**	mg/L	0.20	0.19	1		12/11/18 03:19	16984-48-8	
Sulfate	**87.5**	mg/L	10.0	2.4	10		12/11/18 03:33	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.35**	mg/L	0.10	0.050	1		11/24/18 12:56	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-7S **Lab ID: 60286571017** Collected: 11/14/18 10:05 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**443**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:45	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:45	7440-41-7	
Boron	**120**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:45	7440-42-8	
Calcium	**124000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:45	7440-70-2	
Cobalt	**1.0J**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:45	7440-48-4	
Iron	**8770**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:45	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:45	7439-92-1	
Lithium	**25.4**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:45	7439-93-2	
Magnesium	**43100**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:45	7439-95-4	
Manganese	**1720**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:45	7439-96-5	
Molybdenum	**59.2**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:45	7439-98-7	
Potassium	**9780**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:45	7440-09-7	
Sodium	**63800**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:45	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:45	7440-36-0	
Arsenic	**8.4**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:45	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:45	7440-43-9	
Chromium	**0.083J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:45	7440-47-3	
Selenium	**0.17J**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:45	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:45	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:20	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**605**	mg/L	20.0	4.9	1		11/26/18 10:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**648**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**8.7**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.11J**	mg/L	0.20	0.012	1		11/17/18 10:53		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.1**	mg/L	10.0	2.9	10		12/11/18 08:19	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.19	1		12/11/18 08:05	16984-48-8	
Sulfate	**16.2**	mg/L	1.0	0.24	1		12/11/18 08:05	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.053J**	mg/L	0.10	0.050	1		11/24/18 12:57	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-7M **Lab ID: 60286571018** Collected: 11/14/18 10:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**382**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:47	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:47	7440-41-7	
Boron	**87.3J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:47	7440-42-8	
Calcium	**131000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:47	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:47	7440-48-4	
Iron	**17300**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:47	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:47	7439-92-1	
Lithium	**40.2**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:47	7439-93-2	
Magnesium	**30800**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:47	7439-95-4	
Manganese	**610**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:47	7439-96-5	
Molybdenum	**2.4J**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:47	7439-98-7	
Potassium	**5990**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:47	7440-09-7	
Sodium	**7020**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:47	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:46	7440-36-0	
Arsenic	**0.67J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:46	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:46	7440-43-9	
Chromium	**0.84J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:46	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:46	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:22	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**415**	mg/L	20.0	4.9	1		11/26/18 10:46		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**487**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**17.2**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.092J**	mg/L	0.20	0.012	1		11/17/18 10:53		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**16.6**	mg/L	1.0	0.29	1		12/11/18 08:47	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.19	1		12/11/18 08:47	16984-48-8	
Sulfate	**57.7**	mg/L	10.0	2.4	10		12/11/18 09:02	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.41**	mg/L	0.10	0.050	1		11/24/18 12:59	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-7D **Lab ID: 60286571019** Collected: 11/14/18 11:20 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**410**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:49	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:49	7440-41-7	
Boron	**85.4J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:49	7440-42-8	
Calcium	**140000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:49	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:49	7440-48-4	
Iron	**16600**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:49	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:49	7439-92-1	
Lithium	**43.8**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:49	7439-93-2	
Magnesium	**35600**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:49	7439-95-4	
Manganese	**716**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:49	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:49	7439-98-7	
Potassium	**5330**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:49	7440-09-7	
Sodium	**10100**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:49	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.11J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:48	7440-36-0	
Arsenic	**0.23J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:48	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:48	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:48	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:48	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:25	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**335**	mg/L	20.0	4.9	1		11/26/18 10:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**624**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**16.5**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.094J**	mg/L	0.20	0.012	1		11/17/18 10:54		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**32.7**	mg/L	10.0	2.9	10		12/12/18 15:20	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.19	1		12/12/18 15:06	16984-48-8	
Sulfate	**169**	mg/L	10.0	2.4	10		12/12/18 15:20	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.42**	mg/L	0.10	0.050	1		11/24/18 13:00	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-8S **Lab ID: 60286571020** Collected: 11/14/18 13:00 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**167**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:51	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:51	7440-41-7	
Boron	**84.5J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:51	7440-42-8	
Calcium	**112000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:51	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:51	7440-48-4	
Iron	**<6.1**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:51	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:51	7439-92-1	
Lithium	**18.3**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:51	7439-93-2	
Magnesium	**24400**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:51	7439-95-4	
Manganese	**594**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:51	7439-96-5	
Molybdenum	**16.6J**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:51	7439-98-7	
Potassium	**9760**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:51	7440-09-7	
Sodium	**28900**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:51	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.32J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:56	7440-36-0	
Arsenic	**0.43J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:56	7440-38-2	
Cadmium	**0.085J**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:56	7440-43-9	
Chromium	**0.079J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:56	7440-47-3	
Selenium	**3.9**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:56	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:31	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**374**	mg/L	20.0	4.9	1		11/26/18 10:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**509**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 10:54		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**28.2**	mg/L	2.0	0.58	2		12/11/18 06:21	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.19	1		12/11/18 06:03	16984-48-8	
Sulfate	**28.9**	mg/L	2.0	0.48	2		12/11/18 06:21	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:02	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-8M **Lab ID: 60286571021** Collected: 11/14/18 13:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**248**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 15:54	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 15:54	7440-41-7	
Boron	**81.7J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 15:54	7440-42-8	
Calcium	**114000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 15:54	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 15:54	7440-48-4	
Iron	**8810**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 15:54	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 15:54	7439-92-1	
Lithium	**27.6**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 15:54	7439-93-2	
Magnesium	**25100**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 15:54	7439-95-4	
Manganese	**402**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 15:54	7439-96-5	
Molybdenum	**1.0J**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 15:54	7439-98-7	
Potassium	**3810**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 15:54	7440-09-7	
Sodium	**10500**	ug/L	500	157	1	11/29/18 15:57	11/30/18 15:54	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:57	7440-36-0	
Arsenic	**0.91J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:57	7440-38-2	
Cadmium	**0.041J**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:57	7440-43-9	
Chromium	**0.15J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:57	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:57	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:57	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:34	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**356**	mg/L	20.0	4.9	1		11/26/18 11:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**339**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**8.7**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.11J**	mg/L	0.20	0.012	1		11/17/18 10:54		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**36.2**	mg/L	2.0	0.58	2		12/11/18 06:56	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.19	1		12/11/18 06:39	16984-48-8	
Sulfate	**22.0**	mg/L	2.0	0.48	2		12/11/18 06:56	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.23**	mg/L	0.10	0.050	1		11/24/18 13:03	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-8D **Lab ID: 60286571022** Collected: 11/14/18 14:10 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**363**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 16:17	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 16:17	7440-41-7	
Boron	**65.9J**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 16:17	7440-42-8	
Calcium	**110000**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 16:17	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 16:17	7440-48-4	
Iron	**6660**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 16:17	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 16:17	7439-92-1	
Lithium	**33.1**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 16:17	7439-93-2	
Magnesium	**23700**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 16:17	7439-95-4	
Manganese	**408**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 16:17	7439-96-5	
Molybdenum	**1.5J**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 16:17	7439-98-7	
Potassium	**3680**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 16:17	7440-09-7	
Sodium	**8330**	ug/L	500	157	1	11/29/18 15:57	11/30/18 16:17	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:59	7440-36-0	
Arsenic	**0.88J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 11:59	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 11:59	7440-43-9	
Chromium	**0.36J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 11:59	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 11:59	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 11:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:36	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**334**	mg/L	20.0	4.9	1		11/26/18 11:08		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**435**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**6.5**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.17J**	mg/L	0.20	0.012	1		11/17/18 10:55		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**30.6**	mg/L	5.0	1.4	5		12/11/18 07:32	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.19	1		12/11/18 07:14	16984-48-8	
Sulfate	**32.7**	mg/L	5.0	1.2	5		12/11/18 07:32	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.39**	mg/L	0.10	0.050	1		11/24/18 13:04	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-FB-2 **Lab ID: 60286571023** Collected: 11/14/18 11:30 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 16:25	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 16:25	7440-41-7	
Boron	**<12.5**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 16:25	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 16:25	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 16:25	7440-48-4	
Iron	**<6.1**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 16:25	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 16:25	7439-92-1	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 16:25	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 16:25	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 16:25	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 16:25	7439-98-7	
Potassium	**<79.3**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 16:25	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	11/29/18 15:57	11/30/18 16:25	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:01	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:01	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:01	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:01	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:01	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:38	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/26/18 11:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 10:55		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		12/11/18 07:50	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		12/11/18 07:50	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		12/11/18 07:50	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:07	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-NE-FB-3 **Lab ID: 60286571024** Collected: 11/14/18 14:20 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/29/18 15:57	11/30/18 16:27	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/29/18 15:57	11/30/18 16:27	7440-41-7	
Boron	**<12.5**	ug/L	100	12.5	1	11/29/18 15:57	11/30/18 16:27	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	11/29/18 15:57	11/30/18 16:27	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/29/18 15:57	11/30/18 16:27	7440-48-4	
Iron	**<6.1**	ug/L	50.0	6.1	1	11/29/18 15:57	11/30/18 16:27	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/29/18 15:57	11/30/18 16:27	7439-92-1	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/29/18 15:57	11/30/18 16:27	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/29/18 15:57	11/30/18 16:27	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	11/29/18 15:57	11/30/18 16:27	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/29/18 15:57	11/30/18 16:27	7439-98-7	
Potassium	**<79.3**	ug/L	500	79.3	1	11/29/18 15:57	11/30/18 16:27	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	11/29/18 15:57	11/30/18 16:27	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:02	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:02	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:02	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:02	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:02	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 12:41	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/26/18 11:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6.5**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 10:56		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		12/11/18 09:01	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		12/11/18 09:01	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		12/11/18 09:01	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:08	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-1S **Lab ID: 60287156001** Collected: 11/16/18 11:20 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**369**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:23	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:23	7440-41-7	
Boron	**122**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:23	7440-42-8	
Calcium	**204000**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:23	7440-70-2	M1
Cobalt	**2.7J**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:23	7440-48-4	
Iron	**22500**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:23	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:23	7439-92-1	
Lithium	**6.5J**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 16:47	7439-93-2	
Magnesium	**53000**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:23	7439-95-4	
Manganese	**11600**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:23	7439-96-5	M1
Molybdenum	**5.8J**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:23	7439-98-7	
Potassium	**1800**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 16:47	7440-09-7	
Sodium	**71600**	ug/L	500	157	1	12/03/18 11:17	12/04/18 16:47	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:04	7440-36-0	
Arsenic	**25.3**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:04	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:04	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:04	7440-47-3	
Selenium	**0.16J**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:04	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:04	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:01	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**438**	mg/L	20.0	4.9	1		11/29/18 11:47		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1020**	mg/L	5.0	5.0	1		11/21/18 14:49		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**22.2**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.35**	mg/L	0.20	0.012	1		11/21/18 12:11		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**325**	mg/L	20.0	5.8	20		12/11/18 21:20	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.19	1		12/11/18 20:48	16984-48-8	
Sulfate	**34.8**	mg/L	5.0	1.2	5		12/11/18 21:04	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**2.0**	mg/L	0.10	0.050	1		11/26/18 13:18	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-1M **Lab ID: 60287156002** Collected: 11/16/18 13:50 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**212**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:29	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:29	7440-41-7	
Boron	**293**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:29	7440-42-8	
Calcium	**78400**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:29	7440-70-2	M1
Cobalt	**<0.87**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:29	7440-48-4	
Iron	**6700**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:29	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:29	7439-92-1	
Lithium	**17.5**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 16:53	7439-93-2	
Magnesium	**20300**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:29	7439-95-4	
Manganese	**398**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:29	7439-96-5	
Molybdenum	**1.8J**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:29	7439-98-7	
Potassium	**1350**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 16:53	7440-09-7	
Sodium	**38000**	ug/L	500	157	1	12/03/18 11:17	12/04/18 16:53	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:05	7440-36-0	
Arsenic	**0.12J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:05	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:05	7440-43-9	
Chromium	**0.19J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:05	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:05	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:05	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:04	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**241**	mg/L	20.0	4.9	1		11/29/18 11:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**423**	mg/L	5.0	5.0	1		11/21/18 14:49		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**6.5**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.20J**	mg/L	0.20	0.012	1		11/21/18 12:13		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**55.6**	mg/L	10.0	2.9	10		12/11/18 21:53	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.19	1		12/11/18 21:36	16984-48-8	
Sulfate	**50.4**	mg/L	10.0	2.4	10		12/11/18 21:53	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.67**	mg/L	0.10	0.050	1		11/26/18 13:19	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-1D **Lab ID: 60287156003** Collected: 11/16/18 12:45 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**98.0**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:38	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:38	7440-41-7	
Boron	**492**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:38	7440-42-8	
Calcium	**54400**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:38	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:38	7440-48-4	
Iron	**2880**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:38	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:38	7439-92-1	
Lithium	**16.4**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 16:57	7439-93-2	
Magnesium	**13800**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:38	7439-95-4	
Manganese	**329**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:38	7439-96-5	
Molybdenum	**3.5J**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:38	7439-98-7	
Potassium	**6880**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 16:57	7440-09-7	
Sodium	**17100**	ug/L	500	157	1	12/03/18 11:17	12/04/18 16:57	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:09	7440-36-0	
Arsenic	**0.16J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:09	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:09	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:09	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:09	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:09	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:06	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**187**	mg/L	20.0	4.9	1		11/29/18 11:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**295**	mg/L	5.0	5.0	1		11/21/18 14:49		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**2.8**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.060J**	mg/L	0.20	0.012	1		11/21/18 12:12		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**23.5**	mg/L	2.0	0.58	2		12/11/18 22:57	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.19	1		12/11/18 22:41	16984-48-8	
Sulfate	**51.6**	mg/L	10.0	2.4	10		12/11/18 23:13	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.28**	mg/L	0.10	0.050	1		11/26/18 13:20	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-4S **Lab ID: 60287156004** Collected: 11/16/18 10:20 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**192**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:40	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:40	7440-41-7	
Boron	**112**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:40	7440-42-8	
Calcium	**90700**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:40	7440-70-2	
Cobalt	**1.4J**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:40	7440-48-4	
Iron	**1890**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:40	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:40	7439-92-1	
Lithium	**14.8**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 17:00	7439-93-2	
Magnesium	**19500**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:40	7439-95-4	
Manganese	**2180**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:40	7439-96-5	
Molybdenum	**33.1**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:40	7439-98-7	
Potassium	**5730**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 17:00	7440-09-7	
Sodium	**59700**	ug/L	500	157	1	12/03/18 11:17	12/04/18 17:00	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:10	7440-36-0	
Arsenic	**5.8**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:10	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:10	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:10	7440-47-3	
Selenium	**0.21J**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:10	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:08	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**366**	mg/L	20.0	4.9	1		11/29/18 12:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**466**	mg/L	5.0	5.0	1		11/21/18 14:49		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**1.9**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/21/18 12:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**30.9**	mg/L	5.0	1.4	5		12/11/18 23:45	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.19	1		12/11/18 23:29	16984-48-8	
Sulfate	**43.0**	mg/L	5.0	1.2	5		12/11/18 23:45	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 13:24	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-4M **Lab ID: 60287156005** Collected: 11/16/18 10:50 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**408**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:42	7440-39-3	
Beryllium	**0.26J**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:42	7440-41-7	
Boron	**73.0J**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:42	7440-42-8	
Calcium	**112000**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:42	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:42	7440-48-4	
Iron	**7150**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:42	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:42	7439-92-1	
Lithium	**24.9**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 17:06	7439-93-2	
Magnesium	**25000**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:42	7439-95-4	
Manganese	**605**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:42	7439-96-5	
Molybdenum	**1.8J**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:42	7439-98-7	
Potassium	**4060**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 17:06	7440-09-7	
Sodium	**9800**	ug/L	500	157	1	12/03/18 11:17	12/04/18 17:06	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:15	7440-36-0	
Arsenic	**0.33J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:15	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:15	7440-43-9	
Chromium	**0.21J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:15	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:15	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**337**	mg/L	20.0	4.9	1		11/29/18 12:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**455**	mg/L	5.0	5.0	1		11/21/18 14:50		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**7.0**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.15J**	mg/L	0.20	0.012	1		11/21/18 12:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.1**	mg/L	1.0	0.29	1		12/12/18 00:01	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.19	1		12/12/18 00:01	16984-48-8	
Sulfate	**60.4**	mg/L	10.0	2.4	10		12/12/18 00:17	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.24**	mg/L	0.10	0.050	1		11/26/18 13:25	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Sample: S-TP-4D **Lab ID: 60287156006** Collected: 11/16/18 11:25 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**557**	ug/L	5.0	1.5	1	12/03/18 11:17	12/04/18 16:45	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	12/03/18 11:17	12/04/18 16:45	7440-41-7	
Boron	**56.5J**	ug/L	100	12.5	1	12/03/18 11:17	12/04/18 16:45	7440-42-8	
Calcium	**104000**	ug/L	200	53.5	1	12/03/18 11:17	12/04/18 16:45	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	12/03/18 11:17	12/04/18 16:45	7440-48-4	
Iron	**6540**	ug/L	50.0	6.1	1	12/03/18 11:17	12/04/18 16:45	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	12/03/18 11:17	12/04/18 16:45	7439-92-1	
Lithium	**29.6**	ug/L	10.0	4.6	1	12/03/18 11:17	12/04/18 17:09	7439-93-2	
Magnesium	**25600**	ug/L	50.0	14.0	1	12/03/18 11:17	12/04/18 16:45	7439-95-4	
Manganese	**438**	ug/L	5.0	0.73	1	12/03/18 11:17	12/04/18 16:45	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	12/03/18 11:17	12/04/18 16:45	7439-98-7	
Potassium	**3110**	ug/L	500	79.3	1	12/03/18 11:17	12/04/18 17:09	7440-09-7	
Sodium	**6620**	ug/L	500	157	1	12/03/18 11:17	12/04/18 17:09	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:17	7440-36-0	
Arsenic	**0.95J**	ug/L	1.0	0.065	1	12/03/18 12:24	12/04/18 12:17	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	12/03/18 12:24	12/04/18 12:17	7440-43-9	
Chromium	**0.16J**	ug/L	1.0	0.078	1	12/03/18 12:24	12/04/18 12:17	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	12/03/18 12:24	12/04/18 12:17	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/03/18 12:24	12/04/18 12:17	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	12/03/18 01:18	12/03/18 13:13	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**305**	mg/L	20.0	4.9	1		11/29/18 12:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**444**	mg/L	5.0	5.0	1		11/21/18 14:50		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**6.2**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.36**	mg/L	0.20	0.012	1		11/21/18 12:11		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.3**	mg/L	1.0	0.29	1		12/12/18 00:33	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.19	1		12/12/18 00:33	16984-48-8	
Sulfate	**78.4**	mg/L	10.0	2.4	10		12/12/18 00:49	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.30**	mg/L	0.10	0.050	1		11/26/18 13:26	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557276 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2286236 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/29/18 12:01	

LABORATORY CONTROL SAMPLE: 2286237

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286238 2286239

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	4.7	100	95	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557517 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2287229 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/30/18 09:54	

LABORATORY CONTROL SAMPLE: 2287230

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287231 2287232

Parameter	Units	60286571009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	5.0	100	100	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287233 2287234

Parameter	Units	60287184003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.1	5.1	102	102	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557911 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2288969 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	12/03/18 12:04	

LABORATORY CONTROL SAMPLE: 2288970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288971 2288972

Parameter	Units	60286571014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	4.9	101	99	75-125	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557912 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2288973 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	12/03/18 12:45	

LABORATORY CONTROL SAMPLE: 2288974

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288975 2288976

Parameter	Units	60287155001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.20	5	5	4.9	5.0	98	100	75-125	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557225 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/28/18 20:44	
Beryllium	ug/L	0.48J	1.0	0.16	11/28/18 20:44	
Boron	ug/L	<12.5	100	12.5	11/28/18 20:44	
Calcium	ug/L	<53.5	200	53.5	11/28/18 20:44	
Cobalt	ug/L	<0.87	5.0	0.87	11/28/18 20:44	
Iron	ug/L	8.6J	50.0	6.1	11/28/18 20:44	
Lead	ug/L	<3.0	10.0	3.0	11/28/18 20:44	
Lithium	ug/L	<4.6	10.0	4.6	11/28/18 20:44	
Magnesium	ug/L	<14.0	50.0	14.0	11/28/18 20:44	
Manganese	ug/L	<0.73	5.0	0.73	11/28/18 20:44	
Molybdenum	ug/L	<0.90	20.0	0.90	11/28/18 20:44	
Potassium	ug/L	179J	500	79.3	11/28/18 20:44	
Sodium	ug/L	<157	500	157	11/28/18 20:44	

LABORATORY CONTROL SAMPLE: 2286039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	977	98	85-115	
Beryllium	ug/L	1000	974	97	85-115	
Boron	ug/L	1000	917	92	85-115	
Calcium	ug/L	10000	9880	99	85-115	
Cobalt	ug/L	1000	1000	100	85-115	
Iron	ug/L	10000	9860	99	85-115	
Lead	ug/L	1000	968	97	85-115	
Lithium	ug/L	1000	988	99	85-115	
Magnesium	ug/L	10000	9400	94	85-115	
Manganese	ug/L	1000	916	92	85-115	
Molybdenum	ug/L	1000	998	100	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE SAMPLE: 2286040

Parameter	Units	60286569002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	645	1000	1620	98	70-130	
Beryllium	ug/L	<0.16	1000	992	99	70-130	
Boron	ug/L	47.3J	1000	985	94	70-130	
Calcium	ug/L	108000	10000	118000	98	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE SAMPLE: 2286040

Parameter	Units	60286569002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	ug/L	<0.87	1000	987	99	70-130	
Iron	ug/L	7630	10000	17500	99	70-130	
Lead	ug/L	<3.0	1000	949	95	70-130	
Lithium	ug/L	25.4	1000	1030	100	70-130	
Magnesium	ug/L	23600	10000	32900	93	70-130	
Manganese	ug/L	459	1000	1360	90	70-130	
Molybdenum	ug/L	<0.90	1000	1010	101	70-130	
Potassium	ug/L	3640	10000	13800	102	70-130	
Sodium	ug/L	6500	10000	16800	103	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286041 2286042

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	87.2	1000	1000	1080	1090	99	100	70-130	1	20	
Beryllium	ug/L	0.29J	1000	1000	986	989	99	99	70-130	0	20	
Boron	ug/L	70.3J	1000	1000	1020	1030	95	96	70-130	1	20	
Calcium	ug/L	274000	10000	10000	289000	288000	150	133	70-130	1	20	M1
Cobalt	ug/L	<0.87	1000	1000	982	985	98	99	70-130	0	20	
Iron	ug/L	17400	10000	10000	27700	27600	103	102	70-130	0	20	
Lead	ug/L	<3.0	1000	1000	944	949	94	95	70-130	1	20	
Lithium	ug/L	47.1	1000	1000	1060	1060	101	101	70-130	0	20	
Magnesium	ug/L	68900	10000	10000	79200	79200	103	103	70-130	0	20	
Manganese	ug/L	1160	1000	1000	2080	2090	92	93	70-130	0	20	
Molybdenum	ug/L	<0.90	1000	1000	1020	1030	102	103	70-130	1	20	
Potassium	ug/L	6110	10000	10000	16400	16500	103	104	70-130	1	20	
Sodium	ug/L	20700	10000	10000	31300	31300	106	105	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557272 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2286208 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/28/18 23:20	
Beryllium	ug/L	<0.16	1.0	0.16	11/28/18 23:20	
Boron	ug/L	<12.5	100	12.5	11/28/18 23:20	
Calcium	ug/L	<53.5	200	53.5	11/28/18 23:20	
Cobalt	ug/L	<0.87	5.0	0.87	11/28/18 23:20	
Iron	ug/L	8.0J	50.0	6.1	11/28/18 23:20	
Lead	ug/L	<3.0	10.0	3.0	11/28/18 23:20	
Lithium	ug/L	8.0J	10.0	4.6	11/28/18 23:20	
Magnesium	ug/L	<14.0	50.0	14.0	11/28/18 23:20	
Manganese	ug/L	<0.73	5.0	0.73	11/28/18 23:20	
Molybdenum	ug/L	<0.90	20.0	0.90	11/28/18 23:20	
Potassium	ug/L	109J	500	79.3	11/28/18 23:20	
Sodium	ug/L	<157	500	157	11/28/18 23:20	

LABORATORY CONTROL SAMPLE: 2286209

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	999	100	85-115	
Beryllium	ug/L	1000	992	99	85-115	
Boron	ug/L	1000	919	92	85-115	
Calcium	ug/L	10000	10100	101	85-115	
Cobalt	ug/L	1000	1020	102	85-115	
Iron	ug/L	10000	10100	101	85-115	
Lead	ug/L	1000	968	97	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Magnesium	ug/L	10000	9400	94	85-115	
Manganese	ug/L	1000	911	91	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10400	104	85-115	
Sodium	ug/L	10000	10500	105	85-115	

MATRIX SPIKE SAMPLE: 2286210

Parameter	Units	60286571006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	252	1000	1240	98	70-130	
Beryllium	ug/L	<0.16	1000	988	99	70-130	
Boron	ug/L	3190	1000	4150	95	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE SAMPLE: 2286210

Parameter	Units	60286571006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	149000	10000	158000	83	70-130	
Cobalt	ug/L	<0.87	1000	989	99	70-130	
Iron	ug/L	8560	10000	18400	98	70-130	
Lead	ug/L	<3.0	1000	951	95	70-130	
Lithium	ug/L	31.0	1000	1030	100	70-130	
Magnesium	ug/L	26500	10000	35500	90	70-130	
Manganese	ug/L	360	1000	1260	90	70-130	
Molybdenum	ug/L	12.8J	1000	1030	102	70-130	
Potassium	ug/L	5620	10000	15600	100	70-130	
Sodium	ug/L	17200	10000	26700	96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286211 2286212

Parameter	Units	60286571009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	454	1000	1000	1450	1430	100	98	70-130	1	20	
Beryllium	ug/L	<0.16	1000	1000	1000	988	100	99	70-130	1	20	
Boron	ug/L	63.8J	1000	1000	1010	990	95	93	70-130	2	20	
Calcium	ug/L	132000	10000	10000	143000	141000	111	88	70-130	2	20	
Cobalt	ug/L	<0.87	1000	1000	992	983	99	98	70-130	1	20	
Iron	ug/L	10200	10000	10000	20300	20000	101	98	70-130	2	20	
Lead	ug/L	<3.0	1000	1000	954	942	95	94	70-130	1	20	
Lithium	ug/L	22.8	1000	1000	1030	1020	101	100	70-130	1	20	
Magnesium	ug/L	27000	10000	10000	36400	35700	94	87	70-130	2	20	
Manganese	ug/L	452	1000	1000	1360	1330	91	87	70-130	2	20	
Molybdenum	ug/L	2.9J	1000	1000	1030	1010	102	101	70-130	1	20	
Potassium	ug/L	4130	10000	10000	14500	14300	104	102	70-130	1	20	
Sodium	ug/L	16300	10000	10000	26700	26300	104	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557560 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2287443 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/30/18 15:18	
Beryllium	ug/L	<0.16	1.0	0.16	11/30/18 15:18	
Boron	ug/L	<12.5	100	12.5	11/30/18 15:18	
Calcium	ug/L	<53.5	200	53.5	11/30/18 15:18	
Cobalt	ug/L	<0.87	5.0	0.87	11/30/18 15:18	
Iron	ug/L	<6.1	50.0	6.1	11/30/18 15:18	
Lead	ug/L	<3.0	10.0	3.0	11/30/18 15:18	
Lithium	ug/L	<4.6	10.0	4.6	11/30/18 15:18	
Magnesium	ug/L	<14.0	50.0	14.0	11/30/18 15:18	
Manganese	ug/L	3.1J	5.0	0.73	11/30/18 15:18	
Molybdenum	ug/L	<0.90	20.0	0.90	11/30/18 15:18	
Potassium	ug/L	81.0J	500	79.3	11/30/18 15:18	
Sodium	ug/L	253J	500	157	11/30/18 15:18	

LABORATORY CONTROL SAMPLE: 2287444

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	976	98	85-115	
Beryllium	ug/L	1000	979	98	85-115	
Boron	ug/L	1000	931	93	85-115	
Calcium	ug/L	10000	9890	99	85-115	
Cobalt	ug/L	1000	1010	101	85-115	
Iron	ug/L	10000	9930	99	85-115	
Lead	ug/L	1000	967	97	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Magnesium	ug/L	10000	9360	94	85-115	
Manganese	ug/L	1000	919	92	85-115	
Molybdenum	ug/L	1000	1040	104	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287445 2287446

Parameter	Units	60286571016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	574	1000	1000	1550	1560	97	98	70-130	1	20	
Beryllium	ug/L	<0.16	1000	1000	985	998	99	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287445 2287446

Parameter	Units	60286571016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	52.0J	1000	1000	995	1010	94	96	70-130	2	20	
Calcium	ug/L	119000	10000	10000	128000	129000	86	93	70-130	1	20	
Cobalt	ug/L	<0.87	1000	1000	985	993	98	99	70-130	1	20	
Iron	ug/L	8080	10000	10000	17800	18000	97	99	70-130	1	20	
Lead	ug/L	<3.0	1000	1000	950	962	95	96	70-130	1	20	
Lithium	ug/L	32.1	1000	1000	1050	1060	102	102	70-130	0	20	
Magnesium	ug/L	28100	10000	10000	37200	37500	91	94	70-130	1	20	
Manganese	ug/L	603	1000	1000	1510	1520	91	92	70-130	1	20	
Molybdenum	ug/L	<0.90	1000	1000	1040	1050	104	105	70-130	1	20	
Potassium	ug/L	4150	10000	10000	14100	14400	99	102	70-130	2	20	
Sodium	ug/L	7440	10000	10000	17400	17600	99	101	70-130	1	20	

MATRIX SPIKE SAMPLE: 2287447

Parameter	Units	60286571021 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	248	1000	1230	98	70-130	
Beryllium	ug/L	<0.16	1000	998	100	70-130	
Boron	ug/L	81.7J	1000	1030	95	70-130	
Calcium	ug/L	114000	10000	123000	95	70-130	
Cobalt	ug/L	<0.87	1000	985	99	70-130	
Iron	ug/L	8810	10000	18800	99	70-130	
Lead	ug/L	<3.0	1000	952	95	70-130	
Lithium	ug/L	27.6	1000	1040	101	70-130	
Magnesium	ug/L	25100	10000	33900	88	70-130	
Manganese	ug/L	402	1000	1300	90	70-130	
Molybdenum	ug/L	1.0J	1000	1040	103	70-130	
Potassium	ug/L	3810	10000	13900	101	70-130	
Sodium	ug/L	10500	10000	20700	102	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 558026 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2289491 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	12/04/18 16:14	
Beryllium	ug/L	<0.16	1.0	0.16	12/04/18 16:14	
Boron	ug/L	<12.5	100	12.5	12/04/18 16:14	
Calcium	ug/L	<53.5	200	53.5	12/04/18 16:14	
Cobalt	ug/L	<0.87	5.0	0.87	12/04/18 16:14	
Iron	ug/L	<6.1	50.0	6.1	12/04/18 16:14	
Lead	ug/L	<3.0	10.0	3.0	12/04/18 16:14	
Lithium	ug/L	<4.6	10.0	4.6	12/04/18 16:44	
Magnesium	ug/L	21.8J	50.0	14.0	12/04/18 16:14	
Manganese	ug/L	<0.73	5.0	0.73	12/04/18 16:14	
Molybdenum	ug/L	<0.90	20.0	0.90	12/04/18 16:14	
Potassium	ug/L	<79.3	500	79.3	12/04/18 16:44	
Sodium	ug/L	<157	500	157	12/04/18 16:44	

LABORATORY CONTROL SAMPLE: 2289492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1070	107	85-115	
Beryllium	ug/L	1000	991	99	85-115	
Boron	ug/L	1000	1030	103	85-115	
Calcium	ug/L	10000	9850	98	85-115	
Cobalt	ug/L	1000	1020	102	85-115	
Iron	ug/L	10000	9290	93	85-115	
Lead	ug/L	1000	1000	100	85-115	
Lithium	ug/L	1000	935	94	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	9380	94	85-115	
Sodium	ug/L	10000	9760	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2289493 2289494

Parameter	Units	60287156001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	369	1000	1000	1460	1510	109	114	70-130	3	20	
Beryllium	ug/L	<0.16	1000	1000	1030	1060	103	106	70-130	3	20	
Boron	ug/L	122	1000	1000	1140	1170	102	104	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2289493 2289494

Parameter	Units	60287156001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	204000	10000	10000	221000	231000	171	265	70-130	4	20	M1
Cobalt	ug/L	2.7J	1000	1000	975	987	97	98	70-130	1	20	
Iron	ug/L	22500	10000	10000	31700	33300	92	108	70-130	5	20	
Lead	ug/L	<3.0	1000	1000	949	963	95	96	70-130	1	20	
Lithium	ug/L	6.5J	1000	1000	948	936	94	93	70-130	1	20	
Magnesium	ug/L	53000	10000	10000	62500	65000	95	120	70-130	4	20	
Manganese	ug/L	11600	1000	1000	12300	12800	67	116	70-130	4	20	M1
Molybdenum	ug/L	5.8J	1000	1000	1040	1060	104	105	70-130	1	20	
Potassium	ug/L	1800	10000	10000	11400	11300	96	95	70-130	1	20	
Sodium	ug/L	71600	10000	10000	80800	80700	92	90	70-130	0	20	

MATRIX SPIKE SAMPLE: 2289495

Parameter	Units	60287156002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	212	1000	1360	115	70-130	
Beryllium	ug/L	<0.16	1000	1070	107	70-130	
Boron	ug/L	293	1000	1360	107	70-130	
Calcium	ug/L	78400	10000	94500	161	70-130	M1
Cobalt	ug/L	<0.87	1000	1040	104	70-130	
Iron	ug/L	6700	10000	16700	100	70-130	
Lead	ug/L	<3.0	1000	1010	101	70-130	
Lithium	ug/L	17.5	1000	958	94	70-130	
Magnesium	ug/L	20300	10000	30600	103	70-130	
Manganese	ug/L	398	1000	1440	105	70-130	
Molybdenum	ug/L	1.8J	1000	1090	108	70-130	
Potassium	ug/L	1350	10000	10900	96	70-130	
Sodium	ug/L	38000	10000	47400	94	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557233 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2286073 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/28/18 17:28	
Arsenic	ug/L	<0.065	1.0	0.065	11/28/18 17:28	
Cadmium	ug/L	<0.033	0.50	0.033	11/28/18 17:28	
Chromium	ug/L	0.19J	1.0	0.078	11/28/18 17:28	
Selenium	ug/L	<0.085	1.0	0.085	11/28/18 17:28	
Thallium	ug/L	<0.099	1.0	0.099	11/28/18 17:28	

LABORATORY CONTROL SAMPLE: 2286074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.0	100	85-115	
Arsenic	ug/L	40	40.3	101	85-115	
Cadmium	ug/L	40	40.0	100	85-115	
Chromium	ug/L	40	41.4	103	85-115	
Selenium	ug/L	40	39.1	98	85-115	
Thallium	ug/L	40	37.9	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286075 2286076

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.078	40	40	39.4	38.4	98	96	70-130	3	20	
Arsenic	ug/L	0.12J	40	40	41.1	40.3	102	100	70-130	2	20	
Cadmium	ug/L	<0.033	40	40	37.7	36.9	94	92	70-130	2	20	
Chromium	ug/L	0.45J	40	40	50.7	49.9	126	124	70-130	2	20	
Selenium	ug/L	0.095J	40	40	38.5	37.7	96	94	70-130	2	20	
Thallium	ug/L	<0.099	40	40	36.5	35.9	91	90	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557460 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2286955 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/29/18 16:21	
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 16:21	
Cadmium	ug/L	<0.033	0.50	0.033	11/29/18 16:21	
Chromium	ug/L	0.19J	1.0	0.078	11/29/18 16:21	
Selenium	ug/L	<0.085	1.0	0.085	11/29/18 16:21	
Thallium	ug/L	<0.099	1.0	0.099	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286956

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.3	98	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	39.2	98	85-115	
Selenium	ug/L	40	37.5	94	85-115	
Thallium	ug/L	40	37.8	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286959 2286960

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.32J	40	40	39.2	39.1	97	97	70-130	0	20	
Arsenic	ug/L	0.56J	40	40	40.6	40.5	100	100	70-130	0	20	
Cadmium	ug/L	0.13J	40	40	39.0	39.0	97	97	70-130	0	20	
Chromium	ug/L	0.30J	40	40	38.7	38.6	96	96	70-130	0	20	
Selenium	ug/L	5.4	40	40	43.2	42.1	95	92	70-130	3	20	
Thallium	ug/L	<0.099	40	40	38.6	38.8	96	97	70-130	1	20	

MATRIX SPIKE SAMPLE: 2286961

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	39.2	98	70-130	
Arsenic	ug/L	0.52J	40	40.4	100	70-130	
Cadmium	ug/L	0.034J	40	39.0	97	70-130	
Chromium	ug/L	0.20J	40	38.5	96	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE SAMPLE: 2286961

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Selenium	ug/L	<0.085	40	36.0	90	70-130	
Thallium	ug/L	<0.099	40	39.2	98	70-130	

SAMPLE DUPLICATE: 2288579

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	<0.078	<0.078		20	
Arsenic	ug/L	0.52J	0.53J		20	
Cadmium	ug/L	0.034J	<0.033		20	
Chromium	ug/L	0.20J	0.28J		20	
Selenium	ug/L	<0.085	0.11J		20	
Thallium	ug/L	<0.099	<0.099		20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 558060 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024, 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2289594 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024, 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	12/04/18 11:37	
Arsenic	ug/L	<0.065	1.0	0.065	12/04/18 11:37	
Cadmium	ug/L	<0.033	0.50	0.033	12/04/18 11:37	
Chromium	ug/L	<0.078	1.0	0.078	12/04/18 11:37	
Selenium	ug/L	<0.085	1.0	0.085	12/04/18 11:37	
Thallium	ug/L	<0.099	1.0	0.099	12/04/18 11:37	

LABORATORY CONTROL SAMPLE: 2289595

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.2	98	85-115	
Arsenic	ug/L	40	40.2	101	85-115	
Cadmium	ug/L	40	39.6	99	85-115	
Chromium	ug/L	40	40.4	101	85-115	
Selenium	ug/L	40	39.0	98	85-115	
Thallium	ug/L	40	37.9	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2289596 2289597

Parameter	Units	60286571019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.11J	40	40	39.9	39.9	99	99	70-130	0	20	
Arsenic	ug/L	0.23J	40	40	40.0	40.0	99	99	70-130	0	20	
Cadmium	ug/L	<0.033	40	40	38.8	38.8	97	97	70-130	0	20	
Chromium	ug/L	0.22J	40	40	43.0	44.1	107	110	70-130	3	20	
Selenium	ug/L	<0.085	40	40	37.6	37.6	94	94	70-130	0	20	
Thallium	ug/L	<0.099	40	40	39.7	39.2	99	98	70-130	1	20	

MATRIX SPIKE SAMPLE: 2289598

Parameter	Units	60287156002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	40.1	100	70-130	
Arsenic	ug/L	0.12J	40	40.3	100	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

MATRIX SPIKE SAMPLE: 2289598

Parameter	Units	60287156002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	<0.033	40	38.9	97	70-130	
Chromium	ug/L	0.19J	40	41.6	104	70-130	
Selenium	ug/L	<0.085	40	37.9	95	70-130	
Thallium	ug/L	<0.099	40	39.1	98	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556192 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286571001, 60286571002

METHOD BLANK: 2282069 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/20/18 10:40	

LABORATORY CONTROL SAMPLE: 2282070

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

SAMPLE DUPLICATE: 2282071

Parameter	Units	60286215025 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	58.8	64.8	10	10	

SAMPLE DUPLICATE: 2282072

Parameter	Units	60286372001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	534	545	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556367 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286571003, 60286571004

METHOD BLANK: 2282759 Matrix: Water
Associated Lab Samples: 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/20/18 16:40	

LABORATORY CONTROL SAMPLE: 2282760

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	505	101	90-110	

SAMPLE DUPLICATE: 2282761

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	457	456	0	10	

SAMPLE DUPLICATE: 2282762

Parameter	Units	60286592001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	856		10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556417 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2282875 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/20/18 19:30	

LABORATORY CONTROL SAMPLE: 2282876

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	491	98	90-110	

SAMPLE DUPLICATE: 2282877

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	351	363	3	10	

SAMPLE DUPLICATE: 2282878

Parameter	Units	60286571005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	430	454	5	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556649
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286571009

METHOD BLANK: 2283901 Matrix: Water
Associated Lab Samples: 60286571009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/21/18 17:29	

LABORATORY CONTROL SAMPLE: 2283902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	478	96	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556754 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2284647 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/26/18 09:46	

LABORATORY CONTROL SAMPLE: 2284648

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	511	102	90-110	

SAMPLE DUPLICATE: 2284649

Parameter	Units	60287011001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	204	208	2	10	

SAMPLE DUPLICATE: 2284650

Parameter	Units	60287013001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	227	227	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557384 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2286702 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/29/18 10:30	

LABORATORY CONTROL SAMPLE: 2286703

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	502	100	90-110	

SAMPLE DUPLICATE: 2286706

Parameter	Units	60287257029 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	62.8	63.7	1	10	

SAMPLE DUPLICATE: 2286707

Parameter	Units	60287115002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	90.6	90.8	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555505 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2278841 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/16/18 10:25	

LABORATORY CONTROL SAMPLE: 2278842

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

SAMPLE DUPLICATE: 2278843

Parameter	Units	60286668009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	498	503	1	10	

SAMPLE DUPLICATE: 2278845

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1280	1290	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555739 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008

METHOD BLANK: 2280014 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/17/18 10:13	

LABORATORY CONTROL SAMPLE: 2280015

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	992	99	80-120	

SAMPLE DUPLICATE: 2280018

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	607	513	17	10	D6

SAMPLE DUPLICATE: 2280019

Parameter	Units	60286654010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2210	2280	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555802 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2280445 Matrix: Water
Associated Lab Samples: 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/19/18 10:30	

LABORATORY CONTROL SAMPLE: 2280446

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

SAMPLE DUPLICATE: 2280447

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	540	425	24	10	D6

SAMPLE DUPLICATE: 2280448

Parameter	Units	60287078003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	989	1030	4	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555805 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2280475 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/19/18 10:30	

LABORATORY CONTROL SAMPLE: 2280476

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

SAMPLE DUPLICATE: 2280477

Parameter	Units	60287003004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	575	594	3	10	

SAMPLE DUPLICATE: 2280482

Parameter	Units	60287011001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	348	273	24	10	D6

SAMPLE DUPLICATE: 2280487

Parameter	Units	60287013001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	346	294	16	10	D6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556380 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2282802 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/21/18 14:48	

LABORATORY CONTROL SAMPLE: 2282803

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	954	95	80-120	

SAMPLE DUPLICATE: 2282804

Parameter	Units	60287115001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	264	248	6	10	

SAMPLE DUPLICATE: 2282805

Parameter	Units	60287156005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	455	464	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555661 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004, 60286571005, 60286571006, 60286571007, 60286571008

METHOD BLANK: 2279572 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004, 60286571005, 60286571006, 60286571007, 60286571008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/17/18 10:32	H6

LABORATORY CONTROL SAMPLE: 2279573

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	100	90-110	H6

SAMPLE DUPLICATE: 2279574

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.048J	0.048J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 555662 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60286571009, 60286571010, 60286571011, 60286571012, 60286571013, 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2279575 Matrix: Water
Associated Lab Samples: 60286571009, 60286571010, 60286571011, 60286571012, 60286571013, 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/17/18 10:46	H6

LABORATORY CONTROL SAMPLE: 2279576

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	100	90-110	H6

SAMPLE DUPLICATE: 2279577

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.096J	0.10J		20	H6

SAMPLE DUPLICATE: 2279578

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556509 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2283283 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/21/18 12:09	H6

LABORATORY CONTROL SAMPLE: 2283284

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	100	90-110	H6

SAMPLE DUPLICATE: 2283286

Parameter	Units	60287289002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

SAMPLE DUPLICATE: 2283287

Parameter	Units	60287289001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.1	2.1	2	20	H6

SAMPLE DUPLICATE: 2283288

Parameter	Units	60287288010 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.4	2.5	4	20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557318 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2286426 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/28/18 21:20	
Fluoride	mg/L	<0.19	0.20	0.19	11/28/18 21:20	
Sulfate	mg/L	<0.24	1.0	0.24	11/28/18 21:20	

LABORATORY CONTROL SAMPLE: 2286427

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286428 2286429

Parameter	Units	2088132005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	ND	25	25	24.5	32.8	98	131	90-110	29	15	M1,R1
Sulfate	mg/L	10.7			195	173				12	15	M1

MATRIX SPIKE SAMPLE: 2286430

Parameter	Units	60286571003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	86.6	50	147	121	90-110	M1
Fluoride	mg/L	<0.19	2.5	2.5	99	90-110	
Sulfate	mg/L	520	250	746	90	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 557508 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2287152 Matrix: Water
Associated Lab Samples: 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/29/18 20:18	
Fluoride	mg/L	<0.19	0.20	0.19	11/29/18 20:18	
Sulfate	mg/L	<0.24	1.0	0.24	11/29/18 20:18	

LABORATORY CONTROL SAMPLE: 2287153

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 558976 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571011

METHOD BLANK: 2293712 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006, 60286571007, 60286571008, 60286571009, 60286571011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.48J	1.0	0.29	12/08/18 14:13	
Fluoride	mg/L	<0.19	0.20	0.19	12/08/18 14:13	
Sulfate	mg/L	<0.24	1.0	0.24	12/08/18 14:13	

LABORATORY CONTROL SAMPLE: 2293713

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2293714 2293715

Parameter	Units	60287438001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	17.1J	100	100	103	104	86	87	90-110	1	15	M1
Fluoride	mg/L	<3.8	50	50	46.2	46.9	92	94	90-110	2	15	
Sulfate	mg/L	64.3	100	100	156	154	92	90	90-110	1	15	

MATRIX SPIKE SAMPLE: 2293716

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	14.3	5	19.8	111	90-110	M1
Fluoride	mg/L	0.26	2.5	2.5	90	90-110	
Sulfate	mg/L	80.4	50	129	98	90-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559055 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571012

METHOD BLANK: 2294201 Matrix: Water
Associated Lab Samples: 60286571012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/08/18 11:31	
Fluoride	mg/L	<0.19	0.20	0.19	12/08/18 11:31	

LABORATORY CONTROL SAMPLE: 2294202

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2294203 2294204

Parameter	Units	60286571012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	6.9	5	5	11.4	11.7	91	96	90-110	2	15	
Fluoride	mg/L	0.31	2.5	2.5	2.7	2.9	97	102	90-110	4	15	

MATRIX SPIKE SAMPLE: 2294205

Parameter	Units	60288021001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	246	100	343	97	90-110	
Fluoride	mg/L	1.0	2.5	3.5	98	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559267 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018

METHOD BLANK: 2295307 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/10/18 15:36	
Fluoride	mg/L	<0.19	0.20	0.19	12/10/18 15:36	
Sulfate	mg/L	<0.24	1.0	0.24	12/10/18 15:36	

LABORATORY CONTROL SAMPLE: 2295308

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2295309 2295310

Parameter	Units	60287649001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.23	2.5	2.5	2.9	2.8	106	105	90-110	1	15	
Sulfate	mg/L	ND	5	5	5.7	5.6	114	112	90-110	2	15	M1

MATRIX SPIKE SAMPLE: 2295311

Parameter	Units	60287799002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	366	500	788	84	90-110	M1
Fluoride	mg/L	27.4	250	251	89	90-110	M1
Sulfate	mg/L	118	500	540	84	90-110	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559270 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2295317 Matrix: Water
Associated Lab Samples: 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/11/18 05:27	
Fluoride	mg/L	<0.19	0.20	0.19	12/11/18 05:27	
Sulfate	mg/L	<0.24	1.0	0.24	12/11/18 05:27	

LABORATORY CONTROL SAMPLE: 2295318

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Fluoride	mg/L	2.5	2.3	94	90-110	
Sulfate	mg/L	5	4.5	91	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559515 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2296165 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/11/18 14:38	
Fluoride	mg/L	<0.19	0.20	0.19	12/11/18 14:38	
Sulfate	mg/L	<0.24	1.0	0.24	12/11/18 14:38	

LABORATORY CONTROL SAMPLE: 2296166

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

MATRIX SPIKE SAMPLE: 2296169

Parameter	Units	60288106001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	1110	1000	2220	111	90-110	M1

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559735 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571014, 60286571015

METHOD BLANK: 2296946 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	12/12/18 09:02	

LABORATORY CONTROL SAMPLE: 2296947

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2296948 2296949

Parameter	Units	60286571014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	30.4	10	10	40.7	40.5	102	101	90-110	0	15	E

MATRIX SPIKE SAMPLE: 2296950

Parameter	Units	60287758023 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	ND	5	4.7	95	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 559839
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286571019

METHOD BLANK: 2297425
Matrix: Water
Associated Lab Samples: 60286571019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/12/18 14:15	
Fluoride	mg/L	<0.19	0.20	0.19	12/12/18 14:15	
Sulfate	mg/L	<0.24	1.0	0.24	12/12/18 14:15	

LABORATORY CONTROL SAMPLE: 2297426

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.9	99	90-110	
Fluoride	mg/L	5	5.2	104	90-110	
Sulfate	mg/L	10	10.4	104	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 554984 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

METHOD BLANK: 2276694 Matrix: Water
Associated Lab Samples: 60286571001, 60286571002, 60286571003, 60286571004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/15/18 11:25	

LABORATORY CONTROL SAMPLE: 2276695

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	96	90-110	

MATRIX SPIKE SAMPLE: 2276696

Parameter	Units	60286318019 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.18	2	2.1	98	90-110	

MATRIX SPIKE SAMPLE: 2276698

Parameter	Units	60286571003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.28	2	2.3	100	90-110	

SAMPLE DUPLICATE: 2276697

Parameter	Units	60286372001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	<0.050	<0.050		10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556414 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286571005, 60286571006

METHOD BLANK: 2282866 Matrix: Water
Associated Lab Samples: 60286571005, 60286571006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/24/18 09:23	

LABORATORY CONTROL SAMPLE: 2282867

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	91	90-110	

MATRIX SPIKE SAMPLE: 2282868

Parameter	Units	60285123001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1.1	2	2.8	87	90-110	M1

MATRIX SPIKE SAMPLE: 2282870

Parameter	Units	60286655002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.8	89	90-110	M1

SAMPLE DUPLICATE: 2282869

Parameter	Units	60285123001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	1.1	<0.050		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556421 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

METHOD BLANK: 2282980 Matrix: Water
Associated Lab Samples: 60286571007, 60286571008, 60286571009, 60286571010, 60286571011, 60286571012, 60286571013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/24/18 10:00	

LABORATORY CONTROL SAMPLE: 2282981

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	90	90-110	

MATRIX SPIKE SAMPLE: 2282982

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.12	2	1.9	90	90-110	

MATRIX SPIKE SAMPLE: 2282984

Parameter	Units	60286677001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	7.0	2	8.8	86	90-110	M1

SAMPLE DUPLICATE: 2282983

Parameter	Units	60286664002 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	3.4	3.6	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556507 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

METHOD BLANK: 2283264 Matrix: Water
Associated Lab Samples: 60286571014, 60286571015, 60286571016, 60286571017, 60286571018, 60286571019, 60286571020, 60286571021, 60286571022, 60286571023, 60286571024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/24/18 12:44	

LABORATORY CONTROL SAMPLE: 2283265

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	91	90-110	

MATRIX SPIKE SAMPLE: 2283266

Parameter	Units	60287011001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.18	2	1.9	89	90-110	M1

MATRIX SPIKE SAMPLE: 2283268

Parameter	Units	60287013001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.26	2	2.0	87	90-110	M1

SAMPLE DUPLICATE: 2283267

Parameter	Units	60287011003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.44	0.44	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

QC Batch: 556706 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

METHOD BLANK: 2284384 Matrix: Water
Associated Lab Samples: 60287156001, 60287156002, 60287156003, 60287156004, 60287156005, 60287156006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/26/18 12:59	

LABORATORY CONTROL SAMPLE: 2284385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	92	90-110	

MATRIX SPIKE SAMPLE: 2284388

Parameter	Units	60287167001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.6	76	90-110	M1

MATRIX SPIKE SAMPLE: 2284608

Parameter	Units	60287371002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	3.6	2	4.8	64	90-110	M1

SAMPLE DUPLICATE: 2284387

Parameter	Units	60287412003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	9.1	9.3	2	10	

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QUALIFIERS

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

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.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
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.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571001	**S-TP-2S**	EPA 200.7	557225	EPA 200.7	557391
60286571002	**S-TP-2M**	EPA 200.7	557225	EPA 200.7	557391
60286571003	**S-TP-2D**	EPA 200.7	557225	EPA 200.7	557391
60286571004	**S-NE-DUP-1**	EPA 200.7	557225	EPA 200.7	557391
60286571005	**S-TP-5S**	EPA 200.7	557272	EPA 200.7	557416
60286571006	**S-TP-5M**	EPA 200.7	557272	EPA 200.7	557416
60286571007	**S-TP-5D**	EPA 200.7	557272	EPA 200.7	557416
60286571008	**S-TP-6S**	EPA 200.7	557272	EPA 200.7	557416
60286571009	**S-TP-6M**	EPA 200.7	557272	EPA 200.7	557416
60286571010	**S-TP-6D**	EPA 200.7	557272	EPA 200.7	557416
60286571011	**S-NE-DUP-2**	EPA 200.7	557272	EPA 200.7	557416
60286571012	**S-NE-DUP-3**	EPA 200.7	557272	EPA 200.7	557416
60286571013	**S-NE-FB-1**	EPA 200.7	557272	EPA 200.7	557416
60286571014	**S-TP-3S**	EPA 200.7	557560	EPA 200.7	557641
60286571015	**S-TP-3M**	EPA 200.7	557560	EPA 200.7	557641
60286571016	**S-TP-3D**	EPA 200.7	557560	EPA 200.7	557641
60286571017	**S-TP-7S**	EPA 200.7	557560	EPA 200.7	557641
60286571018	**S-TP-7M**	EPA 200.7	557560	EPA 200.7	557641
60286571019	**S-TP-7D**	EPA 200.7	557560	EPA 200.7	557641
60286571020	**S-TP-8S**	EPA 200.7	557560	EPA 200.7	557641
60286571021	**S-TP-8M**	EPA 200.7	557560	EPA 200.7	557641
60286571022	**S-TP-8D**	EPA 200.7	557560	EPA 200.7	557641
60286571023	**S-NE-FB-2**	EPA 200.7	557560	EPA 200.7	557641
60286571024	**S-NE-FB-3**	EPA 200.7	557560	EPA 200.7	557641
60287156001	**S-TP-1S**	EPA 200.7	558026	EPA 200.7	558094
60287156002	**S-TP-1M**	EPA 200.7	558026	EPA 200.7	558094
60287156003	**S-TP-1D**	EPA 200.7	558026	EPA 200.7	558094
60287156004	**S-TP-4S**	EPA 200.7	558026	EPA 200.7	558094
60287156005	**S-TP-4M**	EPA 200.7	558026	EPA 200.7	558094
60287156006	**S-TP-4D**	EPA 200.7	558026	EPA 200.7	558094
60286571001	**S-TP-2S**	EPA 200.8	557233	EPA 200.8	557393
60286571002	**S-TP-2M**	EPA 200.8	557233	EPA 200.8	557393
60286571003	**S-TP-2D**	EPA 200.8	557233	EPA 200.8	557393
60286571004	**S-NE-DUP-1**	EPA 200.8	557233	EPA 200.8	557393
60286571005	**S-TP-5S**	EPA 200.8	557460	EPA 200.8	557561
60286571006	**S-TP-5M**	EPA 200.8	557460	EPA 200.8	557561
60286571007	**S-TP-5D**	EPA 200.8	557460	EPA 200.8	557561
60286571008	**S-TP-6S**	EPA 200.8	557460	EPA 200.8	557561
60286571009	**S-TP-6M**	EPA 200.8	557460	EPA 200.8	557561
60286571010	**S-TP-6D**	EPA 200.8	557460	EPA 200.8	557561
60286571011	**S-NE-DUP-2**	EPA 200.8	557460	EPA 200.8	557561
60286571012	**S-NE-DUP-3**	EPA 200.8	557460	EPA 200.8	557561
60286571013	**S-NE-FB-1**	EPA 200.8	557460	EPA 200.8	557561
60286571014	**S-TP-3S**	EPA 200.8	558060	EPA 200.8	558102
60286571015	**S-TP-3M**	EPA 200.8	558060	EPA 200.8	558102
60286571016	**S-TP-3D**	EPA 200.8	558060	EPA 200.8	558102

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571017	S-TP-7S	EPA 200.8	558060	EPA 200.8	558102
60286571018	S-TP-7M	EPA 200.8	558060	EPA 200.8	558102
60286571019	S-TP-7D	EPA 200.8	558060	EPA 200.8	558102
60286571020	S-TP-8S	EPA 200.8	558060	EPA 200.8	558102
60286571021	S-TP-8M	EPA 200.8	558060	EPA 200.8	558102
60286571022	S-TP-8D	EPA 200.8	558060	EPA 200.8	558102
60286571023	S-NE-FB-2	EPA 200.8	558060	EPA 200.8	558102
60286571024	S-NE-FB-3	EPA 200.8	558060	EPA 200.8	558102
60287156001	S-TP-1S	EPA 200.8	558060	EPA 200.8	558102
60287156002	S-TP-1M	EPA 200.8	558060	EPA 200.8	558102
60287156003	S-TP-1D	EPA 200.8	558060	EPA 200.8	558102
60287156004	S-TP-4S	EPA 200.8	558060	EPA 200.8	558102
60287156005	S-TP-4M	EPA 200.8	558060	EPA 200.8	558102
60287156006	S-TP-4D	EPA 200.8	558060	EPA 200.8	558102
60286571001	S-TP-2S	EPA 7470	557276	EPA 7470	557453
60286571002	S-TP-2M	EPA 7470	557276	EPA 7470	557453
60286571003	S-TP-2D	EPA 7470	557276	EPA 7470	557453
60286571004	S-NE-DUP-1	EPA 7470	557276	EPA 7470	557453
60286571005	S-TP-5S	EPA 7470	557517	EPA 7470	557564
60286571006	S-TP-5M	EPA 7470	557517	EPA 7470	557564
60286571007	S-TP-5D	EPA 7470	557517	EPA 7470	557564
60286571008	S-TP-6S	EPA 7470	557517	EPA 7470	557564
60286571009	S-TP-6M	EPA 7470	557517	EPA 7470	557564
60286571010	S-TP-6D	EPA 7470	557517	EPA 7470	557564
60286571011	S-NE-DUP-2	EPA 7470	557517	EPA 7470	557564
60286571012	S-NE-DUP-3	EPA 7470	557517	EPA 7470	557564
60286571013	S-NE-FB-1	EPA 7470	557517	EPA 7470	557564
60286571014	S-TP-3S	EPA 7470	557911	EPA 7470	558000
60286571015	S-TP-3M	EPA 7470	557911	EPA 7470	558000
60286571016	S-TP-3D	EPA 7470	557911	EPA 7470	558000
60286571017	S-TP-7S	EPA 7470	557911	EPA 7470	558000
60286571018	S-TP-7M	EPA 7470	557911	EPA 7470	558000
60286571019	S-TP-7D	EPA 7470	557911	EPA 7470	558000
60286571020	S-TP-8S	EPA 7470	557911	EPA 7470	558000
60286571021	S-TP-8M	EPA 7470	557911	EPA 7470	558000
60286571022	S-TP-8D	EPA 7470	557911	EPA 7470	558000
60286571023	S-NE-FB-2	EPA 7470	557911	EPA 7470	558000
60286571024	S-NE-FB-3	EPA 7470	557911	EPA 7470	558000
60287156001	S-TP-1S	EPA 7470	557912	EPA 7470	558002
60287156002	S-TP-1M	EPA 7470	557912	EPA 7470	558002
60287156003	S-TP-1D	EPA 7470	557912	EPA 7470	558002
60287156004	S-TP-4S	EPA 7470	557912	EPA 7470	558002
60287156005	S-TP-4M	EPA 7470	557912	EPA 7470	558002
60287156006	S-TP-4D	EPA 7470	557912	EPA 7470	558002
60286571001	S-TP-2S	SM 2320B	556192		
60286571002	S-TP-2M	SM 2320B	556192		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571003	**S-TP-2D**	SM 2320B	556367		
60286571004	**S-NE-DUP-1**	SM 2320B	556367		
60286571005	**S-TP-5S**	SM 2320B	556417		
60286571006	**S-TP-5M**	SM 2320B	556417		
60286571007	**S-TP-5D**	SM 2320B	556417		
60286571008	**S-TP-6S**	SM 2320B	556417		
60286571009	**S-TP-6M**	SM 2320B	556649		
60286571010	**S-TP-6D**	SM 2320B	556417		
60286571011	**S-NE-DUP-2**	SM 2320B	556417		
60286571012	**S-NE-DUP-3**	SM 2320B	556417		
60286571013	**S-NE-FB-1**	SM 2320B	556417		
60286571014	**S-TP-3S**	SM 2320B	556754		
60286571015	**S-TP-3M**	SM 2320B	556754		
60286571016	**S-TP-3D**	SM 2320B	556754		
60286571017	**S-TP-7S**	SM 2320B	556754		
60286571018	**S-TP-7M**	SM 2320B	556754		
60286571019	**S-TP-7D**	SM 2320B	556754		
60286571020	**S-TP-8S**	SM 2320B	556754		
60286571021	**S-TP-8M**	SM 2320B	556754		
60286571022	**S-TP-8D**	SM 2320B	556754		
60286571023	**S-NE-FB-2**	SM 2320B	556754		
60286571024	**S-NE-FB-3**	SM 2320B	556754		
60287156001	**S-TP-1S**	SM 2320B	557384		
60287156002	**S-TP-1M**	SM 2320B	557384		
60287156003	**S-TP-1D**	SM 2320B	557384		
60287156004	**S-TP-4S**	SM 2320B	557384		
60287156005	**S-TP-4M**	SM 2320B	557384		
60287156006	**S-TP-4D**	SM 2320B	557384		
60286571001	**S-TP-2S**	SM 2540C	555505		
60286571002	**S-TP-2M**	SM 2540C	555505		
60286571003	**S-TP-2D**	SM 2540C	555505		
60286571004	**S-NE-DUP-1**	SM 2540C	555505		
60286571005	**S-TP-5S**	SM 2540C	555739		
60286571006	**S-TP-5M**	SM 2540C	555739		
60286571007	**S-TP-5D**	SM 2540C	555739		
60286571008	**S-TP-6S**	SM 2540C	555739		
60286571009	**S-TP-6M**	SM 2540C	555802		
60286571010	**S-TP-6D**	SM 2540C	555802		
60286571011	**S-NE-DUP-2**	SM 2540C	555802		
60286571012	**S-NE-DUP-3**	SM 2540C	555802		
60286571013	**S-NE-FB-1**	SM 2540C	555802		
60286571014	**S-TP-3S**	SM 2540C	555805		
60286571015	**S-TP-3M**	SM 2540C	555805		
60286571016	**S-TP-3D**	SM 2540C	555805		

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571017	**S-TP-7S**	SM 2540C	555805		
60286571018	**S-TP-7M**	SM 2540C	555805		
60286571019	**S-TP-7D**	SM 2540C	555805		
60286571020	**S-TP-8S**	SM 2540C	555805		
60286571021	**S-TP-8M**	SM 2540C	555805		
60286571022	**S-TP-8D**	SM 2540C	555805		
60286571023	**S-NE-FB-2**	SM 2540C	555805		
60286571024	**S-NE-FB-3**	SM 2540C	555805		
60287156001	**S-TP-1S**	SM 2540C	556380		
60287156002	**S-TP-1M**	SM 2540C	556380		
60287156003	**S-TP-1D**	SM 2540C	556380		
60287156004	**S-TP-4S**	SM 2540C	556380		
60287156005	**S-TP-4M**	SM 2540C	556380		
60287156006	**S-TP-4D**	SM 2540C	556380		
60286571001	**S-TP-2S**	SM 3500-Fe B#4	558082		
60286571002	**S-TP-2M**	SM 3500-Fe B#4	558082		
60286571003	**S-TP-2D**	SM 3500-Fe B#4	558082		
60286571004	**S-NE-DUP-1**	SM 3500-Fe B#4	558082		
60286571005	**S-TP-5S**	SM 3500-Fe B#4	558084		
60286571006	**S-TP-5M**	SM 3500-Fe B#4	558084		
60286571007	**S-TP-5D**	SM 3500-Fe B#4	558084		
60286571008	**S-TP-6S**	SM 3500-Fe B#4	558084		
60286571009	**S-TP-6M**	SM 3500-Fe B#4	558084		
60286571010	**S-TP-6D**	SM 3500-Fe B#4	558084		
60286571011	**S-NE-DUP-2**	SM 3500-Fe B#4	558084		
60286571012	**S-NE-DUP-3**	SM 3500-Fe B#4	558084		
60286571013	**S-NE-FB-1**	SM 3500-Fe B#4	558084		
60286571014	**S-TP-3S**	SM 3500-Fe B#4	558438		
60286571015	**S-TP-3M**	SM 3500-Fe B#4	558438		
60286571016	**S-TP-3D**	SM 3500-Fe B#4	558438		
60286571017	**S-TP-7S**	SM 3500-Fe B#4	558438		
60286571018	**S-TP-7M**	SM 3500-Fe B#4	558438		
60286571019	**S-TP-7D**	SM 3500-Fe B#4	558438		
60286571020	**S-TP-8S**	SM 3500-Fe B#4	558438		
60286571021	**S-TP-8M**	SM 3500-Fe B#4	558438		
60286571022	**S-TP-8D**	SM 3500-Fe B#4	558438		
60286571023	**S-NE-FB-2**	SM 3500-Fe B#4	558438		
60286571024	**S-NE-FB-3**	SM 3500-Fe B#4	558438		
60287156001	**S-TP-1S**	SM 3500-Fe B#4	558438		
60287156002	**S-TP-1M**	SM 3500-Fe B#4	558438		
60287156003	**S-TP-1D**	SM 3500-Fe B#4	558438		
60287156004	**S-TP-4S**	SM 3500-Fe B#4	558438		
60287156005	**S-TP-4M**	SM 3500-Fe B#4	558438		
60287156006	**S-TP-4D**	SM 3500-Fe B#4	558438		
60286571001	**S-TP-2S**	SM 3500-Fe B#4	555661		
60286571002	**S-TP-2M**	SM 3500-Fe B#4	555661		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPA N&E
Pace Project No.: 60286571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571003	**S-TP-2D**	SM 3500-Fe B#4	555661		
60286571004	**S-NE-DUP-1**	SM 3500-Fe B#4	555661		
60286571005	**S-TP-5S**	SM 3500-Fe B#4	555661		
60286571006	**S-TP-5M**	SM 3500-Fe B#4	555661		
60286571007	**S-TP-5D**	SM 3500-Fe B#4	555661		
60286571008	**S-TP-6S**	SM 3500-Fe B#4	555661		
60286571009	**S-TP-6M**	SM 3500-Fe B#4	555662		
60286571010	**S-TP-6D**	SM 3500-Fe B#4	555662		
60286571011	**S-NE-DUP-2**	SM 3500-Fe B#4	555662		
60286571012	**S-NE-DUP-3**	SM 3500-Fe B#4	555662		
60286571013	**S-NE-FB-1**	SM 3500-Fe B#4	555662		
60286571014	**S-TP-3S**	SM 3500-Fe B#4	555662		
60286571015	**S-TP-3M**	SM 3500-Fe B#4	555662		
60286571016	**S-TP-3D**	SM 3500-Fe B#4	555662		
60286571017	**S-TP-7S**	SM 3500-Fe B#4	555662		
60286571018	**S-TP-7M**	SM 3500-Fe B#4	555662		
60286571019	**S-TP-7D**	SM 3500-Fe B#4	555662		
60286571020	**S-TP-8S**	SM 3500-Fe B#4	555662		
60286571021	**S-TP-8M**	SM 3500-Fe B#4	555662		
60286571022	**S-TP-8D**	SM 3500-Fe B#4	555662		
60286571023	**S-NE-FB-2**	SM 3500-Fe B#4	555662		
60286571024	**S-NE-FB-3**	SM 3500-Fe B#4	555662		
60287156001	**S-TP-1S**	SM 3500-Fe B#4	556509		
60287156002	**S-TP-1M**	SM 3500-Fe B#4	556509		
60287156003	**S-TP-1D**	SM 3500-Fe B#4	556509		
60287156004	**S-TP-4S**	SM 3500-Fe B#4	556509		
60287156005	**S-TP-4M**	SM 3500-Fe B#4	556509		
60287156006	**S-TP-4D**	SM 3500-Fe B#4	556509		
60286571001	**S-TP-2S**	EPA 300.0	557318		
60286571002	**S-TP-2M**	EPA 300.0	557318		
60286571003	**S-TP-2D**	EPA 300.0	557318		
60286571004	**S-NE-DUP-1**	EPA 300.0	557318		
60286571005	**S-TP-5S**	EPA 300.0	558976		
60286571006	**S-TP-5M**	EPA 300.0	558976		
60286571007	**S-TP-5D**	EPA 300.0	558976		
60286571008	**S-TP-6S**	EPA 300.0	558976		
60286571009	**S-TP-6M**	EPA 300.0	558976		
60286571010	**S-TP-6D**	EPA 300.0	557508		
60286571011	**S-NE-DUP-2**	EPA 300.0	557508		
60286571011	**S-NE-DUP-2**	EPA 300.0	558976		
60286571012	**S-NE-DUP-3**	EPA 300.0	557508		
60286571012	**S-NE-DUP-3**	EPA 300.0	559055		
60286571013	**S-NE-FB-1**	EPA 300.0	557508		
60286571014	**S-TP-3S**	EPA 300.0	559267		

REPORT OF LABORATORY ANALYSIS

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286571014	S-TP-3S	EPA 300.0	559735		
60286571015	S-TP-3M	EPA 300.0	559267		
60286571015	S-TP-3M	EPA 300.0	559735		
60286571016	S-TP-3D	EPA 300.0	559267		
60286571017	S-TP-7S	EPA 300.0	559267		
60286571018	S-TP-7M	EPA 300.0	559267		
60286571019	S-TP-7D	EPA 300.0	559839		
60286571020	S-TP-8S	EPA 300.0	559270		
60286571021	S-TP-8M	EPA 300.0	559270		
60286571022	S-TP-8D	EPA 300.0	559270		
60286571023	S-NE-FB-2	EPA 300.0	559270		
60286571024	S-NE-FB-3	EPA 300.0	559270		
60287156001	S-TP-1S	EPA 300.0	559515		
60287156002	S-TP-1M	EPA 300.0	559515		
60287156003	S-TP-1D	EPA 300.0	559515		
60287156004	S-TP-4S	EPA 300.0	559515		
60287156005	S-TP-4M	EPA 300.0	559515		
60287156006	S-TP-4D	EPA 300.0	559515		
60286571001	S-TP-2S	EPA 365.4	554984		
60286571002	S-TP-2M	EPA 365.4	554984		
60286571003	S-TP-2D	EPA 365.4	554984		
60286571004	S-NE-DUP-1	EPA 365.4	554984		
60286571005	S-TP-5S	EPA 365.4	556414		
60286571006	S-TP-5M	EPA 365.4	556414		
60286571007	S-TP-5D	EPA 365.4	556421		
60286571008	S-TP-6S	EPA 365.4	556421		
60286571009	S-TP-6M	EPA 365.4	556421		
60286571010	S-TP-6D	EPA 365.4	556421		
60286571011	S-NE-DUP-2	EPA 365.4	556421		
60286571012	S-NE-DUP-3	EPA 365.4	556421		
60286571013	S-NE-FB-1	EPA 365.4	556421		
60286571014	S-TP-3S	EPA 365.4	556507		
60286571015	S-TP-3M	EPA 365.4	556507		
60286571016	S-TP-3D	EPA 365.4	556507		
60286571017	S-TP-7S	EPA 365.4	556507		
60286571018	S-TP-7M	EPA 365.4	556507		
60286571019	S-TP-7D	EPA 365.4	556507		
60286571020	S-TP-8S	EPA 365.4	556507		
60286571021	S-TP-8M	EPA 365.4	556507		
60286571022	S-TP-8D	EPA 365.4	556507		
60286571023	S-NE-FB-2	EPA 365.4	556507		
60286571024	S-NE-FB-3	EPA 365.4	556507		
60287156001	S-TP-1S	EPA 365.4	556706		

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Pace Project No.: 60286571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60287156002	**S-TP-1M**	EPA 365.4	556706		
60287156003	**S-TP-1D**	EPA 365.4	556706		
60287156004	**S-TP-4S**	EPA 365.4	556706		
60287156005	**S-TP-4M**	EPA 365.4	556706		
60287156006	**S-TP-4D**	EPA 365.4	556706		

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Sample Condition Upon Receipt

WO# : 60286571

60286571

Client Name: Golder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 4.0 3.6 **Corr. Factor** +0.0 **Corrected** 4.0 3.6

Date and initials of person examining contents: JB 11/13 JB

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	FC 24
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Church 11/13/18 Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #14)

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N						
1	S-TP-1S	WT	G																								60286571
2	S-TP-1M	WT	G																								
3	S-TP-1D	WT	G																								
4	S-TP-2S	WT	G	11/12/18	1040	11/12/18	1040		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	(2) BP2U BP3S BP3N 001
5	S-TP-2M	WT	G		1130		1130		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	002
6	S-TP-2D	WT	G		1250		1250		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	(3x) 003
7	~~S-TP-20~~ S-TP-20-MS	WT	G		1250		1250		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
8	~~S-TP-20~~ S-TP-20-MSD	WT	G		1250		1250		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
9	~~S-TP-20~~ S-NE-Dup-1	WT	G				—		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	1	004
10	S-TP-4S	WT	G																								
11	S-TP-4M	WT	G																								
12	S-TP-4D	WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder	11/12/18	17:15		11/13	0747

SAMPLE CONDITIONS	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	4.0	y	y	y
	3.6	y	y	y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: | DATE Signed (MM/DD/YY):

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Sample Condition Upon Receipt

WO# : 60286571

60286571

Client Name: Golder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 3.3 3.0 4.0 3.4 **Corr. Factor** +0.0 **Corrected** 3.3 3.0 4.0 3.4

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Church 11/14/18

Project Manager Review: _____ Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

60286571

Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPA N&E	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003L (COC #14)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

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

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
																		Y/N		N	N	N	N	N	N	N	N								
1	S-TP-5S	WT	G			11/13/18	1430		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓						2	BP2U BP3S BP3N	005
2	S-TP-5M	WT	G				1510		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓								006
3	S-TP-5D	WT	G				1555		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓								007
4	S-TP-6S	WT	G				1340		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓								008
5	S-TP-6M	WT	G				1430		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓						(3X)		009
6	S-TP-6D	WT	G				1535		4	2	1	1								✓	✓	✓	✓	✓	✓	✓	✓								010
7	S-TP-7S	WT	G																														
8	S-TP-7M	WT	G																														
9	S-TP-7D	WT	G																														
10	S-TP-8S	WT	G																														
11	S-TP-8M	WT	G																														
12	S-TP-8D	WT	G																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder	11/13/18	1715		11/14/18	0340	3.6	Y	Y	Y
							3.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Bri Works		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY): 11/13/18				

CHAIN-OF-CUSTODY / Analytical Request Document

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

6028671

Page: 2 of 2

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #14)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Analysis Test Y/N																		N	N	N	N	N	N	N	N	
1	S-NE-DUP-1	WT	G			11/13/18	—		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	20 BP2N BP3S BP3N 250
2	S-NE-DUP-2	WT	G			〃	—		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
3	S-NE-DUP-3	WT	G			〃	—		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
4	S-NE-FB-1	WT	G			〃	1505		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
5	S-NE-FB-2	WT	G																								
6	S-NE-FB-3	WT	G																								
7	S-NE-MS-2	WT	G			11/13/18	1430		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
8	S-NE-MSD-2	WT	G			〃	1430		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓	
9		WT	G																								
10		WT	G																								
11		WT	G																								
12		WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	[signature] / Golder	11/13/18	1715				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Works

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/13/18

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

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Sample Condition Upon Receipt

WO# : 60286571

60286571

Client Name: Golder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 3.6 4.0 2.8 4.0 **Corr. Factor** +0.0 **Corrected** 3.6 4.0 2.8 4.0

Date and initials of person examining contents: JLS 11/16

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	Fe2+
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Chunk 11/16/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical™ www.pacelabs.com

Page: 1 of 3

Section A — **Required** Client Information:

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

Section B — **Required** Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #14)

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES — GROUND WATER (circled) — DRINKING WATER

UST — RCRA — OTHER

Site Location STATE: MO

Section D Required Client Information

Valid Matrix Codes

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

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

Requested Analysis Filtered (Y/N): Metals* N, Mercury N, Chloride/Fluoride/Sulfate N

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60286571
1	S-TP-1S	WT	G																									
2	S-TP-1M	WT	G																									
3	S-TP-1D	WT	G																									
4	S-TP-2S	WT	G																									
5	S-TP-2M	WT	G																									
6	S-TP-2D	WT	G																									
7	S-TP-3S	WT	G			11/14/18	1505		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓		(2) BP2U BP3S BP3N 014
8	S-TP-3M	WT	G			↓	1540		↓	↓	↓	↓							↓	↓	↓	↓	↓	↓	↓	↓		↓ [illegible]
9	S-TP-3D	WT	G			↓	1610		↓	↓	↓	↓							↓	↓	↓	↓	↓	↓	↓	↓		↓ [illegible]
10	S-TP-4S	WT	G																									
11	S-TP-4M	WT	G																									
12	S-TP-4D	WT	G																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder / [illegible]	11/14/18	1750	[illegible]	11/15	1000	3.6	Y	Y	Y
							4.0	Y	Y	Y
							2.8	Y	Y	Y
							4.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [illegible]

SIGNATURE of SAMPLER: [illegible]

DATE Signed (MM/DD/YY): 11/14/18

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 2 of 3

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPA N&E	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003L (COC #14)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N	N	N	N					
1	S-TP-5S	WT	G																										
2	S-TP-5M	WT	G																										
3	S-TP-5D	WT	G																										
4	S-TP-6S	WT	G																										
5	S-TP-6M	WT	G																										
6	S-TP-6D	WT	G																										
7	S-TP-7S	WT	G			11/1/18	1005		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓				(2) BP2A BP3S BP3D	017
8	S-TP-7M	WT	G				1035		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓					018
9	S-TP-7D	WT	G				1120		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓					019
10	S-TP-8S	WT	G				1300		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓					020
11	S-TP-8M	WT	G				1335		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓					021
12	S-TP-8D	WT	G				1410		4	2	1		1						✓	✓	✓	✓	✓	✓	✓	✓					022

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl		11/1/18	1730				

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Eric Schroeder	DATE Signed (MM/DD/YY):	11/1/18	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:							

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical www.pacelabs.com

Page: 3 of 3

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #14)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER (circled) | DRINKING WATER
UST | RCRA | OTHER ______

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N): N N N N N N N N

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-NE-DUP-1	WT	G																									
2	S-NE-DUP-2	WT	G																									
3	S-NE-DUP-3	WT	G																									
4	S-NE-FB-1	WT	G																									
5	S-NE-FB-2	WT	G			11/14/18	1130		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓		(2) BP2U BP35 BP3N 025
6	S-NE-FB-3	WT	G			⊥	1420		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓		+ 024
7		WT	G																									
8		WT	G																									
9		WT	G																									
10		WT	G																									
11		WT	G																									
12		WT	G																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder / [signature]	11/14/18	1750				

SAMPLER NAME AND SAMPLER SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 11/14/18

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

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60287156

60287156

Client Name: Golder

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

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

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

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

Thermometer Used: T-298 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.7 **Corr. Factor** 0.0 **Corrected** 2.7

Date and initials of person examining contents: KC 11/18

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	FE21
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Chunk Date: 11/18/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #14)

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES — GROUND WATER — DRINKING WATER

UST — RCRA — OTHER _____

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N						60267156
1	S-TP-1S	WT	G			11/16/18	1120		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓		2BP2U, BP3S, BP3N 01
2	S-TP-1M	WT	G			1	1350		1	1	1	1							1	1	1	1	1	1	1	1		02
3	S-TP-1D	WT	G			1	1245		2	2	2	2							1	1	1	1	1	1	1	1		03
4	S-TP-2S	WT	G																									
5	S-TP-2M	WT	G																									
6	S-TP-2D	WT	G																									
7	S-TP-3S	WT	G																									
8	S-TP-3M	WT	G																									
9	S-TP-3D	WT	G																									
10	S-TP-4S	WT	G			11/16/18	1020		4	2	1	1							✓	✓	✓	✓	✓	✓	✓	✓		2BP2U, BP3S, BP3N 04
11	S-TP-4M	WT	G			1	1050		1	1	1	1							1	1	1	1	1	1	1	1		05
12	S-TP-4D	WT	G			1	1125		2	2	2	2							1	1	1	1	1	1	1	1		06

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder	11/16/18		EBrockett / Pace	11/17/18	0430	2.7	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Andrew Atkins

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 11/16/18

MEMORANDUM

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

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – GROUNDWATER MONITORING – DATA PACKAGE 60286571

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

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).
- When a sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SEC-SCPA-NTE
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/17/19

Laboratory: Pace Analytical
SDG #: 60286571
Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), ~~Ra (903.1&904.0)~~ (2)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-TP-2S, S-TP-2M, S-TP-2D, S-NE-DUP-1, S-TP-5S, S-TP-5M, S-TP-5D, S-TP-6S, S-TP-6M, S-TP-6D, S-NE-DUP-2, S-NE-DUP-3, S-NE-FB-1, S-TP-3S, S-TP-3M, S-TP-3D, S-TP-7S, S-TP-7M, S-TP-7D, S-TP-8S, S-TP-8M, S-TP-8D, S-NE-FB-2, S-NE-FB-3, S-TP-1S, S-TP-1M, S-TP-1D, S-TP-4S, S-TP-4M, S-TP-4D

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/(13,14,16)/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☐	☐	☒	
b) Were hold times met for sample analysis?	☐	☑	☐	Fe^{2+}
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☑	☐	☐	
g) Were any matrix problems noted?	☑	☐	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☐	☐	☐	See Notes Fe^{3+}(0.032)
b) Were analytes detected in the field blank(s)?	☑	☐	☐	FB-1: Ca(238), Fe(32.1), Mn(0.92), K(106), Na(58), Cl(0.24)
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	FB-2: Cr(0.11),
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	FB-3: Cr(0.22), TDS(6.5)

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☑	☐	☐	Dup-1@TP-2M ; Dup-2@TP-5S ; Dup-3@TP-6S FB-1@TP-5M ; FB-2@TP-7D ; FB-3@TP-8D
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Dup-1: Pb,t(200), Cl(134)
c) Were lab duplicates analyzed (note original and duplicate samples)?	☒	☐	☐	Dup-2: Be(42), Co(200), Pb(200), Se(73), F(200), P(200) Dup-3: Cr(35)
d) Were lab dup. precision criteria met (note RPD)?	☐	☑	☐	[1009] TDS(24)

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

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

Comments/Notes:

MB
[1001-04] Be(0.48), Fe(8.6), K(179), Cs(0.19),
[1005-13] Fe(8.0), Li(8.0), K(109), Cs(0.19), Cl(0.48)
[1014-24] Mn(3.1), K(81.0), Na(253)
[6001-06] Mg(21.8),

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
All Samples	Ferrous Iron (Fe^{2+})	—	J/UJ	Analyzed outside EPA hold time
S-TP-2S	Potassium (K)	1140	J	MB; 10×MB > Result > PQL
⊥	Chromium (Cr)	1.0	U	⊥; PQL > Result > MDL
S-TP-2M	Cr	1.0	U	⊥ ⊥
⊥	Lead (Pb)	3.5	J	RPD exceeded limit; Result > MDL
⊥	Chloride (Cl^-)	11.4	J	⊥ ⊥
S-TP-2D	Beryllium (Be)	1.0	U	MB; PQL > Result > MDL
⊥	Cr	1.0	U	⊥ ⊥
S-NE-DUP-1	Cr	1.0	U	
⊥	Pb	3.0	UJ	RPD exceeded limit; MDL > Result
⊥	Cl^-	57.8	J	⊥ ; Result > MDL
S-TP-5S	Lithium (Li)	10.0	U	MB; PQL > Result > MDL
⊥	Cr	1.0	U	⊥ ⊥
⊥	Be	0.43	J	RPD; Result > MDL
⊥	Cobalt (Co)	0.95	J	⊥
⊥	Pb	3.0	UJ	⊥; MDL > Result
⊥	Selenium (Se)	0.19	J	⊥; Result > MDL
⊥	Fluoride (F^-)	0.28	J	⊥ ⊥
⊥	Phosphorus (P)	0.054	J	⊥ ⊥
S-TP-5M	Li	31.0	J	MB; 10×MB > Result > MDL
⊥	Cr	1.0	U	⊥; PQL > Result > MDL
S-TP-5D	Cr	1.0	U	⊥
⊥	Li	33.0	J	⊥; 10×MB > Result > MDL
S-TP-6S	Li	33.7	J	⊥
⊥	Cr	1.0	U	⊥; PQL > Result > MDL
S-TP-6M	Cr	1.0	U	⊥
⊥	Li	22.8	J	⊥; 10×MB > Result > MDL
⊥	Total Dissolved Solids (TDS)	540	J	Sample Dup exceeded limit; Result > MDL
S-TP-6D	Li	28.0	J	MB; 10×MB > Result > MDL
⊥	Cr	1.0	U	PQL > Result > MDL
Continue on Next Page				

Signature: _____ Date: _____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-NE-DUP-2	Li	18.8	J	MB; 10×MB > Result > MDL
↓	Cr	1.0	U	↓; PQL > Result > MDL
	Be	0.28	J	RPD; Result > MDL
	Co	0.87	UJ	; MDL > Result
	Pb	3.8	J	; Result > MDL
	Se	0.088	J	↓
	F⁻	0.19	UJ	; MDL > Result
↓	P	0.050	UJ	↓
S-NE-DUP-3	Li	31.0	J	MB; 10×MB > Result > MDL
↓	Cr	1.0	U	; PQL > Result > MDL
S-NE-FB-1	Iron (Fe)	50.0	U	
↓	Potassium (K)	500	U	
↓	Cr	1.0	U	↓

Signature: Tommy J. Good Jr. Date: 1/19/19

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

January 14, 2019

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

RE: Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between November 13, 2018 and November 17, 2018. 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.

REV-1, 1/14/19: Revised to remove Bairum , Lithium, Molybdenum and Arsenic.

REV-1, 1/14/19: Revised to report only Barium, Lithium, Molybdenum and Arsenic

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

Sincerely,

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

Enclosures

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

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Arkansas Drinking Water
Missouri Certification Number: 10090
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

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SAMPLE SUMMARY

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286568001	**S-BMW-1S**	Water	11/12/18 13:45	11/13/18 03:47
60286568002	**S-BMW-3S**	Water	11/12/18 11:05	11/13/18 03:47
60287013001	**S-LMW-1S**	Water	11/14/18 12:25	11/15/18 10:00
60287013002	**S-LMW-4S**	Water	11/14/18 15:25	11/15/18 10:00
60287013003	**S-LMW-6S**	Water	11/14/18 15:45	11/15/18 10:00
60287013004	**S-LMW-7S**	Water	11/14/18 13:35	11/15/18 10:00
60287013005	**S-LMW-8S**	Water	11/14/18 14:40	11/15/18 10:00
60287013006	**S-LMW-DUP-1**	Water	11/14/18 12:25	11/15/18 10:00
60287013007	**S-LMW-DUP-2**	Water	11/14/18 12:25	11/15/18 10:00
60287013008	**S-LMW-FB-1**	Water	11/14/18 15:35	11/15/18 10:00
60287013009	**S-LMW-FB-2**	Water	11/14/18 15:50	11/15/18 10:00
60287167001	**S-LMW-2S**	Water	11/16/18 14:15	11/17/18 04:30
60287167002	**S-LMW-3S**	Water	11/16/18 13:05	11/17/18 04:30
60287167003	**S-LMW-5S**	Water	11/16/18 10:20	11/17/18 04:30
60287167004	**S-LMW-9S**	Water	11/16/18 14:40	11/17/18 04:30

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286568001	S-BMW-1S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286568002	S-BMW-3S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013001	S-LMW-1S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013002	S-LMW-4S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013003	S-LMW-6S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013004	S-LMW-7S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013005	S-LMW-8S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013006	S-LMW-DUP-1	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013007	S-LMW-DUP-2	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013008	S-LMW-FB-1	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287013009	S-LMW-FB-2	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287167001	S-LMW-2S	EPA 200.7	EMR, JGP	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287167002	S-LMW-3S	EPA 200.7	EMR, JGP	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287167003	S-LMW-5S	EPA 200.7	EMR, JGP	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287167004	S-LMW-9S	EPA 200.7	EMR, JGP	3	PASI-K
		EPA 200.8	JDH	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-BMW-1S **Lab ID: 60286568001** Collected: 11/12/18 13:45 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**160**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:48	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:48	7439-93-2	
Molybdenum	**2.2J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:48	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.95J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:54	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-BMW-3S **Lab ID: 60286568002** Collected: 11/12/18 11:05 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**157**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:50	7440-39-3	
Lithium	**12.1**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:50	7439-93-2	
Molybdenum	**2.8J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:50	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.45J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:57	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-1S **Lab ID: 60287013001** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**127**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:30	7440-39-3	
Lithium	**21.0**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:30	7439-93-2	
Molybdenum	**43.6**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:30	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.0**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:55	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-4S **Lab ID: 60287013002** Collected: 11/14/18 15:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**247**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:36	7440-39-3	
Lithium	**38.9**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:36	7439-93-2	
Molybdenum	**2.1J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:36	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.54J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:00	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-6S **Lab ID: 60287013003** Collected: 11/14/18 15:45 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**45.5**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:39	7440-39-3	
Lithium	**24.9**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:39	7439-93-2	
Molybdenum	**1.1J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:39	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.64J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:02	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-7S **Lab ID: 60287013004** Collected: 11/14/18 13:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**91.0**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:41	7440-39-3	
Lithium	**22.1**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:41	7439-93-2	
Molybdenum	**1.5J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:41	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.45J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:08	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-8S **Lab ID: 60287013005** Collected: 11/14/18 14:40 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**105**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:43	7440-39-3	
Lithium	**23.1**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:43	7439-93-2	
Molybdenum	**390**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:43	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.1**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:10	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-DUP-1 **Lab ID: 60287013006** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**92.8**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:50	7440-39-3	
Lithium	**22.5**	ug/L	10.0	4.6	1	11/30/18 10:47	12/01/18 12:27	7439-93-2	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/30/18 10:47	12/01/18 12:27	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.47J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:12	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-DUP-2 **Lab ID: 60287013007** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**106**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:52	7440-39-3	
Lithium	**13.1**	ug/L	10.0	4.6	1	11/30/18 10:47	12/01/18 12:30	7439-93-2	
Molybdenum	**353**	ug/L	20.0	0.90	1	11/30/18 10:47	12/01/18 12:30	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.1**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:13	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-FB-1 **Lab ID: 60287013008** Collected: 11/14/18 15:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:54	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/30/18 10:47	12/01/18 12:32	7439-93-2	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/30/18 10:47	12/01/18 12:32	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:15	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-FB-2 **Lab ID: 60287013009** Collected: 11/14/18 15:50 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:57	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/30/18 10:47	12/01/18 12:34	7439-93-2	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/30/18 10:47	12/01/18 12:34	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 18:17	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-2S **Lab ID: 60287167001** Collected: 11/16/18 14:15 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**127**	ug/L	5.0	1.5	1	12/04/18 12:45	12/05/18 13:37	7440-39-3	
Lithium	**41.6**	ug/L	10.0	4.6	1	12/04/18 12:45	12/05/18 14:32	7439-93-2	
Molybdenum	**709**	ug/L	20.0	0.90	1	12/04/18 12:45	12/05/18 13:37	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.0**	ug/L	1.0	0.065	1	12/05/18 10:24	12/05/18 15:45	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-3S **Lab ID: 60287167002** Collected: 11/16/18 13:05 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**200**	ug/L	5.0	1.5	1	12/04/18 12:45	12/05/18 13:39	7440-39-3	
Lithium	**29.4**	ug/L	10.0	4.6	1	12/04/18 12:45	12/05/18 14:34	7439-93-2	
Molybdenum	**1.1J**	ug/L	20.0	0.90	1	12/04/18 12:45	12/05/18 13:39	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.57J**	ug/L	1.0	0.065	1	12/05/18 10:24	12/05/18 15:50	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-5S **Lab ID: 60287167003** Collected: 11/16/18 10:20 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**73.5**	ug/L	5.0	1.5	1	12/04/18 12:45	12/05/18 13:42	7440-39-3	
Lithium	**52.1**	ug/L	10.0	4.6	1	12/04/18 12:45	12/05/18 14:36	7439-93-2	
Molybdenum	**690**	ug/L	20.0	0.90	1	12/04/18 12:45	12/05/18 13:42	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.73J**	ug/L	1.0	0.065	1	12/05/18 10:24	12/05/18 15:52	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Sample: S-LMW-9S **Lab ID: 60287167004** Collected: 11/16/18 14:40 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**73.4**	ug/L	5.0	1.5	1	12/04/18 12:45	12/05/18 13:44	7440-39-3	
Lithium	**43.4**	ug/L	10.0	4.6	1	12/04/18 12:45	12/05/18 14:38	7439-93-2	
Molybdenum	**11.4J**	ug/L	20.0	0.90	1	12/04/18 12:45	12/05/18 13:44	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.91J**	ug/L	1.0	0.065	1	12/05/18 10:24	12/05/18 15:53	7440-38-2	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 557225
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/28/18 20:44	
Lithium	ug/L	<4.6	10.0	4.6	11/28/18 20:44	
Molybdenum	ug/L	<0.90	20.0	0.90	11/28/18 20:44	

LABORATORY CONTROL SAMPLE: 2286039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	977	98	85-115	
Lithium	ug/L	1000	988	99	85-115	
Molybdenum	ug/L	1000	998	100	85-115	

MATRIX SPIKE SAMPLE: 2286040

Parameter	Units	60286569002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	645	1000	1620	98	70-130	
Lithium	ug/L	25.4	1000	1030	100	70-130	
Molybdenum	ug/L	<0.90	1000	1010	101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286041 2286042

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	87.2	1000	1000	1080	1090	99	100	70-130	1	20	
Lithium	ug/L	47.1	1000	1000	1060	1060	101	101	70-130	0	20	
Molybdenum	ug/L	<0.90	1000	1000	1020	1030	102	103	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 557642 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

METHOD BLANK: 2287717 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/30/18 21:51	
Lithium	ug/L	<4.6	10.0	4.6	11/30/18 21:51	
Molybdenum	ug/L	<0.90	20.0	0.90	11/30/18 21:51	

LABORATORY CONTROL SAMPLE: 2287718

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	1080	108	85-115	
Molybdenum	ug/L	1000	1090	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287719 2287720

Parameter	Units	60287003004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	238	1000	1000	1250	1200	101	96	70-130	4	20	
Lithium	ug/L	32.0	1000	1000	1090	1030	106	100	70-130	5	20	
Molybdenum	ug/L	3.2J	1000	1000	1090	1040	109	104	70-130	5	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287721 2287722

Parameter	Units	60287011001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	134	1000	1000	1130	1130	100	100	70-130	0	20	
Lithium	ug/L	15.7	1000	1000	1070	1080	105	106	70-130	1	20	
Molybdenum	ug/L	24.0	1000	1000	1110	1110	109	108	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287723 2287724

Parameter	Units	60287013001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	127	1000	1000	1130	1140	101	101	70-130	0	20	
Lithium	ug/L	21.0	1000	1000	1080	1080	106	106	70-130	0	20	
Molybdenum	ug/L	43.6	1000	1000	1130	1140	109	110	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 558212 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2290148 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	12/05/18 13:33	
Lithium	ug/L	<4.6	10.0	4.6	12/05/18 14:28	
Molybdenum	ug/L	<0.90	20.0	0.90	12/05/18 13:33	

LABORATORY CONTROL SAMPLE: 2290149

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1010	101	85-115	
Lithium	ug/L	1000	919	92	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2290150 2290151

Parameter	Units	60287289003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	386	1000	1000	1380	1370	100	99	70-130	1	20	
Lithium	ug/L	17.2	1000	1000	923	911	91	89	70-130	1	20	
Molybdenum	ug/L	3.1J	1000	1000	1020	1030	101	103	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 555794 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2280347 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/20/18 15:33	

LABORATORY CONTROL SAMPLE: 2280348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	40.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2280349 2280350

Parameter	Units	60286372001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.8	40	40	42.3	42.8	101	103	70-130	1	20	

MATRIX SPIKE SAMPLE: 2280351

Parameter	Units	60287127001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	1.4	40	42.6	103	70-130	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 557644 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

METHOD BLANK: 2287725 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/30/18 17:23	

LABORATORY CONTROL SAMPLE: 2287726

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.3	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287727 2287728

Parameter	Units	60287003004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.34J	40	40	40.8	41.1	101	102	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287729 2287730

Parameter	Units	60287011001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.4	40	40	41.9	41.0	101	99	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287731 2287732

Parameter	Units	60287013001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.0	40	40	43.5	42.4	104	101	70-130	3	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

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

QC Batch: 558318 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2290488 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	12/05/18 15:42	

LABORATORY CONTROL SAMPLE: 2290489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	37.9	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2290490 2290491

Parameter	Units	60287167001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.0	40	40	38.5	38.3	94	93	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPB /SCPA N&E
Pace Project No.: 60286568

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568001	**S-BMW-1S**	EPA 200.7	557225	EPA 200.7	557391
60286568002	**S-BMW-3S**	EPA 200.7	557225	EPA 200.7	557391
60287013001	**S-LMW-1S**	EPA 200.7	557642	EPA 200.7	557772
60287013002	**S-LMW-4S**	EPA 200.7	557642	EPA 200.7	557772
60287013003	**S-LMW-6S**	EPA 200.7	557642	EPA 200.7	557772
60287013004	**S-LMW-7S**	EPA 200.7	557642	EPA 200.7	557772
60287013005	**S-LMW-8S**	EPA 200.7	557642	EPA 200.7	557772
60287013006	**S-LMW-DUP-1**	EPA 200.7	557642	EPA 200.7	557772
60287013007	**S-LMW-DUP-2**	EPA 200.7	557642	EPA 200.7	557772
60287013008	**S-LMW-FB-1**	EPA 200.7	557642	EPA 200.7	557772
60287013009	**S-LMW-FB-2**	EPA 200.7	557642	EPA 200.7	557772
60287167001	**S-LMW-2S**	EPA 200.7	558212	EPA 200.7	558388
60287167002	**S-LMW-3S**	EPA 200.7	558212	EPA 200.7	558388
60287167003	**S-LMW-5S**	EPA 200.7	558212	EPA 200.7	558388
60287167004	**S-LMW-9S**	EPA 200.7	558212	EPA 200.7	558388
60286568001	**S-BMW-1S**	EPA 200.8	555794	EPA 200.8	556335
60286568002	**S-BMW-3S**	EPA 200.8	555794	EPA 200.8	556335
60287013001	**S-LMW-1S**	EPA 200.8	557644	EPA 200.8	557771
60287013002	**S-LMW-4S**	EPA 200.8	557644	EPA 200.8	557771
60287013003	**S-LMW-6S**	EPA 200.8	557644	EPA 200.8	557771
60287013004	**S-LMW-7S**	EPA 200.8	557644	EPA 200.8	557771
60287013005	**S-LMW-8S**	EPA 200.8	557644	EPA 200.8	557771
60287013006	**S-LMW-DUP-1**	EPA 200.8	557644	EPA 200.8	557771
60287013007	**S-LMW-DUP-2**	EPA 200.8	557644	EPA 200.8	557771
60287013008	**S-LMW-FB-1**	EPA 200.8	557644	EPA 200.8	557771
60287013009	**S-LMW-FB-2**	EPA 200.8	557644	EPA 200.8	557771
60287167001	**S-LMW-2S**	EPA 200.8	558318	EPA 200.8	558523
60287167002	**S-LMW-3S**	EPA 200.8	558318	EPA 200.8	558523
60287167003	**S-LMW-5S**	EPA 200.8	558318	EPA 200.8	558523
60287167004	**S-LMW-9S**	EPA 200.8	558318	EPA 200.8	558523

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60286568

60286568

Client Name: Golder

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

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

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

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

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

JLS

Cooler Temperature (°C): **As-read** 4.0 3.6 **Corr. Factor** +0.0 **Corrected** 4.0 3.6

Date and initials of person examining contents: JB 11/13

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	FC 24
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Church 11/13/18 Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
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Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS																	Y/N	N	N	N		60286566
1	S-LMW-1S	WT	G																				
2	S-LMW-2S	WT	G																				
3	S-LMW-3S	WT	G																				
4	S-LMW-4S	WT	G																				
5	S-LMW-5S	WT	G																				
6	S-LMW-6S	WT	G																				
7	S-LMW-7S	WT	G																				
8	S-LMW-8S	WT	G																				
9	S-LMW-9S	WT	G																				
10	S-BMW-1S	WT	G			11/12/18	1345		4	2	1	1							✓	✓	✓		(2) BP2A BP3S BP3
11	S-BMW-3S	WT	G			11/12/18	1105		4	2	1	1							✓	✓	✓		
12	S-LMW-DUP-1	WT	G																				

001
002

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca	Golder	11/12/18	17:15		11/13	0747	4° Y Y Y
							3½ Y Y Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: | DATE Signed (MM/DD/YY):

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPB
Project Number:	153-1406.0003L (COC #16)

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-LMW-1S	WT	G																						
2	S-LMW-2S	WT	G																						
3	S-LMW-3S	WT	G																						
4	S-LMW-4S	WT	G																						
5	S-LMW-5S	WT	G																						
6	S-LMW-6S	WT	G																						
7	S-LMW-7S	WT	G																						
8	S-LMW-8S	WT	G																						
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G			11/12/18	1345		4	2	1	1							✓	✓	✓	✓	✓		
11	S-BMW-3S	WT	G			11/12/18	1105		4	2	1	1							✓	✓	✓	✓	✓		
12	S-LMW-DUP-1	WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	[signature] / Golder	11/12/18	17:15	[signature]	11/13	0747

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: | DATE Signed (MM/DD/YY):

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Sample Condition Upon Receipt

WO# : 60287013

60287013

Client Name: Golder

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

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

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

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

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

JLS

Date and initials of person examining contents: JB 11/16

Cooler Temperature (°C): **As-read** 3.6 2.8 4.0 **Corr. Factor** +0.0 **Corrected** 3.6 2.8 4.0

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	Fe2+
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Church 11/16/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

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Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003L (COC #16)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron						Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N						
1	S-LMW-1S	WT	G			11/14/18	1225		4	2	1	1						✓	✓	✓	✓	✓	(4) BP2N	(3) BP3U	3	BP3U		60287913
2	S-LMW-2S	WT	G																									
3	S-LMW-3S	WT	G																									
4	S-LMW-4S	WT	G			11/14/18	1525		4	2	1	1						✓	✓	✓	✓	✓	(2) BP2N	BP3U	BP3U			
5	S-LMW-5S	WT	G																									
6	S-LMW-6S	WT	G			11/14/18	1545		4	2	1	1						✓	✓	✓	✓	✓						
7	S-LMW-7S	WT	G			1	1335		1	1	1	1						1	1	1	1	1						
8	S-LMW-8S	WT	G			1	1440		1	1	1	1						1	1	1	1	1						
9	S-LMW-9S	WT	G																									
10	(LMW-1S) ~~S-BMW-1S~~ S-LMW-MS-1	WT	G			11/14/18	1225		4	2	1	1						✓	✓	✓	✓	✓						MS Collected @ LMW-1S
11	(LMW-1S) ~~S-BMW-3S~~ S-LMW-MSD-1	WT	G			11/14/18	1225		1	1	1	1						1	1	1	1	1						MSD Collected @ LMW-1S
12	S-LMW-DUP-1	WT	G			11/14/18	—		4	2	1	1						✓	✓	✓	✓	✓						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	Golder	11/14/18	1750		11/15/18	1000	3.6	Y	Y	Y
							2.8	Y	Y	Y
							4.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/14/18

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 2

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #16)

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron									Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																			N	N	N	N	N									
1	S-LMW-DUP-2	WT	G			11/14/18	—		4	2	1	1							✓	✓	✓	✓	✓	②	BP2N	BP3U	BP3N					
2	S-LMW-FB-1	WT	G			11/14/18	1535		1	1	1	1							↓	↓	↓	↓	↓		↓							
3	S-LMW-FB-2	WT	G			11/14/18	1550		1	1	1	1							↓	↓	↓	↓	↓									
4		WT	G																												
5		WT	G																												
6		WT	G																												
7		WT	G																												
8		WT	G																												
9		WT	G																												
10		WT	G																												
11		WT	G																												
12		WT	G																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	[signature] / Golder	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Sonnichsen

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 11/14/18

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

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

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N		
1	S-LMW-1S	WT	G			11/14/18	1725		4	2	1	1							✓	✓	✓		
2	S-LMW-2S	WT	G																				
3	S-LMW-3S	WT	G																				
4	S-LMW-4S	WT	G			11/14/18	1525		4	2	1	1							✓	✓	✓		
5	S-LMW-5S	WT	G																				
6	S-LMW-6S	WT	G			11/14/18	1545		4	2	1	1							✓	✓	✓		
7	S-LMW-7S	WT	G			1	1335		1	1	1	1							1	1	1		
8	S-LMW-8S	WT	G			1	1440		1	1	1	1							1	1	1		
9	S-LMW-9S	WT	G																				
10	~~S-LMW-MS-1~~ ~~S-BMW-1S~~ (LMW-15)	WT	G			11/14/18	1225		4	2	1	1							✓	✓	✓		MS Collected @ LMW-1S
11	~~S-LMW-MSD-1~~ ~~S-BMW-3S~~ (LMW-15)	WT	G			1	1225		1	1	1	1							1	1	1		MSD Collected @ LMW-1S
12	S-LMW-DUP-1	WT	G			1	—		1	1	1	1							1	1	1		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca	Golder	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/14/18

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
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	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPA N&E	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS																	Y/N	N	N	N		
1	S-LMW-DUP-2	WT	G			11/14/18	—		4	2	1	1							✓	✓	✓		
2	S-LMW-FB-1	WT	G				1535		1	1	1	1							1	1	1		
3	S-LMW-FB-2	WT	G				1550		1	1	1	1							1	1	1		
4		WT	G																				
5		WT	G																				
6		WT	G																				
7		WT	G																				
8		WT	G																				
9		WT	G																				
10		WT	G																				
11		WT	G																				
12		WT	G																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca	Golder /	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schmidt

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/14/18

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

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www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60287167

60287167

Client Name: Golder

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

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

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

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

Thermometer Used: T-298 **Type of Ice:** Wet Blue None

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

Date and initials of person examining contents: 11/19/18 D

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jana Church 11/18/18 Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE (DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																				Y/N	N	N	N		40287167
1	S-LMW-1S	WT	G																					
2	S-LMW-2S	WT	G				11/16/18	1415		4	2	1	1							✓	✓	✓		2BP2U, BP3S, BP3N 01 02
3	S-LMW-3S	WT	G				〃	1305		〃	〃	〃	〃							〃	〃	〃		↓ ↓
4	S-LMW-4S	WT	G																					
5	S-LMW-5S	WT	G				11/16/18	1020		4	2	1	1							✓	✓	✓		2BP2U, BP3S, BP3N 03
6	S-LMW-6S	WT	G																					
7	S-LMW-7S	WT	G																					
8	S-LMW-8S	WT	G																					
9	S-LMW-9S	WT	G				11/16/18	1446		4	2	1	1							✓	✓	✓		2BP2U, BP3S, BP3N 04
10	S-BMW-1S	WT	G																					
11	S-BMW-3S	WT	G																					
12	S-LMW-DUP-1	WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca	Golder	11/16/18		EBrockett / Pace	11/17/18	0430	0.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Andrea Ackins

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/16/18

MEMORANDUM

DATE January 14, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – ASSESSMENT MONITORING – DATA PACKAGE 60286568R2

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 sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL (MDC for radionuclide analysis) or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

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

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QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SCPB-SEC- Nov 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/14/19

Laboratory: Pace Analytical
SDG #: 60286568-2
Analytical Method (type and no.): Metals (200.7&200.8), ~~Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)~~
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-BMW-1S, S-BMW-3S, S-LMW-1S, S-LMW-2S, S-LMW-3S, S-LMW-4S, S-LMW-5S, S-LMW-6S, S-LMW-7S, S-LMW-8S, S-LMW-9S, S-LMW-DUP-1, S-LMW-DUP-2, S-LMW-FB-1, S-LMW-FB-2

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/12,14,16/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ 7S DUP2@ 8S
	☑	☐	☐	FB-1@ 4S FB-2@ 6S
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	DUP-1: Mo(200),
c) Were lab duplicates analyzed (note original and duplicate samples)?				DUP-2: Ba(55)
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☑	☐	☐	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-LMW-8S	Barium (Ba)	23.1	J	RPD exceeded limits; Result > MDL
S-LMW-DUP-2	⊥	13.1	J	⊥ ⊥
S-LMW-DUP-1	Molybdenum (Mo)	0.90	UJ	; Result < MDL
S-LMW-7S	⊥	1.5	J	; Result > MDL

Signature: _____ Date: 1/14/19

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

January 14, 2019

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

RE: Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between November 13, 2018 and November 14, 2018. 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.

REV-1, 1/14/19: Revised to report only Barium, Lithium, Molybdenum and Arsenic

REV-2, 1/14/19: Revised to remove Bairum , Lithium, Molybdenum and Arsenic.

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

Sincerely,

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

Enclosures

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

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CERTIFICATIONS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Arkansas Drinking Water
Missouri Certification Number: 10090
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

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SAMPLE SUMMARY

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286655001	**S-UG-1A**	Water	11/13/18 10:30	11/14/18 03:40
60286655002	**S-UG-2**	Water	11/13/18 13:15	11/14/18 03:40
60286655003	**S-DG-1**	Water	11/13/18 10:20	11/14/18 03:40
60286655004	**S-DG-2**	Water	11/13/18 11:10	11/14/18 03:40
60286655005	**S-DG-3**	Water	11/13/18 12:05	11/14/18 03:40
60286655006	**S-DG-4**	Water	11/13/18 11:15	11/14/18 03:40
60286655007	**S-SCPC-DUP-1**	Water	11/13/18 10:20	11/14/18 03:40
60286655008	**S-SCPC-FB-1**	Water	11/13/18 10:08	11/14/18 03:40
60286568001	**S-BMW-1S**	Water	11/12/18 13:45	11/13/18 03:47
60286568002	**S-BMW-3S**	Water	11/12/18 11:05	11/13/18 03:47

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286655001	**S-UG-1A**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655002	**S-UG-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655003	**S-DG-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655004	**S-DG-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655005	**S-DG-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655006	**S-DG-4**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655007	**S-SCPC-DUP-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286655008	**S-SCPC-FB-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286568001	**S-BMW-1S**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286568002	**S-BMW-3S**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-UG-1A **Lab ID: 60286655001** Collected: 11/13/18 10:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**212**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:46	7440-39-3	
Lithium	**37.3**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:46	7439-93-2	
Molybdenum	**1.8J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:46	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.60J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:34	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-UG-2 **Lab ID: 60286655002** Collected: 11/13/18 13:15 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**287**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:48	7440-39-3	
Lithium	**19.3**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:48	7439-93-2	
Molybdenum	**2.4J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:48	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.56J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:39	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-DG-1 **Lab ID: 60286655003** Collected: 11/13/18 10:20 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**323**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:54	7440-39-3	
Lithium	**37.6**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:54	7439-93-2	
Molybdenum	**1.2J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:54	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.61J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:43	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-DG-2 **Lab ID: 60286655004** Collected: 11/13/18 11:10 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**238**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:57	7440-39-3	
Lithium	**32.7**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:57	7439-93-2	
Molybdenum	**1.7J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:57	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.72J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:19	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-DG-3 **Lab ID: 60286655005** Collected: 11/13/18 12:05 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**299**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:59	7440-39-3	
Lithium	**40.4**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:59	7439-93-2	
Molybdenum	**1.6J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:59	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.1**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:21	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-DG-4 **Lab ID: 60286655006** Collected: 11/13/18 11:15 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**254**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 17:58	7440-39-3	
Lithium	**43.3**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 17:58	7439-93-2	
Molybdenum	**1.2J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 17:58	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.35J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:23	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-SCPC-DUP-1 **Lab ID: 60286655007** Collected: 11/13/18 10:20 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**256**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 18:05	7440-39-3	
Lithium	**33.6**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 18:05	7439-93-2	
Molybdenum	**1.8J**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 18:05	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.33J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:25	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-SCPC-FB-1 **Lab ID: 60286655008** Collected: 11/13/18 10:08 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 18:07	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 18:07	7439-93-2	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 18:07	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:27	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-BMW-1S **Lab ID: 60286568001** Collected: 11/12/18 13:45 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**160**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:48	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:48	7439-93-2	
Molybdenum	**2.2J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:48	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.95J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:54	7440-38-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Sample: S-BMW-3S **Lab ID: 60286568002** Collected: 11/12/18 11:05 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**157**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:50	7440-39-3	
Lithium	**12.1**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:50	7439-93-2	
Molybdenum	**2.8J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:50	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.45J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:57	7440-38-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

QC Batch: 557225
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/28/18 20:44	
Lithium	ug/L	<4.6	10.0	4.6	11/28/18 20:44	
Molybdenum	ug/L	<0.90	20.0	0.90	11/28/18 20:44	

LABORATORY CONTROL SAMPLE: 2286039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	977	98	85-115	
Lithium	ug/L	1000	988	99	85-115	
Molybdenum	ug/L	1000	998	100	85-115	

MATRIX SPIKE SAMPLE: 2286040

Parameter	Units	60286569002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	645	1000	1620	98	70-130	
Lithium	ug/L	25.4	1000	1030	100	70-130	
Molybdenum	ug/L	<0.90	1000	1010	101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286041 2286042

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	87.2	1000	1000	1080	1090	99	100	70-130	1	20	
Lithium	ug/L	47.1	1000	1000	1060	1060	101	101	70-130	0	20	
Molybdenum	ug/L	<0.90	1000	1000	1020	1030	102	103	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

QC Batch: 557358 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2286636 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/29/18 16:21	
Lithium	ug/L	<4.6	10.0	4.6	11/29/18 16:21	
Molybdenum	ug/L	<0.90	20.0	0.90	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	955	96	85-115	
Lithium	ug/L	1000	936	94	85-115	
Molybdenum	ug/L	1000	952	95	85-115	

MATRIX SPIKE SAMPLE: 2286638

Parameter	Units	60286569007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	112	1000	1060	94	70-130	
Lithium	ug/L	19.3	1000	941	92	70-130	
Molybdenum	ug/L	58.0	1000	1020	96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286639 2286640

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	287	1000	1000	1230	1230	94	94	70-130	0	20	
Lithium	ug/L	19.3	1000	1000	951	948	93	93	70-130	0	20	
Molybdenum	ug/L	2.4J	1000	1000	973	969	97	97	70-130	0	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

QC Batch: 555794 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2280347 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/20/18 15:33	

LABORATORY CONTROL SAMPLE: 2280348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	40.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2280349 2280350

Parameter	Units	60286372001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.8	40	40	42.3	42.8	101	103	70-130	1	20	

MATRIX SPIKE SAMPLE: 2280351

Parameter	Units	60287127001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	1.4	40	42.6	103	70-130	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

QC Batch: 557460 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286655001, 60286655002, 60286655003

METHOD BLANK: 2286955 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286956

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.7	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286959 2286960

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.56J	40	40	40.6	40.5	100	100	70-130	0	20	

MATRIX SPIKE SAMPLE: 2286961

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	0.52J	40	40.4	100	70-130	

SAMPLE DUPLICATE: 2288579

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Arsenic	ug/L	0.52J	0.53J		20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

QC Batch: 557461 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2286967 Matrix: Water
Associated Lab Samples: 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 17:13	

LABORATORY CONTROL SAMPLE: 2286968

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	38.9	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286969 2286970

Parameter	Units	60287435001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.45J	40	40	40.3	40.1	100	99	70-130	1	20	

MATRIX SPIKE SAMPLE: 2286971

Parameter	Units	60286708001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	4.3	40	47.4	108	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

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

QUALIFIERS

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SCPC / SCPA N&E
Pace Project No.: 60286655

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568001	**S-BMW-1S**	EPA 200.7	557225	EPA 200.7	557391
60286568002	**S-BMW-3S**	EPA 200.7	557225	EPA 200.7	557391
60286655001	**S-UG-1A**	EPA 200.7	557358	EPA 200.7	557423
60286655002	**S-UG-2**	EPA 200.7	557358	EPA 200.7	557423
60286655003	**S-DG-1**	EPA 200.7	557358	EPA 200.7	557423
60286655004	**S-DG-2**	EPA 200.7	557358	EPA 200.7	557423
60286655005	**S-DG-3**	EPA 200.7	557358	EPA 200.7	557423
60286655006	**S-DG-4**	EPA 200.7	557358	EPA 200.7	557423
60286655007	**S-SCPC-DUP-1**	EPA 200.7	557358	EPA 200.7	557423
60286655008	**S-SCPC-FB-1**	EPA 200.7	557358	EPA 200.7	557423
60286568001	**S-BMW-1S**	EPA 200.8	555794	EPA 200.8	556335
60286568002	**S-BMW-3S**	EPA 200.8	555794	EPA 200.8	556335
60286655001	**S-UG-1A**	EPA 200.8	557460	EPA 200.8	557561
60286655002	**S-UG-2**	EPA 200.8	557460	EPA 200.8	557561
60286655003	**S-DG-1**	EPA 200.8	557460	EPA 200.8	557561
60286655004	**S-DG-2**	EPA 200.8	557461	EPA 200.8	557562
60286655005	**S-DG-3**	EPA 200.8	557461	EPA 200.8	557562
60286655006	**S-DG-4**	EPA 200.8	557461	EPA 200.8	557562
60286655007	**S-SCPC-DUP-1**	EPA 200.8	557461	EPA 200.8	557562
60286655008	**S-SCPC-FB-1**	EPA 200.8	557461	EPA 200.8	557562

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Sample Condition Upon Receipt

WO# : 60286655

60286655

Client Name: Golder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 3.9 3.0 / 4.0 3.4 **Corr. Factor** +0.0 **Corrected** 3.9 3.0 / 4.0 3.4

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Church 11/14/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPC
Project Number:	153-1406.0003G (COC #17)

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N		6028655
1	S-UG-1A	WT	G			11/13/18	1030		4	2	1	1							✓	✓	✓		001
2	S-UG-2	WT	G				1315		1	1	1	1									(2)		002
3	S-DG-1	WT	G				1820																003
4	S-DG-2	WT	G				1110																004
5	S-DG-3	WT	G				1205																005
6	S-DG-4	WT	G				1115																006
7	S-SCPC-DUP-1	WT	G				—																007
8	S-SCPC-FB-1	WT	G				1008		1	1	1	1							1	1	1		008
9	S-SCPC-MS-1 ~~S-BMW-1S~~ ~~S-MS-1~~	WT	G			11/13/18	1315		4	2	1	1							✓	✓	✓		
10	S-SCPC-MSD-1 ~~S-BMW-2S~~	WT	G				1315		1	1	1	1							1	1	1		
11		WT	G																				
12		WT	G																				

(2) BP2N BP3S BP3N

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca	Golder	11/13/18	1715		11/14/18	0340

SAMPLE CONDITIONS

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bri Works

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 11/13/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #18)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-UG-1A	WT	G			11/13/18	1030		4	2	1	1							✓	✓	✓	✓	✓		
2	S-UG-2	WT	G				1315		1	1	1	1													
3	S-DG-1	WT	G				1020																		
4	S-DG-2	WT	G				1110																		
5	S-DG-3	WT	G				1705																		
6	S-DG-4	WT	G				1115																		
7	S-SCPC-DUP-1	WT	G				—																		
8	S-SCPC-FB-1	WT	G				1008																		
9	S-SCPC-MS-1 ~~S-BMW-1S~~	WT	G				1315																		
10	S-SCPC-MSD ~~S-BMW-2S~~	WT	G			"	1315																		
11		WT	G																						
12		WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	Golder	11/13/18	1715		11/14/18	0540	4.0	Y	Y	Y
							3.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 11/13/18					

MEMORANDUM

DATE January 15, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – ASSESSMENT MONITORING – DATA PACKAGE 60286655R2

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 sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL (MDC for radionuclide analysis) or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SCPC - SER - Ash - Nov 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/15/19

Laboratory: Pace Analytical
SDG #: 60286655 r2
Analytical Method (type and no.): Metals (200.7&200.8), ~~Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)~~ (12)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-UG-1A, S-UG-2, S-DG-1, S-DG-2, S-DG-3, S-DG-4, S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/12-13/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ S-D6-4
	☑	☐	☐	FB-1@ S-U6-1A (b) (a)
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Fe(50), Li(25), Mo(40), P(200), Fe^{3+}(49)
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☑	☐	☐	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-DG-4	Lithium (Li)	43.3	J	RPD exceeded limits; Result > MDL
"	Molybdenum (Mo)	1.2	J	"
S-SCPC-DUP-1	Li	33.6	J	"
"	Mo	1.8	J	"

Signature: Tony J Good Jr Date: 4/15/19

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January 14, 2019

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

RE: Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between November 13, 2018 and November 15, 2018. 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.

REV-1, 1/14/19: Revised to remove Bairum , Lithium, Molybdenum and Arsenic.

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

Sincerely,

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

Enclosures

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

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CERTIFICATIONS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Arkansas Drinking Water
Missouri Certification Number: 10090
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

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SAMPLE SUMMARY

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60287003001	**S-TMW-1**	Water	11/14/18 09:40	11/15/18 10:00
60287003002	**S-TMW-2**	Water	11/14/18 10:50	11/15/18 10:00
60287003003	**S-TMW-3**	Water	11/14/18 11:50	11/15/18 10:00
60287003004	**S-UG-3**	Water	11/14/18 12:50	11/15/18 10:00
60287003005	**S-SCL4A-DUP-1**	Water	11/14/18 09:40	11/15/18 10:00
60287003006	**S-SCL4A-FB-1**	Water	11/14/18 10:45	11/15/18 10:00
60286568001	**S-BMW-1S**	Water	11/12/18 13:45	11/13/18 03:47
60286568002	**S-BMW-3S**	Water	11/12/18 11:05	11/13/18 03:47

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60287003001	**S-TMW-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287003002	**S-TMW-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287003003	**S-TMW-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287003004	**S-UG-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287003005	**S-SCL4A-DUP-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60287003006	**S-SCL4A-FB-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286568001	**S-BMW-1S**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K
60286568002	**S-BMW-3S**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JDH	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-TMW-1 **Lab ID: 60287003001** Collected: 11/14/18 09:40 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**170**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 21:57	7440-39-3	
Lithium	**28.7**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 21:57	7439-93-2	
Molybdenum	**4.0J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 21:57	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.46J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:26	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-TMW-2 **Lab ID: 60287003002** Collected: 11/14/18 10:50 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**233**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:00	7440-39-3	
Lithium	**37.7**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:00	7439-93-2	
Molybdenum	**2.0J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:00	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**3.5**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:28	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-TMW-3 **Lab ID: 60287003003** Collected: 11/14/18 11:50 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**280**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:02	7440-39-3	
Lithium	**42.2**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:02	7439-93-2	
Molybdenum	**2.7J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:02	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.7**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:30	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-UG-3 **Lab ID: 60287003004** Collected: 11/14/18 12:50 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**238**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:04	7440-39-3	
Lithium	**32.0**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:04	7439-93-2	
Molybdenum	**3.2J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:04	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.34J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:32	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-SCL4A-DUP-1 **Lab ID: 60287003005** Collected: 11/14/18 09:40 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**172**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:10	7440-39-3	
Lithium	**28.9**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:10	7439-93-2	
Molybdenum	**4.1J**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:10	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.43J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:38	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-SCL4A-FB-1 **Lab ID: 60287003006** Collected: 11/14/18 10:45 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.5**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:13	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:13	7439-93-2	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:13	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:39	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-BMW-1S **Lab ID: 60286568001** Collected: 11/12/18 13:45 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**160**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:48	7440-39-3	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:48	7439-93-2	
Molybdenum	**2.2J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:48	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.95J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:54	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Sample: S-BMW-3S **Lab ID: 60286568002** Collected: 11/12/18 11:05 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**157**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:50	7440-39-3	
Lithium	**12.1**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:50	7439-93-2	
Molybdenum	**2.8J**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:50	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.45J**	ug/L	1.0	0.065	1	11/20/18 10:02	11/20/18 15:57	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

QC Batch: 557225 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/28/18 20:44	
Lithium	ug/L	<4.6	10.0	4.6	11/28/18 20:44	
Molybdenum	ug/L	<0.90	20.0	0.90	11/28/18 20:44	

LABORATORY CONTROL SAMPLE: 2286039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	977	98	85-115	
Lithium	ug/L	1000	988	99	85-115	
Molybdenum	ug/L	1000	998	100	85-115	

MATRIX SPIKE SAMPLE: 2286040

Parameter	Units	60286569002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	645	1000	1620	98	70-130	
Lithium	ug/L	25.4	1000	1030	100	70-130	
Molybdenum	ug/L	<0.90	1000	1010	101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286041 2286042

Parameter	Units	60286571003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	87.2	1000	1000	1080	1090	99	100	70-130	1	20	
Lithium	ug/L	47.1	1000	1000	1060	1060	101	101	70-130	0	20	
Molybdenum	ug/L	<0.90	1000	1000	1020	1030	102	103	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

QC Batch: 557642 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287003001, 60287003002, 60287003003, 60287003004, 60287003005, 60287003006

METHOD BLANK: 2287717 Matrix: Water
Associated Lab Samples: 60287003001, 60287003002, 60287003003, 60287003004, 60287003005, 60287003006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/30/18 21:51	
Lithium	ug/L	<4.6	10.0	4.6	11/30/18 21:51	
Molybdenum	ug/L	<0.90	20.0	0.90	11/30/18 21:51	

LABORATORY CONTROL SAMPLE: 2287718

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	1080	108	85-115	
Molybdenum	ug/L	1000	1090	109	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287719 2287720

Parameter	Units	60287003004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	238	1000	1000	1250	1200	101	96	70-130	4	20	
Lithium	ug/L	32.0	1000	1000	1090	1030	106	100	70-130	5	20	
Molybdenum	ug/L	3.2J	1000	1000	1090	1040	109	104	70-130	5	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287721 2287722

Parameter	Units	60287011001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	134	1000	1000	1130	1130	100	100	70-130	0	20	
Lithium	ug/L	15.7	1000	1000	1070	1080	105	106	70-130	1	20	
Molybdenum	ug/L	24.0	1000	1000	1110	1110	109	108	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287723 2287724

Parameter	Units	60287013001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	127	1000	1000	1130	1140	101	101	70-130	0	20	
Lithium	ug/L	21.0	1000	1000	1080	1080	106	106	70-130	0	20	
Molybdenum	ug/L	43.6	1000	1000	1130	1140	109	110	70-130	1	20	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

QC Batch: 555794 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2280347 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/20/18 15:33	

LABORATORY CONTROL SAMPLE: 2280348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	40.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2280349 2280350

Parameter	Units	60286372001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.8	40	40	42.3	42.8	101	103	70-130	1	20	

MATRIX SPIKE SAMPLE: 2280351

Parameter	Units	60287127001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	1.4	40	42.6	103	70-130	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

QC Batch: 557644 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287003001, 60287003002, 60287003003, 60287003004, 60287003005, 60287003006

METHOD BLANK: 2287725 Matrix: Water
Associated Lab Samples: 60287003001, 60287003002, 60287003003, 60287003004, 60287003005, 60287003006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/30/18 17:23	

LABORATORY CONTROL SAMPLE: 2287726

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.3	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287727 2287728

Parameter	Units	60287003004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.34J	40	40	40.8	41.1	101	102	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287729 2287730

Parameter	Units	60287011001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.4	40	40	41.9	41.0	101	99	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2287731 2287732

Parameter	Units	60287013001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.0	40	40	43.5	42.4	104	101	70-130	3	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SCL4A & SCPA N&E
Pace Project No.: 60287003

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568001	**S-BMW-1S**	EPA 200.7	557225	EPA 200.7	557391
60286568002	**S-BMW-3S**	EPA 200.7	557225	EPA 200.7	557391
60287003001	**S-TMW-1**	EPA 200.7	557642	EPA 200.7	557772
60287003002	**S-TMW-2**	EPA 200.7	557642	EPA 200.7	557772
60287003003	**S-TMW-3**	EPA 200.7	557642	EPA 200.7	557772
60287003004	**S-UG-3**	EPA 200.7	557642	EPA 200.7	557772
60287003005	**S-SCL4A-DUP-1**	EPA 200.7	557642	EPA 200.7	557772
60287003006	**S-SCL4A-FB-1**	EPA 200.7	557642	EPA 200.7	557772
60286568001	**S-BMW-1S**	EPA 200.8	555794	EPA 200.8	556335
60286568002	**S-BMW-3S**	EPA 200.8	555794	EPA 200.8	556335
60287003001	**S-TMW-1**	EPA 200.8	557644	EPA 200.8	557771
60287003002	**S-TMW-2**	EPA 200.8	557644	EPA 200.8	557771
60287003003	**S-TMW-3**	EPA 200.8	557644	EPA 200.8	557771
60287003004	**S-UG-3**	EPA 200.8	557644	EPA 200.8	557771
60287003005	**S-SCL4A-DUP-1**	EPA 200.8	557644	EPA 200.8	557771
60287003006	**S-SCL4A-FB-1**	EPA 200.8	557644	EPA 200.8	557771

Pace Analytical®
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60287003

60287003

Client Name: Golder

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

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

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

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

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

JLS

Date and initials of person examining contents: JS 11/16

Cooler Temperature (°C): **As-read** 3.0 4.2 **Corr. Factor** +0.0 **Corrected** 3.0 4.2

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	Fe2+
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Church 11/16/18

Project Manager Review: _____ Date: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC ~~SCCP~~ SCL4A	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003G (COC ~~#1~~ 19	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS																		N	N	N		60287003
1	~~S-UG-1A~~ S-TMW-1	WT	G			11/14/18	0940		4	2	1	1						✓	✓	✓	(2) BP2U BP3S BP3N		001
2	~~S-UG-2~~ S-TMW-2	WT	G				1050		1	1	1	1						1	1	1			002
3	~~S-DG-1~~ S-TMW-3	WT	G				1150		1	1	1	1						1	1	1			003
4	~~S-DG-2~~ S-UG-3	WT	G				1250		12	6	3	3						1	1	1	(6) BP2U (3) BP3S (3) BP3N		MS/MSD @ S-UG-3	004
5	~~S-DG-3~~	WT	G																					
6	~~S-DG-4~~	WT	G																					
7	S-SCL4A ~~S-SCPG~~-DUP-1	WT	G			11/14/18	—		4	2	1	1						✓	✓	✓	(2) BP2U BP3S BP3N			005
8	S-SCL4A ~~S-SCPG~~-FB-1	WT	G				1045		1	1	1	1						1	1	1				006
9	~~S-BMW-1S~~	WT	G																					
10	~~S-BMW-3S~~	WT	G																					
11		WT	G																					
12		WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca	Golder /	11/14/18	1750		11/15/18	1000	3.8	Y	Y	Y
							4.2	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: | DATE Signed (MM/DD/YY): 11/14/18

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: / of /

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC [redacted] SCL4A
Project Number:	153-1406.0003L (COC [redacted] 20

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~S-UG-1A~~ S-TMW-1	WT	G			11/14/18	0940		4	2	1	1						N	✓	✓	✓	✓	✓		
2	~~S-UG-2~~ S-TMW-2	WT	G			"	1050		"	"	"	"						N	✓	✓	✓	✓	✓		
3	~~S-DG-1~~ S-TMW-3	WT	G			"	1150		"	"	"	"						N	✓	✓	✓	✓	✓		
4	~~S-DG-2~~ S-UG-3	WT	G			"	1250		12	6	3	3						N	✓	✓	✓	✓	✓		MS/MSD Collected @ UG-3
5	~~S-DG-3~~	WT	G															N							
6	~~S-DG-4~~	WT	G															N							
7	S-SCL4A ~~S-SCPG-~~DUP-1	WT	G			11/14/18	—		4	2	1	1						N							
8	S-SCL4A ~~S-SCPG-~~FB-1	WT	G			"	1045		"	"	"	"						N							
9	~~S-BMW-1S~~	WT	G															N							
10	~~S-BMW-3S~~	WT	G															N							
11		WT	G															N							
12		WT	G															N							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	Golder/	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schreider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/14/18

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

MEMORANDUM

DATE January 15, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – DATA PACKAGE 60287003R1

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).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SEC-SCL4A - Nov 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/15/19

Laboratory: Pace Analytical
SDG #: 60287003 r1 (72)
Analytical Method (type and no.): Metals (200.7&200.8), ~~Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)~~
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-TMW-1, S-TMW-2, S-TMW-3, S-UG-3, S-BMW-1S, S-BMW-3S, S-SCL4A-DUP-1, S-SCL4A-FB-1

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/12-14/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?	☑	☐	☐	Dup-1@ TMW-1 FB-1@ TMW-2
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☑ (12)	☑	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☑	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: [signature] Date: 4/15/19

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: SCPA GW SAMPLING
Pace Project No.: 60291373

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

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

Sincerely,

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

Enclosures

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

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

Kansas Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60291373001	**S-UMW-2D**	Water	01/08/19 13:20	01/09/19 03:00

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60291373001	**S-UMW-2D**	EPA 200.7	CTR	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

Sample: S-UMW-2D **Lab ID: 60291373001** Collected: 01/08/19 13:20 Received: 01/09/19 03:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**181000**	ug/L	200	53.5	1	01/09/19 15:16	01/10/19 10:44	7440-70-2	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

QC Batch: 563906 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60291373001

METHOD BLANK: 2313489 Matrix: Water
Associated Lab Samples: 60291373001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<53.5	200	53.5	01/10/19 10:39	

LABORATORY CONTROL SAMPLE: 2313490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2313491 2313492

Parameter	Units	60291374003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	139000	10000	10000	151000	149000	122	98	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

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

QUALIFIERS

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SCPA GW SAMPLING
Pace Project No.: 60291373

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60291373001	**S-UMW-2D**	EPA 200.7	563906	EPA 200.7	563987

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

JLS WO# : 60291373

60291373

Client Name: Golder Associates

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

1/9/19

Project Manager Review: Jann Chunk Date: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	SCPA GW Sampling
Project Number:	153140600003

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Boron	Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N	N		60291373
1	S-UMW-2D	WT	G			1/8/19	1320		2	1		1								✓		BP2N, BP3N				001
2		WT	G																							
3		WT	G																							
4		WT	G																							
5		WT	G																							
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] / Golder	01/08/19		[signature] / Pace	1/9/19	0300	0.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 01/08/19

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

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

MEMORANDUM

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

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – VERIFICATION SAMPLING – DATA PACKAGE 60291373

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

- None.

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/10/19

Laboratory: Pace Analytical
SDG #: 60291373
Analytical Method (type and no.): Metals (200.7~~,200.8~~), ~~Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)~~ (12)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ _____
Sample Names S-UMW-2D

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

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

Note Deficiencies: _____

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

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

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: [illegible] Date: 1/10/19

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

August 21, 2019

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

RE: Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

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

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

Sincerely,

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

Enclosures

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

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

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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

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

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60310791001	**S-UMW-1D**	Water	08/02/19 15:20	08/03/19 02:50
60310791002	**S-UMW-2D**	Water	08/01/19 12:40	08/03/19 02:50
60310791003	**S-UMW-3D**	Water	08/01/19 11:00	08/03/19 02:50
60310791004	**S-UMW-4D**	Water	08/01/19 09:15	08/03/19 02:50
60310791005	**S-UMW-5D**	Water	08/02/19 13:35	08/03/19 02:50
60310791006	**S-UMW-6D**	Water	08/02/19 14:05	08/03/19 02:50
60310791007	**S-BMW-1D**	Water	08/02/19 10:55	08/03/19 02:50
60310791008	**S-BMW-3D**	Water	08/02/19 12:25	08/03/19 02:50
60310791009	**S-UMW-DUP-1**	Water	08/02/19 09:15	08/03/19 02:50
60310791010	**S-UMW-FB-1**	Water	08/02/19 13:33	08/03/19 02:50
60310791011	**S-UMW-2D MS**	Water	08/01/19 12:40	08/03/19 02:50
60310791012	**S-UMW-2D MSD**	Water	08/01/19 12:40	08/03/19 02:50

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310791001	**S-UMW-1D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791002	**S-UMW-2D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791003	**S-UMW-3D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791004	**S-UMW-4D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791005	**S-UMW-5D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310791006	**S-UMW-6D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310791007	**S-BMW-1D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791008	**S-BMW-3D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791009	**S-UMW-DUP-1**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791010	**S-UMW-FB-1**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310791011	**S-UMW-2D MS**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60310791012	**S-UMW-2D MSD**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-1D **Lab ID: 60310791001** Collected: 08/02/19 15:20 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**111**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:41	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:41	7440-41-7	
Boron	**217**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:59	7440-42-8	
Calcium	**58100**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:41	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:41	7440-48-4	
Iron	**1010**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:41	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:41	7439-92-1	
Lithium	**10.1**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:41	7439-93-2	
Magnesium	**16700**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:41	7439-95-4	
Manganese	**113**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:41	7439-96-5	
Molybdenum	**18.2J**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:41	7439-98-7	
Potassium	**4210**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:41	7440-09-7	
Sodium	**14000**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:41	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.099J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:29	7440-36-0	
Arsenic	**1.5**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:29	7440-38-2	
Cadmium	**0.046J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:29	7440-43-9	
Chromium	**0.25J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:29	7440-47-3	
Selenium	**0.13J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:29	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:11	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**198**	mg/L	20.0	6.5	1		08/15/19 11:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**282**	mg/L	5.0	5.0	1		08/08/19 11:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15.6**	mg/L	1.0	0.22	1		08/15/19 06:34	16887-00-6	
Fluoride	**0.27**	mg/L	0.20	0.085	1		08/15/19 06:34	16984-48-8	
Sulfate	**36.2**	mg/L	2.0	0.46	2		08/15/19 06:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-2D **Lab ID: 60310791002** Collected: 08/01/19 12:40 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**71.3**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:48	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:48	7440-41-7	
Boron	**12400**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:06	7440-42-8	
Calcium	**171000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:48	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:48	7440-48-4	
Iron	**416**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:48	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:48	7439-92-1	
Lithium	**21.4**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:48	7439-93-2	
Magnesium	**5320**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:48	7439-95-4	
Manganese	**168**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:48	7439-96-5	
Molybdenum	**820**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:48	7439-98-7	
Potassium	**22900**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:48	7440-09-7	
Sodium	**46500**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:48	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:31	7440-36-0	
Arsenic	**3.6**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:31	7440-38-2	
Cadmium	**0.34J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:31	7440-43-9	
Chromium	**0.13J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:31	7440-47-3	
Selenium	**0.096J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:31	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:31	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**186**	mg/L	20.0	6.5	1		08/15/19 11:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**822**	mg/L	10.0	10.0	1		08/07/19 13:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.6**	mg/L	1.0	0.22	1		08/14/19 18:23	16887-00-6	
Fluoride	**0.51**	mg/L	0.20	0.085	1		08/14/19 18:23	16984-48-8	
Sulfate	**339**	mg/L	50.0	11.5	50		08/14/19 20:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-3D **Lab ID: 60310791003** Collected: 08/01/19 11:00 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**68.3**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:00	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:00	7440-41-7	
Boron	**27600**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:12	7440-42-8	
Calcium	**236000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:00	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:00	7440-48-4	
Iron	**824**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:00	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:00	7439-92-1	
Lithium	**22.5**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:00	7439-93-2	
Magnesium	**8640**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:00	7439-95-4	
Manganese	**499**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:00	7439-96-5	
Molybdenum	**4120**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:00	7439-98-7	
Potassium	**17700**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:00	7440-09-7	
Sodium	**86600**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:00	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:36	7440-36-0	
Arsenic	**0.52J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:36	7440-38-2	
Cadmium	**1.9**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:36	7440-43-9	
Chromium	**0.21J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:36	7440-47-3	
Selenium	**0.27J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:36	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:25	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**123**	mg/L	20.0	6.5	1		08/15/19 11:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1390**	mg/L	13.3	13.3	1		08/07/19 13:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.9**	mg/L	2.0	0.44	2		08/14/19 21:20	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.085	1		08/14/19 21:06	16984-48-8	
Sulfate	**828**	mg/L	100	23.0	100		08/14/19 21:35	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-4D **Lab ID: 60310791004** Collected: 08/01/19 09:15 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**53.8**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:03	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:03	7440-41-7	
Boron	**15600**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:14	7440-42-8	
Calcium	**136000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:03	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:03	7440-48-4	
Iron	**5430**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:03	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:03	7439-92-1	
Lithium	**33.7**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:03	7439-93-2	
Magnesium	**18300**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:03	7439-95-4	
Manganese	**1160**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:03	7439-96-5	
Molybdenum	**4280**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:03	7439-98-7	
Potassium	**11500**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:03	7440-09-7	
Sodium	**56400**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:03	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:37	7440-36-0	
Arsenic	**0.33J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:37	7440-38-2	
Cadmium	**2.1**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:37	7440-43-9	
Chromium	**0.080J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:37	7440-47-3	
Selenium	**0.16J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:37	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:27	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**173**	mg/L	20.0	6.5	1		08/15/19 11:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**973**	mg/L	10.0	10.0	1		08/07/19 13:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**23.3**	mg/L	2.0	0.44	2		08/14/19 22:05	16887-00-6	
Fluoride	**0.74**	mg/L	0.20	0.085	1		08/14/19 21:50	16984-48-8	
Sulfate	**521**	mg/L	50.0	11.5	50		08/14/19 22:20	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-5D **Lab ID: 60310791005** Collected: 08/02/19 13:35 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**338**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:05	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:05	7440-41-7	
Boron	**13600**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:17	7440-42-8	
Calcium	**95300**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:05	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:05	7440-48-4	
Iron	**3790**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:05	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:05	7439-92-1	
Lithium	**27.4**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:05	7439-93-2	
Magnesium	**19000**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:05	7439-95-4	
Manganese	**381**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:05	7439-96-5	
Molybdenum	**832**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:05	7439-98-7	
Potassium	**9860**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:05	7440-09-7	
Sodium	**26200**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:05	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:39	7440-36-0	
Arsenic	**0.42J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:39	7440-38-2	
Cadmium	**0.36J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:39	7440-43-9	
Chromium	**0.098J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:39	7440-47-3	
Selenium	**0.20J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:39	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:39	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:30	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**255**	mg/L	20.0	6.5	1		08/15/19 12:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**501**	mg/L	10.0	10.0	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.9**	mg/L	2.0	0.44	2		08/14/19 23:19	16887-00-6	
Fluoride	**0.71**	mg/L	0.20	0.085	1		08/14/19 23:04	16984-48-8	
Sulfate	**83.3**	mg/L	10.0	2.3	10		08/17/19 18:30	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-6D **Lab ID: 60310791006** Collected: 08/02/19 14:05 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**136**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:08	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:08	7440-41-7	
Boron	**1120**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:19	7440-42-8	
Calcium	**83400**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:08	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:08	7440-48-4	
Iron	**6590**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:08	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:08	7439-92-1	
Lithium	**18.3**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:08	7439-93-2	
Magnesium	**19400**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:08	7439-95-4	
Manganese	**678**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:08	7439-96-5	
Molybdenum	**82.3**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:08	7439-98-7	
Potassium	**4380**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:08	7440-09-7	
Sodium	**12400**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:08	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:41	7440-36-0	
Arsenic	**0.38J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:41	7440-38-2	
Cadmium	**0.037J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:41	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:41	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:41	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:41	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:32	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**228**	mg/L	20.0	6.5	1		08/15/19 12:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**393**	mg/L	10.0	10.0	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.1**	mg/L	1.0	0.22	1		08/14/19 23:34	16887-00-6	
Fluoride	**0.47**	mg/L	0.20	0.085	1		08/14/19 23:34	16984-48-8	
Sulfate	**68.9**	mg/L	5.0	1.2	5		08/15/19 14:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-BMW-1D **Lab ID: 60310791007** Collected: 08/02/19 10:55 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**311**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:10	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:10	7440-41-7	
Boron	**209**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:25	7440-42-8	
Calcium	**126000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:10	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:10	7440-48-4	
Iron	**9630**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:10	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:10	7439-92-1	
Lithium	**17.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:10	7439-93-2	
Magnesium	**27100**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:10	7439-95-4	
Manganese	**1180**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:10	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:10	7439-98-7	
Potassium	**2620**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:10	7440-09-7	
Sodium	**6910**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:10	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:48	7440-36-0	
Arsenic	**0.26J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:48	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:48	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:48	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:48	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:34	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**410**	mg/L	20.0	6.5	1		08/15/19 12:11		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**464**	mg/L	10.0	10.0	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.7**	mg/L	1.0	0.22	1		08/15/19 00:04	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.085	1		08/15/19 00:04	16984-48-8	
Sulfate	**36.9**	mg/L	5.0	1.2	5		08/15/19 00:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-BMW-3D **Lab ID: 60310791008** Collected: 08/02/19 12:25 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**685**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:13	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:13	7440-41-7	
Boron	**70.0J**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:28	7440-42-8	B
Calcium	**105000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:13	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:13	7440-48-4	
Iron	**7400**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:13	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:13	7439-92-1	
Lithium	**24.6**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:13	7439-93-2	
Magnesium	**24200**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:13	7439-95-4	
Manganese	**512**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:13	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:13	7439-98-7	
Potassium	**3710**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:13	7440-09-7	
Sodium	**6290**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:13	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:49	7440-36-0	
Arsenic	**0.14J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:49	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:49	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:49	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:49	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:49	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:37	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**330**	mg/L	20.0	6.5	1		08/15/19 12:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**445**	mg/L	10.0	10.0	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.6**	mg/L	1.0	0.22	1		08/15/19 00:34	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/15/19 00:34	16984-48-8	
Sulfate	**30.7**	mg/L	2.0	0.46	2		08/15/19 00:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-DUP-1 **Lab ID: 60310791009** Collected: 08/02/19 09:15 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**72.1**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:15	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:15	7440-41-7	
Boron	**27800**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:30	7440-42-8	
Calcium	**250000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:15	7440-70-2	
Cobalt	**1.3J**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:15	7440-48-4	
Iron	**862**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:15	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:15	7439-92-1	
Lithium	**31.7**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:15	7439-93-2	
Magnesium	**9100**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:15	7439-95-4	
Manganese	**525**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:15	7439-96-5	
Molybdenum	**4330**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:15	7439-98-7	
Potassium	**18600**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:15	7440-09-7	
Sodium	**91400**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:15	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:51	7440-36-0	
Arsenic	**0.50J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:51	7440-38-2	
Cadmium	**1.8**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:51	7440-43-9	
Chromium	**0.14J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:51	7440-47-3	
Selenium	**0.18J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:51	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:51	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:39	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**119**	mg/L	20.0	6.5	1		08/15/19 12:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1310**	mg/L	13.3	13.3	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.2**	mg/L	2.0	0.44	2		08/15/19 02:03	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.085	1		08/15/19 01:18	16984-48-8	
Sulfate	**808**	mg/L	50.0	11.5	50		08/15/19 02:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-FB-1 **Lab ID: 60310791010** Collected: 08/02/19 13:33 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 17:18	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 17:18	7440-41-7	
Boron	**68.3J**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 13:32	7440-42-8	B
Calcium	**71.9J**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 17:18	7440-70-2	
Cobalt	**1.2J**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 17:18	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 17:18	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 17:18	7439-92-1	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 17:18	7439-93-2	
Magnesium	**<13.0**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 17:18	7439-95-4	
Manganese	**<2.1**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 17:18	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 17:18	7439-98-7	
Potassium	**<79.0**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 17:18	7440-09-7	
Sodium	**<144**	ug/L	500	144	1	08/07/19 14:31	08/08/19 17:18	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:46	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 17:46	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 17:46	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 17:46	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 17:46	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 17:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:41	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		08/15/19 12:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6.5**	mg/L	5.0	5.0	1		08/08/19 11:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		08/15/19 02:32	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		08/15/19 02:32	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		08/15/19 02:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 601921 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2462401 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/09/19 11:07	

LABORATORY CONTROL SAMPLE: 2462402

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462403 2462404

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.037	5	5	4.8	4.8	96	95	75-125	1	20	

MATRIX SPIKE SAMPLE: 2462405

Parameter	Units	60310792004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.037	5	4.8	95	75-125	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 601714 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2461467 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/08/19 16:31	
Beryllium	ug/L	<0.25	1.0	0.25	08/08/19 16:31	
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	
Cobalt	ug/L	<0.84	5.0	0.84	08/08/19 16:31	
Iron	ug/L	<14.0	50.0	14.0	08/08/19 16:31	
Lead	ug/L	<3.4	10.0	3.4	08/08/19 16:31	
Lithium	ug/L	<5.9	10.0	5.9	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	
Molybdenum	ug/L	<2.6	20.0	2.6	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
Barium	ug/L	1000	1010	101	85-115	
Beryllium	ug/L	1000	976	98	85-115	
Boron	ug/L	1000	987	99	85-115	
Calcium	ug/L	10000	9780	98	85-115	
Cobalt	ug/L	1000	994	99	85-115	
Iron	ug/L	10000	9860	99	85-115	
Lead	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Magnesium	ug/L	10000	9530	95	85-115	
Manganese	ug/L	1000	988	99	85-115	
Molybdenum	ug/L	1000	1020	102	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
Barium	ug/L	111	1000	1000	1110	1120	100	101	70-130	0	20	
Beryllium	ug/L	<0.25	1000	1000	984	983	98	98	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

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	
Cobalt	ug/L	<0.84	1000	1000	962	973	96	97	70-130	1	20	
Iron	ug/L	1010	10000	10000	10700	10800	97	97	70-130	1	20	
Lead	ug/L	<3.4	1000	1000	990	999	99	100	70-130	1	20	
Lithium	ug/L	10.1	1000	1000	1030	1040	102	103	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	
Molybdenum	ug/L	18.2J	1000	1000	1030	1040	101	102	70-130	1	20	
Potassium	ug/L	4210	10000	10000	14400	14300	102	101	70-130	0	20	
Sodium	ug/L	14000	10000	10000	24700	24300	107	103	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	71.3	1000	1000	1070	1090	100	102	70-130	2	20	
Beryllium	ug/L	<0.25	1000	1000	977	989	98	99	70-130	1	20	
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	
Cobalt	ug/L	<0.84	1000	1000	978	987	98	99	70-130	1	20	
Iron	ug/L	416	10000	10000	10100	10200	97	98	70-130	0	20	
Lead	ug/L	<3.4	1000	1000	988	998	99	100	70-130	1	20	
Lithium	ug/L	21.4	1000	1000	1050	1060	102	104	70-130	1	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	
Molybdenum	ug/L	820	1000	1000	1850	1890	103	107	70-130	2	20	
Potassium	ug/L	22900	10000	10000	33000	33600	101	107	70-130	2	20	
Sodium	ug/L	46500	10000	10000	56500	57800	100	113	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 601872 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2462177 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/12/19 17:25	
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 17:25	
Cadmium	ug/L	<0.033	0.50	0.033	08/12/19 17:25	
Chromium	ug/L	<0.078	1.0	0.078	08/12/19 17:25	
Selenium	ug/L	<0.085	1.0	0.085	08/12/19 17:25	
Thallium	ug/L	<0.099	1.0	0.099	08/12/19 17:25	

LABORATORY CONTROL SAMPLE: 2462178

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	41.1	103	85-115	
Arsenic	ug/L	40	39.1	98	85-115	
Cadmium	ug/L	40	39.5	99	85-115	
Chromium	ug/L	40	41.6	104	85-115	
Selenium	ug/L	40	40.2	101	85-115	
Thallium	ug/L	40	36.4	91	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462179 2462180

Parameter	Units	60310791009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.078	40	40	39.4	38.7	98	97	70-130	2	20	
Arsenic	ug/L	0.50J	40	40	40.7	40.1	100	99	70-130	1	20	
Cadmium	ug/L	1.8	40	40	37.0	36.6	88	87	70-130	1	20	
Chromium	ug/L	0.14J	40	40	42.4	41.5	106	103	70-130	2	20	
Selenium	ug/L	0.18J	40	40	38.2	37.7	95	94	70-130	1	20	
Thallium	ug/L	<0.099	40	40	32.1	32.1	80	80	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462181 2462182

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.078	40	40	40.7	41.7	102	104	70-130	2	20	
Arsenic	ug/L	3.6	40	40	44.0	44.9	101	103	70-130	2	20	
Cadmium	ug/L	0.34J	40	40	37.3	38.1	92	94	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462181 2462182

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium	ug/L	0.13J	40	40	43.7	44.4	109	111	70-130	2	20	
Selenium	ug/L	0.096J	40	40	38.2	39.2	95	98	70-130	2	20	
Thallium	ug/L	<0.099	40	40	33.3	34.2	83	85	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 603364 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2467297 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

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

LABORATORY CONTROL SAMPLE: 2467298

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

SAMPLE DUPLICATE: 2467299

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

SAMPLE DUPLICATE: 2467300

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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 601524 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310791002, 60310791003, 60310791004

METHOD BLANK: 2460999 Matrix: Water
Associated Lab Samples: 60310791002, 60310791003, 60310791004

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

LABORATORY CONTROL SAMPLE: 2461000

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

SAMPLE DUPLICATE: 2461001

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

SAMPLE DUPLICATE: 2461002

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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 601841 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310791001, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2462110 Matrix: Water
Associated Lab Samples: 60310791001, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/08/19 11:54	

LABORATORY CONTROL SAMPLE: 2462111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	980	98	80-120	

SAMPLE DUPLICATE: 2462112

Parameter	Units	60310791001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	282	288	2	10	

SAMPLE DUPLICATE: 2462113

Parameter	Units	60310792004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	660	717	8	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 603127 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310791001

METHOD BLANK: 2466421 Matrix: Water
Associated Lab Samples: 60310791001

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

LABORATORY CONTROL SAMPLE: 2466422

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466423 2466424

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

MATRIX SPIKE SAMPLE: 2466425

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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 603128 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

METHOD BLANK: 2466428 Matrix: Water
Associated Lab Samples: 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 12:49	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 12:49	
Sulfate	mg/L	<0.23	1.0	0.23	08/14/19 12:49	

LABORATORY CONTROL SAMPLE: 2466429

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466430 2466431

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	19.6	5	5	25.2	25.1	112	110	80-120	0	15	E
Fluoride	mg/L	0.51	2.5	2.5	3.1	3.1	104	102	80-120	1	15	
Sulfate	mg/L	339	250	250	596	592	103	101	80-120	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466432 2466433

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.6	10	10	31.4	31.4	109	109	80-120	0	15	
Fluoride	mg/L	0.36	2.5	2.5	3.0	3.0	104	104	80-120	0	15	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 603455 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310791006

METHOD BLANK: 2467640 Matrix: Water
Associated Lab Samples: 60310791006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.23	1.0	0.23	08/15/19 13:49	

LABORATORY CONTROL SAMPLE: 2467641

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2467642 2467643

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	171	50	50	218	229	96	116	80-120	5	15	E

MATRIX SPIKE SAMPLE: 2467644

Parameter	Units	60310412025 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	147	50	198	103	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 603682 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310791005

METHOD BLANK: 2468403 Matrix: Water
Associated Lab Samples: 60310791005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.23	1.0	0.23	08/17/19 16:31	

LABORATORY CONTROL SAMPLE: 2468404

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2468405 2468406

Parameter	Units	60311536011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10100	5000	5000	15100	15400	99	105	80-120	2	15	

MATRIX SPIKE SAMPLE: 2468407

Parameter	Units	60311535004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	2140	100	2200	64	80-120	E,M1

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-1D **Lab ID: 60310791001** Collected: 08/02/19 15:20 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.132 ± 0.448 (0.864) C:NA T:94%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.346 ± 0.402 (0.849) C:82% T:81%**	pCi/L	08/20/19 15:54	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-2D **Lab ID: 60310791002** Collected: 08/01/19 12:40 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.521 ± 0.413 (0.537) C:NA T:93%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.877 ± 0.501 (0.909) C:79% T:66%**	pCi/L	08/20/19 15:54	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-3D **Lab ID: 60310791003** Collected: 08/01/19 11:00 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.07 ± 0.640 (0.609) C:NA T:77%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.722 ± 0.725 (1.51) C:79% T:60%**	pCi/L	08/20/19 15:59	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-4D **Lab ID: 60310791004** Collected: 08/01/19 09:15 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.508 ± 0.475 (0.674) C:NA T:82%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.204 ± 0.586 (1.30) C:77% T:79%**	pCi/L	08/20/19 15:59	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-5D **Lab ID: 60310791005** Collected: 08/02/19 13:35 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.415 ± 0.472 (0.744) C:NA T:92%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.631 ± 0.586 (1.21) C:81% T:68%**	pCi/L	08/20/19 15:59	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-6D **Lab ID: 60310791006** Collected: 08/02/19 14:05 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.213 ± 0.576 (1.07) C:NA T:92%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**0.469 ± 0.574 (1.22) C:78% T:73%**	pCi/L	08/20/19 15:59	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-BMW-1D **Lab ID: 60310791007** Collected: 08/02/19 10:55 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.507 ± 0.559 (0.894) C:NA T:89%**	pCi/L	08/20/19 11:10	13982-63-3	
Radium-228	EPA 904.0	**1.27 ± 0.745 (1.41) C:79% T:61%**	pCi/L	08/20/19 15:57	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-BMW-3D **Lab ID: 60310791008** Collected: 08/02/19 12:25 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.33 ± 0.707 (0.799) C:NA T:95%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**0.183 ± 0.503 (1.12) C:79% T:80%**	pCi/L	08/20/19 18:17	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-DUP-1 **Lab ID: 60310791009** Collected: 08/02/19 09:15 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.690 ± 0.512 (0.641) C:NA T:86%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**0.344 ± 0.629 (1.38) C:80% T:66%**	pCi/L	08/20/19 18:17	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-FB-1 **Lab ID: 60310791010** Collected: 08/02/19 13:33 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.410 ± 0.466 (0.736) C:NA T:88%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**1.06 ± 0.637 (1.19) C:80% T:73%**	pCi/L	08/20/19 18:17	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-2D MS **Lab ID: 60310791011** Collected: 08/01/19 12:40 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**99.50 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**115.65 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 15:54	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Sample: S-UMW-2D MSD **Lab ID: 60310791012** Collected: 08/01/19 12:40 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**90.40 %REC 9.58 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**85.79 %REC 29.65 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 15:54	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 356262 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010, 60310791011, 60310791012

METHOD BLANK: 1730415 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010, 60310791011, 60310791012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0531 ± 0.275 (0.571) C:NA T:94%	pCi/L	08/20/19 11:10	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

QC Batch: 356265 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010, 60310791011, 60310791012

METHOD BLANK: 1730422 Matrix: Water
Associated Lab Samples: 60310791001, 60310791002, 60310791003, 60310791004, 60310791005, 60310791006, 60310791007, 60310791008, 60310791009, 60310791010, 60310791011, 60310791012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.469 ± 0.374 (0.738) C:79% T:79%	pCi/L	08/20/19 15:54	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310791001	**S-UMW-1D**	EPA 200.7	601714	EPA 200.7	601738
60310791002	**S-UMW-2D**	EPA 200.7	601714	EPA 200.7	601738
60310791003	**S-UMW-3D**	EPA 200.7	601714	EPA 200.7	601738
60310791004	**S-UMW-4D**	EPA 200.7	601714	EPA 200.7	601738
60310791005	**S-UMW-5D**	EPA 200.7	601714	EPA 200.7	601738
60310791006	**S-UMW-6D**	EPA 200.7	601714	EPA 200.7	601738
60310791007	**S-BMW-1D**	EPA 200.7	601714	EPA 200.7	601738
60310791008	**S-BMW-3D**	EPA 200.7	601714	EPA 200.7	601738
60310791009	**S-UMW-DUP-1**	EPA 200.7	601714	EPA 200.7	601738
60310791010	**S-UMW-FB-1**	EPA 200.7	601714	EPA 200.7	601738
60310791001	**S-UMW-1D**	EPA 200.8	601872	EPA 200.8	601929
60310791002	**S-UMW-2D**	EPA 200.8	601872	EPA 200.8	601929
60310791003	**S-UMW-3D**	EPA 200.8	601872	EPA 200.8	601929
60310791004	**S-UMW-4D**	EPA 200.8	601872	EPA 200.8	601929
60310791005	**S-UMW-5D**	EPA 200.8	601872	EPA 200.8	601929
60310791006	**S-UMW-6D**	EPA 200.8	601872	EPA 200.8	601929
60310791007	**S-BMW-1D**	EPA 200.8	601872	EPA 200.8	601929
60310791008	**S-BMW-3D**	EPA 200.8	601872	EPA 200.8	601929
60310791009	**S-UMW-DUP-1**	EPA 200.8	601872	EPA 200.8	601929
60310791010	**S-UMW-FB-1**	EPA 200.8	601872	EPA 200.8	601929
60310791001	**S-UMW-1D**	EPA 7470	601921	EPA 7470	601998
60310791002	**S-UMW-2D**	EPA 7470	601921	EPA 7470	601998
60310791003	**S-UMW-3D**	EPA 7470	601921	EPA 7470	601998
60310791004	**S-UMW-4D**	EPA 7470	601921	EPA 7470	601998
60310791005	**S-UMW-5D**	EPA 7470	601921	EPA 7470	601998
60310791006	**S-UMW-6D**	EPA 7470	601921	EPA 7470	601998
60310791007	**S-BMW-1D**	EPA 7470	601921	EPA 7470	601998
60310791008	**S-BMW-3D**	EPA 7470	601921	EPA 7470	601998
60310791009	**S-UMW-DUP-1**	EPA 7470	601921	EPA 7470	601998
60310791010	**S-UMW-FB-1**	EPA 7470	601921	EPA 7470	601998
60310791001	**S-UMW-1D**	EPA 903.1	356262		
60310791002	**S-UMW-2D**	EPA 903.1	356262		
60310791003	**S-UMW-3D**	EPA 903.1	356262		
60310791004	**S-UMW-4D**	EPA 903.1	356262		
60310791005	**S-UMW-5D**	EPA 903.1	356262		
60310791006	**S-UMW-6D**	EPA 903.1	356262		
60310791007	**S-BMW-1D**	EPA 903.1	356262		
60310791008	**S-BMW-3D**	EPA 903.1	356262		
60310791009	**S-UMW-DUP-1**	EPA 903.1	356262		
60310791010	**S-UMW-FB-1**	EPA 903.1	356262		
60310791011	**S-UMW-2D MS**	EPA 903.1	356262		
60310791012	**S-UMW-2D MSD**	EPA 903.1	356262		
60310791001	**S-UMW-1D**	EPA 904.0	356265		
60310791002	**S-UMW-2D**	EPA 904.0	356265		
60310791003	**S-UMW-3D**	EPA 904.0	356265		
60310791004	**S-UMW-4D**	EPA 904.0	356265		
60310791005	**S-UMW-5D**	EPA 904.0	356265		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60310791

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310791006	**S-UMW-6D**	EPA 904.0	356265		
60310791007	**S-BMW-1D**	EPA 904.0	356265		
60310791008	**S-BMW-3D**	EPA 904.0	356265		
60310791009	**S-UMW-DUP-1**	EPA 904.0	356265		
60310791010	**S-UMW-FB-1**	EPA 904.0	356265		
60310791011	**S-UMW-2D MS**	EPA 904.0	356265		
60310791012	**S-UMW-2D MSD**	EPA 904.0	356265		
60310791001	**S-UMW-1D**	SM 2320B	603364		
60310791002	**S-UMW-2D**	SM 2320B	603364		
60310791003	**S-UMW-3D**	SM 2320B	603364		
60310791004	**S-UMW-4D**	SM 2320B	603364		
60310791005	**S-UMW-5D**	SM 2320B	603364		
60310791006	**S-UMW-6D**	SM 2320B	603364		
60310791007	**S-BMW-1D**	SM 2320B	603364		
60310791008	**S-BMW-3D**	SM 2320B	603364		
60310791009	**S-UMW-DUP-1**	SM 2320B	603364		
60310791010	**S-UMW-FB-1**	SM 2320B	603364		
60310791001	**S-UMW-1D**	SM 2540C	601841		
60310791002	**S-UMW-2D**	SM 2540C	601524		
60310791003	**S-UMW-3D**	SM 2540C	601524		
60310791004	**S-UMW-4D**	SM 2540C	601524		
60310791005	**S-UMW-5D**	SM 2540C	601841		
60310791006	**S-UMW-6D**	SM 2540C	601841		
60310791007	**S-BMW-1D**	SM 2540C	601841		
60310791008	**S-BMW-3D**	SM 2540C	601841		
60310791009	**S-UMW-DUP-1**	SM 2540C	601841		
60310791010	**S-UMW-FB-1**	SM 2540C	601841		
60310791001	**S-UMW-1D**	EPA 300.0	603127		
60310791002	**S-UMW-2D**	EPA 300.0	603128		
60310791003	**S-UMW-3D**	EPA 300.0	603128		
60310791004	**S-UMW-4D**	EPA 300.0	603128		
60310791005	**S-UMW-5D**	EPA 300.0	603128		
60310791005	**S-UMW-5D**	EPA 300.0	603682		
60310791006	**S-UMW-6D**	EPA 300.0	603128		
60310791006	**S-UMW-6D**	EPA 300.0	603455		
60310791007	**S-BMW-1D**	EPA 300.0	603128		
60310791008	**S-BMW-3D**	EPA 300.0	603128		
60310791009	**S-UMW-DUP-1**	EPA 300.0	603128		
60310791010	**S-UMW-FB-1**	EPA 300.0	603128		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60310791

60310791

Client Name: Holder

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

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

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

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

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

Cooler Temperature (°C): **As-read** 2.4, 3.0 **Corr. Factor** -1.0 **Corrected** 1.4, 2.0

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

8/5/19

Project Manager Review: Jamie Church Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

Pace Analytical® www.pacelabs.com

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

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003A (COC #5)

Section C — Invoice Information:

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

REGULATORY AGENCY: NPDES / GROUND WATER (circled) / DRINKING WATER / UST / RCRA / OTHER

Site Location STATE: MO

Section D — Required Client Information

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

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

Requested Analysis Filtered (Y/N): N N N N N N N N

Pace Project No./ Lab I.D.: 60310791

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-UMW-1D	WT	G	8/2/19	1520				5	2		3															BP N(2), BP2U, BP3N, BP3U 001
2	S-UMW-2D	WT	G	8/1/19	1240				15	2		3															BP N(6), BP2U(3), BP3N(3), BP3U(3) 002
3	S-UMW-3D	WT	G		1100																						BP N(2), BP2U, BP3N, BP3U 003
4	S-UMW-4D	WT	G		945																						004
5	S-UMW-5D	WT	G	8/2/19	1335																						005
6	S-UMW-6D	WT	G		1405																						006
7	S-BMW-1D	WT	G	8/2/19	1055				5	2		3															007
8	S-BMW-3D	WT	G	8/2/19	1225																						008
9	S-UMW-DUP-1	WT	G	8/1/19	—																						009
10	S-UMW-FB-1	WT	G	8/2/19	1333																						010
11	S-UMW-2D-MS	WT	G	8/1/19	1240																						
12	S-UMW-2D-MSD	WT	G	8/1/19	1240																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	[signature] / Golder	8/2/19	1635	[signature]	8/3/19	0250	3.0	Y	Y	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8/2/19

MEMORANDUM

DATE August 21, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPA – DATA PACKAGE 60310791

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).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPA
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 8/21/2019

Laboratory: Pace Analytical - KS
SDG #: 60310791
Analytical Method (type and no.): EPA 200.7/200.8 (Metals); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-UMW-1D, S-UMW-2D, S-UMW-3D, S-UMW-4D, S-UMW-5D, S-UMW-6D, S-BMW-1D, S-BMW-3D, S-UMW-DUP-1, S-UMW-FB-1, S-UMW-2D MS, S-UMW-2D MSD

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	x			8/1-8/2/2019
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			
f) Field QC noted?	x			
g) Field parameters collected (note types)?	x			pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	x			
i) Notations of unacceptable field conditions/performances from field logs or field notes?		x		
j) Does the laboratory narrative indicate deficiencies?			x	

Note Deficiencies: _____

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ S-UMW-3D
	[x]	[ ]	[ ]	FB-1 @ S-UMW-4D
b) Were field dup. precision criteria met (note RPD)?	[ ]	[x]	[ ]	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	[x]	[ ]	[ ]	-91001: TDS; -91002: Alk, TDS;
d) Were lab dup. precision criteria met (note RPD)?	[x]	[ ]	[ ]	See Notes

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

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

Comments/Notes:

MB: -90001-10: B (11.8);

FB-1: B (68.3), Ca (71.9), Co (1.2), TDS (6.5);

DUP-1: Co (200), Li (34), Cr (40), Se (40), Ra-226 (43); no qualification is necessary except for Ra-226.

Max Lab Duplicate RPD: 2% (Limit: 10%)

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-BMW-3D	Boron (B)	100	U	Analyte Detected in Method Blank (MB); PQL>Result>MDL
S-UMW-FB-1	B	100	U	"
S-UMW-3D	Radium-226 (Ra-226)	1.07	J	Field Duplicate Exceeded RPD Limit; Result > MDC
S-UMW-DUP-1	Ra-226	0.690	J	"

Signature: ____________________ Date: 8/21/2019

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

September 01, 2019

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

RE: Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory between August 03, 2019 and August 08, 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.
Due to Lab Error, twelve of the samples were analyzed out of hold for Alkalinity.

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

Sincerely,

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

Enclosures

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

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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

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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60310792001	S-UMW-7S(AMW-1S)	Water	08/02/19 09:10	08/03/19 02:50
60310792002	S-UMW-7D(AMW-1D)	Water	08/02/19 09:45	08/03/19 02:50
60310792003	S-TP-5S	Water	08/02/19 13:05	08/03/19 02:50
60310792004	S-TP-5M	Water	08/02/19 11:10	08/03/19 02:50
60310792005	S-TP-5D	Water	08/02/19 12:15	08/03/19 02:50
60310792006	S-NE-DUP-1	Water	08/02/19 09:10	08/03/19 02:50
60310792007	S-NE-FB-1	Water	08/02/19 12:12	08/03/19 02:50
60310792008	S-TP-5M MS	Water	08/02/19 11:10	08/03/19 02:50
60310792009	S-TP-5M MSD	Water	08/02/19 11:10	08/03/19 02:50
60310792010	S-TP-1S	Water	08/05/19 13:00	08/07/19 02:55
60310792011	S-TP-1M	Water	08/05/19 13:15	08/07/19 02:55
60310792012	S-TP-1D	Water	08/06/19 10:03	08/07/19 02:55
60310792013	S-TP-2S	Water	08/05/19 10:55	08/07/19 02:55
60310792014	S-TP-2M	Water	08/05/19 11:27	08/07/19 02:55
60310792015	S-TP-2D	Water	08/06/19 09:58	08/07/19 02:55
60310792016	S-TP-4M	Water	08/06/19 13:58	08/07/19 02:55
60310792017	S-TP-4D	Water	08/06/19 11:37	08/07/19 02:55
60310792018	S-TP-6S	Water	08/06/19 15:20	08/07/19 02:55
60310792019	S-TP-6M	Water	08/06/19 15:33	08/07/19 02:55
60310792020	S-TP-7S	Water	08/06/19 12:30	08/07/19 02:55
60310792021	S-TP-7M	Water	08/06/19 13:20	08/07/19 02:55
60310792022	S-TP-7D	Water	08/06/19 14:10	08/07/19 02:55
60310792023	S-TP-8S	Water	08/05/19 15:35	08/07/19 02:55
60310792024	S-TP-8M	Water	08/05/19 16:10	08/07/19 02:55
60310792025	S-TP-8D	Water	08/05/19 15:30	08/07/19 02:55
60310792026	S-NE-DUP-2	Water	08/05/19 08:00	08/07/19 02:55
60310792027	S-NE-DUP-3	Water	08/06/19 08:00	08/07/19 02:55
60310792028	S-NE-FB-2	Water	08/05/19 13:25	08/07/19 02:55
60310792029	S-NE-FB-3	Water	08/05/19 13:55	08/07/19 02:55
60310792030	S-TP-4S	Water	08/06/19 12:22	08/08/19 02:55
60310792031	S-TP-2S MS	Water	08/05/19 10:55	08/07/19 02:55
60310792032	S-TP-2S MSD	Water	08/05/19 10:55	08/07/19 02:55
60310792033	S-TP-6D	Water	08/07/19 14:07	08/08/19 04:30
60310792034	S-TP-3S	Water	08/07/19 11:23	08/08/19 04:30
60310792035	S-TP-3M	Water	08/07/19 12:18	08/08/19 04:30
60310792036	S-TP-3D	Water	08/07/19 10:03	08/08/19 04:30

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310792001	**S-UMW-7S(AMW-1S)**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792002	**S-UMW-7D(AMW-1D)**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792003	**S-TP-5S**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792004	**S-TP-5M**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792005	**S-TP-5D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792006	**S-NE-DUP-1**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792007	**S-NE-FB-1**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792008	**S-TP-5M MS**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60310792009	**S-TP-5M MSD**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60310792010	**S-TP-1S**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792011	**S-TP-1M**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792012	**S-TP-1D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792013	**S-TP-2S**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792014	**S-TP-2M**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792015	**S-TP-2D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792016	**S-TP-4M**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792017	**S-TP-4D**	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792018	**S-TP-6S**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792019	**S-TP-6M**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792020	**S-TP-7S**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310792021	**S-TP-7M**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792022	**S-TP-7D**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792023	**S-TP-8S**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792024	**S-TP-8M**	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792025	**S-TP-8D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792026	**S-NE-DUP-2**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792027	**S-NE-DUP-3**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310792028	**S-NE-FB-2**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792029	**S-NE-FB-3**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310792030	**S-TP-4S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60310792031	**S-TP-2S MS**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310792032	**S-TP-2S MSD**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310792033	**S-TP-6D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60310792034	**S-TP-3S**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60310792035	**S-TP-3M**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60310792036	**S-TP-3D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	LRS	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-UMW-7S(AMW-1S) **Lab ID: 60310792001** Collected: 08/02/19 09:10 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**147**	ug/L	5.0	1.4	1	08/07/19 14:31	08/09/19 12:20	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/09/19 12:20	7440-41-7	
Boron	**7570**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:20	7440-42-8	
Calcium	**86600**	ug/L	200	50.0	1	08/07/19 14:31	08/09/19 12:20	7440-70-2	
Cobalt	**1.6J**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:02	7440-48-4	
Iron	**2740**	ug/L	50.0	14.0	1	08/07/19 14:31	08/09/19 12:20	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:02	7439-92-1	
Lithium	**30.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/09/19 12:20	7439-93-2	
Magnesium	**7330**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:02	7439-95-4	
Manganese	**285**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:02	7439-96-5	
Molybdenum	**167**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:02	7439-98-7	
Potassium	**10200**	ug/L	500	79.0	1	08/07/19 14:31	08/09/19 12:20	7440-09-7	
Sodium	**20700**	ug/L	500	144	1	08/07/19 14:31	08/09/19 12:20	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:03	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:03	7440-38-2	
Cadmium	**0.10J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:03	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:03	7440-47-3	
Selenium	**0.17J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:03	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:03	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:43	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**275**	mg/L	20.0	6.5	1		08/15/19 12:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**398**	mg/L	10.0	10.0	1		08/08/19 11:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.9**	mg/L	2.0	0.44	2		08/15/19 03:02	16887-00-6	
Fluoride	**0.70**	mg/L	0.20	0.085	1		08/15/19 02:47	16984-48-8	
Sulfate	**23.3**	mg/L	2.0	0.46	2		08/15/19 03:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-UMW-7D(AMW-1D) **Lab ID: 60310792002** Collected: 08/02/19 09:45 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**271**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:04	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:04	7440-41-7	
Boron	**12500**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:22	7440-42-8	
Calcium	**83100**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:04	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:04	7440-48-4	
Iron	**3470**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:04	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:04	7439-92-1	
Lithium	**40.5**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:04	7439-93-2	
Magnesium	**16900**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:04	7439-95-4	
Manganese	**404**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:04	7439-96-5	
Molybdenum	**477**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:04	7439-98-7	
Potassium	**8000**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:04	7440-09-7	
Sodium	**24400**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:04	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:05	7440-36-0	
Arsenic	**0.27J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:05	7440-38-2	
Cadmium	**0.20J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:05	7440-43-9	
Chromium	**0.080J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:05	7440-47-3	
Selenium	**0.15J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:05	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:05	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:46	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**262**	mg/L	20.0	6.5	1		08/15/19 12:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**439**	mg/L	10.0	10.0	1		08/08/19 11:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24.8**	mg/L	2.0	0.44	2		08/15/19 03:47	16887-00-6	
Fluoride	**0.59**	mg/L	0.20	0.085	1		08/15/19 03:32	16984-48-8	
Sulfate	**48.1**	mg/L	10.0	2.3	10		08/15/19 14:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5S **Lab ID: 60310792003** Collected: 08/02/19 13:05 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**558**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:07	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:07	7440-41-7	
Boron	**211**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:24	7440-42-8	
Calcium	**135000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:07	7440-70-2	
Cobalt	**1.1J**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:07	7440-48-4	
Iron	**8470**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:07	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:07	7439-92-1	
Lithium	**17.7**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:07	7439-93-2	
Magnesium	**29900**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:07	7439-95-4	
Manganese	**1230**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:07	7439-96-5	
Molybdenum	**13.1J**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:07	7439-98-7	
Potassium	**4500**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:07	7440-09-7	
Sodium	**39600**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:07	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.11J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:06	7440-36-0	
Arsenic	**3.5**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:06	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:06	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:06	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:06	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**438**	mg/L	20.0	6.5	1		08/15/19 12:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**612**	mg/L	10.0	10.0	1		08/08/19 11:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**35.4**	mg/L	2.0	0.44	2		08/15/19 05:01	16887-00-6	
Fluoride	**0.19J**	mg/L	0.20	0.085	1		08/15/19 04:16	16984-48-8	
Sulfate	**7.4**	mg/L	1.0	0.23	1		08/15/19 04:16	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5M **Lab ID: 60310792004** Collected: 08/02/19 11:10 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**244**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:09	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:09	7440-41-7	
Boron	**3120**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:27	7440-42-8	
Calcium	**147000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:09	7440-70-2	
Cobalt	**1.5J**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:09	7440-48-4	
Iron	**8360**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:09	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:09	7439-92-1	
Lithium	**33.2**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:09	7439-93-2	
Magnesium	**27200**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:09	7439-95-4	
Manganese	**388**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:09	7439-96-5	
Molybdenum	**7.6J**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:09	7439-98-7	
Potassium	**5300**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:09	7440-09-7	
Sodium	**16800**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:09	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:08	7440-36-0	
Arsenic	**5.8**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:08	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:08	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:08	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:08	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:55	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**316**	mg/L	20.0	6.5	1		08/17/19 14:58		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**660**	mg/L	10.0	10.0	1		08/08/19 11:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.6**	mg/L	2.0	0.44	2		08/15/19 06:00	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.085	1		08/15/19 05:16	16984-48-8	
Sulfate	**171**	mg/L	10.0	2.3	10		08/15/19 15:03	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5D **Lab ID: 60310792005** Collected: 08/02/19 12:15 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**39.5**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:16	7440-39-3	
Beryllium	**0.34J**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:16	7440-41-7	
Boron	**5780**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:37	7440-42-8	
Calcium	**30400**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:16	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:16	7440-48-4	
Iron	**2240**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:16	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:16	7439-92-1	
Lithium	**8.5J**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:16	7439-93-2	
Magnesium	**36000**	ug/L	50.0	13.0	1	08/07/19 14:31	08/09/19 12:37	7439-95-4	
Manganese	**1090**	ug/L	5.0	2.1	1	08/07/19 14:31	08/09/19 12:37	7439-96-5	
Molybdenum	**245**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:16	7439-98-7	
Potassium	**1150**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:16	7440-09-7	
Sodium	**5630**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:16	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:13	7440-36-0	
Arsenic	**0.27J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:13	7440-38-2	
Cadmium	**0.12J**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:13	7440-43-9	
Chromium	**0.080J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:13	7440-47-3	
Selenium	**0.099J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:13	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:13	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:59	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**285**	mg/L	20.0	6.5	1		08/15/19 12:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**744**	mg/L	10.0	10.0	1		08/08/19 11:56		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.0**	mg/L	2.0	0.44	2		08/15/19 09:21	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.085	1		08/15/19 09:07	16984-48-8	
Sulfate	**223**	mg/L	20.0	4.6	20		08/15/19 09:36	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-1 **Lab ID: 60310792006** Collected: 08/02/19 09:10 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**554**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:19	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:19	7440-41-7	
Boron	**192**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:39	7440-42-8	
Calcium	**135000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:19	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:19	7440-48-4	
Iron	**8340**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:19	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:19	7439-92-1	
Lithium	**17.6**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:19	7439-93-2	
Magnesium	**29700**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:19	7439-95-4	
Manganese	**1210**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:19	7439-96-5	
Molybdenum	**12.9J**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:19	7439-98-7	
Potassium	**4440**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:19	7440-09-7	
Sodium	**39900**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:19	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.10J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:15	7440-36-0	
Arsenic	**3.3**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:15	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:15	7440-43-9	
Chromium	**0.081J**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:15	7440-47-3	
Selenium	**0.10J**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:15	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 12:02	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**415**	mg/L	20.0	6.5	1		08/15/19 13:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**626**	mg/L	10.0	10.0	1		08/08/19 11:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**84.1**	mg/L	10.0	2.2	10		08/15/19 16:17	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.085	1		08/15/19 09:51	16984-48-8	
Sulfate	**15.1**	mg/L	1.0	0.23	1		08/15/19 09:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-1 **Lab ID: 60310792007** Collected: 08/02/19 12:12 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:26	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/07/19 14:31	08/08/19 16:26	7440-41-7	
Boron	**12.8J**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:42	7440-42-8	
Calcium	**<50.0**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:26	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/07/19 14:31	08/08/19 16:26	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:26	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/07/19 14:31	08/08/19 16:26	7439-92-1	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:26	7439-93-2	
Magnesium	**<13.0**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:26	7439-95-4	
Manganese	**<2.1**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:26	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:26	7439-98-7	
Potassium	**<79.0**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:26	7440-09-7	
Sodium	**<144**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:26	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:20	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:20	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 09:30	08/12/19 18:20	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 09:30	08/12/19 18:20	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 09:30	08/12/19 18:20	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 09:30	08/12/19 18:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 09:51	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		08/17/19 15:08		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8.5**	mg/L	5.0	5.0	1		08/08/19 11:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		08/15/19 10:21	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		08/15/19 10:21	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		08/15/19 10:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1S **Lab ID: 60310792010** Collected: 08/05/19 13:00 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**323**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:23	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:23	7440-41-7	
Boron	**120**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:23	7440-42-8	
Calcium	**188000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:23	7440-70-2	
Cobalt	**1.5J**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:23	7440-48-4	
Iron	**21800**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:23	7439-89-6	
Lead	**6.5J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:23	7439-92-1	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:23	7439-93-2	
Magnesium	**49500**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:23	7439-95-4	
Manganese	**9820**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:23	7439-96-5	
Molybdenum	**5.4J**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:23	7439-98-7	
Potassium	**1540**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:23	7440-09-7	
Sodium	**66800**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:23	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:27	7440-36-0	
Arsenic	**36.0**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:27	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:27	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:27	7440-47-3	
Selenium	**0.18J**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:27	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:27	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 15:49	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**488**	mg/L	20.0	6.5	1		08/20/19 17:34		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1140**	mg/L	13.3	13.3	1		08/10/19 09:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**287**	mg/L	20.0	4.4	20		08/20/19 02:24	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/20/19 01:54	16984-48-8	
Sulfate	**20.2**	mg/L	5.0	1.2	5		08/20/19 02:09	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1M **Lab ID: 60310792011** Collected: 08/05/19 13:15 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**155**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:25	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:25	7440-41-7	
Boron	**246**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:25	7440-42-8	
Calcium	**75100**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:25	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:25	7440-48-4	
Iron	**5680**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:25	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:25	7439-92-1	
Lithium	**16.6**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:25	7439-93-2	
Magnesium	**18400**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:25	7439-95-4	
Manganese	**302**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:25	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:25	7439-98-7	
Potassium	**1460**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:25	7440-09-7	
Sodium	**37500**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:25	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:29	7440-36-0	
Arsenic	**0.14J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:29	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:29	7440-43-9	
Chromium	**0.091J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:29	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:29	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 15:51	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**241**	mg/L	20.0	6.5	1		08/20/19 17:39		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**463**	mg/L	10.0	10.0	1		08/12/19 08:40		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**66.9**	mg/L	10.0	2.2	10		08/20/19 02:53	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.085	1		08/20/19 02:38	16984-48-8	
Sulfate	**56.8**	mg/L	10.0	2.3	10		08/20/19 02:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1D **Lab ID: 60310792012** Collected: 08/06/19 10:03 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**87.7**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:27	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:27	7440-41-7	
Boron	**481**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:27	7440-42-8	
Calcium	**57000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:27	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:27	7440-48-4	
Iron	**2740**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:27	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:27	7439-92-1	
Lithium	**18.7**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:27	7439-93-2	
Magnesium	**13800**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:27	7439-95-4	
Manganese	**314**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:27	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:27	7439-98-7	
Potassium	**6780**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:27	7440-09-7	
Sodium	**16600**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:27	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.25J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:30	7440-36-0	
Arsenic	**0.19J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:30	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:30	7440-43-9	
Chromium	**0.10J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:30	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:30	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 15:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**174**	mg/L	20.0	6.5	1		08/20/19 14:47		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**314**	mg/L	5.0	5.0	1		08/12/19 15:10		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.3**	mg/L	2.0	0.44	2		08/27/19 21:59	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/27/19 21:11	16984-48-8	
Sulfate	**47.2**	mg/L	10.0	2.3	10		08/27/19 22:15	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2S **Lab ID: 60310792013** Collected: 08/05/19 10:55 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**217**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:29	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:29	7440-41-7	
Boron	**88.5J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:29	7440-42-8	
Calcium	**138000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:29	7440-70-2	M1
Cobalt	**2.4J**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:29	7440-48-4	
Iron	**10300**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:29	7439-89-6	
Lead	**4.5J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:29	7439-92-1	
Lithium	**13.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:29	7439-93-2	
Magnesium	**42700**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:29	7439-95-4	M1
Manganese	**3480**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:29	7439-96-5	
Molybdenum	**4.3J**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:29	7439-98-7	
Potassium	**698**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:29	7440-09-7	B
Sodium	**8280**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:29	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:36	7440-36-0	
Arsenic	**11.9**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:36	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:36	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:36	7440-47-3	
Selenium	**0.093J**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:36	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 16:00	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**514**	mg/L	20.0	6.5	1		08/20/19 17:46		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**605**	mg/L	10.0	10.0	1		08/12/19 08:40		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.1**	mg/L	1.0	0.22	1		08/20/19 03:53	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.085	1		08/20/19 03:53	16984-48-8	
Sulfate	**60.0**	mg/L	5.0	1.2	5		08/20/19 05:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2M **Lab ID: 60310792014** Collected: 08/05/19 11:27 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**167**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:36	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:36	7440-41-7	
Boron	**238**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:36	7440-42-8	
Calcium	**198000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:36	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:36	7440-48-4	
Iron	**14600**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:36	7439-89-6	
Lead	**4.0J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:36	7439-92-1	
Lithium	**28.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:36	7439-93-2	
Magnesium	**50000**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:36	7439-95-4	
Manganese	**999**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:36	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:36	7439-98-7	
Potassium	**4840**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:36	7440-09-7	
Sodium	**14000**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:36	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:41	7440-36-0	
Arsenic	**0.25J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:41	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:41	7440-43-9	
Chromium	**0.095J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:41	7440-47-3	
Selenium	**0.11J**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:41	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:41	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 16:05	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**423**	mg/L	20.0	6.5	1		08/20/19 17:58		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1010**	mg/L	13.3	13.3	1		08/12/19 08:40		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.9**	mg/L	2.0	0.44	2		08/20/19 06:06	16887-00-6	
Fluoride	**0.22**	mg/L	0.20	0.085	1		08/20/19 05:52	16984-48-8	
Sulfate	**343**	mg/L	50.0	11.5	50		08/20/19 06:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2D **Lab ID: 60310792015** Collected: 08/06/19 09:58 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**54.3**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:38	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:38	7440-41-7	
Boron	**67.8J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:38	7440-42-8	
Calcium	**236000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:38	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:38	7440-48-4	
Iron	**13500**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:38	7439-89-6	
Lead	**4.2J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:38	7439-92-1	
Lithium	**42.1**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:38	7439-93-2	
Magnesium	**66800**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:38	7439-95-4	
Manganese	**1140**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:38	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:38	7439-98-7	
Potassium	**5190**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:38	7440-09-7	
Sodium	**17000**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:38	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:42	7440-36-0	
Arsenic	**0.27J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:42	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:42	7440-43-9	
Chromium	**0.21J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:42	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:42	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 16:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**449**	mg/L	20.0	6.5	1		08/20/19 14:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1380**	mg/L	13.3	13.3	1		08/12/19 15:10		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**81.9**	mg/L	10.0	2.2	10		08/20/19 06:51	16887-00-6	
Fluoride	**0.22**	mg/L	0.20	0.085	1		08/20/19 06:36	16984-48-8	
Sulfate	**488**	mg/L	50.0	11.5	50		08/20/19 08:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4M **Lab ID: 60310792016** Collected: 08/06/19 13:58 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**393**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:40	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:40	7440-41-7	
Boron	**66.8J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:40	7440-42-8	
Calcium	**116000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:40	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:40	7440-48-4	
Iron	**6990**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:40	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:40	7439-92-1	
Lithium	**32.0**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:40	7439-93-2	
Magnesium	**25500**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:40	7439-95-4	
Manganese	**638**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:40	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:40	7439-98-7	
Potassium	**4200**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:40	7440-09-7	
Sodium	**7140**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:40	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:44	7440-36-0	
Arsenic	**0.50J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:44	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/12/19 19:44	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/12/19 19:44	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/12/19 19:44	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/12/19 19:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 16:30	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**350**	mg/L	20.0	6.5	1		08/20/19 15:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**199**	mg/L	10.0	10.0	1		08/12/19 15:10		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.9**	mg/L	1.0	0.22	1		08/20/19 09:05	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/20/19 09:05	16984-48-8	
Sulfate	**65.8**	mg/L	10.0	2.3	10		08/20/19 09:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4D **Lab ID: 60310792017** Collected: 08/06/19 11:37 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**514**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:42	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:42	7440-41-7	
Boron	**57.8J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:42	7440-42-8	
Calcium	**105000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:42	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:42	7440-48-4	
Iron	**6160**	ug/L	50.0	14.0	1	08/08/19 13:00	08/09/19 18:42	7439-89-6	
Lead	**5.2J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:42	7439-92-1	
Lithium	**31.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:42	7439-93-2	
Magnesium	**25800**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:42	7439-95-4	
Manganese	**434**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:42	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:42	7439-98-7	
Potassium	**3350**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:42	7440-09-7	
Sodium	**6990**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:42	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:27	7440-36-0	
Arsenic	**1.4**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:27	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:27	7440-43-9	
Chromium	**0.13J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:27	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:27	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:27	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**311**	mg/L	20.0	6.5	1		08/20/19 15:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**481**	mg/L	10.0	10.0	1		08/12/19 15:10		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.4**	mg/L	1.0	0.22	1		08/20/19 09:34	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.085	1		08/20/19 09:34	16984-48-8	
Sulfate	**81.9**	mg/L	10.0	2.3	10		08/20/19 09:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6S **Lab ID: 60310792018** Collected: 08/06/19 15:20 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**253**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:49	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:49	7440-41-7	
Boron	**99.5J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:49	7440-42-8	
Calcium	**128000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:49	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:49	7440-48-4	
Iron	**29.5J**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:17	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:49	7439-92-1	
Lithium	**34.9**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:49	7439-93-2	
Magnesium	**28700**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:49	7439-95-4	
Manganese	**238**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:49	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:49	7439-98-7	
Potassium	**2630**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:49	7440-09-7	
Sodium	**6560**	ug/L	500	144	1	08/08/19 13:00	08/12/19 15:17	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.14J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:29	7440-36-0	
Arsenic	**0.45J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:29	7440-38-2	
Cadmium	**0.066J**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:29	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:29	7440-47-3	
Selenium	**1.1**	ug/L	1.0	0.085	1	08/08/19 13:40	08/14/19 13:27	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:09	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**354**	mg/L	20.0	6.5	1		08/20/19 15:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**493**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.0**	mg/L	1.0	0.22	1		08/20/19 10:04	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.085	1		08/20/19 10:04	16984-48-8	
Sulfate	**20.6**	mg/L	5.0	1.2	5		08/20/19 10:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6M **Lab ID: 60310792019** Collected: 08/06/19 15:33 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**436**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:51	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:51	7440-41-7	
Boron	**53.1J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:51	7440-42-8	
Calcium	**118000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:51	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:51	7440-48-4	
Iron	**6310**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:19	7439-89-6	
Lead	**3.8J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:51	7439-92-1	
Lithium	**25.1**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:51	7439-93-2	
Magnesium	**26600**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:51	7439-95-4	
Manganese	**368**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:51	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:51	7439-98-7	
Potassium	**3170**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:51	7440-09-7	
Sodium	**5860**	ug/L	500	144	1	08/08/19 13:00	08/12/19 15:19	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:31	7440-36-0	
Arsenic	**0.18J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:31	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:31	7440-43-9	
Chromium	**0.49J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:31	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:31	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:31	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:11	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**352**	mg/L	20.0	6.5	1		08/20/19 15:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**527**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.8**	mg/L	1.0	0.22	1		08/27/19 22:30	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.085	1		08/27/19 22:30	16984-48-8	
Sulfate	**69.2**	mg/L	10.0	2.3	10		08/27/19 22:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7S **Lab ID: 60310792020** Collected: 08/06/19 12:30 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**177**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:53	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:53	7440-41-7	
Boron	**144**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:53	7440-42-8	
Calcium	**110000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:53	7440-70-2	
Cobalt	**1.0J**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:53	7440-48-4	
Iron	**160**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:22	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:53	7439-92-1	
Lithium	**43.3**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:53	7439-93-2	
Magnesium	**61400**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:53	7439-95-4	
Manganese	**568**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:53	7439-96-5	
Molybdenum	**14.1J**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:53	7439-98-7	
Potassium	**4880**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:53	7440-09-7	
Sodium	**11300**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:53	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.090J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:33	7440-36-0	
Arsenic	**0.49J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:33	7440-38-2	
Cadmium	**0.040J**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:33	7440-43-9	
Chromium	**0.29J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:33	7440-47-3	
Selenium	**4.1**	ug/L	1.0	0.085	1	08/08/19 13:40	08/14/19 13:29	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:33	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**466**	mg/L	20.0	6.5	1		08/20/19 15:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**609**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.3**	mg/L	1.0	0.22	1		08/27/19 23:02	16887-00-6	
Fluoride	**0.45**	mg/L	0.20	0.085	1		08/27/19 23:02	16984-48-8	
Sulfate	**69.9**	mg/L	5.0	1.2	5		08/27/19 23:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7M **Lab ID: 60310792021** Collected: 08/06/19 13:20 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**365**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:56	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:56	7440-41-7	
Boron	**93.5J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:56	7440-42-8	
Calcium	**118000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:56	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:56	7440-48-4	
Iron	**11800**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:24	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:56	7439-92-1	
Lithium	**37.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:56	7439-93-2	
Magnesium	**30300**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:56	7439-95-4	
Manganese	**418**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:56	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:56	7439-98-7	
Potassium	**4850**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:56	7440-09-7	
Sodium	**8370**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:56	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:38	7440-36-0	
Arsenic	**0.73J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:38	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:38	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:38	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:38	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:38	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**394**	mg/L	20.0	6.5	1		08/20/19 15:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**497**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.8**	mg/L	2.0	0.44	2		08/28/19 15:23	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/27/19 23:34	16984-48-8	
Sulfate	**39.4**	mg/L	10.0	2.3	10		08/27/19 23:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7D **Lab ID: 60310792022** Collected: 08/06/19 14:10 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**363**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:58	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 18:58	7440-41-7	
Boron	**110**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 18:58	7440-42-8	
Calcium	**120000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 18:58	7440-70-2	M1
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 18:58	7440-48-4	
Iron	**10400**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:27	7439-89-6	
Lead	**3.7J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 18:58	7439-92-1	
Lithium	**42.5**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:58	7439-93-2	
Magnesium	**32600**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 18:58	7439-95-4	
Manganese	**637**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 18:58	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:58	7439-98-7	
Potassium	**4270**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 18:58	7440-09-7	
Sodium	**9550**	ug/L	500	144	1	08/08/19 13:00	08/09/19 18:58	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:40	7440-36-0	
Arsenic	**0.24J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:40	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:40	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:40	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:40	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:40	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**274**	mg/L	20.0	6.5	1		08/20/19 15:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**636**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.0**	mg/L	2.0	0.44	2		08/28/19 15:40	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.085	1		08/28/19 00:06	16984-48-8	
Sulfate	**189**	mg/L	10.0	2.3	10		08/28/19 00:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8S **Lab ID: 60310792023** Collected: 08/05/19 15:35 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**208**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:02	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:02	7440-41-7	
Boron	**72.6J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:02	7440-42-8	
Calcium	**113000**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:02	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:02	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:31	7439-89-6	
Lead	**4.0J**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:02	7439-92-1	
Lithium	**21.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:02	7439-93-2	
Magnesium	**26500**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:02	7439-95-4	
Manganese	**41.0**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:02	7439-96-5	
Molybdenum	**6.5J**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:02	7439-98-7	
Potassium	**7770**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:02	7440-09-7	
Sodium	**13300**	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:02	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.22J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:42	7440-36-0	
Arsenic	**0.40J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:42	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:42	7440-43-9	
Chromium	**0.61J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:42	7440-47-3	
Selenium	**5.7**	ug/L	1.0	0.085	1	08/08/19 13:40	08/14/19 13:30	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/12/19 16:31	08/13/19 11:20	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**348**	mg/L	20.0	6.5	1		08/20/19 18:03		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**569**	mg/L	10.0	10.0	1		08/12/19 08:40		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.2**	mg/L	1.0	0.22	1		08/28/19 01:09	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.085	1		08/28/19 01:09	16984-48-8	
Sulfate	**28.0**	mg/L	2.0	0.46	2		08/28/19 01:25	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8M **Lab ID: 60310792024** Collected: 08/05/19 16:10 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**191**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:04	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:04	7440-41-7	
Boron	**85.1J**	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:04	7440-42-8	
Calcium	**98800**	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:04	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:04	7440-48-4	
Iron	**6020**	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 15:34	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:04	7439-92-1	
Lithium	**29.0**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:04	7439-93-2	
Magnesium	**23700**	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:04	7439-95-4	
Manganese	**341**	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:04	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:04	7439-98-7	
Potassium	**3310**	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:04	7440-09-7	
Sodium	**7560**	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:04	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:44	7440-36-0	
Arsenic	**4.8**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:44	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:44	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:44	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:44	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 10:49	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**342**	mg/L	20.0	6.5	1		08/20/19 18:09		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**422**	mg/L	10.0	10.0	1		08/12/19 08:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.6**	mg/L	5.0	1.1	5		08/28/19 01:57	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.085	1		08/28/19 01:41	16984-48-8	
Sulfate	**19.6**	mg/L	5.0	1.2	5		08/28/19 01:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8D **Lab ID: 60310792025** Collected: 08/05/19 15:30 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**352**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:27	7440-39-3	
Beryllium	**1.3**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:27	7440-41-7	
Boron	**66.9J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:27	7440-42-8	
Calcium	**102000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:27	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:27	7440-48-4	
Iron	**5990**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:27	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:27	7439-92-1	
Lithium	**31.7**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:27	7439-93-2	
Magnesium	**23400**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:27	7439-95-4	
Manganese	**391**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:27	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:27	7439-98-7	
Potassium	**3430**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:27	7440-09-7	
Sodium	**5350**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:27	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:46	7440-36-0	
Arsenic	**1.3**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:46	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:46	7440-43-9	
Chromium	**0.16J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:46	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:46	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 10:51	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**321**	mg/L	20.0	6.5	1		08/20/19 18:14		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**433**	mg/L	10.0	10.0	1		08/12/19 08:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.6**	mg/L	5.0	1.1	5		08/28/19 02:28	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.085	1		08/28/19 02:12	16984-48-8	
Sulfate	**19.6**	mg/L	5.0	1.2	5		08/28/19 02:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-2 **Lab ID: 60310792026** Collected: 08/05/19 08:00 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**214**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:33	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:33	7440-41-7	
Boron	**72.0J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:33	7440-42-8	
Calcium	**114000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:33	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:33	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:33	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:33	7439-92-1	
Lithium	**21.4**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:33	7439-93-2	
Magnesium	**26000**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:33	7439-95-4	
Manganese	**49.1**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:33	7439-96-5	
Molybdenum	**7.4J**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:33	7439-98-7	
Potassium	**7700**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:33	7440-09-7	
Sodium	**13200**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:33	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.22J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:48	7440-36-0	
Arsenic	**0.41J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:48	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:48	7440-43-9	
Chromium	**0.57J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:48	7440-47-3	
Selenium	**6.3**	ug/L	1.0	0.085	1	08/08/19 13:40	08/14/19 13:32	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 10:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**337**	mg/L	20.0	6.5	1		08/20/19 18:29		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**560**	mg/L	5.0	5.0	1		08/12/19 08:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.7**	mg/L	1.0	0.22	1		08/28/19 02:14	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.085	1		08/28/19 02:14	16984-48-8	
Sulfate	**28.6**	mg/L	5.0	1.2	5		08/28/19 03:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-3 **Lab ID: 60310792027** Collected: 08/06/19 08:00 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**391**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:35	7440-39-3	
Beryllium	**0.35J**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:35	7440-41-7	
Boron	**116**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:35	7440-42-8	
Calcium	**126000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:35	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:35	7440-48-4	
Iron	**11800**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:35	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:35	7439-92-1	
Lithium	**45.0**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:35	7439-93-2	
Magnesium	**33900**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:35	7439-95-4	
Manganese	**641**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:35	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:35	7439-98-7	
Potassium	**4420**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:35	7440-09-7	
Sodium	**9920**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:35	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.10J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:50	7440-36-0	
Arsenic	**0.23J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:50	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:50	7440-43-9	
Chromium	**0.095J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:50	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 15:50	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:50	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 10:56	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**276**	mg/L	20.0	6.5	1		08/20/19 15:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**608**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.8**	mg/L	2.0	0.44	2		08/28/19 16:14	16887-00-6	
Fluoride	**0.24**	mg/L	0.20	0.085	1		08/28/19 04:29	16984-48-8	
Sulfate	**187**	mg/L	10.0	2.3	10		08/28/19 04:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-2 **Lab ID: 60310792028** Collected: 08/05/19 13:25 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:37	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:37	7440-41-7	
Boron	**<10.7**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:37	7440-42-8	
Calcium	**62.9J**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:37	7440-70-2	B
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:37	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:37	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:37	7439-92-1	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:37	7439-93-2	
Magnesium	**16.2J**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:37	7439-95-4	B
Manganese	**<2.1**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:37	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:37	7439-98-7	
Potassium	**<79.0**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:37	7440-09-7	
Sodium	**166J**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:37	7440-23-5	B
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 16:01	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 16:01	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 16:01	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 16:01	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 16:01	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 16:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 10:58	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		08/20/19 18:34		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		08/12/19 08:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		08/28/19 05:03	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		08/28/19 05:03	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		08/28/19 05:03	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-3 **Lab ID: 60310792029** Collected: 08/05/19 13:55 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:44	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:44	7440-41-7	
Boron	**<10.7**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:44	7440-42-8	
Calcium	**<50.0**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:44	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:44	7440-48-4	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:44	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:44	7439-92-1	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:44	7439-93-2	
Magnesium	**15.0J**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:44	7439-95-4	B
Manganese	**<2.1**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:44	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:44	7439-98-7	
Potassium	**<79.0**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:44	7440-09-7	
Sodium	**158J**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:44	7440-23-5	B
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 16:03	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 16:03	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 16:03	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 16:03	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/08/19 13:40	08/13/19 16:03	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 16:03	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:00	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		08/20/19 18:37		H1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		08/12/19 08:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		08/28/19 05:19	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		08/28/19 05:19	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		08/28/19 05:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4S **Lab ID: 60310792030** Collected: 08/06/19 12:22 Received: 08/08/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**143**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:46	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:46	7440-41-7	
Boron	**101**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:46	7440-42-8	
Calcium	**78900**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:46	7440-70-2	
Cobalt	**1.1J**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:46	7440-48-4	
Iron	**330**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:46	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:46	7439-92-1	
Lithium	**18.6**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:46	7439-93-2	
Magnesium	**16000**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:46	7439-95-4	
Manganese	**1250**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:46	7439-96-5	
Molybdenum	**28.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:46	7439-98-7	
Potassium	**4620**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:46	7440-09-7	
Sodium	**60300**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:46	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.17J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:56	7440-36-0	
Arsenic	**3.1**	ug/L	1.0	0.065	1	08/08/19 13:40	08/13/19 15:56	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/08/19 13:40	08/13/19 15:56	7440-43-9	
Chromium	**0.16J**	ug/L	1.0	0.078	1	08/08/19 13:40	08/13/19 15:56	7440-47-3	
Selenium	**1.9**	ug/L	1.0	0.085	1	08/08/19 13:40	08/14/19 13:36	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/08/19 13:40	08/13/19 15:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**352**	mg/L	20.0	6.5	1		08/20/19 15:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**440**	mg/L	10.0	10.0	1		08/12/19 15:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.1**	mg/L	1.0	0.22	1		08/28/19 16:31	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.085	1		08/28/19 16:31	16984-48-8	
Sulfate	**29.4**	mg/L	5.0	1.2	5		08/28/19 17:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6D **Lab ID: 60310792033** Collected: 08/07/19 14:07 Received: 08/08/19 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**406**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:49	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:49	7440-41-7	
Boron	**66.1J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:49	7440-42-8	
Calcium	**114000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:49	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:49	7440-48-4	
Iron	**8230**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:49	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:49	7439-92-1	
Lithium	**27.8**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:49	7439-93-2	
Magnesium	**29400**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:49	7439-95-4	
Manganese	**471**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:49	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:49	7439-98-7	
Potassium	**3690**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:49	7440-09-7	
Sodium	**5750**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:49	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.10J**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:37	7440-36-0	
Arsenic	**0.15J**	ug/L	1.0	0.065	1	08/09/19 14:00	08/12/19 18:37	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/09/19 14:00	08/12/19 18:37	7440-43-9	
Chromium	**0.14J**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:37	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/09/19 14:00	08/12/19 18:37	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/09/19 14:00	08/12/19 18:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:09	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**338**	mg/L	20.0	6.5	1		08/20/19 16:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**482**	mg/L	10.0	10.0	1		08/13/19 07:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.0**	mg/L	1.0	0.22	1		08/28/19 18:45	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.085	1		08/28/19 18:45	16984-48-8	
Sulfate	**67.5**	mg/L	5.0	1.2	5		08/28/19 19:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3S **Lab ID: 60310792034** Collected: 08/07/19 11:23 Received: 08/08/19 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**273**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:51	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:51	7440-41-7	
Boron	**71.3J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:51	7440-42-8	
Calcium	**116000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:51	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:51	7440-48-4	
Iron	**3740**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:51	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:51	7439-92-1	
Lithium	**12.3**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:51	7439-93-2	
Magnesium	**24200**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:51	7439-95-4	
Manganese	**1680**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:51	7439-96-5	
Molybdenum	**16.8J**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:51	7439-98-7	
Potassium	**3860**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:51	7440-09-7	
Sodium	**14000**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:51	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.14J**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:42	7440-36-0	
Arsenic	**5.3**	ug/L	1.0	0.065	1	08/09/19 14:00	08/12/19 18:42	7440-38-2	
Cadmium	**0.065J**	ug/L	0.50	0.033	1	08/09/19 14:00	08/12/19 18:42	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:42	7440-47-3	
Selenium	**0.14J**	ug/L	1.0	0.085	1	08/09/19 14:00	08/12/19 18:42	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/09/19 14:00	08/12/19 18:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:12	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**375**	mg/L	20.0	6.5	1		08/20/19 16:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**466**	mg/L	10.0	10.0	1		08/13/19 07:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.6**	mg/L	1.0	0.22	1		08/28/19 19:53	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.085	1		08/28/19 19:53	16984-48-8	
Sulfate	**40.0**	mg/L	5.0	1.2	5		08/28/19 20:10	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3M **Lab ID: 60310792035** Collected: 08/07/19 12:18 Received: 08/08/19 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**450**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:53	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:53	7440-41-7	
Boron	**44.3J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:53	7440-42-8	
Calcium	**105000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:53	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:53	7440-48-4	
Iron	**6480**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:53	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:53	7439-92-1	
Lithium	**23.9**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:53	7439-93-2	
Magnesium	**24500**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:53	7439-95-4	
Manganese	**535**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:53	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:53	7439-98-7	
Potassium	**3730**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:53	7440-09-7	
Sodium	**7030**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:53	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:44	7440-36-0	
Arsenic	**0.28J**	ug/L	1.0	0.065	1	08/09/19 14:00	08/12/19 18:44	7440-38-2	
Cadmium	**0.049J**	ug/L	0.50	0.033	1	08/09/19 14:00	08/12/19 18:44	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:44	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/09/19 14:00	08/12/19 18:44	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/09/19 14:00	08/12/19 18:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**332**	mg/L	20.0	6.5	1		08/20/19 16:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**486**	mg/L	10.0	10.0	1		08/13/19 07:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.5**	mg/L	1.0	0.22	1		08/28/19 20:26	16887-00-6	
Fluoride	**0.28**	mg/L	0.20	0.085	1		08/28/19 20:26	16984-48-8	
Sulfate	**63.9**	mg/L	10.0	2.3	10		08/28/19 20:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3D **Lab ID: 60310792036** Collected: 08/07/19 10:03 Received: 08/08/19 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**575**	ug/L	5.0	1.4	1	08/09/19 10:30	08/13/19 11:55	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	08/09/19 10:30	08/13/19 11:55	7440-41-7	
Boron	**54.7J**	ug/L	100	10.7	1	08/09/19 10:30	08/13/19 11:55	7440-42-8	
Calcium	**114000**	ug/L	200	50.0	1	08/09/19 10:30	08/13/19 11:55	7440-70-2	
Cobalt	**<0.84**	ug/L	5.0	0.84	1	08/09/19 10:30	08/13/19 11:55	7440-48-4	
Iron	**7600**	ug/L	50.0	14.0	1	08/09/19 10:30	08/13/19 11:55	7439-89-6	
Lead	**<3.4**	ug/L	10.0	3.4	1	08/09/19 10:30	08/13/19 11:55	7439-92-1	
Lithium	**33.9**	ug/L	10.0	5.9	1	08/09/19 10:30	08/13/19 11:55	7439-93-2	
Magnesium	**29100**	ug/L	50.0	13.0	1	08/09/19 10:30	08/13/19 11:55	7439-95-4	
Manganese	**605**	ug/L	5.0	2.1	1	08/09/19 10:30	08/13/19 11:55	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/09/19 10:30	08/13/19 11:55	7439-98-7	
Potassium	**3880**	ug/L	500	79.0	1	08/09/19 10:30	08/13/19 11:55	7440-09-7	
Sodium	**6670**	ug/L	500	144	1	08/09/19 10:30	08/13/19 11:55	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:46	7440-36-0	
Arsenic	**0.18J**	ug/L	1.0	0.065	1	08/09/19 14:00	08/12/19 18:46	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	08/09/19 14:00	08/12/19 18:46	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	08/09/19 14:00	08/12/19 18:46	7440-47-3	
Selenium	**<0.085**	ug/L	1.0	0.085	1	08/09/19 14:00	08/12/19 18:46	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	08/09/19 14:00	08/12/19 18:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.037**	ug/L	0.20	0.037	1	08/14/19 16:59	08/15/19 11:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**341**	mg/L	20.0	6.5	1		08/20/19 16:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**565**	mg/L	10.0	10.0	1		08/13/19 07:49		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.5**	mg/L	1.0	0.22	1		08/28/19 21:00	16887-00-6	
Fluoride	**0.21**	mg/L	0.20	0.085	1		08/28/19 21:00	16984-48-8	
Sulfate	**81.3**	mg/L	10.0	2.3	10		08/28/19 21:17	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601921 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006

METHOD BLANK: 2462401 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/09/19 11:07	

LABORATORY CONTROL SAMPLE: 2462402

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462403 2462404

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.037	5	5	4.8	4.8	96	95	75-125	1	20	

MATRIX SPIKE SAMPLE: 2462405

Parameter	Units	60310792004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.037	5	4.8	95	75-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602715 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60310792007, 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015

METHOD BLANK: 2465038 Matrix: Water
Associated Lab Samples: 60310792007, 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/13/19 09:47	

LABORATORY CONTROL SAMPLE: 2465039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2465040 2465041

Parameter	Units	60311046001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.7	4.7	95	95	75-125	0	20	

MATRIX SPIKE SAMPLE: 2465042

Parameter	Units	60310792013 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.037	5	4.8	96	75-125	

MATRIX SPIKE SAMPLE: 2465043

Parameter	Units	60311328001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	0.00062 mg/L	5	5.6	101	75-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602716 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023

METHOD BLANK: 2465044 Matrix: Water
Associated Lab Samples: 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/13/19 16:21	

LABORATORY CONTROL SAMPLE: 2465045

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2465046 2465047

Parameter	Units	60310792016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.037	5	5	4.8	5.3	96	106	75-125	10	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603265 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2466903 Matrix: Water
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/15/19 10:44	

LABORATORY CONTROL SAMPLE: 2466904

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466905 2466906

Parameter	Units	60310792036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.037	5	5	4.3	4.4	86	88	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601715 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

METHOD BLANK: 2461473 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/08/19 15:59	
Beryllium	ug/L	<0.25	1.0	0.25	08/08/19 15:59	
Boron	ug/L	<10.7	100	10.7	08/09/19 12:18	
Calcium	ug/L	<50.0	200	50.0	08/08/19 15:59	
Cobalt	ug/L	<0.84	5.0	0.84	08/08/19 15:59	
Iron	ug/L	<14.0	50.0	14.0	08/08/19 15:59	
Lead	ug/L	<3.4	10.0	3.4	08/08/19 15:59	
Lithium	ug/L	<5.9	10.0	5.9	08/08/19 15:59	
Magnesium	ug/L	<13.0	50.0	13.0	08/08/19 15:59	
Manganese	ug/L	<2.1	5.0	2.1	08/08/19 15:59	
Molybdenum	ug/L	<2.6	20.0	2.6	08/08/19 15:59	
Potassium	ug/L	<79.0	500	79.0	08/08/19 15:59	
Sodium	ug/L	<144	500	144	08/08/19 15:59	

LABORATORY CONTROL SAMPLE: 2461474

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	976	98	85-115	
Beryllium	ug/L	1000	992	99	85-115	
Boron	ug/L	1000	986	99	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Cobalt	ug/L	1000	984	98	85-115	
Iron	ug/L	10000	10200	102	85-115	
Lead	ug/L	1000	1060	106	85-115	
Lithium	ug/L	1000	1000	100	85-115	
Magnesium	ug/L	10000	10300	103	85-115	
Manganese	ug/L	1000	987	99	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10600	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461475 2461476

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	244	1000	1000	1260	1260	102	102	70-130	0	20	
Beryllium	ug/L	<0.25	1000	1000	993	992	99	99	70-130	0	20	
Boron	ug/L	3120	1000	1000	4050	4080	92	96	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461475 2461476

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	147000	10000	10000	156000	156000	93	90	70-130	0	20	
Cobalt	ug/L	1.5J	1000	1000	972	977	97	98	70-130	1	20	
Iron	ug/L	8360	10000	10000	18300	18200	99	99	70-130	0	20	
Lead	ug/L	<3.4	1000	1000	996	997	100	100	70-130	0	20	
Lithium	ug/L	33.2	1000	1000	1080	1080	105	104	70-130	0	20	
Magnesium	ug/L	27200	10000	10000	36600	39000	94	118	70-130	6	20	
Manganese	ug/L	388	1000	1000	1380	1370	99	98	70-130	0	20	
Molybdenum	ug/L	7.6J	1000	1000	1040	1040	103	104	70-130	1	20	
Potassium	ug/L	5300	10000	10000	15400	15400	101	101	70-130	0	20	
Sodium	ug/L	16800	10000	10000	27100	27000	103	102	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601955 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024

METHOD BLANK: 2462496 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/09/19 18:05	
Beryllium	ug/L	<0.25	1.0	0.25	08/09/19 18:05	
Boron	ug/L	<10.7	100	10.7	08/09/19 18:05	
Calcium	ug/L	86.6J	200	50.0	08/09/19 18:05	
Cobalt	ug/L	<0.84	5.0	0.84	08/09/19 18:05	
Iron	ug/L	<14.0	50.0	14.0	08/09/19 18:05	
Lead	ug/L	<3.4	10.0	3.4	08/09/19 18:05	
Lithium	ug/L	<5.9	10.0	5.9	08/09/19 18:05	
Magnesium	ug/L	16.8J	50.0	13.0	08/09/19 18:05	
Manganese	ug/L	<2.1	5.0	2.1	08/09/19 18:05	
Molybdenum	ug/L	<2.6	20.0	2.6	08/09/19 18:05	
Potassium	ug/L	94.0J	500	79.0	08/09/19 18:05	
Sodium	ug/L	<144	500	144	08/12/19 15:07	

LABORATORY CONTROL SAMPLE: 2462497

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	969	97	85-115	
Beryllium	ug/L	1000	961	96	85-115	
Boron	ug/L	1000	964	96	85-115	
Calcium	ug/L	10000	9980	100	85-115	
Cobalt	ug/L	1000	976	98	85-115	
Iron	ug/L	10000	9500	95	85-115	
Lead	ug/L	1000	1040	104	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	992	99	85-115	
Molybdenum	ug/L	1000	999	100	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10500	105	85-115	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462498 2462499

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	217	1000	1000	1200	1110	98	89	70-130	8	20	
Beryllium	ug/L	<0.25	1000	1000	955	890	96	89	70-130	7	20	
Boron	ug/L	88.5J	1000	1000	1070	1000	99	91	70-130	7	20	
Calcium	ug/L	138000	10000	10000	158000	145000	208	73	70-130	9	20	M1
Cobalt	ug/L	2.4J	1000	1000	938	878	94	88	70-130	7	20	
Iron	ug/L	10300	10000	10000	20500	18900	102	85	70-130	8	20	
Lead	ug/L	4.5J	1000	1000	992	930	99	93	70-130	6	20	
Lithium	ug/L	13.8	1000	1000	1040	976	103	96	70-130	7	20	
Magnesium	ug/L	42700	10000	10000	56000	51300	132	86	70-130	9	20	M1
Manganese	ug/L	3480	1000	1000	4730	4350	125	87	70-130	8	20	
Molybdenum	ug/L	4.3J	1000	1000	1010	946	100	94	70-130	6	20	
Potassium	ug/L	698	10000	10000	11000	10300	103	96	70-130	7	20	
Sodium	ug/L	8280	10000	10000	19200	17800	109	96	70-130	7	20	

MATRIX SPIKE SAMPLE: 2462500

Parameter	Units	60310792022 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	363	1000	1220	86	70-130	
Beryllium	ug/L	<0.25	1000	863	86	70-130	
Boron	ug/L	110	1000	1030	92	70-130	
Calcium	ug/L	120000	10000	126000	61	70-130	M1
Cobalt	ug/L	<0.84	1000	862	86	70-130	
Iron	ug/L	10400	10000	21900	116	70-130	
Lead	ug/L	3.7J	1000	916	91	70-130	
Lithium	ug/L	42.5	1000	981	94	70-130	
Magnesium	ug/L	32600	10000	41000	84	70-130	
Manganese	ug/L	637	1000	1540	90	70-130	
Molybdenum	ug/L	<2.6	1000	920	92	70-130	
Potassium	ug/L	4270	10000	13600	93	70-130	
Sodium	ug/L	9550	10000	18800	92	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602156 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2463281 Matrix: Water
Associated Lab Samples: 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/13/19 11:24	
Beryllium	ug/L	<0.25	1.0	0.25	08/13/19 11:24	
Boron	ug/L	<10.7	100	10.7	08/13/19 11:24	
Calcium	ug/L	59.4J	200	50.0	08/13/19 11:24	
Cobalt	ug/L	<0.84	5.0	0.84	08/13/19 11:24	
Iron	ug/L	<14.0	50.0	14.0	08/13/19 11:24	
Lead	ug/L	<3.4	10.0	3.4	08/13/19 11:24	
Lithium	ug/L	<5.9	10.0	5.9	08/13/19 11:24	
Magnesium	ug/L	14.4J	50.0	13.0	08/13/19 11:24	
Manganese	ug/L	<2.1	5.0	2.1	08/13/19 11:24	
Molybdenum	ug/L	<2.6	20.0	2.6	08/13/19 11:24	
Potassium	ug/L	<79.0	500	79.0	08/13/19 11:24	
Sodium	ug/L	306J	500	144	08/13/19 11:24	

LABORATORY CONTROL SAMPLE: 2463282

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	961	96	85-115	
Beryllium	ug/L	1000	947	95	85-115	
Boron	ug/L	1000	935	94	85-115	
Calcium	ug/L	10000	9440	94	85-115	
Cobalt	ug/L	1000	952	95	85-115	
Iron	ug/L	10000	9590	96	85-115	
Lead	ug/L	1000	1000	100	85-115	
Lithium	ug/L	1000	949	95	85-115	
Magnesium	ug/L	10000	9460	95	85-115	
Manganese	ug/L	1000	908	91	85-115	
Molybdenum	ug/L	1000	987	99	85-115	
Potassium	ug/L	10000	9580	96	85-115	
Sodium	ug/L	10000	9710	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2463283 2463284

Parameter	Units	60310792025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	352	1000	1000	1310	1340	96	99	70-130	2	20	
Beryllium	ug/L	1.3	1000	1000	941	971	94	97	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2463283 2463284

Parameter	Units	60310792025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	66.9J	1000	1000	1010	1030	94	97	70-130	3	20	
Calcium	ug/L	102000	10000	10000	114000	114000	124	122	70-130	0	20	
Cobalt	ug/L	<0.84	1000	1000	920	941	92	94	70-130	2	20	
Iron	ug/L	5990	10000	10000	15500	15800	95	98	70-130	2	20	
Lead	ug/L	<3.4	1000	1000	973	998	97	100	70-130	3	20	
Lithium	ug/L	31.7	1000	1000	992	1020	96	99	70-130	3	20	
Magnesium	ug/L	23400	10000	10000	33200	33100	98	97	70-130	0	20	
Manganese	ug/L	391	1000	1000	1320	1320	93	93	70-130	0	20	
Molybdenum	ug/L	<2.6	1000	1000	983	1010	98	100	70-130	2	20	
Potassium	ug/L	3430	10000	10000	13100	13400	97	100	70-130	2	20	
Sodium	ug/L	5350	10000	10000	15100	15200	97	99	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601873 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

METHOD BLANK: 2462183 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/12/19 18:00	
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:00	
Cadmium	ug/L	<0.033	0.50	0.033	08/12/19 18:00	
Chromium	ug/L	<0.078	1.0	0.078	08/12/19 18:00	
Selenium	ug/L	<0.085	1.0	0.085	08/12/19 18:00	
Thallium	ug/L	<0.099	1.0	0.099	08/12/19 18:00	

LABORATORY CONTROL SAMPLE: 2462184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.3	101	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	39.8	100	85-115	
Chromium	ug/L	40	41.1	103	85-115	
Selenium	ug/L	40	40.7	102	85-115	
Thallium	ug/L	40	36.3	91	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462185 2462186

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.078	40	40	41.5	41.0	104	102	70-130	1	20	
Arsenic	ug/L	5.8	40	40	46.3	46.1	101	101	70-130	0	20	
Cadmium	ug/L	<0.033	40	40	37.9	37.5	95	94	70-130	1	20	
Chromium	ug/L	<0.078	40	40	43.5	43.1	109	108	70-130	1	20	
Selenium	ug/L	<0.085	40	40	38.8	38.8	97	97	70-130	0	20	
Thallium	ug/L	<0.099	40	40	34.7	34.3	87	86	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601982 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016

METHOD BLANK: 2462565 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/12/19 18:58	
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:58	
Cadmium	ug/L	<0.033	0.50	0.033	08/12/19 18:58	
Chromium	ug/L	<0.078	1.0	0.078	08/12/19 18:58	
Selenium	ug/L	<0.085	1.0	0.085	08/12/19 18:58	
Thallium	ug/L	<0.099	1.0	0.099	08/12/19 18:58	

LABORATORY CONTROL SAMPLE: 2462566

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.0	100	85-115	
Arsenic	ug/L	40	39.4	99	85-115	
Cadmium	ug/L	40	39.2	98	85-115	
Chromium	ug/L	40	40.0	100	85-115	
Selenium	ug/L	40	40.7	102	85-115	
Thallium	ug/L	40	35.6	89	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462567 2462568

Parameter	Units	60310790007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L		40	40	40.1	41.2	100	103	70-130	3	20	
Arsenic	ug/L	0.85J	40	40	41.9	42.9	103	105	70-130	2	20	
Cadmium	ug/L		40	40	36.8	37.6	89	91	70-130	2	20	
Chromium	ug/L		40	40	40.7	41.8	101	104	70-130	3	20	
Selenium	ug/L		40	40	38.8	39.4	97	98	70-130	2	20	
Thallium	ug/L		40	40	33.4	34.1	84	85	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462569 2462570

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.078	40	40	41.0	40.0	103	100	70-130	3	20	
Arsenic	ug/L	11.9	40	40	52.1	50.4	101	96	70-130	3	20	
Cadmium	ug/L	<0.033	40	40	37.4	36.6	94	92	70-130	2	20	
Chromium	ug/L	<0.078	40	40	42.4	41.0	106	102	70-130	3	20	
Selenium	ug/L	0.093J	40	40	38.8	38.2	97	95	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462569 2462570

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Thallium	ug/L	<0.099	40	40	34.4	33.9	86	85	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601983 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

METHOD BLANK: 2462571 Matrix: Water
Associated Lab Samples: 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/13/19 15:16	
Arsenic	ug/L	<0.065	1.0	0.065	08/13/19 15:16	
Cadmium	ug/L	<0.033	0.50	0.033	08/13/19 15:16	
Chromium	ug/L	<0.078	1.0	0.078	08/13/19 15:16	
Selenium	ug/L	<0.085	1.0	0.085	08/13/19 15:16	
Thallium	ug/L	<0.099	1.0	0.099	08/13/19 15:16	

LABORATORY CONTROL SAMPLE: 2462572

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	37.4	93	85-115	
Arsenic	ug/L	40	39.1	98	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	36.7	92	85-115	
Selenium	ug/L	40	40.3	101	85-115	
Thallium	ug/L	40	36.4	91	85-115	

MATRIX SPIKE SAMPLE: 2462573

Parameter	Units	60311123001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	ND	40	32.3	80	70-130	
Arsenic	ug/L	4.3	40	44.3	100	70-130	
Cadmium	ug/L	ND	40	36.3	91	70-130	
Chromium	ug/L	ND	40	39.8	99	70-130	
Selenium	ug/L	1.2	40	43.5	106	70-130	
Thallium	ug/L	ND	40	40.0	100	70-130	

MATRIX SPIKE SAMPLE: 2462574

Parameter	Units	60310792027 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.10J	40	34.8	87	70-130	
Arsenic	ug/L	0.23J	40	39.7	99	70-130	
Cadmium	ug/L	<0.033	40	37.6	94	70-130	
Chromium	ug/L	0.095J	40	36.4	91	70-130	
Selenium	ug/L	<0.085	40	38.8	97	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

MATRIX SPIKE SAMPLE: 2462574

Parameter	Units	60310792027 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Thallium	ug/L	<0.099	40	37.4	93	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602268 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2463645 Matrix: Water
Associated Lab Samples: 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/12/19 18:30	
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:30	
Cadmium	ug/L	<0.033	0.50	0.033	08/12/19 18:30	
Chromium	ug/L	<0.078	1.0	0.078	08/12/19 18:30	
Selenium	ug/L	<0.085	1.0	0.085	08/12/19 18:30	
Thallium	ug/L	<0.099	1.0	0.099	08/12/19 18:30	

LABORATORY CONTROL SAMPLE: 2463646

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	41.4	104	85-115	
Arsenic	ug/L	40	40.5	101	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	41.1	103	85-115	
Selenium	ug/L	40	42.4	106	85-115	
Thallium	ug/L	40	36.7	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2463647 2463648

Parameter	Units	60310792033 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.10J	40	40	42.4	42.0	106	105	70-130	1	20	
Arsenic	ug/L	0.15J	40	40	41.0	41.0	102	102	70-130	0	20	
Cadmium	ug/L	<0.033	40	40	38.9	38.5	97	96	70-130	1	20	
Chromium	ug/L	0.14J	40	40	42.9	42.4	107	106	70-130	1	20	
Selenium	ug/L	<0.085	40	40	40.5	40.6	101	101	70-130	0	20	
Thallium	ug/L	<0.099	40	40	35.2	34.6	88	87	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603364 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792005, 60310792006

METHOD BLANK: 2467297 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792005, 60310792006

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

LABORATORY CONTROL SAMPLE: 2467298

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

SAMPLE DUPLICATE: 2467299

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

SAMPLE DUPLICATE: 2467300

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603666 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310792004, 60310792007

METHOD BLANK: 2468274 Matrix: Water
Associated Lab Samples: 60310792004, 60310792007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	08/17/19 14:48	

LABORATORY CONTROL SAMPLE: 2468275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	485	97	90-110	

SAMPLE DUPLICATE: 2468276

Parameter	Units	60310792004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	316	313	1	10	H1

SAMPLE DUPLICATE: 2468277

Parameter	Units	60310790007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L		343	10	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 604275 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310792010, 60310792011, 60310792013, 60310792014, 60310792023, 60310792024, 60310792025, 60310792026, 60310792028, 60310792029

METHOD BLANK: 2470695 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792013, 60310792014, 60310792023, 60310792024, 60310792025, 60310792026, 60310792028, 60310792029

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	08/20/19 18:41	

LABORATORY CONTROL SAMPLE: 2470696

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

SAMPLE DUPLICATE: 2470697

Parameter	Units	60310792013 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	514	476	8	10	H1

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 604278 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310792012, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792027, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2470699 Matrix: Water
Associated Lab Samples: 60310792012, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792027, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	08/20/19 14:36	

LABORATORY CONTROL SAMPLE: 2470700

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	493	99	90-110	

SAMPLE DUPLICATE: 2470701

Parameter	Units	60310792012 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	174	173	1	10	

SAMPLE DUPLICATE: 2470702

Parameter	Units	60310792030 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	352	379	8	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 601841 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

METHOD BLANK: 2462110 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/08/19 11:54	

LABORATORY CONTROL SAMPLE: 2462111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	980	98	80-120	

SAMPLE DUPLICATE: 2462112

Parameter	Units	60310791001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	282	288	2	10	

SAMPLE DUPLICATE: 2462113

Parameter	Units	60310792004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	660	717	8	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602428 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310792010

METHOD BLANK: 2464295 Matrix: Water
Associated Lab Samples: 60310792010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/10/19 09:47	

LABORATORY CONTROL SAMPLE: 2464296

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

SAMPLE DUPLICATE: 2464297

Parameter	Units	60310940002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	49600	45400	9	10	

SAMPLE DUPLICATE: 2464299

Parameter	Units	60310790007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L		1870	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602435 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310792011, 60310792013, 60310792014, 60310792023, 60310792024, 60310792025, 60310792026, 60310792028, 60310792029

METHOD BLANK: 2464521 Matrix: Water
Associated Lab Samples: 60310792011, 60310792013, 60310792014, 60310792023, 60310792024, 60310792025, 60310792026, 60310792028, 60310792029

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/12/19 08:40	

LABORATORY CONTROL SAMPLE: 2464522

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

SAMPLE DUPLICATE: 2464523

Parameter	Units	60310792013 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	605	635	5	10	

SAMPLE DUPLICATE: 2464524

Parameter	Units	60311330002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	987	984	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602605 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310792012, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792027, 60310792030

METHOD BLANK: 2464881 Matrix: Water
Associated Lab Samples: 60310792012, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792027, 60310792030

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/12/19 15:08	

LABORATORY CONTROL SAMPLE: 2464882

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

SAMPLE DUPLICATE: 2464883

Parameter	Units	60311128005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	10200	9980	2	10	

SAMPLE DUPLICATE: 2464884

Parameter	Units	60310792017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	481	490	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 602758 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2465252 Matrix: Water
Associated Lab Samples: 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/13/19 07:47	

LABORATORY CONTROL SAMPLE: 2465253

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	992	99	80-120	

SAMPLE DUPLICATE: 2465254

Parameter	Units	60311330004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	927	924	0	10	

SAMPLE DUPLICATE: 2465255

Parameter	Units	60310792035 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	486	499	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603128 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

METHOD BLANK: 2466428 Matrix: Water
Associated Lab Samples: 60310792001, 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 12:49	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 12:49	
Sulfate	mg/L	<0.23	1.0	0.23	08/14/19 12:49	

LABORATORY CONTROL SAMPLE: 2466429

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466430 2466431

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	19.6	5	5	25.2	25.1	112	110	80-120	0	15	E
Fluoride	mg/L	0.51	2.5	2.5	3.1	3.1	104	102	80-120	1	15	
Sulfate	mg/L	339	250	250	596	592	103	101	80-120	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466432 2466433

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.6	10	10	31.4	31.4	109	109	80-120	0	15	
Fluoride	mg/L	0.36	2.5	2.5	3.0	3.0	104	104	80-120	0	15	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603455 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792002, 60310792004, 60310792006

METHOD BLANK: 2467640 Matrix: Water
Associated Lab Samples: 60310792002, 60310792004, 60310792006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/15/19 13:49	
Sulfate	mg/L	<0.23	1.0	0.23	08/15/19 13:49	

LABORATORY CONTROL SAMPLE: 2467641

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2467642 2467643

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.6	50	50	68.0	68.3	92	92	80-120	0	15	
Sulfate	mg/L	171	50	50	218	229	96	116	80-120	5	15	E

MATRIX SPIKE SAMPLE: 2467644

Parameter	Units	60310412025 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	25.7	50	73.0	92	80-120	
Sulfate	mg/L	147	50	198	103	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 603862 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792010, 60310792011, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018

METHOD BLANK: 2469461 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/19/19 10:41	
Fluoride	mg/L	<0.085	0.20	0.085	08/19/19 10:41	
Sulfate	mg/L	<0.23	1.0	0.23	08/19/19 10:41	

LABORATORY CONTROL SAMPLE: 2469462

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2469463 2469464

Parameter	Units	60310790007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L		10	10	48.3	48.9	117	123	80-120	1	15	E,M1
Fluoride	mg/L		2.5	2.5	2.3	2.3	92	94	80-120	2	15	
Sulfate	mg/L		500	500	1450	1450	104	105	80-120	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2469465 2469466

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	11.1	5	5	16.5	16.5	108	109	80-120	0	15	
Fluoride	mg/L	0.29	2.5	2.5	2.8	2.8	102	102	80-120	1	15	
Sulfate	mg/L	60.0	25	25	87.5	86.7	110	107	80-120	1	15	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 605755 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792012, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024, 60310792025

METHOD BLANK: 2476001 Matrix: Water
Associated Lab Samples: 60310792012, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792024, 60310792025

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/27/19 10:51	
Fluoride	mg/L	<0.085	0.20	0.085	08/27/19 10:51	
Sulfate	mg/L	<0.23	1.0	0.23	08/27/19 10:51	

LABORATORY CONTROL SAMPLE: 2476002

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	5	5.1	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2476003 2476004

Parameter	Units	60311920002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	271	250	250	508	507	95	94	80-120	0	15	
Fluoride	mg/L	0.47	2.5	2.5	2.9	2.9	99	98	80-120	1	15	
Sulfate	mg/L	456	250	250	703	701	99	98	80-120	0	15	

MATRIX SPIKE SAMPLE: 2476005

Parameter	Units	60312114001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	ND	50	49.6	86	80-120	
Fluoride	mg/L	ND	25	24.6	98	80-120	
Sulfate	mg/L	166	50	214	95	80-120	E

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 605914 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792026, 60310792027, 60310792028, 60310792029

METHOD BLANK: 2476616 Matrix: Water
Associated Lab Samples: 60310792026, 60310792027, 60310792028, 60310792029

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/28/19 01:40	
Fluoride	mg/L	<0.085	0.20	0.085	08/28/19 01:40	
Sulfate	mg/L	<0.23	1.0	0.23	08/28/19 01:40	

LABORATORY CONTROL SAMPLE: 2476617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.6	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2476618 2476619

Parameter	Units	60310792026 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	14.7	5	5	20.5	20.5	115	116	80-120	0	15	E
Fluoride	mg/L	0.26	2.5	2.5	2.7	2.8	99	100	80-120	1	15	
Sulfate	mg/L	28.6	25	25	54.0	53.5	102	99	80-120	1	15	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 606064 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310792021, 60310792022, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 2477152 Matrix: Water
Associated Lab Samples: 60310792021, 60310792022, 60310792030, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/28/19 10:20	
Fluoride	mg/L	<0.085	0.20	0.085	08/28/19 10:20	
Sulfate	mg/L	<0.23	1.0	0.23	08/28/19 10:20	

LABORATORY CONTROL SAMPLE: 2477153

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2477154 2477155

Parameter	Units	60310792030 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	14.1	5	5	19.7	19.8	111	112	80-120	0	15	
Fluoride	mg/L	0.32	2.5	2.5	2.8	2.8	98	100	80-120	1	15	
Sulfate	mg/L	29.4	25	25	54.5	54.4	100	100	80-120	0	15	

MATRIX SPIKE SAMPLE: 2477156

Parameter	Units	60310792033 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	14.0	5	19.6	111	80-120	
Fluoride	mg/L	0.26	2.5	2.7	97	80-120	
Sulfate	mg/L	67.5	25	93.3	103	80-120	

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

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-UMW-7S(AMW-1S) **Lab ID: 60310792001** Collected: 08/02/19 09:10 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.133 ± 0.412 (0.799) C:NA T:93%**	pCi/L	08/19/19 15:39	13982-63-3	
Radium-228	EPA 904.0	**0.945 ± 0.470 (0.829) C:76% T:88%**	pCi/L	08/19/19 16:51	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-UMW-7D(AMW-1D) **Lab ID: 60310792002** Collected: 08/02/19 09:45 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.645 ± 0.479 (0.599) C:NA T:91%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**0.809 ± 0.769 (1.59) C:81% T:75%**	pCi/L	08/20/19 19:09	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5S **Lab ID: 60310792003** Collected: 08/02/19 13:05 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.487 ± 0.456 (0.647) C:NA T:92%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**0.0132 ± 0.481 (1.12) C:78% T:85%**	pCi/L	08/20/19 18:18	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5M **Lab ID: 60310792004** Collected: 08/02/19 11:10 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.438 ± 0.432 (0.657) C:NA T:84%**	pCi/L	08/20/19 11:46	13982-63-3	
Radium-228	EPA 904.0	**0.626 ± 0.714 (1.50) C:79% T:59%**	pCi/L	08/20/19 18:18	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5D **Lab ID: 60310792005** Collected: 08/02/19 12:15 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.645 ± 0.479 (0.599) C:NA T:92%**	pCi/L	08/20/19 12:02	13982-63-3	
Radium-228	EPA 904.0	**0.230 ± 0.587 (1.31) C:78% T:75%**	pCi/L	08/20/19 18:18	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-1 **Lab ID: 60310792006** Collected: 08/02/19 09:10 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.506 ± 0.467 (0.681) C:NA T:98%**	pCi/L	08/20/19 12:02	13982-63-3	
Radium-228	EPA 904.0	**0.444 ± 0.492 (1.03) C:80% T:80%**	pCi/L	08/20/19 18:19	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-1 **Lab ID: 60310792007** Collected: 08/02/19 12:12 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.438 ± 0.329 (0.170) C:NA T:94%**	pCi/L	08/20/19 12:02	13982-63-3	
Radium-228	EPA 904.0	**-0.178 ± 0.495 (1.19) C:81% T:74%**	pCi/L	08/20/19 18:19	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5M MS **Lab ID: 60310792008** Collected: 08/02/19 11:10 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**98.85 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 12:02	13982-63-3	
Radium-228	EPA 904.0	**71.45 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 18:19	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-5M MSD **Lab ID: 60310792009** Collected: 08/02/19 11:10 Received: 08/03/19 02:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**102.56 %REC 3.68 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 12:02	13982-63-3	
Radium-228	EPA 904.0	**49.68 %REC 35.96 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/20/19 18:19	15262-20-1	1e

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1S **Lab ID: 60310792010** Collected: 08/05/19 13:00 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.726 ± 0.510 (0.651) C:NA T:85%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**0.748 ± 0.448 (0.838) C:80% T:89%**	pCi/L	08/28/19 14:43	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1M **Lab ID: 60310792011** Collected: 08/05/19 13:15 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.584 ± 0.463 (0.628) C:NA T:84%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**0.733 ± 0.620 (1.25) C:69% T:80%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-1D **Lab ID: 60310792012** Collected: 08/06/19 10:03 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.392 ± 0.455 (0.734) C:NA T:90%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**1.18 ± 0.599 (1.06) C:75% T:88%**	pCi/L	08/28/19 15:06	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2S **Lab ID: 60310792013** Collected: 08/05/19 10:55 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.316 ± 0.247 (0.291) C:NA T:93%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**0.535 ± 0.637 (1.35) C:75% T:87%**	pCi/L	08/28/19 11:39	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2M **Lab ID: 60310792014** Collected: 08/05/19 11:27 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.872 ± 0.631 (0.908) C:NA T:89%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**1.29 ± 0.590 (0.980) C:77% T:85%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2D **Lab ID: 60310792015** Collected: 08/06/19 09:58 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.670 ± 0.373 (0.140) C:NA T:88%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**1.00 ± 0.640 (1.22) C:76% T:75%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4M **Lab ID: 60310792016** Collected: 08/06/19 13:58 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.35 ± 0.585 (0.166) C:NA T:80%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**1.39 ± 0.560 (0.861) C:77% T:82%**	pCi/L	08/28/19 14:54	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4D **Lab ID: 60310792017** Collected: 08/06/19 11:37 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.962 ± 0.458 (0.145) C:NA T:88%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**1.49 ± 0.560 (0.830) C:77% T:88%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6S **Lab ID: 60310792018** Collected: 08/06/19 15:20 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.693 ± 0.462 (0.574) C:NA T:93%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**0.817 ± 0.425 (0.735) C:71% T:91%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6M **Lab ID: 60310792019** Collected: 08/06/19 15:33 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.932 ± 0.664 (0.933) C:NA T:84%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**0.675 ± 0.411 (0.742) C:77% T:82%**	pCi/L	08/28/19 14:44	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7S **Lab ID: 60310792020** Collected: 08/06/19 12:30 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.298 ± 0.414 (0.700) C:NA T:88%**	pCi/L	08/27/19 15:32	13982-63-3	
Radium-228	EPA 904.0	**0.946 ± 0.641 (1.26) C:75% T:84%**	pCi/L	08/28/19 14:49	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7M **Lab ID: 60310792021** Collected: 08/06/19 13:20 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.03 ± 0.565 (0.652) C:NA T:87%**	pCi/L	08/27/19 15:51	13982-63-3	
Radium-228	EPA 904.0	**1.88 ± 0.717 (1.16) C:77% T:91%**	pCi/L	08/28/19 14:49	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-7D **Lab ID: 60310792022** Collected: 08/06/19 14:10 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.38 ± 0.714 (0.847) C:NA T:86%**	pCi/L	08/27/19 15:51	13982-63-3	
Radium-228	EPA 904.0	**1.85 ± 0.690 (1.08) C:77% T:86%**	pCi/L	08/28/19 14:49	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8S **Lab ID: 60310792023** Collected: 08/05/19 15:35 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.386 ± 0.542 (0.918) C:NA T:88%**	pCi/L	08/27/19 15:51	13982-63-3	
Radium-228	EPA 904.0	**0.372 ± 0.575 (1.25) C:75% T:93%**	pCi/L	08/28/19 14:49	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8M **Lab ID: 60310792024** Collected: 08/05/19 16:10 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.928 ± 0.589 (0.760) C:NA T:89%**	pCi/L	08/27/19 14:44	13982-63-3	
Radium-228	EPA 904.0	**0.665 ± 0.453 (0.885) C:78% T:84%**	pCi/L	08/21/19 11:30	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-8D **Lab ID: 60310792025** Collected: 08/05/19 15:30 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.627 ± 0.631 (0.994) C:NA T:86%**	pCi/L	08/27/19 14:44	13982-63-3	
Radium-228	EPA 904.0	**1.24 ± 0.538 (0.919) C:78% T:84%**	pCi/L	08/21/19 11:30	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-2 **Lab ID: 60310792026** Collected: 08/05/19 08:00 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.565 ± 0.546 (0.847) C:NA T:89%**	pCi/L	08/27/19 14:44	13982-63-3	
Radium-228	EPA 904.0	**0.205 ± 0.303 (0.654) C:82% T:87%**	pCi/L	08/21/19 11:30	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-DUP-3 **Lab ID: 60310792027** Collected: 08/06/19 08:00 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.290 ± 0.523 (0.921) C:NA T:92%**	pCi/L	08/27/19 14:57	13982-63-3	
Radium-228	EPA 904.0	**0.901 ± 0.410 (0.692) C:80% T:88%**	pCi/L	08/21/19 11:30	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-2 **Lab ID: 60310792028** Collected: 08/05/19 13:25 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.230 ± 0.277 (0.423) C:NA T:92%**	pCi/L	08/27/19 14:57	13982-63-3	
Radium-228	EPA 904.0	**0.248 ± 0.319 (0.679) C:78% T:87%**	pCi/L	08/21/19 11:31	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-NE-FB-3 **Lab ID: 60310792029** Collected: 08/05/19 13:55 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.180 ± 0.311 (0.556) C:NA T:86%**	pCi/L	08/27/19 14:57	13982-63-3	
Radium-228	EPA 904.0	**0.432 ± 0.353 (0.707) C:79% T:88%**	pCi/L	08/21/19 11:31	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-4S **Lab ID: 60310792030** Collected: 08/06/19 12:22 Received: 08/08/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.253 ± 0.385 (0.663) C:NA T:89%**	pCi/L	08/27/19 14:57	13982-63-3	
Radium-228	EPA 904.0	**-0.0441 ± 0.300 (0.707) C:78% T:92%**	pCi/L	08/21/19 11:31	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2S MS **Lab ID: 60310792031** Collected: 08/05/19 10:55 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**134.59 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/27/19 15:51	13982-63-3	
Radium-228	EPA 904.0	**137.20 %REC ± NA (NA) C:NA T:NA**	pCi/L	08/28/19 11:30	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-2S MSD **Lab ID: 60310792032** Collected: 08/05/19 10:55 Received: 08/07/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**111.52 %REC 18.74 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/27/19 15:51	13982-63-3	
Radium-228	EPA 904.0	**107.57 %REC 24.21 RPD ± NA (NA) C:NA T:NA**	pCi/L	08/28/19 11:30	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-6D **Lab ID: 60310792033** Collected: 08/07/19 14:07 Received: 08/08/19 04:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.878 ± 0.537 (0.659) C:NA T:93%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**1.94 ± 0.670 (0.963) C:77% T:92%**	pCi/L	08/28/19 14:43	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3S **Lab ID: 60310792034** Collected: 08/07/19 11:23 Received: 08/08/19 04:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.641 ± 0.660 (1.06) C:NA T:83%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**1.32 ± 0.538 (0.861) C:80% T:91%**	pCi/L	08/28/19 14:43	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3M **Lab ID: 60310792035** Collected: 08/07/19 12:18 Received: 08/08/19 04:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.621 ± 0.406 (0.416) C:NA T:90%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**1.41 ± 0.643 (1.10) C:77% T:80%**	pCi/L	08/28/19 14:43	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Sample: S-TP-3D **Lab ID: 60310792036** Collected: 08/07/19 10:03 Received: 08/08/19 04:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.896 ± 0.502 (0.520) C:NA T:89%**	pCi/L	08/27/19 15:19	13982-63-3	
Radium-228	EPA 904.0	**1.60 ± 0.572 (0.843) C:78% T:93%**	pCi/L	08/28/19 14:43	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356262 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007, 60310792008, 60310792009

METHOD BLANK: 1730415 Matrix: Water
Associated Lab Samples: 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007, 60310792008, 60310792009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0531 ± 0.275 (0.571) C:NA T:94%	pCi/L	08/20/19 11:10	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356264 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60310792001

METHOD BLANK: 1730421 Matrix: Water
Associated Lab Samples: 60310792001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.997 ± 0.408 (0.638) C:85% T:84%	pCi/L	08/19/19 13:51	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356261 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60310792001

METHOD BLANK: 1730411 Matrix: Water
Associated Lab Samples: 60310792001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.324 ± 0.337 (0.501) C:NA T:81%	pCi/L	08/19/19 15:05	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356809 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792031, 60310792032, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 1732973 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792031, 60310792032, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.130 ± 0.224 (0.401) C:NA T:91%	pCi/L	08/27/19 15:19	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356810 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792031, 60310792032, 60310792033, 60310792034, 60310792035, 60310792036

METHOD BLANK: 1732974 Matrix: Water
Associated Lab Samples: 60310792010, 60310792011, 60310792012, 60310792013, 60310792014, 60310792015, 60310792016, 60310792017, 60310792018, 60310792019, 60310792020, 60310792021, 60310792022, 60310792023, 60310792031, 60310792032, 60310792033, 60310792034, 60310792035, 60310792036

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.113 ± 0.306 (0.683) C:72% T:98%	pCi/L	08/28/19 11:29	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356812 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

METHOD BLANK: 1732977 Matrix: Water
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.371 ± 0.295 (0.383) C:NA T:89%	pCi/L	08/27/19 14:32	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356813 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

METHOD BLANK: 1732978 Matrix: Water
Associated Lab Samples: 60310792024, 60310792025, 60310792026, 60310792027, 60310792028, 60310792029, 60310792030

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.200 ± 0.367 (0.804) C:79% T:80%	pCi/L	08/21/19 11:28	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

QC Batch: 356265 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007, 60310792008, 60310792009

METHOD BLANK: 1730422 Matrix: Water
Associated Lab Samples: 60310792002, 60310792003, 60310792004, 60310792005, 60310792006, 60310792007, 60310792008, 60310792009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.469 ± 0.374 (0.738) C:79% T:79%	pCi/L	08/20/19 15:54	

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QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

1e	The MSD recovery is low and outside of the default acceptance limit for MS recovery at 49.68%. Duplicate precision between the MS and MSD are acceptable, indicating the MSD recovery may be low due matrix interference.
B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792001	**S-UMW-7S(AMW-1S)**	EPA 200.7	601715	EPA 200.7	601739
60310792002	**S-UMW-7D(AMW-1D)**	EPA 200.7	601715	EPA 200.7	601739
60310792003	**S-TP-5S**	EPA 200.7	601715	EPA 200.7	601739
60310792004	**S-TP-5M**	EPA 200.7	601715	EPA 200.7	601739
60310792005	**S-TP-5D**	EPA 200.7	601715	EPA 200.7	601739
60310792006	**S-NE-DUP-1**	EPA 200.7	601715	EPA 200.7	601739
60310792007	**S-NE-FB-1**	EPA 200.7	601715	EPA 200.7	601739
60310792010	**S-TP-1S**	EPA 200.7	601955	EPA 200.7	602074
60310792011	**S-TP-1M**	EPA 200.7	601955	EPA 200.7	602074
60310792012	**S-TP-1D**	EPA 200.7	601955	EPA 200.7	602074
60310792013	**S-TP-2S**	EPA 200.7	601955	EPA 200.7	602074
60310792014	**S-TP-2M**	EPA 200.7	601955	EPA 200.7	602074
60310792015	**S-TP-2D**	EPA 200.7	601955	EPA 200.7	602074
60310792016	**S-TP-4M**	EPA 200.7	601955	EPA 200.7	602074
60310792017	**S-TP-4D**	EPA 200.7	601955	EPA 200.7	602074
60310792018	**S-TP-6S**	EPA 200.7	601955	EPA 200.7	602074
60310792019	**S-TP-6M**	EPA 200.7	601955	EPA 200.7	602074
60310792020	**S-TP-7S**	EPA 200.7	601955	EPA 200.7	602074
60310792021	**S-TP-7M**	EPA 200.7	601955	EPA 200.7	602074
60310792022	**S-TP-7D**	EPA 200.7	601955	EPA 200.7	602074
60310792023	**S-TP-8S**	EPA 200.7	601955	EPA 200.7	602074
60310792024	**S-TP-8M**	EPA 200.7	601955	EPA 200.7	602074
60310792025	**S-TP-8D**	EPA 200.7	602156	EPA 200.7	602195
60310792026	**S-NE-DUP-2**	EPA 200.7	602156	EPA 200.7	602195
60310792027	**S-NE-DUP-3**	EPA 200.7	602156	EPA 200.7	602195
60310792028	**S-NE-FB-2**	EPA 200.7	602156	EPA 200.7	602195
60310792029	**S-NE-FB-3**	EPA 200.7	602156	EPA 200.7	602195
60310792030	**S-TP-4S**	EPA 200.7	602156	EPA 200.7	602195
60310792033	**S-TP-6D**	EPA 200.7	602156	EPA 200.7	602195
60310792034	**S-TP-3S**	EPA 200.7	602156	EPA 200.7	602195
60310792035	**S-TP-3M**	EPA 200.7	602156	EPA 200.7	602195
60310792036	**S-TP-3D**	EPA 200.7	602156	EPA 200.7	602195
60310792001	**S-UMW-7S(AMW-1S)**	EPA 200.8	601873	EPA 200.8	601930
60310792002	**S-UMW-7D(AMW-1D)**	EPA 200.8	601873	EPA 200.8	601930
60310792003	**S-TP-5S**	EPA 200.8	601873	EPA 200.8	601930
60310792004	**S-TP-5M**	EPA 200.8	601873	EPA 200.8	601930
60310792005	**S-TP-5D**	EPA 200.8	601873	EPA 200.8	601930
60310792006	**S-NE-DUP-1**	EPA 200.8	601873	EPA 200.8	601930
60310792007	**S-NE-FB-1**	EPA 200.8	601873	EPA 200.8	601930
60310792010	**S-TP-1S**	EPA 200.8	601982	EPA 200.8	602076
60310792011	**S-TP-1M**	EPA 200.8	601982	EPA 200.8	602076
60310792012	**S-TP-1D**	EPA 200.8	601982	EPA 200.8	602076
60310792013	**S-TP-2S**	EPA 200.8	601982	EPA 200.8	602076
60310792014	**S-TP-2M**	EPA 200.8	601982	EPA 200.8	602076
60310792015	**S-TP-2D**	EPA 200.8	601982	EPA 200.8	602076
60310792016	**S-TP-4M**	EPA 200.8	601982	EPA 200.8	602076

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792017	S-TP-4D	EPA 200.8	601983	EPA 200.8	602077
60310792018	S-TP-6S	EPA 200.8	601983	EPA 200.8	602077
60310792019	S-TP-6M	EPA 200.8	601983	EPA 200.8	602077
60310792020	S-TP-7S	EPA 200.8	601983	EPA 200.8	602077
60310792021	S-TP-7M	EPA 200.8	601983	EPA 200.8	602077
60310792022	S-TP-7D	EPA 200.8	601983	EPA 200.8	602077
60310792023	S-TP-8S	EPA 200.8	601983	EPA 200.8	602077
60310792024	S-TP-8M	EPA 200.8	601983	EPA 200.8	602077
60310792025	S-TP-8D	EPA 200.8	601983	EPA 200.8	602077
60310792026	S-NE-DUP-2	EPA 200.8	601983	EPA 200.8	602077
60310792027	S-NE-DUP-3	EPA 200.8	601983	EPA 200.8	602077
60310792028	S-NE-FB-2	EPA 200.8	601983	EPA 200.8	602077
60310792029	S-NE-FB-3	EPA 200.8	601983	EPA 200.8	602077
60310792030	S-TP-4S	EPA 200.8	601983	EPA 200.8	602077
60310792033	S-TP-6D	EPA 200.8	602268	EPA 200.8	602324
60310792034	S-TP-3S	EPA 200.8	602268	EPA 200.8	602324
60310792035	S-TP-3M	EPA 200.8	602268	EPA 200.8	602324
60310792036	S-TP-3D	EPA 200.8	602268	EPA 200.8	602324
60310792001	S-UMW-7S(AMW-1S)	EPA 7470	601921	EPA 7470	601998
60310792002	S-UMW-7D(AMW-1D)	EPA 7470	601921	EPA 7470	601998
60310792003	S-TP-5S	EPA 7470	601921	EPA 7470	601998
60310792004	S-TP-5M	EPA 7470	601921	EPA 7470	601998
60310792005	S-TP-5D	EPA 7470	601921	EPA 7470	601998
60310792006	S-NE-DUP-1	EPA 7470	601921	EPA 7470	601998
60310792007	S-NE-FB-1	EPA 7470	602715	EPA 7470	602745
60310792010	S-TP-1S	EPA 7470	602715	EPA 7470	602745
60310792011	S-TP-1M	EPA 7470	602715	EPA 7470	602745
60310792012	S-TP-1D	EPA 7470	602715	EPA 7470	602745
60310792013	S-TP-2S	EPA 7470	602715	EPA 7470	602745
60310792014	S-TP-2M	EPA 7470	602715	EPA 7470	602745
60310792015	S-TP-2D	EPA 7470	602715	EPA 7470	602745
60310792016	S-TP-4M	EPA 7470	602716	EPA 7470	602746
60310792017	S-TP-4D	EPA 7470	602716	EPA 7470	602746
60310792018	S-TP-6S	EPA 7470	602716	EPA 7470	602746
60310792019	S-TP-6M	EPA 7470	602716	EPA 7470	602746
60310792020	S-TP-7S	EPA 7470	602716	EPA 7470	602746
60310792021	S-TP-7M	EPA 7470	602716	EPA 7470	602746
60310792022	S-TP-7D	EPA 7470	602716	EPA 7470	602746
60310792023	S-TP-8S	EPA 7470	602716	EPA 7470	602746
60310792024	S-TP-8M	EPA 7470	603265	EPA 7470	603347
60310792025	S-TP-8D	EPA 7470	603265	EPA 7470	603347
60310792026	S-NE-DUP-2	EPA 7470	603265	EPA 7470	603347
60310792027	S-NE-DUP-3	EPA 7470	603265	EPA 7470	603347
60310792028	S-NE-FB-2	EPA 7470	603265	EPA 7470	603347
60310792029	S-NE-FB-3	EPA 7470	603265	EPA 7470	603347
60310792030	S-TP-4S	EPA 7470	603265	EPA 7470	603347

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310792

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792033	S-TP-6D	EPA 7470	603265	EPA 7470	603347
60310792034	S-TP-3S	EPA 7470	603265	EPA 7470	603347
60310792035	S-TP-3M	EPA 7470	603265	EPA 7470	603347
60310792036	S-TP-3D	EPA 7470	603265	EPA 7470	603347
60310792001	S-UMW-7S(AMW-1S)	EPA 903.1	356261		
60310792002	S-UMW-7D(AMW-1D)	EPA 903.1	356262		
60310792003	S-TP-5S	EPA 903.1	356262		
60310792004	S-TP-5M	EPA 903.1	356262		
60310792005	S-TP-5D	EPA 903.1	356262		
60310792006	S-NE-DUP-1	EPA 903.1	356262		
60310792007	S-NE-FB-1	EPA 903.1	356262		
60310792008	S-TP-5M MS	EPA 903.1	356262		
60310792009	S-TP-5M MSD	EPA 903.1	356262		
60310792010	S-TP-1S	EPA 903.1	356809		
60310792011	S-TP-1M	EPA 903.1	356809		
60310792012	S-TP-1D	EPA 903.1	356809		
60310792013	S-TP-2S	EPA 903.1	356809		
60310792014	S-TP-2M	EPA 903.1	356809		
60310792015	S-TP-2D	EPA 903.1	356809		
60310792016	S-TP-4M	EPA 903.1	356809		
60310792017	S-TP-4D	EPA 903.1	356809		
60310792018	S-TP-6S	EPA 903.1	356809		
60310792019	S-TP-6M	EPA 903.1	356809		
60310792020	S-TP-7S	EPA 903.1	356809		
60310792021	S-TP-7M	EPA 903.1	356809		
60310792022	S-TP-7D	EPA 903.1	356809		
60310792023	S-TP-8S	EPA 903.1	356809		
60310792024	S-TP-8M	EPA 903.1	356812		
60310792025	S-TP-8D	EPA 903.1	356812		
60310792026	S-NE-DUP-2	EPA 903.1	356812		
60310792027	S-NE-DUP-3	EPA 903.1	356812		
60310792028	S-NE-FB-2	EPA 903.1	356812		
60310792029	S-NE-FB-3	EPA 903.1	356812		
60310792030	S-TP-4S	EPA 903.1	356812		
60310792031	S-TP-2S MS	EPA 903.1	356809		
60310792032	S-TP-2S MSD	EPA 903.1	356809		
60310792033	S-TP-6D	EPA 903.1	356809		
60310792034	S-TP-3S	EPA 903.1	356809		
60310792035	S-TP-3M	EPA 903.1	356809		
60310792036	S-TP-3D	EPA 903.1	356809		
60310792001	S-UMW-7S(AMW-1S)	EPA 904.0	356264		
60310792002	S-UMW-7D(AMW-1D)	EPA 904.0	356265		
60310792003	S-TP-5S	EPA 904.0	356265		
60310792004	S-TP-5M	EPA 904.0	356265		
60310792005	S-TP-5D	EPA 904.0	356265		

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792006	S-NE-DUP-1	EPA 904.0	356265		
60310792007	S-NE-FB-1	EPA 904.0	356265		
60310792008	S-TP-5M MS	EPA 904.0	356265		
60310792009	S-TP-5M MSD	EPA 904.0	356265		
60310792010	S-TP-1S	EPA 904.0	356810		
60310792011	S-TP-1M	EPA 904.0	356810		
60310792012	S-TP-1D	EPA 904.0	356810		
60310792013	S-TP-2S	EPA 904.0	356810		
60310792014	S-TP-2M	EPA 904.0	356810		
60310792015	S-TP-2D	EPA 904.0	356810		
60310792016	S-TP-4M	EPA 904.0	356810		
60310792017	S-TP-4D	EPA 904.0	356810		
60310792018	S-TP-6S	EPA 904.0	356810		
60310792019	S-TP-6M	EPA 904.0	356810		
60310792020	S-TP-7S	EPA 904.0	356810		
60310792021	S-TP-7M	EPA 904.0	356810		
60310792022	S-TP-7D	EPA 904.0	356810		
60310792023	S-TP-8S	EPA 904.0	356810		
60310792024	S-TP-8M	EPA 904.0	356813		
60310792025	S-TP-8D	EPA 904.0	356813		
60310792026	S-NE-DUP-2	EPA 904.0	356813		
60310792027	S-NE-DUP-3	EPA 904.0	356813		
60310792028	S-NE-FB-2	EPA 904.0	356813		
60310792029	S-NE-FB-3	EPA 904.0	356813		
60310792030	S-TP-4S	EPA 904.0	356813		
60310792031	S-TP-2S MS	EPA 904.0	356810		
60310792032	S-TP-2S MSD	EPA 904.0	356810		
60310792033	S-TP-6D	EPA 904.0	356810		
60310792034	S-TP-3S	EPA 904.0	356810		
60310792035	S-TP-3M	EPA 904.0	356810		
60310792036	S-TP-3D	EPA 904.0	356810		
60310792001	S-UMW-7S(AMW-1S)	SM 2320B	603364		
60310792002	S-UMW-7D(AMW-1D)	SM 2320B	603364		
60310792003	S-TP-5S	SM 2320B	603364		
60310792004	S-TP-5M	SM 2320B	603666		
60310792005	S-TP-5D	SM 2320B	603364		
60310792006	S-NE-DUP-1	SM 2320B	603364		
60310792007	S-NE-FB-1	SM 2320B	603666		
60310792010	S-TP-1S	SM 2320B	604275		
60310792011	S-TP-1M	SM 2320B	604275		
60310792012	S-TP-1D	SM 2320B	604278		
60310792013	S-TP-2S	SM 2320B	604275		
60310792014	S-TP-2M	SM 2320B	604275		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792015	**S-TP-2D**	SM 2320B	604278		
60310792016	**S-TP-4M**	SM 2320B	604278		
60310792017	**S-TP-4D**	SM 2320B	604278		
60310792018	**S-TP-6S**	SM 2320B	604278		
60310792019	**S-TP-6M**	SM 2320B	604278		
60310792020	**S-TP-7S**	SM 2320B	604278		
60310792021	**S-TP-7M**	SM 2320B	604278		
60310792022	**S-TP-7D**	SM 2320B	604278		
60310792023	**S-TP-8S**	SM 2320B	604275		
60310792024	**S-TP-8M**	SM 2320B	604275		
60310792025	**S-TP-8D**	SM 2320B	604275		
60310792026	**S-NE-DUP-2**	SM 2320B	604275		
60310792027	**S-NE-DUP-3**	SM 2320B	604278		
60310792028	**S-NE-FB-2**	SM 2320B	604275		
60310792029	**S-NE-FB-3**	SM 2320B	604275		
60310792030	**S-TP-4S**	SM 2320B	604278		
60310792033	**S-TP-6D**	SM 2320B	604278		
60310792034	**S-TP-3S**	SM 2320B	604278		
60310792035	**S-TP-3M**	SM 2320B	604278		
60310792036	**S-TP-3D**	SM 2320B	604278		
60310792001	**S-UMW-7S(AMW-1S)**	SM 2540C	601841		
60310792002	**S-UMW-7D(AMW-1D)**	SM 2540C	601841		
60310792003	**S-TP-5S**	SM 2540C	601841		
60310792004	**S-TP-5M**	SM 2540C	601841		
60310792005	**S-TP-5D**	SM 2540C	601841		
60310792006	**S-NE-DUP-1**	SM 2540C	601841		
60310792007	**S-NE-FB-1**	SM 2540C	601841		
60310792010	**S-TP-1S**	SM 2540C	602428		
60310792011	**S-TP-1M**	SM 2540C	602435		
60310792012	**S-TP-1D**	SM 2540C	602605		
60310792013	**S-TP-2S**	SM 2540C	602435		
60310792014	**S-TP-2M**	SM 2540C	602435		
60310792015	**S-TP-2D**	SM 2540C	602605		
60310792016	**S-TP-4M**	SM 2540C	602605		
60310792017	**S-TP-4D**	SM 2540C	602605		
60310792018	**S-TP-6S**	SM 2540C	602605		
60310792019	**S-TP-6M**	SM 2540C	602605		
60310792020	**S-TP-7S**	SM 2540C	602605		
60310792021	**S-TP-7M**	SM 2540C	602605		
60310792022	**S-TP-7D**	SM 2540C	602605		
60310792023	**S-TP-8S**	SM 2540C	602435		
60310792024	**S-TP-8M**	SM 2540C	602435		
60310792025	**S-TP-8D**	SM 2540C	602435		

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792026	**S-NE-DUP-2**	SM 2540C	602435		
60310792027	**S-NE-DUP-3**	SM 2540C	602605		
60310792028	**S-NE-FB-2**	SM 2540C	602435		
60310792029	**S-NE-FB-3**	SM 2540C	602435		
60310792030	**S-TP-4S**	SM 2540C	602605		
60310792033	**S-TP-6D**	SM 2540C	602758		
60310792034	**S-TP-3S**	SM 2540C	602758		
60310792035	**S-TP-3M**	SM 2540C	602758		
60310792036	**S-TP-3D**	SM 2540C	602758		
60310792001	**S-UMW-7S(AMW-1S)**	EPA 300.0	603128		
60310792002	**S-UMW-7D(AMW-1D)**	EPA 300.0	603128		
60310792002	**S-UMW-7D(AMW-1D)**	EPA 300.0	603455		
60310792003	**S-TP-5S**	EPA 300.0	603128		
60310792004	**S-TP-5M**	EPA 300.0	603128		
60310792004	**S-TP-5M**	EPA 300.0	603455		
60310792005	**S-TP-5D**	EPA 300.0	603128		
60310792006	**S-NE-DUP-1**	EPA 300.0	603128		
60310792006	**S-NE-DUP-1**	EPA 300.0	603455		
60310792007	**S-NE-FB-1**	EPA 300.0	603128		
60310792010	**S-TP-1S**	EPA 300.0	603862		
60310792011	**S-TP-1M**	EPA 300.0	603862		
60310792012	**S-TP-1D**	EPA 300.0	605755		
60310792013	**S-TP-2S**	EPA 300.0	603862		
60310792014	**S-TP-2M**	EPA 300.0	603862		
60310792015	**S-TP-2D**	EPA 300.0	603862		
60310792016	**S-TP-4M**	EPA 300.0	603862		
60310792017	**S-TP-4D**	EPA 300.0	603862		
60310792018	**S-TP-6S**	EPA 300.0	603862		
60310792019	**S-TP-6M**	EPA 300.0	605755		
60310792020	**S-TP-7S**	EPA 300.0	605755		
60310792021	**S-TP-7M**	EPA 300.0	605755		
60310792021	**S-TP-7M**	EPA 300.0	606064		
60310792022	**S-TP-7D**	EPA 300.0	605755		
60310792022	**S-TP-7D**	EPA 300.0	606064		
60310792023	**S-TP-8S**	EPA 300.0	605755		
60310792024	**S-TP-8M**	EPA 300.0	605755		
60310792025	**S-TP-8D**	EPA 300.0	605755		
60310792026	**S-NE-DUP-2**	EPA 300.0	605914		
60310792027	**S-NE-DUP-3**	EPA 300.0	605914		

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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310792028	**S-NE-FB-2**	EPA 300.0	605914		
60310792029	**S-NE-FB-3**	EPA 300.0	605914		
60310792030	**S-TP-4S**	EPA 300.0	606064		
60310792033	**S-TP-6D**	EPA 300.0	606064		
60310792034	**S-TP-3S**	EPA 300.0	606064		
60310792035	**S-TP-3M**	EPA 300.0	606064		
60310792036	**S-TP-3D**	EPA 300.0	606064		

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Sample Condition Upon Receipt

WO# : 60310792

60310792

Client Name: Golder Assoc.

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

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

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

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

Thermometer Used: T300 **Type of Ice:** (Wet) Blue (None)

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

Date and initials of person examining contents: 8.7.19 MA

Temperature should be above freezing to 6°C 22.7, 23.2, 25.7, 0.6, 1.0 0.5 22.7, 23.2, 25.7, 0.6, 1.0, 0.5

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 3

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003 (COC #11)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER (circled) | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N): Metals* N, Mercury N, Chloride/Fluoride/Sulfate N, TDS N, Alkalinity N, Radium 226 N, Radium 228 N

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./Lab I.D. 60310792
1	S-UMW-7S (AMW-1S)	WT	G																							
2	S-UMW-7D (AMW-1D)	WT	G																							
3	S-TP-1S	WT	G			8-5	1300		5	2	[illegible]	3						✓	✓	✓	✓	✓	✓	✓		2BPIN, 1BP2U, 6B3N, BE3U 010
4	S-TP-1M	WT	G			↓	1315		5	2		3						↓	↓	↓	↓	↓	↓	↓		011
5	S-TP-1D	WT	G			8-6	1003		5	2		3						↓	↓	↓	↓	↓	↓	↓		012
6	S-TP-2S	WT	G			8-5	1055		15	6		9						↓	↓	↓	↓	↓	↓	↓		013
7	S-TP-2M	WT	G			↓	1127		5	2		3						↓	↓	↓	↓	↓	↓	↓		014
8	S-TP-2D	WT	G			8-6	0958		5	2		3						↓	↓	↓	↓	↓	↓	↓		015
9	S-TP-3S	WT	G																							
10	S-TP-3M	WT	G																							
11	S-TP-3D	WT	G																							
12	S-TP-4S	WT	G			8-6	1222		5	2		3						✓	✓	✓	✓	✓	✓	✓		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	[signature] / Golder	8/6/19	1700	[signature] / Pace	8-7-19	0255	0.2, 0.6, 1.0, 0.3, 22.7, 23.2	Y	Y	Y

25.7 N Y Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 8/6/19

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CHAIN-OF-CUSTODY / Analytical Request Document

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Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003 (COC #11)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N	N	N		6131079?
1	S-TP-4M 2BPIN	WT	G			8-6	1358		5	2	3								✓	✓	✓	✓	✓	✓	✓	BPJU, BPJN, BPJO	D16
2	S-TP-4D	WT	G			8-6	1137		5	2	3								✓	✓	✓	✓	✓	✓	✓	" " "	D17
3	S-TP-5S	WT	G																								
4	S-TP-5M	WT	G																								
5	S-TP-5D	WT	G																								
6	S-TP-6S 2BPIN	WT	G			8-6	1520		5	2	3								✓	✓	✓	✓	✓	✓	✓	BPJU, BPJN, BPJO	D18
7	S-TP-6M	WT	G			1	1533		1	1	1								2	1	1	1	1	1	1	" " "	D19
8	S-TP-6D	WT	G																								
9	S-TP-7S 2BPIN	WT	G			8-6	1230		5	2	3								✓	✓	✓	✓	✓	✓	✓	BPJU, BPJN, BPJO	D20
10	S-TP-7M	WT	G				1320		1	1	1																D21
11	S-TP-7D	WT	G			1	1410		1	1	1																D22
12	S-TP-8S	WT	G			8-5	1535		5	2	3																D23

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Golder	8/6/19	1700	UCYT lbs.	8.7.19	0255

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
0.2	Y	Y	Y
0.6			
1.6			
0.3			
22.7	N		
23.2			
25.7	N	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 8/6/19

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Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003 (COC #11)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N	N	N		60310792
1	S-TP-8M 2BPIN	WT	G			8-5	1610		5	2		3							✓	✓	✓	✓	✓	✓	✓	BPJN, BPJV	BPJN, BPJV	024
2	S-TP-8D	WT	G			↓	1530		1	2		1							✓	✓	✓	✓	✓	✓	✓	↓, ↓	↓, ↓	025
3	S-NE-DUP-1	WT	G																								
4	S-NE-DUP-2 2BPIN	WT	G			8-5	—		5	2		3							✓	✓	✓	✓	✓	✓	✓	BPJN, BPJV	BPJN, BPJV	026
5	S-NE-DUP-3 ↓	WT	G			8-6	—		5	2		3							✓	✓	✓	✓	✓	✓	✓	↓, ↓	↓, ↓	027
6	S-NE-FB-1	WT	G																								
7	S-NE-FB-2 2BPIN	WT	G			8-5	1325		5	2		3							✓	✓	✓	✓	✓	✓	✓	BPJN, BPJV	BPJN, BPJV	028
8	S-NE-FB-3 ↓	WT	G			8-5	1355		5	2		3							✓	✓	✓	✓	✓	✓	✓	↓, ↓	↓, ↓	029
9		WT	G																								
10		WT	G																								
11		WT	G																								
12		WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl				UPS Ltr / Pace	8-7-19	~~0225~~ 0255

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
0.2	Y	Y	Y
0.6			
1.0			
0.3	N		
22.7			
23.2	↓	↓	↓

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

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

25.7 Y Y

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Sample Condition Upon Receipt

WO# : 60310792

60310792

Client Name: Golder

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

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

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

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

Thermometer Used: T300 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 0.9 **Corr. Factor** 20.0 **Corrected** 0.9 21.5 21.5

Date and initials of person examining contents: 8.8.19 JL

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	Cooler with no ICE only had radium samples
Sufficient volume:	☒Yes ☐No ☐N/A JL 8.8.19	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	Received samples for Radium
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	Test not marked on CoC
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

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www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 1

2013243

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Jeffrey Ingram
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Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-140601.0003 E

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: _____

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: Metals *	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-TP-6D 2BP1N					8/7/19	1407		3	2		1						/	/	/	/	BP3N, BP2U, BP3U		033
2	S-TP-3S					8/7/19	1123		3	2		1						/	/	/	/			034
3	S-TP-3M					8/7/19	1218		3	2		1						/	/	/	/			035
4	S-TP-3D					8/7/19	1003		3	2		1						/	/	/	/			036
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

LD310792

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
* EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	[signature] / Golder	8/7/19	1605	[signature] / Pace	8-8-19	0430	0.9	Y	Y	Y
							21.5	N	2	1

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Bartels

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8/7/19

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

MEMORANDUM

DATE September 18, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – N&E – DATA PACKAGE 60310792

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 matrix spike/matrix spike duplicate (MS/MSD) criterion was not met, 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).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - N&E
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 9/18/2019

Laboratory: Pace Analytical - KS
SDG #: 60310792
Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 7470 (Hg); EPA 903.1/904.0 (Rads); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-UMW-7S (AMW-1S), S-UMW-7D (AMW-1D), S-TP-5S, S-TP-5M, S-TP-5D, S-NE-DUP-1, S-NE-FB-1, S-TP-5M MS/MSD, S-TP-1S, S-TP-1M, S-TP-1D, S-TP-2S, S-TP-2M, S-TP-2D, S-TP-4M, S-TP-4D, S-TP-6S, S-TP-6M, S-TP-7S, S-TP-7M, S-TP-7D, S-TP-8S, S-TP-8M, S-TP-8D, S-NE-DUP-2, S-NE-DUP-3, S-NE-FB-2, S-NE-FB-3, S-TP-4S, S-TP-2S MS/MSD, S-TP-6D, S-TP-3S, S-TP-3M, S-TP-3D

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	x			8/2-8/7/2019
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			
f) Field QC noted?	x			
g) Field parameters collected (note types)?	x			pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	x			
i) Notations of unacceptable field conditions/performances from field logs or field notes?		x		
j) Does the laboratory narrative indicate deficiencies?			x	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	x			
b) Was the COC signed by both field and laboratory personnel?		x		Field staff failed to sign pg. 3 of CoC
c) Were samples received in good condition?	x			

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	[x]	[ ]	[ ]	DUP-1 @ S-TP-5S, DUP-2 @ S-TP-8S, DUP-3 @ S-TP-7D FB-1 @ S-TP-5D, FB-2 @ S-TP-1S, FB-3 @ S-TP-1M
b) Were field dup. precision criteria met (note RPD)?	[ ]	[x]	[ ]	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	[x]	[ ]	[ ]	See Notes
d) Were lab dup. precision criteria met (note RPD)?	[x]	[ ]	[ ]	See Notes

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

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

Comments/Notes:

MB: -92010-24: Ca (86.6), Mg (16.8), K (94.0); -92025-30,-33-36: Ca (59.4), Mg (14.4), Na (306); -92001: Ra-228 (0.997);

FB-1: B (12.8), TDS (8.5), Ra-226 (0.438); FB-2: Ca (62.9), Mg (16.2), Na (166); FB-3: Mg (15.0), Na (158)

DUP-1: Co (200), Cr (200), Se (200), Cl (82), F (42), SO4 (68); DUP-2: Pb (200); DUP-3: Be (200), Pb (200), Sb (200), Ra-226 (200), Ra-228 (69)

Lab DUP: -04 (Alk, TDS), -13 (Alk, TDS), -12 (Alk), -30 (Alk), -17 (TDS), -35 (TDS)

MS/MSD: -92013: Ca (208), Mg (132); -92022: Ca (61)

Max Lab Duplicate RPD: 8% (Limit: 10%)

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-TP-5S	Chloride (Cl)	-	J	Field Duplicate (FD) Exceeded RPD Limit; Result > MDL
"	Sulfate (SO4)	-	J	"
S-TP-5M	Alkalinity (Alk)	-	J	Analyzed Outside of EPA Hold Time
S-NE-DUP-1	Cl	-	J	FD Exceeded RPD Limit; Result > MDL
"	SO4	-	J	"
S-TP-2S	Alk	-	J	Analyzed Outside of EPA Hold Time
S-TP-2M	Alk	-	J	"
S-TP-8S	Alk	-	J	"
S-TP-8M	Alk	-	J	"
S-TP-8D	Alk	-	J	"
S-NE-DUP-2	Alk	-	J	"
S-TP-2S	Calcium (Ca)	-	J	MS/MSD Exceeded Calibration Range
"	Magnesium (Mg)	-	J	"
S-TP-7D	Ca	-	J	"
S-NE-FB-2	Ca	200	U	Analyte Detected in Method Blank (MB); PQL>Result>MDL
"	Mg	50	U	"
"	Sodium (Na)	500	U	"
S-NE-FB-3	Mg	50	U	"
"	Na	500	U	"
S-TP-5D	Radium-226 (Ra-226)	-	J	Analyte Detected in Field Blank (FB); 10x Blank>Result>MDC
S-UMW-7S (AMW-1S)	Radium-228 (Ra-228)	-	J	Analyte Detected in MB; 10x Blank>Result>MDC
S-TP-1S	Alk	-	J	Analyzed Outside of EPA Hold Time
S-TP-1M	Alk	-	J	"
S-TP-7D	Ra-226	-	J	FD Exceeded RPD Limit; Result > MDC
"	Ra-228	-	J	"
S-NE-DUP-3	Ra-228	-	J	"

Signature: Tommy J Good Jr Date: 9/18/2019

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September 01, 2019

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

RE: Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory between August 03, 2019 and August 10, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

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

Enclosures

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

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CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Kansas Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60310790001	**S-LMW-1S**	Water	08/02/19 15:00	08/03/19 02:50
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
60310790004	**S-LMW-2S**	Water	08/06/19 10:30	08/07/19 02:55
60310790005	**S-LMW-3S**	Water	08/05/19 16:20	08/07/19 02:55
60310790006	**S-LMW-4S**	Water	08/05/19 14:50	08/07/19 02:55
60310790007	**S-LMW-5S**	Water	08/05/19 10:30	08/07/19 02:55
60310790008	**S-LMW-6S**	Water	08/05/19 11:35	08/07/19 02:55
60310790009	**S-LMW-7S**	Water	08/05/19 12:55	08/07/19 02:55
60310790010	**S-LMW-8S**	Water	08/06/19 09:25	08/07/19 02:55
60310790011	**S-LMW-DUP-1**	Water	08/05/19 08:00	08/07/19 02:55
60310790012	**S-LMW-DUP-2**	Water	08/06/19 08:00	08/07/19 02:55
60310790013	**S-LMW-FB-1**	Water	08/05/19 14:08	08/07/19 02:55
60310790014	**S-LMW-FB-2**	Water	08/06/19 08:12	08/07/19 02:55
60310790015	**S-LMW-9S**	Water	08/09/19 09:35	08/10/19 01:45

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310790001	S-LMW-1S	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790002	S-BMW-1S	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790003	S-BMW-3S	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790004	S-LMW-2S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790005	S-LMW-3S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790006	S-LMW-4S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790007	S-LMW-5S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790008	S-LMW-6S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790009	S-LMW-7S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790010	S-LMW-8S	EPA 200.7	EMR, HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790011	S-LMW-DUP-1	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790012	S-LMW-DUP-2	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790013	S-LMW-FB-1	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790014	S-LMW-FB-2	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790015	S-LMW-9S	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-1S **Lab ID: 60310790001** Collected: 08/02/19 15:00 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**115**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:33	7440-39-3	
Lithium	**18.0**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:33	7439-93-2	
Molybdenum	**33.9**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:33	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.2**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:22	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**155**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:36	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:36	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:36	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.0**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:24	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**192**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:38	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:38	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:38	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.42J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:25	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-2S **Lab ID: 60310790004** Collected: 08/06/19 10:30 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**98.7**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:50	7440-39-3	
Lithium	**30.4**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 14:45	7439-93-2	
Molybdenum	**896**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:50	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.0**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:01	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-3S **Lab ID: 60310790005** Collected: 08/05/19 16:20 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**159**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:52	7440-39-3	
Lithium	**29.9**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 14:48	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:52	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.53J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:03	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-4S **Lab ID: 60310790006** Collected: 08/05/19 14:50 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**195**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:54	7440-39-3	
Lithium	**25.1**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 14:50	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:54	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.65J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:05	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-5S **Lab ID: 60310790007** Collected: 08/05/19 10:30 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**63.4**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:56	7440-39-3	
Lithium	**44.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 14:53	7439-93-2	
Molybdenum	**1140**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:56	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.85J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:06	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-6S **Lab ID: 60310790008** Collected: 08/05/19 11:35 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**59.6**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 20:03	7440-39-3	
Lithium	**14.4**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 15:00	7439-93-2	
Molybdenum	**4.4J**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 20:03	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.96J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:11	7440-38-2	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-7S **Lab ID: 60310790009** Collected: 08/05/19 12:55 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**94.4**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 20:09	7440-39-3	
Lithium	**18.2**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 15:02	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 20:09	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.58J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:13	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-8S **Lab ID: 60310790010** Collected: 08/06/19 09:25 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**99.8**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 20:12	7440-39-3	
Lithium	**12.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 15:04	7439-93-2	
Molybdenum	**282**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 20:12	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.2**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:22	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-DUP-1 **Lab ID: 60310790011** Collected: 08/05/19 08:00 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**59.9**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:09	7440-39-3	
Lithium	**22.6**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:09	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:09	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.84J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:24	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-DUP-2 **Lab ID: 60310790012** Collected: 08/06/19 08:00 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**113**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:11	7440-39-3	
Lithium	**36.8**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:11	7439-93-2	
Molybdenum	**1020**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:11	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.94J**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:25	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-FB-1 **Lab ID: 60310790013** Collected: 08/05/19 14:08 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:14	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:14	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:14	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:18	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-FB-2 **Lab ID: 60310790014** Collected: 08/06/19 08:12 Received: 08/07/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**1.6J**	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 18:16	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 18:16	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 18:16	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/08/19 13:40	08/12/19 19:20	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Sample: S-LMW-9S **Lab ID: 60310790015** Collected: 08/09/19 09:35 Received: 08/10/19 01:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**78.6**	ug/L	5.0	1.4	1	08/14/19 10:28	08/15/19 13:28	7440-39-3	
Lithium	**47.4**	ug/L	10.0	5.9	1	08/14/19 10:28	08/15/19 13:28	7439-93-2	
Molybdenum	**8.7J**	ug/L	20.0	2.6	1	08/14/19 10:28	08/15/19 13:28	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.89J**	ug/L	1.0	0.065	1	08/14/19 10:28	08/15/19 14:34	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 601714 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310790001, 60310790002, 60310790003

METHOD BLANK: 2461467 Matrix: Water
Associated Lab Samples: 60310790001, 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/08/19 16:31	
Lithium	ug/L	<5.9	10.0	5.9	08/08/19 16:31	
Molybdenum	ug/L	<2.6	20.0	2.6	08/08/19 16:31	

LABORATORY CONTROL SAMPLE: 2461468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1010	101	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1020	102	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
Barium	ug/L	111	1000	1000	1110	1120	100	101	70-130	0	20	
Lithium	ug/L	10.1	1000	1000	1030	1040	102	103	70-130	1	20	
Molybdenum	ug/L	18.2J	1000	1000	1030	1040	101	102	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	71.3	1000	1000	1070	1090	100	102	70-130	2	20	
Lithium	ug/L	21.4	1000	1000	1050	1060	102	104	70-130	1	20	
Molybdenum	ug/L	820	1000	1000	1850	1890	103	107	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 601954 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310790004, 60310790005, 60310790006, 60310790007, 60310790008, 60310790009, 60310790010

METHOD BLANK: 2462491 Matrix: Water
Associated Lab Samples: 60310790004, 60310790005, 60310790006, 60310790007, 60310790008, 60310790009, 60310790010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/09/19 19:07	
Lithium	ug/L	<5.9	10.0	5.9	08/09/19 19:07	
Molybdenum	ug/L	<2.6	20.0	2.6	08/09/19 19:07	

LABORATORY CONTROL SAMPLE: 2462492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	915	92	85-115	
Lithium	ug/L	1000	965	97	85-115	
Molybdenum	ug/L	1000	958	96	85-115	

MATRIX SPIKE SAMPLE: 2462493

Parameter	Units	60311085001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	0.031 mg/L	1000	983	95	70-130	
Lithium	ug/L	0.011 mg/L	1000	1030	102	70-130	
Molybdenum	ug/L	<20.0	1000	998	100	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462494 2462495

Parameter	Units	60310790007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	63.4	1000	1000	972	999	91	94	70-130	3	20	
Lithium	ug/L	44.8	1000	1000	1070	1000	102	96	70-130	6	20	
Molybdenum	ug/L	1140	1000	1000	2130	2140	98	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 601955 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310790011, 60310790012, 60310790013, 60310790014

METHOD BLANK: 2462496 Matrix: Water
Associated Lab Samples: 60310790011, 60310790012, 60310790013, 60310790014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/09/19 18:05	
Lithium	ug/L	<5.9	10.0	5.9	08/09/19 18:05	
Molybdenum	ug/L	<2.6	20.0	2.6	08/09/19 18:05	

LABORATORY CONTROL SAMPLE: 2462497

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	969	97	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Molybdenum	ug/L	1000	999	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462498 2462499

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	217	1000	1000	1200	1110	98	89	70-130	8	20	
Lithium	ug/L	13.8	1000	1000	1040	976	103	96	70-130	7	20	
Molybdenum	ug/L	4.3J	1000	1000	1010	946	100	94	70-130	6	20	

MATRIX SPIKE SAMPLE: 2462500

Parameter	Units	60310792022 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	363	1000	1220	86	70-130	
Lithium	ug/L	42.5	1000	981	94	70-130	
Molybdenum	ug/L	<2.6	1000	920	92	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 603088
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310790015

METHOD BLANK: 2466336 Matrix: Water
Associated Lab Samples: 60310790015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/15/19 13:11	
Lithium	ug/L	<5.9	10.0	5.9	08/15/19 13:11	
Molybdenum	ug/L	<2.6	20.0	2.6	08/15/19 13:11	

LABORATORY CONTROL SAMPLE: 2466337

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1010	101	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466338 2466339

Parameter	Units	60311242002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	43.8	1000	1000	1000	1020	96	98	70-130	2	20	
Lithium	ug/L	ND	1000	1000	981	1000	98	100	70-130	2	20	
Molybdenum	ug/L	ND	1000	1000	961	989	96	99	70-130	3	20	

MATRIX SPIKE SAMPLE: 2466340

Parameter	Units	60311616003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	0.068 mg/L	1000	1070	100	70-130	
Lithium	ug/L	0.011 mg/L	1000	1040	103	70-130	
Molybdenum	ug/L	ND	1000	987	99	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 601873 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310790001, 60310790002, 60310790003

METHOD BLANK: 2462183 Matrix: Water
Associated Lab Samples: 60310790001, 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:00	

LABORATORY CONTROL SAMPLE: 2462184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.7	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462185 2462186

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	5.8	40	40	46.3	46.1	101	101	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 601982 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310790004, 60310790005, 60310790006, 60310790007, 60310790008, 60310790009, 60310790010, 60310790011, 60310790012, 60310790013, 60310790014

METHOD BLANK: 2462565 Matrix: Water
Associated Lab Samples: 60310790004, 60310790005, 60310790006, 60310790007, 60310790008, 60310790009, 60310790010, 60310790011, 60310790012, 60310790013, 60310790014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:58	

LABORATORY CONTROL SAMPLE: 2462566

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.4	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462567 2462568

Parameter	Units	60310790007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.85J	40	40	41.9	42.9	103	105	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462569 2462570

Parameter	Units	60310792013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	11.9	40	40	52.1	50.4	101	96	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

QC Batch: 603094 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310790015

METHOD BLANK: 2466353 Matrix: Water
Associated Lab Samples: 60310790015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/15/19 14:25	

LABORATORY CONTROL SAMPLE: 2466354

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	37.0	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466355 2466356

Parameter	Units	60310790015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.89J	40	40	39.7	39.9	97	98	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60310790

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310790001	**S-LMW-1S**	EPA 200.7	601714	EPA 200.7	601738
60310790002	**S-BMW-1S**	EPA 200.7	601714	EPA 200.7	601738
60310790003	**S-BMW-3S**	EPA 200.7	601714	EPA 200.7	601738
60310790004	**S-LMW-2S**	EPA 200.7	601954	EPA 200.7	602073
60310790005	**S-LMW-3S**	EPA 200.7	601954	EPA 200.7	602073
60310790006	**S-LMW-4S**	EPA 200.7	601954	EPA 200.7	602073
60310790007	**S-LMW-5S**	EPA 200.7	601954	EPA 200.7	602073
60310790008	**S-LMW-6S**	EPA 200.7	601954	EPA 200.7	602073
60310790009	**S-LMW-7S**	EPA 200.7	601954	EPA 200.7	602073
60310790010	**S-LMW-8S**	EPA 200.7	601954	EPA 200.7	602073
60310790011	**S-LMW-DUP-1**	EPA 200.7	601955	EPA 200.7	602074
60310790012	**S-LMW-DUP-2**	EPA 200.7	601955	EPA 200.7	602074
60310790013	**S-LMW-FB-1**	EPA 200.7	601955	EPA 200.7	602074
60310790014	**S-LMW-FB-2**	EPA 200.7	601955	EPA 200.7	602074
60310790015	**S-LMW-9S**	EPA 200.7	603088	EPA 200.7	603144
60310790001	**S-LMW-1S**	EPA 200.8	601873	EPA 200.8	601930
60310790002	**S-BMW-1S**	EPA 200.8	601873	EPA 200.8	601930
60310790003	**S-BMW-3S**	EPA 200.8	601873	EPA 200.8	601930
60310790004	**S-LMW-2S**	EPA 200.8	601982	EPA 200.8	602076
60310790005	**S-LMW-3S**	EPA 200.8	601982	EPA 200.8	602076
60310790006	**S-LMW-4S**	EPA 200.8	601982	EPA 200.8	602076
60310790007	**S-LMW-5S**	EPA 200.8	601982	EPA 200.8	602076
60310790008	**S-LMW-6S**	EPA 200.8	601982	EPA 200.8	602076
60310790009	**S-LMW-7S**	EPA 200.8	601982	EPA 200.8	602076
60310790010	**S-LMW-8S**	EPA 200.8	601982	EPA 200.8	602076
60310790011	**S-LMW-DUP-1**	EPA 200.8	601982	EPA 200.8	602076
60310790012	**S-LMW-DUP-2**	EPA 200.8	601982	EPA 200.8	602076
60310790013	**S-LMW-FB-1**	EPA 200.8	601982	EPA 200.8	602076
60310790014	**S-LMW-FB-2**	EPA 200.8	601982	EPA 200.8	602076
60310790015	**S-LMW-9S**	EPA 200.8	603094	EPA 200.8	603150

Pace Analytical®
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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

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Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

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

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N		40310790
1	S-LMW-1S	WT	G	8/1/19	1500				5	2		3						1	1	1	1	1			BP3N 001
2	S-LMW-2S	WT	G																						
3	S-LMW-3S	WT	G																						
4	S-LMW-4S	WT	G																						
5	S-LWM-5S	WT	G																						
6	S-LWM-6S	WT	G																						
7	S-LMW-7S	WT	G																						
8	S-LMW-8S	WT	G																						
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G	8/1/19	1055				5	2		3						1	1	1	1	1			BP3N 002
11	S-BMW-3S	WT	G	↓	1145				5	2		3						1	1	1	1	1			↓ 003
12	S-LMW-DUP-1	WT	G																						

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

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature]

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

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Sample Condition Upon Receipt

WO#: 60310790

60310790

Client Name: Golder Assoc.

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

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

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

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

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

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

Date and initials of person examining contents: 8.7.19 ML

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

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	~~Total Phosphorus~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-LMW-1S	WT	G																						40310790
2	S-LMW-2S	WT	G			8/6/19	1030		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		004
3	S-LMW-3S	WT	G			8/5/19	1620		3	2		1							✓	✓	✓	✓			005
4	S-LMW-4S	WT	G			8/5/19	1450		3	2		1							✓	✓	✓	✓			006
5	S-LWM-5S	WT	G			8/5/19	1030		9	2		3							✓	✓	✓	✓	3BP2U, 3BP3N, 3BP3U		007
6	S-LWM-6S	WT	G			8/5/19	1135		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		008
7	S-LMW-7S	WT	G			8/5/19	1255		3	2		1							✓	✓	✓	✓			009
8	S-LMW-8S	WT	G			8/6/19	0925		3	2		1							✓	✓	✓	✓			010
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G																						
11	S-BMW-3S	WT	G																						
12	S-LMW-DUP-1	WT	G			8/5/19	—		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		011

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus								Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N								
1	S-LMW-DUP-2	WT	G			8/6/19	—		3	2		1							/	/	/	/	DP2U, DP3N,								DP3U 012
2	S-LMW-FB-1	WT	G			8/5/19	1408		3	2		1							/	/	/	/									013
3	S-LMW-FB-2	WT	G			8/6/19	0812		3	2		1							/	/	/	/									014
4		WT	G																											
5		WT	G																											
6		WT	G																											
7		WT	G																											
8		WT	G																											
9		WT	G																											
10		WT	G																											
11		WT	G																											
12		WT	G																											

Pace Project No./ Lab I.D. 60310790

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/6/19	1700	UPS / FedEx	8.7.19	0255	2.0	Y	Y	Y
							0.6			
							1.0			
							0.3			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: of

2013245

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: _____

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Fe, Mg,	Golder	8/9/19	1311		8/9/19	1317				
Mn, K, Na		8/9/19	1700		8/10/19	0745	1,2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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

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

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

MEMORANDUM

DATE January 14, 2020 **Project No.** 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPB – DATA PACKAGE 60310790_FRC_NE

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).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPB
Project Number: 153140601
Reviewer: T Goodwin
Validation Date: 1/14/2020

Laboratory: Pace Analytical - KS
SDG #: 60310790_frc_NE
Analytical Method (type and no.): EPA 200.7/200.8 (Metals);
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-LMW-1S, S-BMW-1S, S-BMW-3S, S-LMW-2S, S-LMW-3S, S-LMW-4S, S-LMW-5S, S-LMW-6S, S-LMW-7S, S-LMW-8S, S-LMW-DUP-1, S-LMW-DUP-2, S-LMW-FB-1, S-LMW-FB-2, S-LMW-9S

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	x			8/1-8/9/2019
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			
f) Field QC noted?	x			
g) Field parameters collected (note types)?	x			pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	x			
i) Notations of unacceptable field conditions/performances from field logs or field notes?		x		
j) Does the laboratory narrative indicate deficiencies?			x	

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☒	☐	☐	DUP-1 @ S-LMW-6S; DUP-2 @ S-LMW-2S FB-1 @ S-LMW-4S; FB-2 @ S-LMW-8S
b) Were field dup. precision criteria met (note RPD)?	☐	☒	☐	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☒	

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

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

Comments/Notes:

FB-2: Ba (1.6)

DUP-1: Li (44), Mo (200) - No qualification necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: _____ Date: 1/14/2020

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October 17, 2019

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

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

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

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

Sincerely,

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

Enclosures

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

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CERTIFICATIONS

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

Kansas Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

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

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

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SAMPLE ANALYTE COUNT

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

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60312389001	**S-UG-1A**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389002	**S-UG-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389003	**S-DG-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389004	**S-DG-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389005	**S-DG-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389006	**S-DG-4**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389007	**S-SCPC-DUP-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312389008	**S-SCPC-FB-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790002	**S-BMW-1S**	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790003	**S-BMW-3S**	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**318**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:43	7440-39-3	
Lithium	**40.3**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:43	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:43	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.61J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:54	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**287**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:45	7440-39-3	
Lithium	**19.1**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:45	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:45	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.64J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:00	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**262**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:52	7440-39-3	
Lithium	**31.6**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:52	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:52	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.3**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:01	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**242**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:54	7440-39-3	
Lithium	**35.5**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:54	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:54	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.8**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:02	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**282**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:56	7440-39-3	
Lithium	**35.2**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:56	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:56	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.68J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:03	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**262**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 18:59	7440-39-3	
Lithium	**34.8**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 18:59	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 18:59	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.53J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:05	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**286**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 19:05	7440-39-3	
Lithium	**36.1**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 19:05	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 19:05	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.73J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 12:08	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/22/19 08:30	08/22/19 19:07	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/22/19 08:30	08/22/19 19:07	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/22/19 08:30	08/22/19 19:07	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:59	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**155**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:36	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:36	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:36	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.0**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:24	7440-38-2	

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ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**192**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:38	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:38	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:38	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.42J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:25	7440-38-2	

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QUALITY CONTROL DATA

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

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

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

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/08/19 16:31	
Lithium	ug/L	<5.9	10.0	5.9	08/08/19 16:31	
Molybdenum	ug/L	<2.6	20.0	2.6	08/08/19 16:31	

LABORATORY CONTROL SAMPLE: 2461468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1010	101	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1020	102	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
Barium	ug/L	111	1000	1000	1110	1120	100	101	70-130	0	20	
Lithium	ug/L	10.1	1000	1000	1030	1040	102	103	70-130	1	20	
Molybdenum	ug/L	18.2J	1000	1000	1030	1040	101	102	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	71.3	1000	1000	1070	1090	100	102	70-130	2	20	
Lithium	ug/L	21.4	1000	1000	1050	1060	102	104	70-130	1	20	
Molybdenum	ug/L	820	1000	1000	1850	1890	103	107	70-130	2	20	

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QUALITY CONTROL DATA

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

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

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

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/22/19 18:41	
Lithium	ug/L	<5.9	10.0	5.9	08/22/19 18:41	
Molybdenum	ug/L	<2.6	20.0	2.6	08/22/19 18:41	

LABORATORY CONTROL SAMPLE: 2472449

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	975	97	85-115	
Lithium	ug/L	1000	960	96	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472450 2472451

Parameter	Units	60312389006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	262	1000	1000	1210	1230	95	97	70-130	2	20	
Lithium	ug/L	34.8	1000	1000	985	999	95	96	70-130	1	20	
Molybdenum	ug/L	<2.6	1000	1000	976	998	98	100	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

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

QC Batch: 601873 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2462183 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:00	

LABORATORY CONTROL SAMPLE: 2462184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.7	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462185 2462186

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	5.8	40	40	46.3	46.1	101	101	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

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

QC Batch: 604834 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

METHOD BLANK: 2472514 Matrix: Water
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/23/19 11:42	

LABORATORY CONTROL SAMPLE: 2472515

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	37.9	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472516 2472517

Parameter	Units	60312388003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.0	40	40	40.3	40.3	96	96	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472518 2472519

Parameter	Units	60312389006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.53J	40	40	40.1	38.4	99	95	70-130	4	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

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

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

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

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310790002	**S-BMW-1S**	EPA 200.7	601714	EPA 200.7	601738
60310790003	**S-BMW-3S**	EPA 200.7	601714	EPA 200.7	601738
60312389001	**S-UG-1A**	EPA 200.7	604815	EPA 200.7	604890
60312389002	**S-UG-2**	EPA 200.7	604815	EPA 200.7	604890
60312389003	**S-DG-1**	EPA 200.7	604815	EPA 200.7	604890
60312389004	**S-DG-2**	EPA 200.7	604815	EPA 200.7	604890
60312389005	**S-DG-3**	EPA 200.7	604815	EPA 200.7	604890
60312389006	**S-DG-4**	EPA 200.7	604815	EPA 200.7	604890
60312389007	**S-SCPC-DUP-1**	EPA 200.7	604815	EPA 200.7	604890
60312389008	**S-SCPC-FB-1**	EPA 200.7	604815	EPA 200.7	604890
60310790002	**S-BMW-1S**	EPA 200.8	601873	EPA 200.8	601930
60310790003	**S-BMW-3S**	EPA 200.8	601873	EPA 200.8	601930
60312389001	**S-UG-1A**	EPA 200.8	604834	EPA 200.8	604896
60312389002	**S-UG-2**	EPA 200.8	604834	EPA 200.8	604896
60312389003	**S-DG-1**	EPA 200.8	604834	EPA 200.8	604896
60312389004	**S-DG-2**	EPA 200.8	604834	EPA 200.8	604896
60312389005	**S-DG-3**	EPA 200.8	604834	EPA 200.8	604896
60312389006	**S-DG-4**	EPA 200.8	604834	EPA 200.8	604896
60312389007	**S-SCPC-DUP-1**	EPA 200.8	604834	EPA 200.8	604896
60312389008	**S-SCPC-FB-1**	EPA 200.8	604834	EPA 200.8	604896

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Sample Condition Upon Receipt

WO# : 60312389

60312389

Client Name: Golder Associates

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: of

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

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

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

SAMPLE CONDITIONS

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: J Ingram

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

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
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Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

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

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N		40310790
1	S-LMW-1S	WT	G	8/1/19	1500				5	2		3							1	1	1	1	1		BP3N 001
2	S-LMW-2S	WT	G																						
3	S-LMW-3S	WT	G																						
4	S-LMW-4S	WT	G																						
5	S-LWM-5S	WT	G																						
6	S-LWM-6S	WT	G																						
7	S-LMW-7S	WT	G																						
8	S-LMW-8S	WT	G																						
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G	8/1/19	1055				5	2		3							1	1	1	1	1		BP3N 002
11	S-BMW-3S	WT	G	↓	1145				5	2		3							1	1	1	1	1		BP3N 003
12	S-LMW-DUP-1	WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/2/19	1635		8/3/19	0250	1.5 2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature]

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

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Sample Condition Upon Receipt

WO#: 60310790

60310790

Client Name: Golder Assoc.

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

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

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

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

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

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

Date and initials of person examining contents: 8.7.19 ML

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

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Pace Analytical
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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	~~Total Phosphorus~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N		40310790
1	S-LMW-1S	WT	G																						
2	S-LMW-2S	WT	G			8/6/19	1030		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		DW4
3	S-LMW-3S	WT	G			8/5/19	1620		3	2		1							✓	✓	✓	✓			005
4	S-LMW-4S	WT	G			8/5/19	1450		3	2		1							✓	✓	✓	✓			006
5	S-LWM-5S	WT	G			8/5/19	1030		9	2		3							✓	✓	✓	✓	3BP2U, 3BP3N, 3BP3U		007
6	S-LWM-6S	WT	G			8/5/19	1135		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		008
7	S-LMW-7S	WT	G			8/5/19	1255		3	2		1							✓	✓	✓	✓			009
8	S-LMW-8S	WT	G			8/6/19	0925		3	2		1							✓	✓	✓	✓			010
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G																						
11	S-BMW-3S	WT	G																						
12	S-LMW-DUP-1	WT	G			8/5/19	—		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U		011

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus							Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. (6031079D)
																		Y/N	N	N	N	N	N						
1	S-LMW-DUP-2	WT	G			8/6/19	—		3	2		1							/	/	/	/	DP2U, DP3N					DP3U	012
2	S-LMW-FB-1	WT	G			8/5/19	1408		3	2		1							/	/	/	/							013
3	S-LMW-FB-2	WT	G			8/6/19	0812		3	2		1							/	/	/	/							014
4		WT	G																										
5		WT	G																										
6		WT	G																										
7		WT	G																										
8		WT	G																										
9		WT	G																										
10		WT	G																										
11		WT	G																										
12		WT	G																										

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

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

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

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: of

2013245

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: _____

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Al, B, Ca, Fe, Mg,	Golder	8/9/19	1311		8/9/19	1317				
Mn, K, Na		8/9/19	1700		8/10/19	0745	1,2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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

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

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

MEMORANDUM

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

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

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

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).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

Laboratory: Pace Analytical - KS
SDG #: 60312389A
Analytical Method (type and no.): EPA 200.7/200.8 (Metals);
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-UG-1A, S-UG-2, S-DG-1, S-DG-2, S-DG-3, S-DG-4, S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S

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

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

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

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

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

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

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

Comments/Notes:

Max Field Duplicate RPD: 7.1% (Limit: 20%)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy Abbott II

Date: 10/17/2019

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

October 17, 2019

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

RE: Project: AMEREN SIOUX ENERGY CTR
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,

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

Enclosures

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

REPORT OF LABORATORY ANALYSIS

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

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 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

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(913)599-5665

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	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312388002	**S-TMW-2**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312388003	**S-TMW-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312388004	**S-UG-3**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312388005	**S-SCL4A-FB-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60312388006	**S-SCL4A-DUP-1**	EPA 200.7	EMR	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790002	**S-BMW-1S**	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K
60310790003	**S-BMW-3S**	EPA 200.7	HKC	3	PASI-K
		EPA 200.8	JGP	1	PASI-K

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

ANALYTICAL RESULTS

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

Sample: S-TMW-1 **Lab ID: 60312388001** Collected: 08/04/19 11:50 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**169**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:17	7440-39-3	
Lithium	**20.6**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:17	7439-93-2	
Molybdenum	**3.1J**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:17	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.50J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:45	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

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

Sample: S-TMW-2 **Lab ID: 60312388002** Collected: 08/04/19 11:10 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**208**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:19	7440-39-3	
Lithium	**28.6**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:19	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:19	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.6**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:46	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

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

Sample: S-TMW-3 **Lab ID: 60312388003** Collected: 08/04/19 10:10 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**233**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:26	7440-39-3	
Lithium	**27.2**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:26	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:26	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.0**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:47	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

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

Sample: S-UG-3 **Lab ID: 60312388004** Collected: 08/04/19 10:15 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**262**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:32	7440-39-3	
Lithium	**32.6**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:32	7439-93-2	
Molybdenum	**2.9J**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:32	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.42J**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:51	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

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

Sample: S-SCL4A-FB-1 **Lab ID: 60312388005** Collected: 08/04/19 10:02 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:34	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:34	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:34	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:57	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

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

Sample: S-SCL4A-DUP-1 **Lab ID: 60312388006** Collected: 08/04/19 08:00 Received: 08/21/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**211**	ug/L	5.0	1.4	1	08/21/19 13:22	08/22/19 18:37	7440-39-3	
Lithium	**27.9**	ug/L	10.0	5.9	1	08/21/19 13:22	08/22/19 18:37	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/21/19 13:22	08/22/19 18:37	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.6**	ug/L	1.0	0.065	1	08/22/19 09:15	08/23/19 11:52	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**155**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:36	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:36	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:36	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.0**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:24	7440-38-2	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

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

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**192**	ug/L	5.0	1.4	1	08/07/19 14:31	08/08/19 16:38	7440-39-3	
Lithium	**<5.9**	ug/L	10.0	5.9	1	08/07/19 14:31	08/08/19 16:38	7439-93-2	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	08/07/19 14:31	08/08/19 16:38	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.42J**	ug/L	1.0	0.065	1	08/08/19 09:30	08/12/19 18:25	7440-38-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

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

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

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

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/08/19 16:31	
Lithium	ug/L	<5.9	10.0	5.9	08/08/19 16:31	
Molybdenum	ug/L	<2.6	20.0	2.6	08/08/19 16:31	

LABORATORY CONTROL SAMPLE: 2461468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1010	101	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1020	102	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
Barium	ug/L	111	1000	1000	1110	1120	100	101	70-130	0	20	
Lithium	ug/L	10.1	1000	1000	1030	1040	102	103	70-130	1	20	
Molybdenum	ug/L	18.2J	1000	1000	1030	1040	101	102	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	71.3	1000	1000	1070	1090	100	102	70-130	2	20	
Lithium	ug/L	21.4	1000	1000	1050	1060	102	104	70-130	1	20	
Molybdenum	ug/L	820	1000	1000	1850	1890	103	107	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

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QUALITY CONTROL DATA

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

QC Batch: 604659 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 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
Barium	ug/L	<1.4	5.0	1.4	08/22/19 18:14	
Lithium	ug/L	<5.9	10.0	5.9	08/22/19 18:14	
Molybdenum	ug/L	<2.6	20.0	2.6	08/22/19 18:14	

LABORATORY CONTROL SAMPLE: 2471842

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	967	97	85-115	
Lithium	ug/L	1000	957	96	85-115	
Molybdenum	ug/L	1000	995	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2471843 2471844

Parameter	Units	60312388003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	233	1000	1000	1170	1100	94	87	70-130	6	20	
Lithium	ug/L	27.2	1000	1000	961	908	93	88	70-130	6	20	
Molybdenum	ug/L	<2.6	1000	1000	964	918	96	92	70-130	5	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

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QUALITY CONTROL DATA

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

QC Batch: 601873 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2462183 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/12/19 18:00	

LABORATORY CONTROL SAMPLE: 2462184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	39.7	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462185 2462186

Parameter	Units	60310792004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	5.8	40	40	46.3	46.1	101	101	70-130	0	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

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QUALITY CONTROL DATA

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

QC Batch: 604834 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60312388001, 60312388002, 60312388003, 60312388004, 60312388005, 60312388006

METHOD BLANK: 2472514 Matrix: Water
Associated Lab Samples: 60312388001, 60312388002, 60312388003, 60312388004, 60312388005, 60312388006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	08/23/19 11:42	

LABORATORY CONTROL SAMPLE: 2472515

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	37.9	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472516 2472517

Parameter	Units	60312388003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.0	40	40	40.3	40.3	96	96	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472518 2472519

Parameter	Units	60312389006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.53J	40	40	40.1	38.4	99	95	70-130	4	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

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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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

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

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310790002	**S-BMW-1S**	EPA 200.7	601714	EPA 200.7	601738
60310790003	**S-BMW-3S**	EPA 200.7	601714	EPA 200.7	601738
60312388001	**S-TMW-1**	EPA 200.7	604659	EPA 200.7	604692
60312388002	**S-TMW-2**	EPA 200.7	604659	EPA 200.7	604692
60312388003	**S-TMW-3**	EPA 200.7	604659	EPA 200.7	604692
60312388004	**S-UG-3**	EPA 200.7	604659	EPA 200.7	604692
60312388005	**S-SCL4A-FB-1**	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**	EPA 200.8	601873	EPA 200.8	601930
60310790003	**S-BMW-3S**	EPA 200.8	601873	EPA 200.8	601930
60312388001	**S-TMW-1**	EPA 200.8	604834	EPA 200.8	604896
60312388002	**S-TMW-2**	EPA 200.8	604834	EPA 200.8	604896
60312388003	**S-TMW-3**	EPA 200.8	604834	EPA 200.8	604896
60312388004	**S-UG-3**	EPA 200.8	604834	EPA 200.8	604896
60312388005	**S-SCL4A-FB-1**	EPA 200.8	604834	EPA 200.8	604896
60312388006	**S-SCL4A-DUP-1**	EPA 200.8	604834	EPA 200.8	604896

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Sample Condition Upon Receipt

WO# : 60312388

60312388

Client Name: Golder Associates

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

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

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

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

Thermometer Used: 1295 **Type of Ice:** (Wet) Blue None

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

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

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	ON COC MS/MSD for S-TMW-3
Sample labels match COC: Date / time / ID / analyses	☑Yes ☑No ☐N/A	IS Labeled as S-SCL4A MS/MSD
Samples contain multiple phases? Matrix: Wt	☐Yes ☐No ☐N/A	but Sample ID & Time match S-TMW-3
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jasmi Chunk 8/21/19

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical

Page: of

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #20)

Section C Invoice Information:

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

REGULATORY AGENCY: NPDES / GROUND WATER / DRINKING WATER / UST / RCRA / OTHER ____

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N): Metals* N, Alkalinity N, Total Phosphorus N, Ferrous Iron N, Ferric Iron N

Pace Project No./ Lab I.D.: 60312388

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Fluoride/Chloride/Sulfate		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1 3	S-TMW-1	WT	G	8/4/14	1150				3	2		1						1	1				1	BP2U BP3U		BP3N 001
2 3	S-TMW-2	WT	G		1110																			↓ ↓		↓ 002
3 3	S-TMW-3	WT	G		1010																			3 BP2U, 3BP2U		3BP3U 3BP3N 003
4 1	S-UG-3	WT	G		1015																			BP2U BP3U		BP3N 004
5	S-SCL4A-DUP-1	WT	G		—																			BP2U BP3U		BP3N 006
6 1	S-SCL4A-FB-1	WT	G		1001																			BP2U BP3U		BP3N 005
7 3	S-SCL4A-MS ~~S-BMW-1S~~	WT	G		1010																					
8 3	S-SCL4A-MSD ~~S-BMW-3S~~	WT	G	↓	1010				↓	↓		↓						↓	↓				↓			
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: Ba, Li, Mo, fe, Mg, Mn, K, Na *EPA 200.8: As	Jeff Ingram / Golder	8/14/14	1345	[signature]	8-19-14	1350				
	[signature]	8-19-14	1315	[signature] / Pace	8/20/14	0245	1.2	Y	Y	Y
							0.2			
							4.1			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jeff Ingram

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

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

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

Section C — Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N		40310790
1	S-LMW-1S	WT	G	8/1/19	1500				5	2		3							1	1	1	1	1		BP3N 001
2	S-LMW-2S	WT	G																						
3	S-LMW-3S	WT	G																						
4	S-LMW-4S	WT	G																						
5	S-LWM-5S	WT	G																						
6	S-LWM-6S	WT	G																						
7	S-LMW-7S	WT	G																						
8	S-LMW-8S	WT	G																						
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G	8/1/19	1055				5	2		3							1	1	1	1	1		BP3N 002
11	S-BMW-3S	WT	G	↓	1145				5	2		3							1	1	1	1	1		003
12	S-LMW-DUP-1	WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/2/19	1635		8/3/19	0250	1.5 2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature]

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

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Sample Condition Upon Receipt

WO#: 60310790

60310790

Client Name: Golder Assoc.

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

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

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

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

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

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

Date and initials of person examining contents: 8.7.19 ML

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

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A — **Required** Client Information:

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

Section B — **Required** Project Information:

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

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D — **Required** Client Information

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

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

Requested Analysis Filtered (Y/N)

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Lucas Swindle/Golder	8/6/19	1700	[illegible] /Pace	8-7-19	0255	0.2
							0.6
							1.0
							0.3

SAMPLER NAME AND SIGNATURE			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Lucas Swindle					
SIGNATURE of SAMPLER:	[signature]	DATE Signed (MM/DD/YY): 8/6/19				

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:

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	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus									Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N									
1	S-LMW-DUP-2	WT	G			8/6/19	—		3	2		1							/	/	/	/	DP2U, DP3N,									DP3U 012
2	S-LMW-FB-1	WT	G			8/5/19	1408		3	2		1							/	/	/	/	↓									↓ 013
3	S-LMW-FB-2	WT	G			8/6/19	0812		3	2		1							/	/	/	/	↓									↓ 014
4		WT	G																												
5		WT	G																												
6		WT	G																												
7		WT	G																												
8		WT	G																												
9		WT	G																												
10		WT	G																												
11		WT	G																												
12		WT	G																												

Valid Matrix Codes

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/6/19	1700	Client/Gas	8.7.19	0255	0.0	Y	Y	Y
							0.6			
							1.0			
							0.3			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

Pace Analytical®
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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Page: of

2013245

Section A Required Client Information:

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

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: _____

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

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

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

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

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

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

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

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

MEMORANDUM

DATE October 17, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – DATA PACKAGE 60312388

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).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCL4A
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 10/17/2019

Laboratory: Pace Analytical - KS
SDG #: 60312388
Analytical Method (type and no.): EPA 200.7/200.8 (Metals);
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-TMW-1, S-TMW-2, S-TMW-3, S-UG-3, S-SCL4A-FB-1, S-SCL4A-DUP-1, S-BMW-1S, S-BMW-3S

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	x			8/1-8/4/2019
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			
f) Field QC noted?	x			
g) Field parameters collected (note types)?	x			pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	x			
i) Notations of unacceptable field conditions/performances from field logs or field notes?		x		
j) Does the laboratory narrative indicate deficiencies?			x	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	x			
b) Was the COC signed by both field and laboratory personnel?	x			
c) Were samples received in good condition?	x			

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	x			
b) Were hold times met for sample analysis?	x			
c) Were the correct preservatives used?	x			
d) Was the correct method used?	x			
e) Were appropriate reporting limits achieved?	x			
f) Were any sample dilutions noted?		x		
g) Were any matrix problems noted?		x		

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☐	☒	☐	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☒	☐	☐	DUP-1 @ S-TMW-2 FB-1 @ S-UG-3
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☒	

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☒	☐	☐	

Comments/Notes:

Max Field Duplicate RPD: 2.5% (Limit: 20%)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy J Ford Jr

Date: 10/17/2019

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 09, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on October 02, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

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

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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60316737001	**S-UMW-5D**	Water	10/01/19 11:32	10/02/19 03:05
60316737002	**S-UMW-6D**	Water	10/01/19 10:02	10/02/19 03:05
60316737003	**S-UMW-DUP-1**	Water	10/01/19 08:00	10/02/19 03:05
60316737004	**S-UMW-FB-1**	Water	10/01/19 11:37	10/02/19 03:05

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60316737001	**S-UMW-5D**	EPA 300.0	MGS	1	PASI-K
60316737002	**S-UMW-6D**	EPA 300.0	MGS	2	PASI-K
60316737003	**S-UMW-DUP-1**	EPA 300.0	MGS	2	PASI-K
60316737004	**S-UMW-FB-1**	EPA 300.0	MGS	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Sample: S-UMW-5D **Lab ID: 60316737001** Collected: 10/01/19 11:32 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**154**	mg/L	20.0	4.6	20		10/07/19 21:16	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Sample: S-UMW-6D **Lab ID: 60316737002** Collected: 10/01/19 10:02 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.0**	mg/L	1.0	0.22	1		10/04/19 19:27	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.085	1		10/04/19 19:27	16984-48-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Sample: S-UMW-DUP-1 **Lab ID: 60316737003** Collected: 10/01/19 08:00 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.0**	mg/L	1.0	0.22	1		10/04/19 20:00	16887-00-6	
Fluoride	**0.41**	mg/L	0.20	0.085	1		10/04/19 20:00	16984-48-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Sample: S-UMW-FB-1 **Lab ID: 60316737004** Collected: 10/01/19 11:37 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		10/04/19 20:32	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		10/04/19 20:32	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		10/04/19 20:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

QC Batch: 613636 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60316737002, 60316737003, 60316737004

METHOD BLANK: 2506081 Matrix: Water
Associated Lab Samples: 60316737002, 60316737003, 60316737004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/04/19 11:02	
Fluoride	mg/L	<0.085	0.20	0.085	10/04/19 11:02	
Sulfate	mg/L	<0.23	1.0	0.23	10/04/19 11:02	

LABORATORY CONTROL SAMPLE: 2506082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2506083 2506084

Parameter	Units	60316718001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	151	50	50	208	177	115	52	80-120	16	15	E,M1, R1
Fluoride	mg/L	ND	25	25	26.0	24.3	99	92	80-120	7	15	
Sulfate	mg/L	598	250	250	824	819	90	88	80-120	1	15	

MATRIX SPIKE SAMPLE: 2506085

Parameter	Units	60316773003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	131	25	158	108	80-120	E
Fluoride	mg/L	0.24	2.5	2.6	96	80-120	
Sulfate	mg/L	57.7	25	82.7	100	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

QC Batch: 613937 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60316737001

METHOD BLANK: 2507245 Matrix: Water
Associated Lab Samples: 60316737001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.23	1.0	0.23	10/07/19 16:39	

LABORATORY CONTROL SAMPLE: 2507246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2507247 2507248

Parameter	Units	60317056001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	33.5	25	25	58.6	58.8	100	101	80-120	0	15	

MATRIX SPIKE SAMPLE: 2507249

Parameter	Units	60316674006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	ND	2000	2030	98	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

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.
R1	RPD value was outside control limits.

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SPCA
Pace Project No.: 60316737

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60316737001	**S-UMW-5D**	EPA 300.0	613937		
60316737002	**S-UMW-6D**	EPA 300.0	613636		
60316737003	**S-UMW-DUP-1**	EPA 300.0	613636		
60316737004	**S-UMW-FB-1**	EPA 300.0	613636		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO#: 60316737

60316737

Client Name: Golder Associates

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☑ 2PIC

Thermometer Used: T301 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 1.4 Corr. Factor +0.0 Corrected 1.4

Date and initials of person examining contents: VB 10/4/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☐Yes ☐No ☑N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

10/3/19

Project Manager Review: Jami Church Date: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Drive, Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren SCPA
Project Number:	15314860l.0001A

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES — GROUND WATER — DRINKING WATER

UST — RCRA — OTHER _____

Site Location STATE: MO

Section D — Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
	WP
	AR
	OT
	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Boron	200.7 Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N	N		60316737
1	S-UMW-5D	WT	G			10/1/19	1132		1	1													/			001
2	S-UMW-6D	WT	G				1002		1	1												/	/			002
3	S-UMW-DUP-1	WT	G				—		1	1												/	/			003
4	S-UMW-FB-1	WT	G				1137		1	1												/	/	/		004
5		WT	G																							
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature]	10/1/19	1738	Natalie B — Pace	10/2/19	0805	1.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 10/1/19

MEMORANDUM

DATE November 5, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPA – ASSESSMENT MONITORING - DATA PACKAGE 60318736

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).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPA
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 11/5/2019

Laboratory: Pace Analytical - KS
SDG #: 60318736
Analytical Method (type and no.): EPA 200.7/200.8 (Metals); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-AM-1S, S-AM-1M

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	10/18/2019
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies: _____

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	See Notes
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☐	☐	☒	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☒	☐	
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☒	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☒	

Blind Standards	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was MS accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☐	☒	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☐	☐	☒	

Comments/Notes:

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy Goodlett Date: 11/5/2019

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

November 05, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on October 19, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Tommy Goodwin, Golder Associates
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

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 #: 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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60318736001	**S-AM-1S**	Water	10/18/19 09:58	10/19/19 03:50
60318736002	**S-AM-1M**	Water	10/18/19 10:41	10/19/19 03:50

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60318736001	**S-AM-1S**	EPA 200.7	EMR	5	PASI-K
		EPA 200.8	EMR	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS, MJK	3	PASI-K
60318736002	**S-AM-1M**	EPA 200.7	EMR	5	PASI-K
		EPA 200.8	EMR	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS, MJK	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Sample: S-AM-1S **Lab ID: 60318736001** Collected: 10/18/19 09:58 Received: 10/19/19 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**155**	ug/L	5.0	1.4	1	10/23/19 08:55	10/24/19 14:57	7440-39-3	
Boron	**9440**	ug/L	100	10.7	1	10/23/19 08:55	10/24/19 14:57	7440-42-8	
Calcium	**87100**	ug/L	200	50.0	1	10/23/19 08:55	10/24/19 14:57	7440-70-2	
Lithium	**28.8**	ug/L	10.0	5.9	1	10/23/19 08:55	10/24/19 14:57	7439-93-2	
Molybdenum	**292**	ug/L	20.0	2.6	1	10/23/19 08:55	10/24/19 14:57	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.7**	ug/L	1.0	0.065	1	10/23/19 15:03	10/29/19 16:59	7440-38-2	
Cadmium	**0.26J**	ug/L	0.50	0.033	1	10/23/19 15:03	10/29/19 16:59	7440-43-9	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**415**	mg/L	10.0	10.0	1		10/24/19 09:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.8**	mg/L	2.0	0.44	2		11/02/19 01:51	16887-00-6	
Fluoride	**0.70**	mg/L	0.20	0.085	1		11/02/19 01:35	16984-48-8	
Sulfate	**53.1**	mg/L	10.0	2.3	10		11/04/19 16:11	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Sample: S-AM-1M **Lab ID: 60318736002** Collected: 10/18/19 10:41 Received: 10/19/19 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**270**	ug/L	5.0	1.4	1	10/23/19 08:55	10/24/19 15:01	7440-39-3	
Boron	**12000**	ug/L	100	10.7	1	10/23/19 08:55	10/24/19 15:01	7440-42-8	
Calcium	**87700**	ug/L	200	50.0	1	10/23/19 08:55	10/24/19 15:01	7440-70-2	
Lithium	**35.4**	ug/L	10.0	5.9	1	10/23/19 08:55	10/24/19 15:01	7439-93-2	
Molybdenum	**497**	ug/L	20.0	2.6	1	10/23/19 08:55	10/24/19 15:01	7439-98-7	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.23J**	ug/L	1.0	0.065	1	10/23/19 15:03	10/29/19 17:01	7440-38-2	
Cadmium	**0.19J**	ug/L	0.50	0.033	1	10/23/19 15:03	10/29/19 17:01	7440-43-9	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**467**	mg/L	10.0	10.0	1		10/24/19 09:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.9**	mg/L	5.0	1.1	5		11/04/19 16:28	16887-00-6	
Fluoride	**0.64**	mg/L	0.20	0.085	1		11/02/19 02:08	16984-48-8	
Sulfate	**76.7**	mg/L	5.0	1.2	5		11/04/19 16:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

QC Batch: 617629 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60318736001, 60318736002

METHOD BLANK: 2520187 Matrix: Water
Associated Lab Samples: 60318736001, 60318736002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	10/24/19 14:50	
Boron	ug/L	<10.7	100	10.7	10/24/19 14:50	
Calcium	ug/L	<50.0	200	50.0	10/24/19 14:50	
Lithium	ug/L	<5.9	10.0	5.9	10/24/19 14:50	
Molybdenum	ug/L	<2.6	20.0	2.6	10/24/19 14:50	

LABORATORY CONTROL SAMPLE: 2520188

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	990	99	85-115	
Boron	ug/L	1000	962	96	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Lithium	ug/L	1000	979	98	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	

MATRIX SPIKE SAMPLE: 2520189

Parameter	Units	60318736001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	155	1000	1130	97	70-130	
Boron	ug/L	9440	1000	10200	81	70-130	
Calcium	ug/L	87100	10000	96300	92	70-130	
Lithium	ug/L	28.8	1000	994	97	70-130	
Molybdenum	ug/L	292	1000	1290	100	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2520190 2520191

Parameter	Units	60318735001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	14.2	1000	1000	998	996	98	98	70-130	0	20	
Boron	ug/L	5260	1000	1000	6480	6410	122	114	70-130	1	20	
Calcium	ug/L	7340	10000	10000	17700	17700	103	103	70-130	0	20	
Lithium	ug/L	12.3	1000	1000	989	985	98	97	70-130	0	20	
Molybdenum	ug/L	302	1000	1000	1320	1320	101	102	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

QC Batch: 617826 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60318736001, 60318736002

METHOD BLANK: 2520917 Matrix: Water
Associated Lab Samples: 60318736001, 60318736002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	10/29/19 16:55	
Cadmium	ug/L	<0.033	0.50	0.033	10/29/19 16:55	

LABORATORY CONTROL SAMPLE: 2520918

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	35.9	90	85-115	
Cadmium	ug/L	40	35.9	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2520919 2520920

Parameter	Units	60318737002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.3	40	40	40.3	40.5	95	96	70-130	1	20	
Cadmium	ug/L	0.13J	40	40	34.3	34.4	85	86	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

QC Batch: 617744 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60318736001, 60318736002

METHOD BLANK: 2520622 Matrix: Water
Associated Lab Samples: 60318736001, 60318736002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	10/24/19 09:35	

LABORATORY CONTROL SAMPLE: 2520623

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	977	98	80-120	

SAMPLE DUPLICATE: 2520624

Parameter	Units	60318634006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	640	636	1	10	

SAMPLE DUPLICATE: 2520625

Parameter	Units	60318741004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	625	618	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

QC Batch: 619851 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60318736001, 60318736002

METHOD BLANK: 2527981 Matrix: Water
Associated Lab Samples: 60318736001, 60318736002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/01/19 19:13	
Fluoride	mg/L	<0.085	0.20	0.085	11/01/19 19:13	
Sulfate	mg/L	<0.23	1.0	0.23	11/01/19 19:13	

METHOD BLANK: 2529413 Matrix: Water
Associated Lab Samples: 60318736001, 60318736002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/04/19 10:02	
Fluoride	mg/L	<0.085	0.20	0.085	11/04/19 10:02	
Sulfate	mg/L	<0.23	1.0	0.23	11/04/19 10:02	

LABORATORY CONTROL SAMPLE: 2527982

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	5.3	106	90-110	

LABORATORY CONTROL SAMPLE: 2529414

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2527983 2527984

Parameter	Units	60317963001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	104	50	50	156	156	103	103	80-120	0	15	
Fluoride	mg/L	0.53	2.5	2.5	0.53	0.54	0	0	80-120	1	15	M1
Sulfate	mg/L	650	500	500	1280	1270	127	124	80-120	1	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

MATRIX SPIKE SAMPLE: 2527985

Parameter	Units	60319009003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	201	250	446	98	80-120	
Fluoride	mg/L	ND	125	73.5	59	80-120	M1
Sulfate	mg/L	ND	250	284	110	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CENTER
Pace Project No.: 60318736

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60318736001	**S-AM-1S**	EPA 200.7	617629	EPA 200.7	617750
60318736002	**S-AM-1M**	EPA 200.7	617629	EPA 200.7	617750
60318736001	**S-AM-1S**	EPA 200.8	617826	EPA 200.8	617909
60318736002	**S-AM-1M**	EPA 200.8	617826	EPA 200.8	617909
60318736001	**S-AM-1S**	SM 2540C	617744		
60318736002	**S-AM-1M**	SM 2540C	617744		
60318736001	**S-AM-1S**	EPA 300.0	619851		
60318736002	**S-AM-1M**	EPA 300.0	619851		

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Sample Condition Upon Receipt

WO#: 60318736

60318736

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: T-796 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.1, 1.0 **Corr. Factor** 0.4 **Corrected** 2.5, 1.4

Date and initials of person examining contents: 10/19/19 AF

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: SO	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jami Church 10/21/19

Project Manager Review: _____ Date:

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Suite 26(	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	314-984-8800 Fax: 636-724-9323	Project Name:	Ameren Groundwater Sampling -Sec	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406	Pace Profile #:	9285

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes (MATRIX / CODE): DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																				N	N	N	N	
1	S-AM-15		WT	G			10/18/19	1558		2	1		1							1	1	1		607
2	S-AM-IM		WT	G			10/18/19	1041		2	1		1							1	1	1		608
3			WT	G																				
4			WT	G																				
5			WT	G																				
6			WT	G																				
7			WT	G																				
8			WT	G																				
9			WT	G																				
10			WT	G																				
11			WT	G																				
12			WT	G																				

Lab 378 732

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Ba, B, Ca, Li, Mo EPA 200.8: As, Cd	Katherine Bartels/Golder	10/18/19	1135	Angie [illegible]	10/18	1136				
				[signature]	10/19/19	0350	2.5 1.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Katherine Bartels

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 10/18/19

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007

MEMORANDUM

DATE November 5, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPA – ASSESSMENT MONITORING - DATA PACKAGE 60318736

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).

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QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPA
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 11/5/2019

Laboratory: Pace Analytical - KS
SDG #: 60318736
Analytical Method (type and no.): EPA 200.7/200.8 (Metals); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-AM-1S, S-AM-1M

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	10/18/2019
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies: _____

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	See Notes
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☐	☐	☒	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☒	☐	
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☒	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☒	

Blind Standards	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was MS accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☐	☒	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☐	☐	☒	

Comments/Notes:

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy Goodlett Date: 11/5/2019

Pace Analytical Services, LLC
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December 03, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on November 16, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Tommy Goodwin, Golder Associates
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

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CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212020-2
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-19-12
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60321515001	**S-UMW-1D**	Water	11/15/19 14:18	11/16/19 02:35
60321515002	**S-UMW-2D**	Water	11/15/19 13:15	11/16/19 02:35
60321515003	**S-UMW-3D**	Water	11/15/19 12:25	11/16/19 02:35
60321515004	**S-UMW-4D**	Water	11/15/19 11:45	11/16/19 02:35
60321515005	**S-UMW-5D**	Water	11/13/19 15:59	11/16/19 02:35
60321515006	**S-UMW-6D**	Water	11/13/19 16:28	11/16/19 02:35
60321515007	**S-AM-1S**	Water	11/13/19 10:09	11/16/19 02:35
60321515008	**S-AM-1D**	Water	11/13/19 10:46	11/16/19 02:35
60321515009	**S-BMW-1D**	Water	11/13/19 14:01	11/16/19 02:35
60321515010	**S-BMW-3D**	Water	11/13/19 13:08	11/16/19 02:35
60321515011	**S-UMW-DUP-1**	Water	11/15/19 13:08	11/16/19 02:35
60321515012	**S-UMW-FB-1**	Water	11/15/19 14:40	11/16/19 02:35

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60321515001	**S-UMW-1D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515002	**S-UMW-2D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515003	**S-UMW-3D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515004	**S-UMW-4D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515005	**S-UMW-5D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515006	**S-UMW-6D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515007	**S-AM-1S**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515008	**S-AM-1D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515009	**S-BMW-1D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515010	**S-BMW-3D**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515011	**S-UMW-DUP-1**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321515012	**S-UMW-FB-1**	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-1D **Lab ID: 60321515001** Collected: 11/15/19 14:18 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**121**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 15:49	7440-39-3	
Boron	**226**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 15:49	7440-42-8	
Calcium	**63000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 15:49	7440-70-2	
Iron	**1380**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 15:49	7439-89-6	
Lithium	**9.9J**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 15:49	7439-93-2	
Magnesium	**18000**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 15:49	7439-95-4	
Manganese	**126**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 15:49	7439-96-5	
Molybdenum	**21.2**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 15:49	7439-98-7	
Potassium	**4570**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 15:49	7440-09-7	
Sodium	**14700**	ug/L	500	144	1	11/26/19 09:41	11/27/19 15:49	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.8**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:25	7440-38-2	
Cadmium	**0.040J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:25	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**220**	mg/L	20.0	6.5	1		11/21/19 18:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**296**	mg/L	5.0	5.0	1		11/22/19 11:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15.9**	mg/L	1.0	0.22	1		11/28/19 00:17	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.085	1		11/28/19 00:17	16984-48-8	
Sulfate	**42.3**	mg/L	10.0	2.3	10		11/28/19 00:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-2D **Lab ID: 60321515002** Collected: 11/15/19 13:15 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**66.7**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 15:55	7440-39-3	
Boron	**13000**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 15:55	7440-42-8	
Calcium	**172000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 15:55	7440-70-2	
Iron	**329**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 15:55	7439-89-6	
Lithium	**18.8**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 15:55	7439-93-2	
Magnesium	**5360**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 15:55	7439-95-4	
Manganese	**165**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 15:55	7439-96-5	
Molybdenum	**943**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 15:55	7439-98-7	
Potassium	**22800**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 15:55	7440-09-7	
Sodium	**44300**	ug/L	500	144	1	11/26/19 09:41	11/27/19 15:55	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**3.4**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:26	7440-38-2	
Cadmium	**0.41J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:26	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**208**	mg/L	20.0	6.5	1		11/21/19 18:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**917**	mg/L	10.0	10.0	1		11/22/19 11:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.8**	mg/L	1.0	0.22	1		11/28/19 01:36	16887-00-6	
Fluoride	**0.49**	mg/L	0.20	0.085	1		11/28/19 01:36	16984-48-8	
Sulfate	**369**	mg/L	50.0	11.5	50		11/28/19 01:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-3D **Lab ID: 60321515003** Collected: 11/15/19 12:25 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**69.5**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:02	7440-39-3	
Boron	**30500**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:02	7440-42-8	
Calcium	**249000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:02	7440-70-2	
Iron	**1010**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:02	7439-89-6	
Lithium	**21.0**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:02	7439-93-2	
Magnesium	**10500**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:02	7439-95-4	
Manganese	**646**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:02	7439-96-5	
Molybdenum	**3630**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:02	7439-98-7	
Potassium	**17800**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:02	7440-09-7	
Sodium	**84200**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:02	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.43J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:30	7440-38-2	
Cadmium	**1.5**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:30	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**116**	mg/L	20.0	6.5	1		11/21/19 19:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1270**	mg/L	13.3	13.3	1		11/22/19 11:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.7**	mg/L	1.0	0.22	1		11/28/19 01:52	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	0.085	1		11/28/19 01:52	16984-48-8	
Sulfate	**755**	mg/L	100	23.0	100		11/28/19 02:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-4D **Lab ID: 60321515004** Collected: 11/15/19 11:45 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**74.3**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:04	7440-39-3	
Boron	**28600**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:04	7440-42-8	
Calcium	**203000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:04	7440-70-2	
Iron	**7760**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:04	7439-89-6	
Lithium	**34.9**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:04	7439-93-2	
Magnesium	**26100**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:04	7439-95-4	
Manganese	**1610**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:04	7439-96-5	
Molybdenum	**7660**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:04	7439-98-7	
Potassium	**15800**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:04	7440-09-7	
Sodium	**72700**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:04	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.41J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:32	7440-38-2	
Cadmium	**3.1**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:32	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**200**	mg/L	20.0	6.5	1		11/21/19 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1130**	mg/L	13.3	13.3	1		11/22/19 11:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.9**	mg/L	2.0	0.44	2		11/28/19 03:27	16887-00-6	
Fluoride	**0.79**	mg/L	0.20	0.085	1		11/28/19 12:34	16984-48-8	
Sulfate	**592**	mg/L	50.0	11.5	50		11/28/19 02:40	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-5D **Lab ID: 60321515005** Collected: 11/13/19 15:59 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**370**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:06	7440-39-3	
Boron	**19000**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:06	7440-42-8	
Calcium	**108000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:06	7440-70-2	
Iron	**3760**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:06	7439-89-6	
Lithium	**28.5**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:06	7439-93-2	
Magnesium	**20700**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:06	7439-95-4	
Manganese	**333**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:06	7439-96-5	
Molybdenum	**2230**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:06	7439-98-7	
Potassium	**11100**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:06	7440-09-7	
Sodium	**36300**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:06	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.50J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:33	7440-38-2	
Cadmium	**0.89**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:33	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**253**	mg/L	20.0	6.5	1		11/21/19 19:22		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**617**	mg/L	10.0	10.0	1		11/20/19 13:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.3**	mg/L	5.0	1.1	5		11/28/19 13:05	16887-00-6	
Fluoride	**0.81**	mg/L	0.20	0.085	1		11/28/19 12:49	16984-48-8	
Sulfate	**143**	mg/L	20.0	4.6	20		11/30/19 00:35	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-6D **Lab ID: 60321515006** Collected: 11/13/19 16:28 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**126**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:13	7440-39-3	
Boron	**1370**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:13	7440-42-8	
Calcium	**82400**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:13	7440-70-2	
Iron	**5360**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:13	7439-89-6	
Lithium	**9.7J**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:13	7439-93-2	
Magnesium	**19700**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:13	7439-95-4	
Manganese	**543**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:13	7439-96-5	
Molybdenum	**102**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:13	7439-98-7	
Potassium	**4620**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:13	7440-09-7	
Sodium	**15000**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:13	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.30J**	ug/L	1.0	0.065	1	11/20/19 17:05	11/21/19 10:29	7440-38-2	
Cadmium	**0.046J**	ug/L	0.50	0.033	1	11/20/19 17:05	11/21/19 10:29	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**287**	mg/L	20.0	6.5	1		11/21/19 19:27		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**372**	mg/L	5.0	5.0	1		11/20/19 13:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.5**	mg/L	1.0	0.22	1		11/27/19 11:48	16887-00-6	
Fluoride	**0.45**	mg/L	0.20	0.085	1		11/27/19 11:48	16984-48-8	
Sulfate	**71.8**	mg/L	5.0	1.2	5		11/27/19 12:37	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-AM-1S **Lab ID: 60321515007** Collected: 11/13/19 10:09 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**145**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:09	7440-39-3	
Boron	**10500**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:09	7440-42-8	
Calcium	**84200**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:09	7440-70-2	
Iron	**2840**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:09	7439-89-6	
Lithium	**25.4**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:09	7439-93-2	
Magnesium	**17800**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:09	7439-95-4	
Manganese	**567**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:09	7439-96-5	
Molybdenum	**319**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:09	7439-98-7	
Potassium	**8590**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:09	7440-09-7	
Sodium	**22700**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:09	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.2**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:34	7440-38-2	
Cadmium	**0.17J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:34	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**272**	mg/L	20.0	6.5	1		11/21/19 19:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**423**	mg/L	5.0	5.0	1		11/20/19 13:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.3**	mg/L	5.0	1.1	5		11/27/19 13:41	16887-00-6	
Fluoride	**0.63**	mg/L	0.20	0.085	1		11/27/19 13:25	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		11/27/19 13:25	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-AM-1D **Lab ID: 60321515008** Collected: 11/13/19 10:46 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**258**	ug/L	5.0	1.4	1	11/26/19 09:41	11/27/19 16:11	7440-39-3	
Boron	**11300**	ug/L	100	10.7	1	11/26/19 09:41	11/27/19 16:11	7440-42-8	
Calcium	**83000**	ug/L	200	50.0	1	11/26/19 09:41	11/27/19 16:11	7440-70-2	
Iron	**3220**	ug/L	50.0	14.0	1	11/26/19 09:41	11/27/19 16:11	7439-89-6	
Lithium	**29.2**	ug/L	10.0	5.9	1	11/26/19 09:41	11/27/19 16:11	7439-93-2	
Magnesium	**17500**	ug/L	50.0	13.0	1	11/26/19 09:41	11/27/19 16:11	7439-95-4	
Manganese	**378**	ug/L	5.0	2.1	1	11/26/19 09:41	11/27/19 16:11	7439-96-5	
Molybdenum	**501**	ug/L	20.0	2.6	1	11/26/19 09:41	11/27/19 16:11	7439-98-7	
Potassium	**7780**	ug/L	500	79.0	1	11/26/19 09:41	11/27/19 16:11	7440-09-7	
Sodium	**23300**	ug/L	500	144	1	11/26/19 09:41	11/27/19 16:11	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.24J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:39	7440-38-2	
Cadmium	**0.22J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:39	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**242**	mg/L	20.0	6.5	1		11/22/19 11:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**441**	mg/L	5.0	5.0	1		11/20/19 13:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.6**	mg/L	10.0	2.2	10		11/27/19 14:45	16887-00-6	
Fluoride	**0.57**	mg/L	0.20	0.085	1		11/27/19 13:57	16984-48-8	
Sulfate	**72.3**	mg/L	10.0	2.3	10		11/27/19 14:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-BMW-1D **Lab ID: 60321515009** Collected: 11/13/19 14:01 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**320**	ug/L	5.0	1.4	1	11/26/19 08:04	11/26/19 17:07	7440-39-3	
Boron	**173**	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:07	7440-42-8	
Calcium	**118000**	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:07	7440-70-2	
Iron	**8520**	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:07	7439-89-6	
Lithium	**8.5J**	ug/L	10.0	5.9	1	11/26/19 08:04	11/26/19 17:07	7439-93-2	
Magnesium	**27500**	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:07	7439-95-4	
Manganese	**1040**	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:07	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	11/26/19 08:04	11/26/19 17:07	7439-98-7	
Potassium	**2400**	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:07	7440-09-7	
Sodium	**6370**	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:07	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.27J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:41	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:41	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**407**	mg/L	20.0	6.5	1		11/22/19 11:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**494**	mg/L	10.0	10.0	1		11/20/19 13:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.8**	mg/L	1.0	0.22	1		11/27/19 15:01	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.085	1		11/27/19 15:01	16984-48-8	
Sulfate	**39.6**	mg/L	5.0	1.2	5		11/27/19 15:17	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-BMW-3D **Lab ID: 60321515010** Collected: 11/13/19 13:08 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**173**	ug/L	5.0	1.4	1	11/26/19 08:04	11/26/19 17:09	7440-39-3	
Boron	**73.6J**	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:09	7440-42-8	
Calcium	**116000**	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:09	7440-70-2	
Iron	**34.3J**	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:09	7439-89-6	
Lithium	**<5.9**	ug/L	10.0	5.9	1	11/26/19 08:04	11/26/19 17:09	7439-93-2	
Magnesium	**22700**	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:09	7439-95-4	
Manganese	**340**	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:09	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	11/26/19 08:04	11/26/19 17:09	7439-98-7	
Potassium	**593**	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:09	7440-09-7	
Sodium	**5190**	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:09	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.48J**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:42	7440-38-2	
Cadmium	**0.047J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:42	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**382**	mg/L	20.0	6.5	1		11/22/19 11:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**512**	mg/L	10.0	10.0	1		11/20/19 13:17		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.1**	mg/L	1.0	0.22	1		11/27/19 15:33	16887-00-6	
Fluoride	**0.39**	mg/L	0.20	0.085	1		11/27/19 15:33	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		11/27/19 15:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-DUP-1 **Lab ID: 60321515011** Collected: 11/15/19 13:08 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**71.9**	ug/L	5.0	1.4	1	11/26/19 08:04	11/26/19 17:11	7440-39-3	
Boron	**13600**	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:11	7440-42-8	
Calcium	**168000**	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:11	7440-70-2	
Iron	**311**	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:11	7439-89-6	
Lithium	**18.6**	ug/L	10.0	5.9	1	11/26/19 08:04	11/26/19 17:11	7439-93-2	
Magnesium	**5440**	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:11	7439-95-4	
Manganese	**172**	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:11	7439-96-5	
Molybdenum	**950**	ug/L	20.0	2.6	1	11/26/19 08:04	11/26/19 17:11	7439-98-7	
Potassium	**23300**	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:11	7440-09-7	
Sodium	**45700**	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:11	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**3.5**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:45	7440-38-2	
Cadmium	**0.41J**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:45	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**198**	mg/L	20.0	6.5	1		11/22/19 12:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**837**	mg/L	10.0	10.0	1		11/22/19 11:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.6**	mg/L	1.0	0.22	1		11/27/19 16:21	16887-00-6	
Fluoride	**0.50**	mg/L	0.20	0.085	1		11/27/19 16:21	16984-48-8	
Sulfate	**353**	mg/L	50.0	11.5	50		11/27/19 16:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Sample: S-UMW-FB-1 **Lab ID: 60321515012** Collected: 11/15/19 14:40 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<1.4**	ug/L	5.0	1.4	1	11/26/19 08:04	11/26/19 17:13	7440-39-3	
Boron	**28.9J**	ug/L	100	10.7	1	11/26/19 08:04	11/26/19 17:13	7440-42-8	
Calcium	**<50.0**	ug/L	200	50.0	1	11/26/19 08:04	11/26/19 17:13	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	11/26/19 08:04	11/26/19 17:13	7439-89-6	
Lithium	**<5.9**	ug/L	10.0	5.9	1	11/26/19 08:04	11/26/19 17:13	7439-93-2	
Magnesium	**<13.0**	ug/L	50.0	13.0	1	11/26/19 08:04	11/26/19 17:13	7439-95-4	
Manganese	**<2.1**	ug/L	5.0	2.1	1	11/26/19 08:04	11/26/19 17:13	7439-96-5	
Molybdenum	**<2.6**	ug/L	20.0	2.6	1	11/26/19 08:04	11/26/19 17:13	7439-98-7	
Potassium	**<79.0**	ug/L	500	79.0	1	11/26/19 08:04	11/26/19 17:13	7440-09-7	
Sodium	**<144**	ug/L	500	144	1	11/26/19 08:04	11/26/19 17:13	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/27/19 09:00	12/02/19 13:38	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/27/19 09:00	12/02/19 13:38	7440-43-9	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		11/22/19 12:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/22/19 11:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		11/27/19 16:38	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		11/27/19 16:38	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		11/27/19 16:38	14808-79-8	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624737 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515006, 60321515007, 60321515008

METHOD BLANK: 2547243 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515006, 60321515007, 60321515008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	11/27/19 15:47	
Boron	ug/L	<10.7	100	10.7	11/27/19 15:47	
Calcium	ug/L	<50.0	200	50.0	11/27/19 15:47	
Iron	ug/L	<14.0	50.0	14.0	11/27/19 15:47	
Lithium	ug/L	<5.9	10.0	5.9	11/27/19 15:47	
Magnesium	ug/L	<13.0	50.0	13.0	11/27/19 15:47	
Manganese	ug/L	<2.1	5.0	2.1	11/27/19 15:47	
Molybdenum	ug/L	<2.6	20.0	2.6	11/27/19 15:47	
Potassium	ug/L	<79.0	500	79.0	11/27/19 15:47	
Sodium	ug/L	<144	500	144	11/27/19 15:47	

LABORATORY CONTROL SAMPLE: 2547244

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Boron	ug/L	1000	1030	103	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10100	101	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Magnesium	ug/L	10000	10100	101	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Molybdenum	ug/L	1000	1050	105	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10200	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547245 2547246

Parameter	Units	60321515001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	121	1000	1000	1120	1120	100	100	70-130	0	20	
Boron	ug/L	226	1000	1000	1240	1240	101	102	70-130	1	20	
Calcium	ug/L	63000	10000	10000	73100	72300	101	93	70-130	1	20	
Iron	ug/L	1380	10000	10000	11300	11200	99	99	70-130	0	20	
Lithium	ug/L	9.9J	1000	1000	1010	1000	100	99	70-130	1	20	
Magnesium	ug/L	18000	10000	10000	27800	27800	99	98	70-130	0	20	
Manganese	ug/L	126	1000	1000	1120	1120	99	99	70-130	0	20	
Molybdenum	ug/L	21.2	1000	1000	1060	1060	103	104	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547245 2547246

Parameter	Units	60321515001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Potassium	ug/L	4570	10000	10000	14600	14500	100	99	70-130	1	20	
Sodium	ug/L	14700	10000	10000	24600	24400	99	98	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624739 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60321515009, 60321515010, 60321515011, 60321515012

METHOD BLANK: 2547247 Matrix: Water
Associated Lab Samples: 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	11/26/19 17:04	
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	
Lithium	ug/L	<5.9	10.0	5.9	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	
Molybdenum	ug/L	<2.6	20.0	2.6	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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1000	100	85-115	
Boron	ug/L	1000	1000	100	85-115	
Calcium	ug/L	10000	9260	93	85-115	
Iron	ug/L	10000	9110	91	85-115	
Lithium	ug/L	1000	976	98	85-115	
Magnesium	ug/L	10000	9750	97	85-115	
Manganese	ug/L	1000	985	98	85-115	
Molybdenum	ug/L	1000	982	98	85-115	
Potassium	ug/L	10000	9850	98	85-115	
Sodium	ug/L	10000	9920	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547249 2547250

Parameter	Units	60321516004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	248	1000	1000	1260	1280	102	103	70-130	1	20	
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	
Lithium	ug/L	30.0	1000	1000	1020	1020	99	99	70-130	1	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	
Molybdenum	ug/L	<2.6	1000	1000	989	1000	99	100	70-130	1	20	
Potassium	ug/L	5790	10000	10000	16100	16100	103	103	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547249 2547250

Parameter	Units	60321516004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sodium	ug/L	26100	10000	10000	37400	38100	113	120	70-130	2	20	

MATRIX SPIKE SAMPLE: 2547251

Parameter	Units	60321516006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	<1.4	1000	1020	102	70-130	
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	
Lithium	ug/L	<5.9	1000	1000	100	70-130	
Magnesium	ug/L	<13.0	10000	9910	99	70-130	
Manganese	ug/L	<2.1	1000	1010	101	70-130	
Molybdenum	ug/L	<2.6	1000	1010	101	70-130	
Potassium	ug/L	<79.0	10000	9980	100	70-130	
Sodium	ug/L	<144	10000	10100	100	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 623695 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60321515006

METHOD BLANK: 2543137 Matrix: Water
Associated Lab Samples: 60321515006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	11/21/19 10:16	
Cadmium	ug/L	<0.033	0.50	0.033	11/21/19 10:16	

LABORATORY CONTROL SAMPLE: 2543138

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	40.3	101	85-115	
Cadmium	ug/L	40	40.2	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2543139 2543140

Parameter	Units	60321515006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.30J	40	40	40.2	39.2	100	97	70-130	3	20	
Cadmium	ug/L	0.046J	40	40	38.1	36.9	95	92	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624621 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

METHOD BLANK: 2547009 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.065	1.0	0.065	12/02/19 13:23	
Cadmium	ug/L	<0.033	0.50	0.033	12/02/19 13:23	

LABORATORY CONTROL SAMPLE: 2547010

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	38.9	97	85-115	
Cadmium	ug/L	40	39.8	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547011 2547012

Parameter	Units	60321515002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	3.4	40	40	44.4	43.8	103	101	70-130	1	20	
Cadmium	ug/L	0.41J	40	40	38.9	38.4	96	95	70-130	1	20	

MATRIX SPIKE SAMPLE: 2547013

Parameter	Units	60321515010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	0.48J	40	40.0	99	70-130	
Cadmium	ug/L	0.047J	40	38.6	96	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624004 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515006, 60321515007

METHOD BLANK: 2544468 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005, 60321515006, 60321515007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	11/21/19 16:57	

LABORATORY CONTROL SAMPLE: 2544469

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	520	104	90-110	

SAMPLE DUPLICATE: 2544470

Parameter	Units	60321205004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	621	734	17	10	D6

SAMPLE DUPLICATE: 2544472

Parameter	Units	60321515006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	287	262	9	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624006 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

METHOD BLANK: 2544475 Matrix: Water
Associated Lab Samples: 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	11/22/19 09:07	

LABORATORY CONTROL SAMPLE: 2544476

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	514	103	90-110	

SAMPLE DUPLICATE: 2544477

Parameter	Units	60321162001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	145	149	3	10	

SAMPLE DUPLICATE: 2544478

Parameter	Units	60321303004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	365	387	6	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 623638 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60321515005, 60321515006, 60321515007, 60321515008, 60321515009, 60321515010

METHOD BLANK: 2542984 Matrix: Water
Associated Lab Samples: 60321515005, 60321515006, 60321515007, 60321515008, 60321515009, 60321515010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/19 13:14	

LABORATORY CONTROL SAMPLE: 2542985

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1000	100	80-120	

SAMPLE DUPLICATE: 2542986

Parameter	Units	60321515006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	372	372	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 624082 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515011, 60321515012

METHOD BLANK: 2544816 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/22/19 11:13	

LABORATORY CONTROL SAMPLE: 2544817

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	964	96	80-120	

SAMPLE DUPLICATE: 2544818

Parameter	Units	60321513012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	779	854	9	10	

SAMPLE DUPLICATE: 2544819

Parameter	Units	60321518006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	628	643	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 625047 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005

METHOD BLANK: 2548479 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/27/19 10:18	
Fluoride	mg/L	<0.085	0.20	0.085	11/27/19 10:18	
Sulfate	mg/L	<0.23	1.0	0.23	11/27/19 10:18	

METHOD BLANK: 2550027 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/29/19 20:37	
Fluoride	mg/L	<0.085	0.20	0.085	11/29/19 20:37	
Sulfate	mg/L	<0.23	1.0	0.23	11/29/19 20:37	

METHOD BLANK: 2550207 Matrix: Water
Associated Lab Samples: 60321515001, 60321515002, 60321515003, 60321515004, 60321515005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/02/19 09:31	
Fluoride	mg/L	<0.085	0.20	0.085	12/02/19 09:31	
Sulfate	mg/L	<0.23	1.0	0.23	12/02/19 09:31	

LABORATORY CONTROL SAMPLE: 2548480

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.5	90	90-110	

LABORATORY CONTROL SAMPLE: 2550028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

LABORATORY CONTROL SAMPLE: 2550208

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548481 2548482

Parameter	Units	60321513002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	102	100	100	218	210	116	108	80-120	4	15	
Fluoride	mg/L	0.31	2.5	2.5	3.1	3.1	110	112	80-120	1	15	
Sulfate	mg/L	317	250	250	568	565	100	99	80-120	0	15	

MATRIX SPIKE SAMPLE: 2548483

Parameter	Units	60321513010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	6.4	5	11.6	103	80-120	
Fluoride	mg/L	0.28	2.5	3.0	110	80-120	
Sulfate	mg/L	26.5	10	37.2	107	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

QC Batch: 625048 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60321515006, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

METHOD BLANK: 2548493 Matrix: Water
Associated Lab Samples: 60321515006, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/27/19 10:45	
Fluoride	mg/L	<0.085	0.20	0.085	11/27/19 10:45	
Sulfate	mg/L	<0.23	1.0	0.23	11/27/19 10:45	

METHOD BLANK: 2550023 Matrix: Water
Associated Lab Samples: 60321515006, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/02/19 09:31	
Fluoride	mg/L	<0.085	0.20	0.085	12/02/19 09:31	
Sulfate	mg/L	<0.23	1.0	0.23	12/02/19 09:31	

METHOD BLANK: 2551117 Matrix: Water
Associated Lab Samples: 60321515006, 60321515007, 60321515008, 60321515009, 60321515010, 60321515011, 60321515012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/03/19 09:27	
Fluoride	mg/L	<0.085	0.20	0.085	12/03/19 09:27	
Sulfate	mg/L	<0.23	1.0	0.23	12/03/19 09:27	

LABORATORY CONTROL SAMPLE: 2548494

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.7	108	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

LABORATORY CONTROL SAMPLE: 2550024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

LABORATORY CONTROL SAMPLE: 2551118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	101	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548495 2548496

Parameter	Units	60321515006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	5	5	17.9	17.8	108	107	80-120	0	15	
Fluoride	mg/L	0.45	2.5	2.5	3.1	3.1	105	104	80-120	0	15	
Sulfate	mg/L	71.8	25	25	102	102	123	119	80-120	1	15	E,M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548497 2548498

Parameter	Units	60321516004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	83.5	25	25	113	112	117	116	80-120	0	15	E
Fluoride	mg/L	0.33	2.5	2.5	3.0	2.9	105	104	80-120	1	15	
Sulfate	mg/L	185	100	100	229	251	44	65	80-120	9	15	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

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

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
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Lenexa, KS 66219
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60321515001	S-UMW-1D	EPA 200.7	624737	EPA 200.7	624855
60321515002	S-UMW-2D	EPA 200.7	624737	EPA 200.7	624855
60321515003	S-UMW-3D	EPA 200.7	624737	EPA 200.7	624855
60321515004	S-UMW-4D	EPA 200.7	624737	EPA 200.7	624855
60321515005	S-UMW-5D	EPA 200.7	624737	EPA 200.7	624855
60321515006	S-UMW-6D	EPA 200.7	624737	EPA 200.7	624855
60321515007	S-AM-1S	EPA 200.7	624737	EPA 200.7	624855
60321515008	S-AM-1D	EPA 200.7	624737	EPA 200.7	624855
60321515009	S-BMW-1D	EPA 200.7	624739	EPA 200.7	624870
60321515010	S-BMW-3D	EPA 200.7	624739	EPA 200.7	624870
60321515011	S-UMW-DUP-1	EPA 200.7	624739	EPA 200.7	624870
60321515012	S-UMW-FB-1	EPA 200.7	624739	EPA 200.7	624870
60321515001	S-UMW-1D	EPA 200.8	624621	EPA 200.8	625180
60321515002	S-UMW-2D	EPA 200.8	624621	EPA 200.8	625180
60321515003	S-UMW-3D	EPA 200.8	624621	EPA 200.8	625180
60321515004	S-UMW-4D	EPA 200.8	624621	EPA 200.8	625180
60321515005	S-UMW-5D	EPA 200.8	624621	EPA 200.8	625180
60321515006	S-UMW-6D	EPA 200.8	623695	EPA 200.8	623766
60321515007	S-AM-1S	EPA 200.8	624621	EPA 200.8	625180
60321515008	S-AM-1D	EPA 200.8	624621	EPA 200.8	625180
60321515009	S-BMW-1D	EPA 200.8	624621	EPA 200.8	625180
60321515010	S-BMW-3D	EPA 200.8	624621	EPA 200.8	625180
60321515011	S-UMW-DUP-1	EPA 200.8	624621	EPA 200.8	625180
60321515012	S-UMW-FB-1	EPA 200.8	624621	EPA 200.8	625180
60321515001	S-UMW-1D	SM 2320B	624004		
60321515002	S-UMW-2D	SM 2320B	624004		
60321515003	S-UMW-3D	SM 2320B	624004		
60321515004	S-UMW-4D	SM 2320B	624004		
60321515005	S-UMW-5D	SM 2320B	624004		
60321515006	S-UMW-6D	SM 2320B	624004		
60321515007	S-AM-1S	SM 2320B	624004		
60321515008	S-AM-1D	SM 2320B	624006		
60321515009	S-BMW-1D	SM 2320B	624006		
60321515010	S-BMW-3D	SM 2320B	624006		
60321515011	S-UMW-DUP-1	SM 2320B	624006		
60321515012	S-UMW-FB-1	SM 2320B	624006		
60321515001	S-UMW-1D	SM 2540C	624082		
60321515002	S-UMW-2D	SM 2540C	624082		
60321515003	S-UMW-3D	SM 2540C	624082		
60321515004	S-UMW-4D	SM 2540C	624082		
60321515005	S-UMW-5D	SM 2540C	623638		
60321515006	S-UMW-6D	SM 2540C	623638		
60321515007	S-AM-1S	SM 2540C	623638		
60321515008	S-AM-1D	SM 2540C	623638		
60321515009	S-BMW-1D	SM 2540C	623638		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCPA
Pace Project No.: 60321515

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60321515010	**S-BMW-3D**	SM 2540C	623638		
60321515011	**S-UMW-DUP-1**	SM 2540C	624082		
60321515012	**S-UMW-FB-1**	SM 2540C	624082		
60321515001	**S-UMW-1D**	EPA 300.0	625047		
60321515002	**S-UMW-2D**	EPA 300.0	625047		
60321515003	**S-UMW-3D**	EPA 300.0	625047		
60321515004	**S-UMW-4D**	EPA 300.0	625047		
60321515005	**S-UMW-5D**	EPA 300.0	625047		
60321515006	**S-UMW-6D**	EPA 300.0	625048		
60321515007	**S-AM-1S**	EPA 300.0	625048		
60321515008	**S-AM-1D**	EPA 300.0	625048		
60321515009	**S-BMW-1D**	EPA 300.0	625048		
60321515010	**S-BMW-3D**	EPA 300.0	625048		
60321515011	**S-UMW-DUP-1**	EPA 300.0	625048		
60321515012	**S-UMW-FB-1**	EPA 300.0	625048		

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60321515

60321515

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: T-299 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.6, 2.3 **Corr. Factor** 0.2 **Corrected** 2.8, 2.5

Date and initials of person examining contents: 11/14/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: LT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

_____ 11/19/19 _____

_____ _____ _____

Project Manager Review: Jami Church Date: _____

F-KS-C-003-Rev.11, February 28, 2018

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Jeffrey Ingram	Attention:	
Address:	13515 Barrett Parkway Dr., Ste 260	Copy To:		Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	jeffrey_ingram@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191	Fax: 636-724-9323	Project Name:	Ameren Sioux Energy Center SCPA	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:		Pace Profile #:	9285

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MO

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
	WP
	AR
	OT
	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		40321515 40321515
1	S-UMW-1D	WT	G			11/15/19	1418		2	1		1							X	X	X	X		001
2	S-UMW-2D	WT	G			"	1315																	002
3	S-UMW-3D	WT	G			"	1225																	003
4	S-UMW-4D	WT	G			"	1145																	004
5	S-UMW-5D	WT	G			11/13/19	1559																	005
6	S-UMW-6D	WT	G			"	1628																	006
7	S-AM-1S	WT	G			11/13/19	1004																	007
8	S-AM-1D	WT	G			"	1046																	008
9	S-BMW-1D	WT	G			"	1401																	009
10	S-BMW-3D	WT	G			"	1308																	010
11	S-UMW-DUP-1	WT	G			11/15/19	—																	011
12	S-UMW-FB-1	WT	G			11/15/19	1440																	012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na, Ba, Li, Mo	Eric Schneider/Golder	11/15/19	1540	Angela McManus	11/15	1545				
**EPA 200.8: As, Cd	Angela McManus	11/15	1545		11/16/19	0235	2.5	Y	Y	Y
							2.5			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/15/19

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Dr., Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center SCPA
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: MO

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
	WP
	AR
	OT
	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		
1	~~S-UMW-1D~~ S-UMW-6D-MS	WT	G			11/13/19	1638		2	1		1							X	X	X	X		213
2	~~S-UMW-2D~~ S-UMW-6D-MSD	WT	G			"	-		"	"		"							"	"	"	"		
3	S-UMW-3D	WT	G																						
4	S-UMW-4D	WT	G																						
5	S-UMW-5D	WT	G																						
6	S-UMW-6D	WT	G		(FE)																				
7	S-AM-1S	WT	G																						
8	S-AM-1D	WT	G																						
9	S-BMW-1D	WT	G																						
10	S-BMW-3D (FE)	WT	G																						
11	S-UMW-DUP-1	WT	G																						
12	S-UMW-FB-1	WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na, Ba, Li, Mo	[signature] / Golder	11/13/19		Angela Newlin	11/15	15:45	
**EPA 200.8: As, Cd	Angela Newlin	11/15/19	15:45	[signature]	11/15/19	1535	2.8 / 2.5 / Y / Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/15/19

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

MEMORANDUM

DATE January 9, 2020 **Project No.** 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPA - DATA PACKAGE 60321515

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When MS/MSD recovery exceeded the QC limits, the associated sample result was qualified as an estimate (J).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPA
Project Number: 153140601
Reviewer: T Goodwin
Validation Date: 1/8/2020

Laboratory: Pace Analytical - KS
SDG #: 60321515
Analytical Method (type and no.): EPA 200.7/200.8 (Metals); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-UMW-1D, S-UMW-2D, S-UMW-3D, S-UMW-4D, S-UMW-5D, S-UMW-6D, S-AM-1S, S-AM-1D, S-BMW-1D, S-BMW-3D, S-UMW-DUP-1, S-UMW-FB-1

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/13-15/2019
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	See Notes
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☒	☐	☐	See Notes
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ S-UMW-2D
	☒	☐	☐	FB-1 @ S-UMW-1D
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	-006 (Alk, TDS)
d) Were lab dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	☐	☒	☐	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☒	☐	☐	

Comments/Notes:

FB-1: B (28.9)

MS: -15006: SO4 (MS-H_123%)

Max Field Duplicate RPD: 9% (Limit: 20%)

Max Lab Duplicate RPD: 9% (Limit: 10%)

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-UMW-6D	Sulfate (SO4)	71.8	J	MS Exceeded QC Range

Signature: Tommy J Gooch Jr Date: 1/8/2020

APPENDIX D

November 2018 Assessment Monitoring Statistical Evaluation

TECHNICAL MEMORANDUM

DATE February 28, 2019 **Project No.** 153-1406

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Paul Pike, Charlie Henderson

FROM Mark Haddock - Golder Associates **EMAIL mhaddock@golder.com**

ASSESSMENT MONITORING STATISTICAL EVALUATION FOR THE SCPA SURFACE IMPOUNDMENT, SIOUX ENERGY CENTER, ST CHARLES COUNTY MISSOURI

This Technical Memorandum provides the results of the Assessment Monitoring Statistical Evaluation for the SCPA Surface Impoundment November 2018 sampling event at the Sioux Energy Center located in St. Charles County Missouri. Included in this memorandum is a brief summary of constituents that are present at a Statistically Significant Level (SSL), a list of site-specific Groundwater Protection Standards (**Table 1**), and the Sanitas Technologies™ (Sanitas) statistical software output for each of the Appendix IV parameters (**Appendix A** and **Appendix B**).

SSLs were calculated using the methods and procedures outlined in the Groundwater Monitoring Plan's (GMP) Statistical Analysis Plan (SAP). The following outlier was removed prior to the calculation of confidence limits:

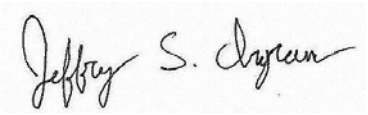
- Fluoride – UMW-6D on 4/6/18: result is statistically lower than other values at the same well

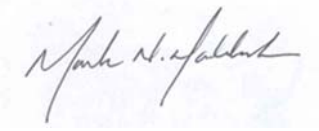
No new SSLs were identified in the November 2018 sampling event. A summary of the continuing SSLs at corresponding wells is as follows:

- Molybdenum at UMW-2D, UMW-3D, UMW-4D, and UMW-5D

Golder appreciates this opportunity to provide hydrogeological and engineering support services to Ameren. If you have any questions or comments regarding the information provided, please call our office at (314) 984-8800.

Sincerely,





Jeffrey Ingram, R.G.
Project Geologist

Mark Haddock, P.E., R.G.
Principal, Practice Leader

JSI/SCP/MNH

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021 T: +1 314 984-8800 F: +1 314 984-8770

Enclosures:

Table 1 – SCPA Groundwater Protection Standards

Appendix A – Sanitas Confidence Interval Statistical Output

Appendix B – Sanitas Trending Confidence Bands Statistical Output

Table 1

SCPA Groundwater Protection Standards

SCPA Surface Impoundment

Sioux Energy Center, St. Charles County, MO

Parameter	Units	MCL or Health Based GWPS	Site GWPS	Value to Return to Detection Monitoring[7]
Antimony	µg/L	6	6	DQR
Arsenic	µg/L	10	10	1.5
Barium	µg/L	2000	2000	699
Beryllium	µg/L	4	4	DQR
Cadmium	µg/L	5	5	DQR
Chromium	µg/L	100	100	DQR
Cobalt	µg/L	6	6	DQR
Fluoride	mg/l	4	4	0.3817
Lead	µg/L	15	15	DQR
Lithium	µg/L	40	40	28.72
Mercury	µg/L	2	2	DQR
Molybdenum	µg/L	100	100	DQR
Radium 226 + 228	pCi/L	5	5	2.537
Selenium	µg/L	50	50	DQR
Thallium	µg/L	2	2	DQR

Notes:

Prepared by: JSI 10/3/2018

Checked by: TJG 10/5/2018

Reviewed by: MNH 10/10/2018

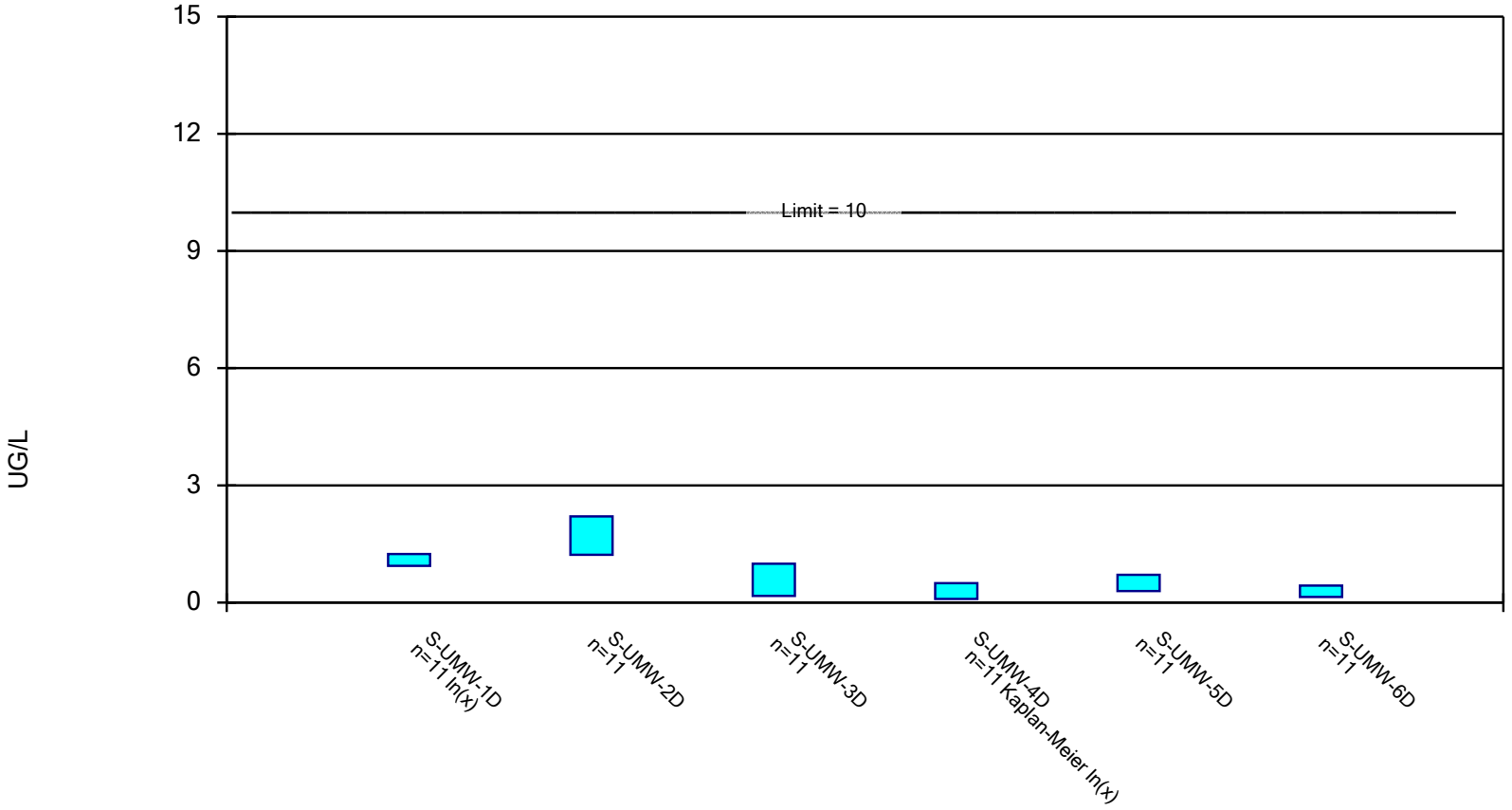
1. µg/L - micrograms per liter
2. mg/L - milligrams per liter
3. pCi/L - picocuries per liter
4. MCL - Maximum Contaminant Level. MCLs from United States Environmental Protection Agency (USEPA) 2012 Edition of the Drinking Water Standards and Health Advisories. Spring 2012. http://water.epa.gov/drink/contaminants/index.cfm.
5. Health Based Groundwater Protection Standards (GWPS) were adoped for Appendix IV parameters without an MCL (i.e. cobalt, lithium, molybdenum, and lead). Information available at https://www.epa.gov/coalash/coal-ash-rule.
6. Values were calculated using statistical methods outlined for Detection Monitoring and are used for returning to Detection Monitoring based on available data to date.
7. DQR - Double Quantification Rule. If all baseline data are less than the Practical Quantitation Limit (PQL), then the DQR will be used. More information on the DQR is provided in the Statistical Analysis Plan.
8. Site GWPS is either the MCL (if available) or based on background levels (calculated as described in the Statistical Analysis Plan for Assessment Monitoring), whichever is higher.
9. GWPS and background values calculated using baseline sampling results from monitoring wells BMW-1D and BMW-3D.

APPENDIX A

Sanitas Confidence Interval Statistical Output

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

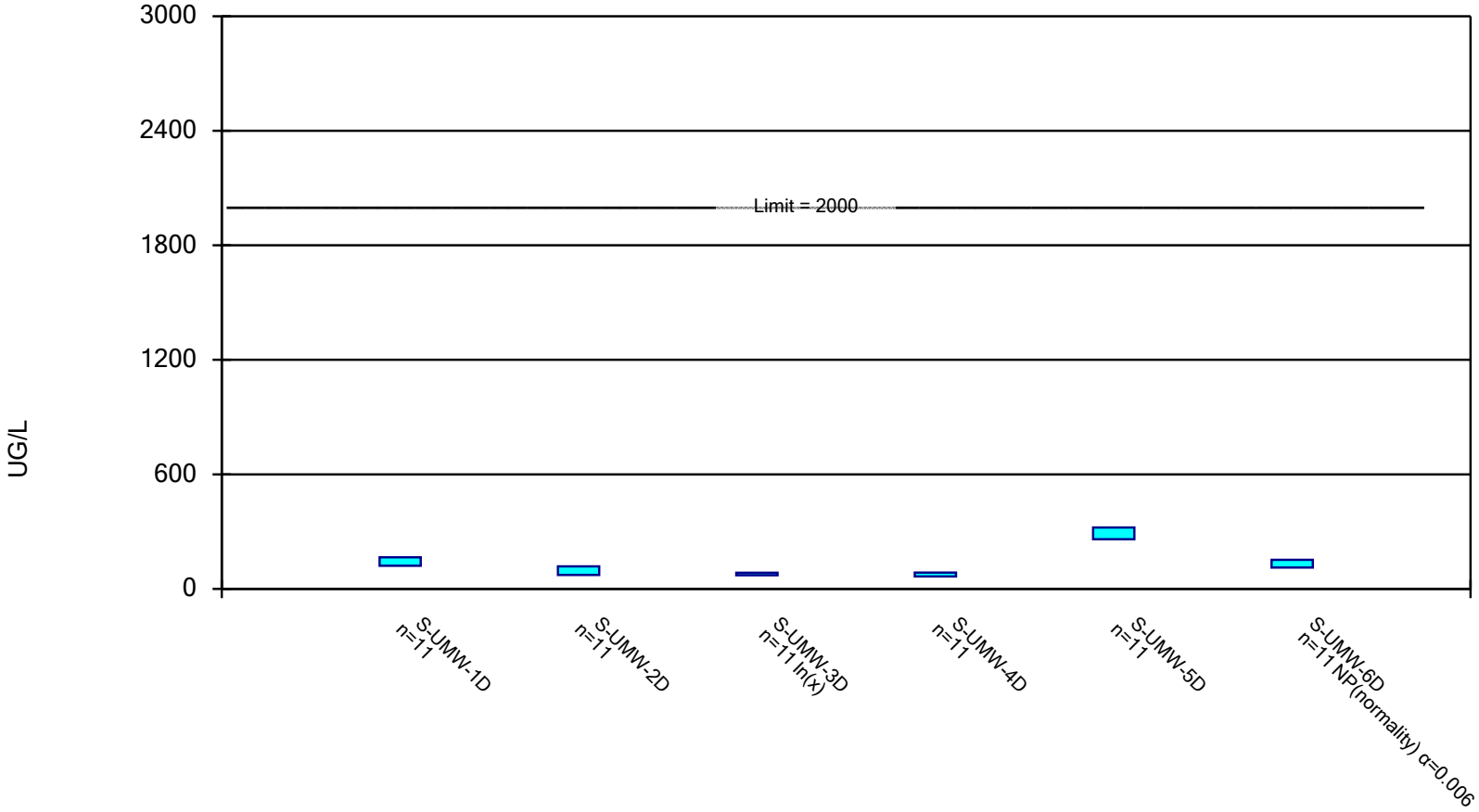


Constituent: ARSENIC, TOTAL Analysis Run 2/20/2019 8:45 AM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

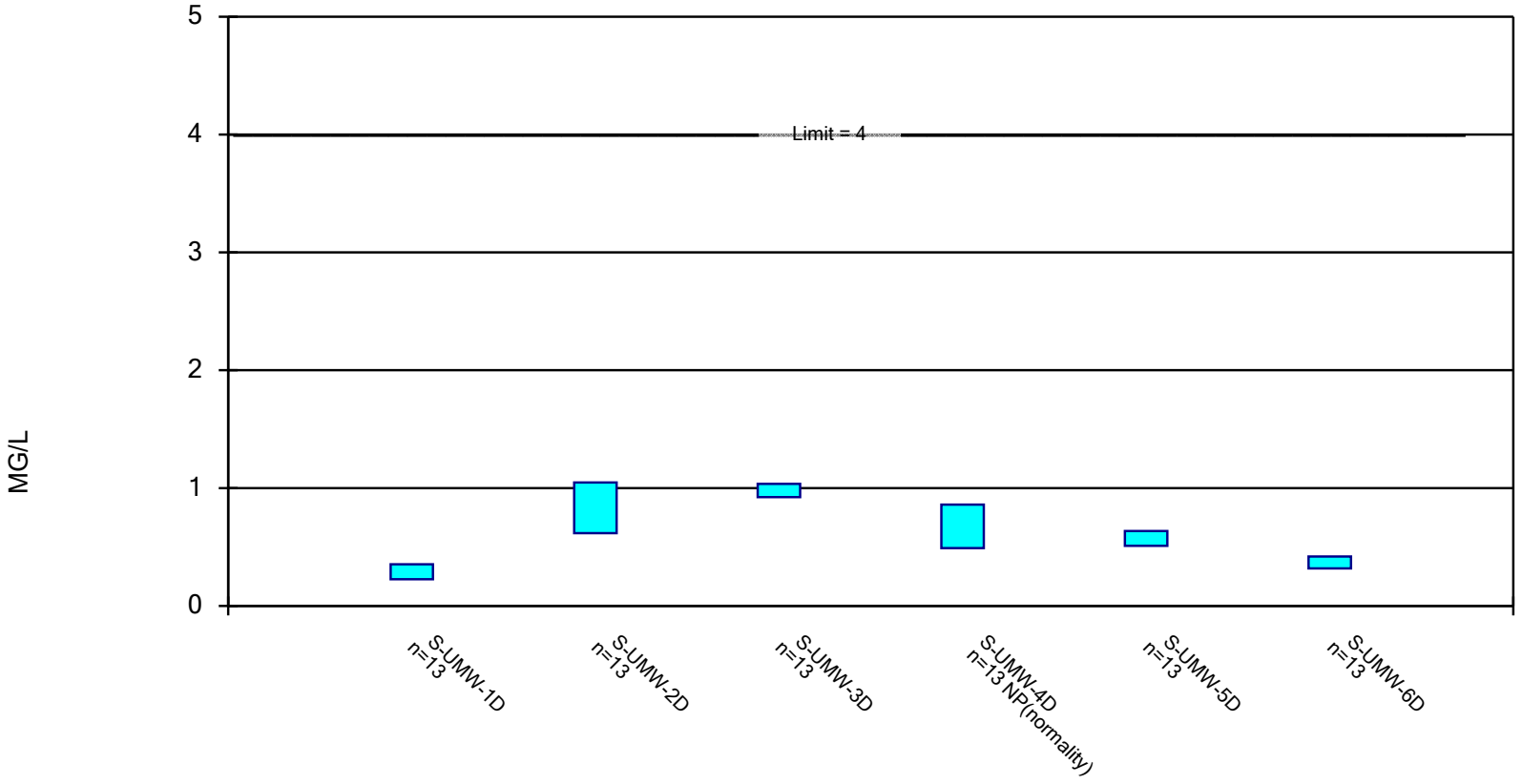


Constituent: BARIUM, TOTAL Analysis Run 2/20/2019 8:45 AM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

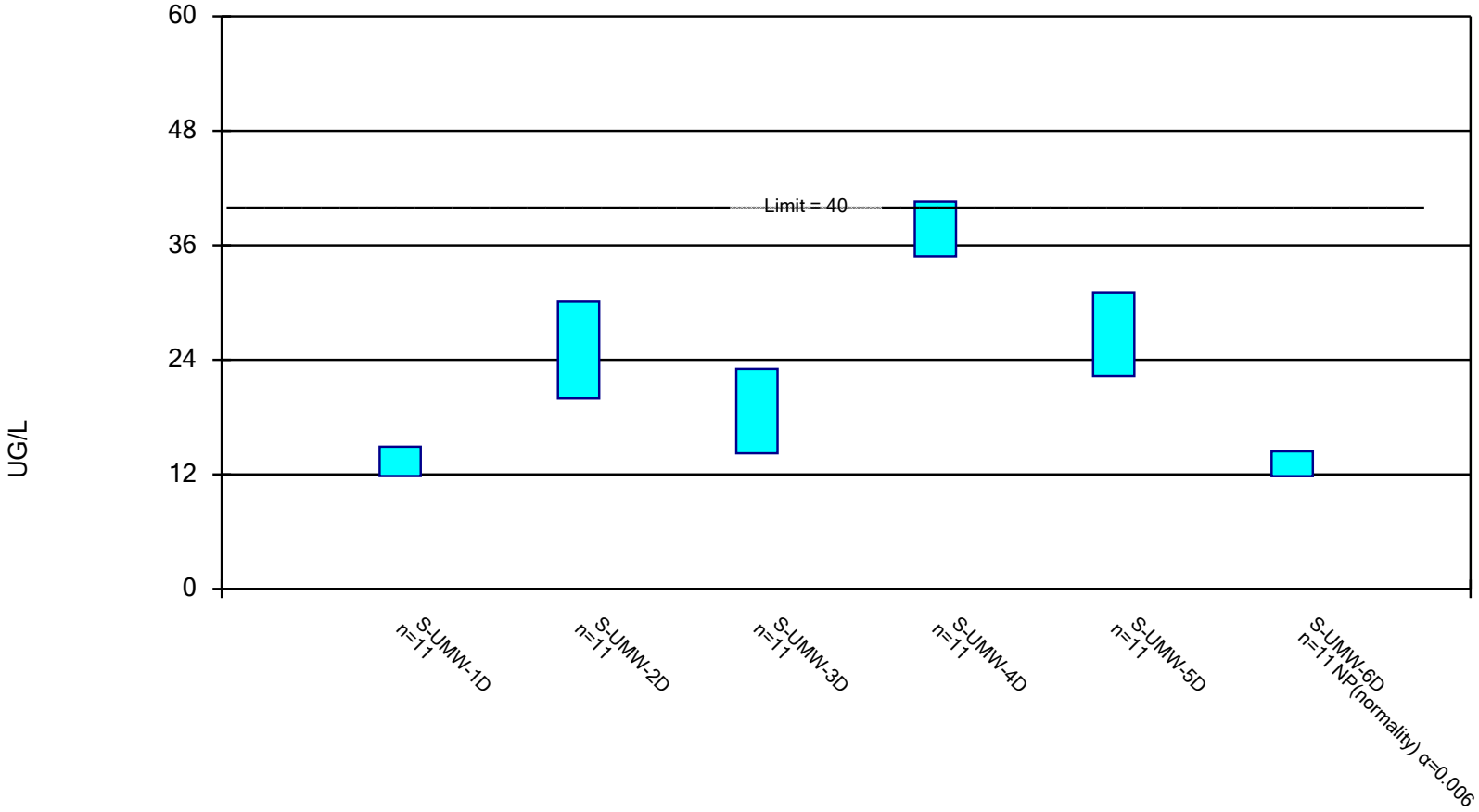


Constituent: FLUORIDE, TOTAL Analysis Run 2/20/2019 8:45 AM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

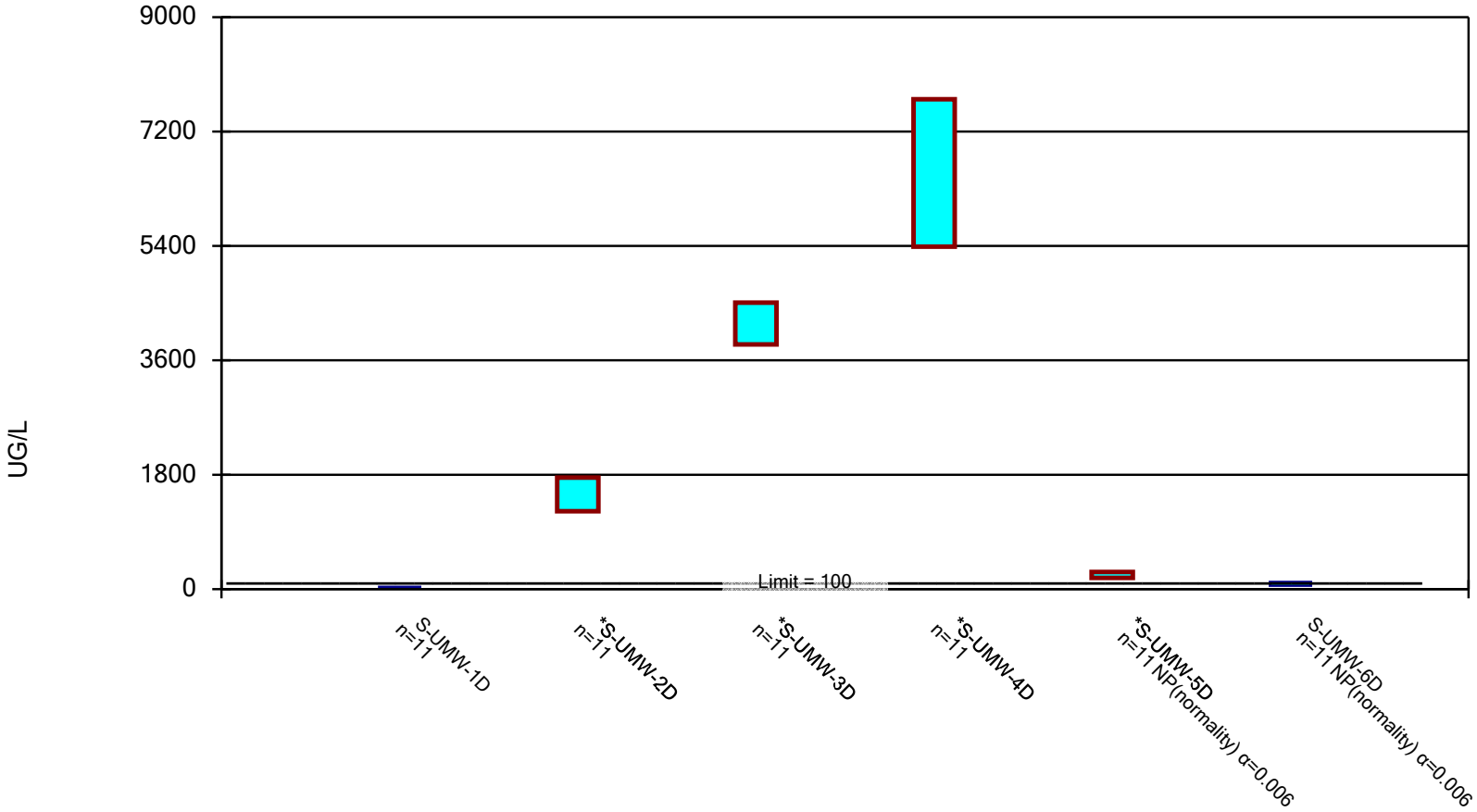


Constituent: LITHIUM, TOTAL Analysis Run 2/20/2019 8:45 AM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: MOLYBDENUM, TOTAL Analysis Run 2/20/2019 8:45 AM

Sioux E.C. Client: Ameren Data: SEC Data

Confidence Interval

Sioux E.C. Client: Ameren Data: SEC Data Printed 2/20/2019, 8:46 AM

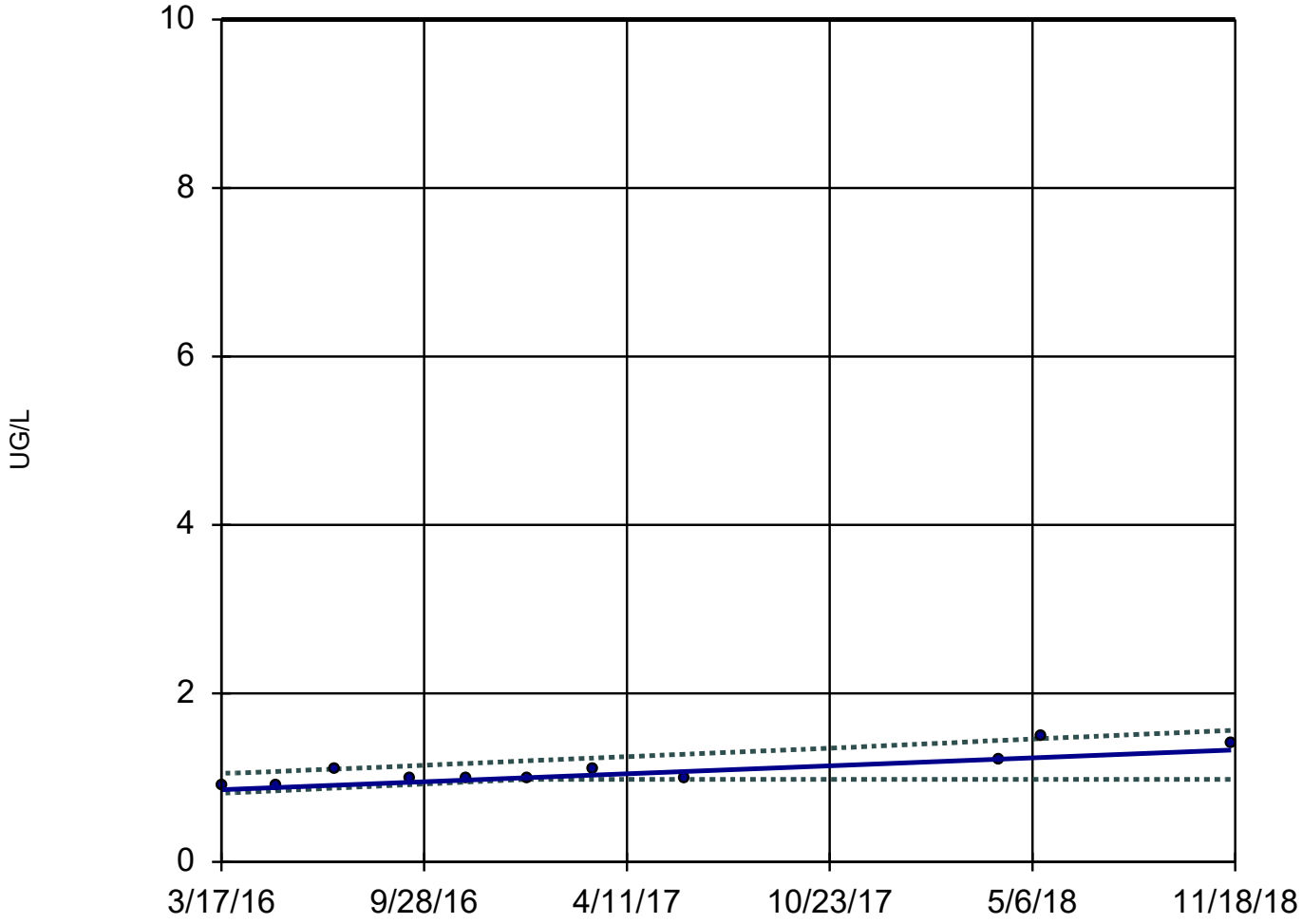
Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
ARSENIC, TOTAL (UG/L)	S-UMW-1D	1.244	0.9374	10	No	11	0	ln(x)	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-2D	2.207	1.223	10	No	11	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-3D	0.9933	0.1714	10	No	11	9.091	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-4D	0.4955	0.09129	10	No	11	27.27	ln(x)	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-5D	0.7096	0.2933	10	No	11	9.091	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-6D	0.4354	0.1438	10	No	11	9.091	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-1D	165.3	120.7	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-2D	118.2	72.87	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-3D	84.75	71.45	2000	No	11	0	ln(x)	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-4D	85.32	65.17	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-5D	321.7	260.5	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-6D	152	112	2000	No	11	0	No	0.006	NP (normality)
FLUORIDE, TOTAL (MG/L)	S-UMW-1D	0.3527	0.2258	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-2D	1.047	0.6178	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-3D	1.035	0.923	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-4D	0.86	0.49	4	No	13	0	No	0.01	NP (normality)
FLUORIDE, TOTAL (MG/L)	S-UMW-5D	0.6352	0.5094	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-6D	0.4199	0.3186	4	No	13	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-1D	14.9	11.82	40	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-2D	30.09	20.01	40	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-3D	23.06	14.2	40	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-4D	40.57	34.85	40	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-5D	31.04	22.27	40	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-6D	14.4	11.8	40	No	11	0	No	0.006	NP (normality)
MOLYBDENUM, TOTAL (UG/L)	S-UMW-1D	37.69	27.8	100	No	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-2D**	**1755**	**1225**	**100**	**Yes**	**11**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-3D**	**4507**	**3849**	**100**	**Yes**	**11**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-4D**	**7709**	**5389**	**100**	**Yes**	**11**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-5D**	**271**	**177**	**100**	**Yes**	**11**	**0**	**No**	**0.006**	**NP (normality)**
MOLYBDENUM, TOTAL (UG/L)	S-UMW-6D	114	52.8	100	No	11	0	No	0.006	NP (normality)

APPENDIX B

Sanitas Trending Confidence Band Statistical Output

Sen's Slope and 95% Confidence Band

S-UMW-1D



n = 11

Slope = 0.1765 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

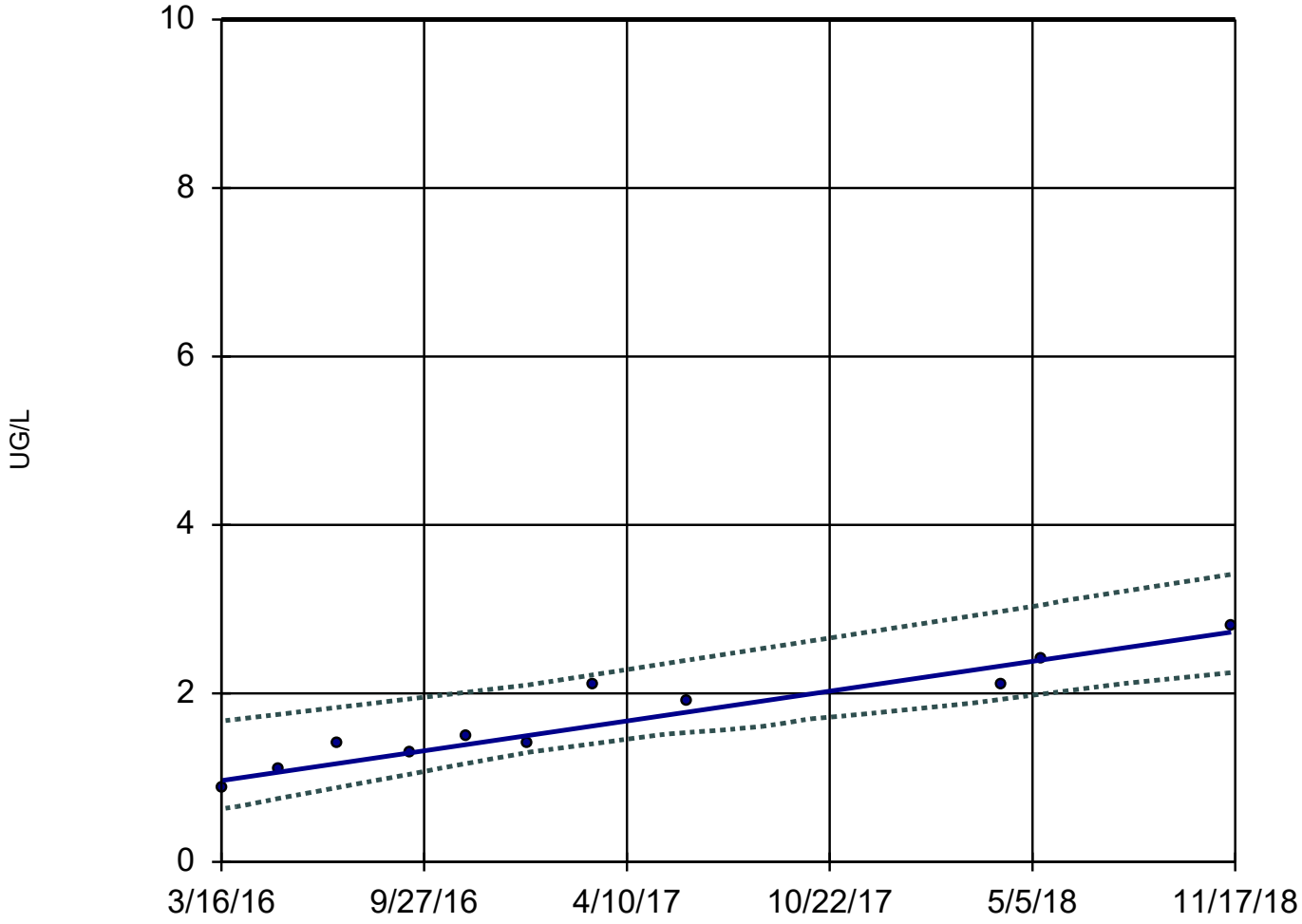
GWPS = 10.

Constituent: ARSENIC, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 11

Slope = 0.6614 units per year.

Mann-Kendall statistic = 47
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

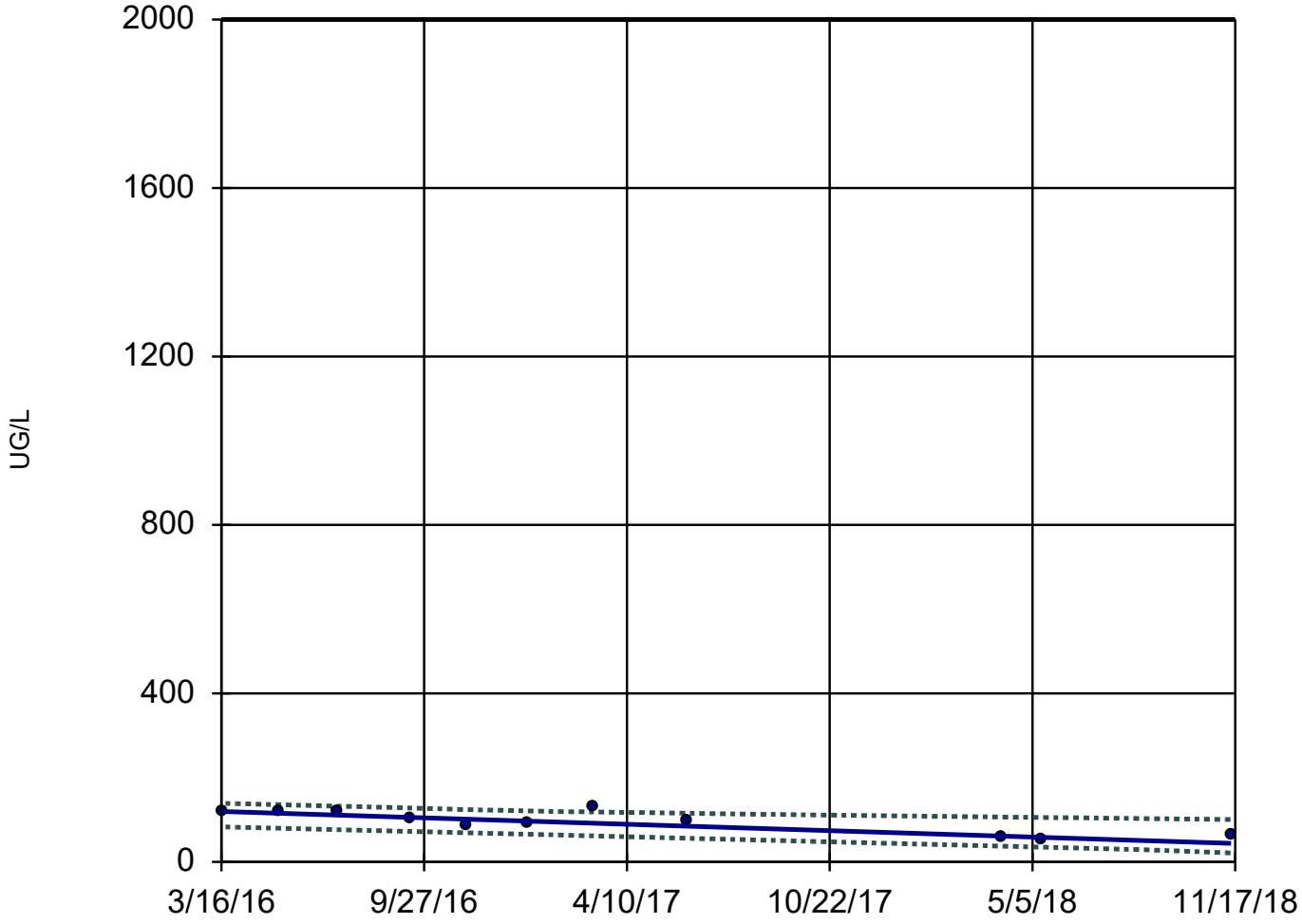
GWPS = 10.

Constituent: ARSENIC, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 11

Slope = -28.34 units per year.

Mann-Kendall statistic = -33
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

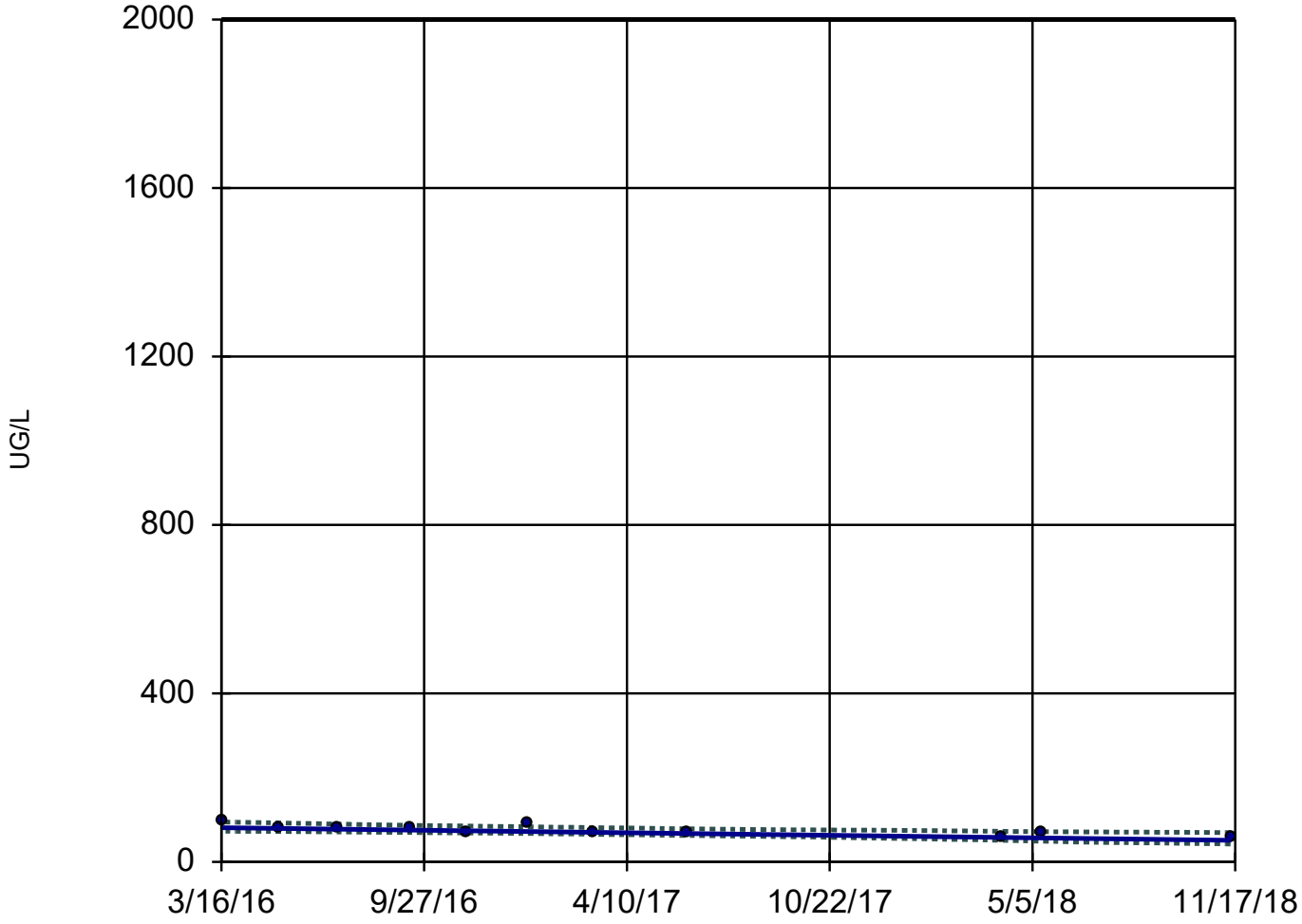
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 11

Slope = -11.23 units per year.

Mann-Kendall statistic = -37
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

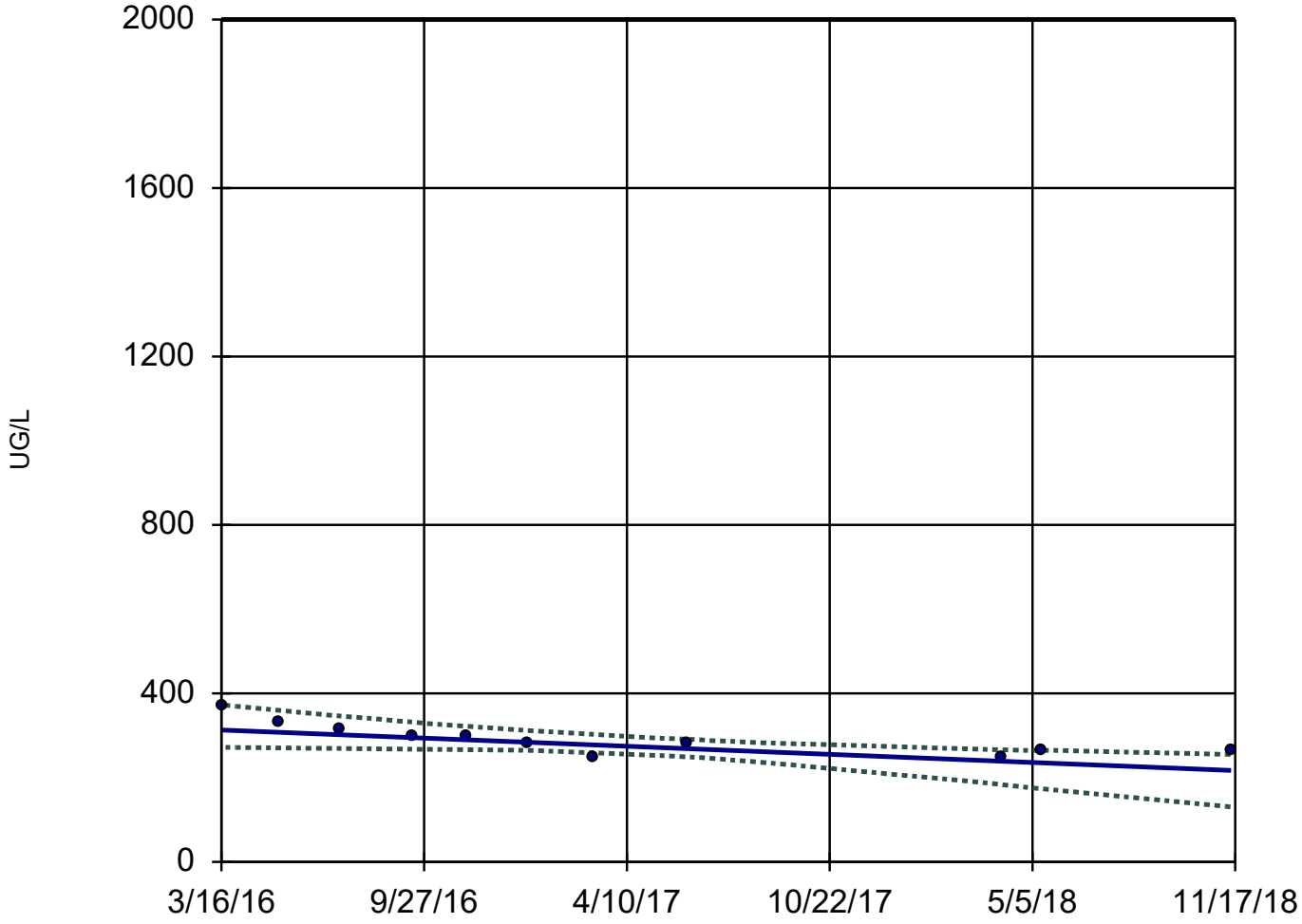
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 11

Slope = -36.04 units per year.

Mann-Kendall statistic = -40
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

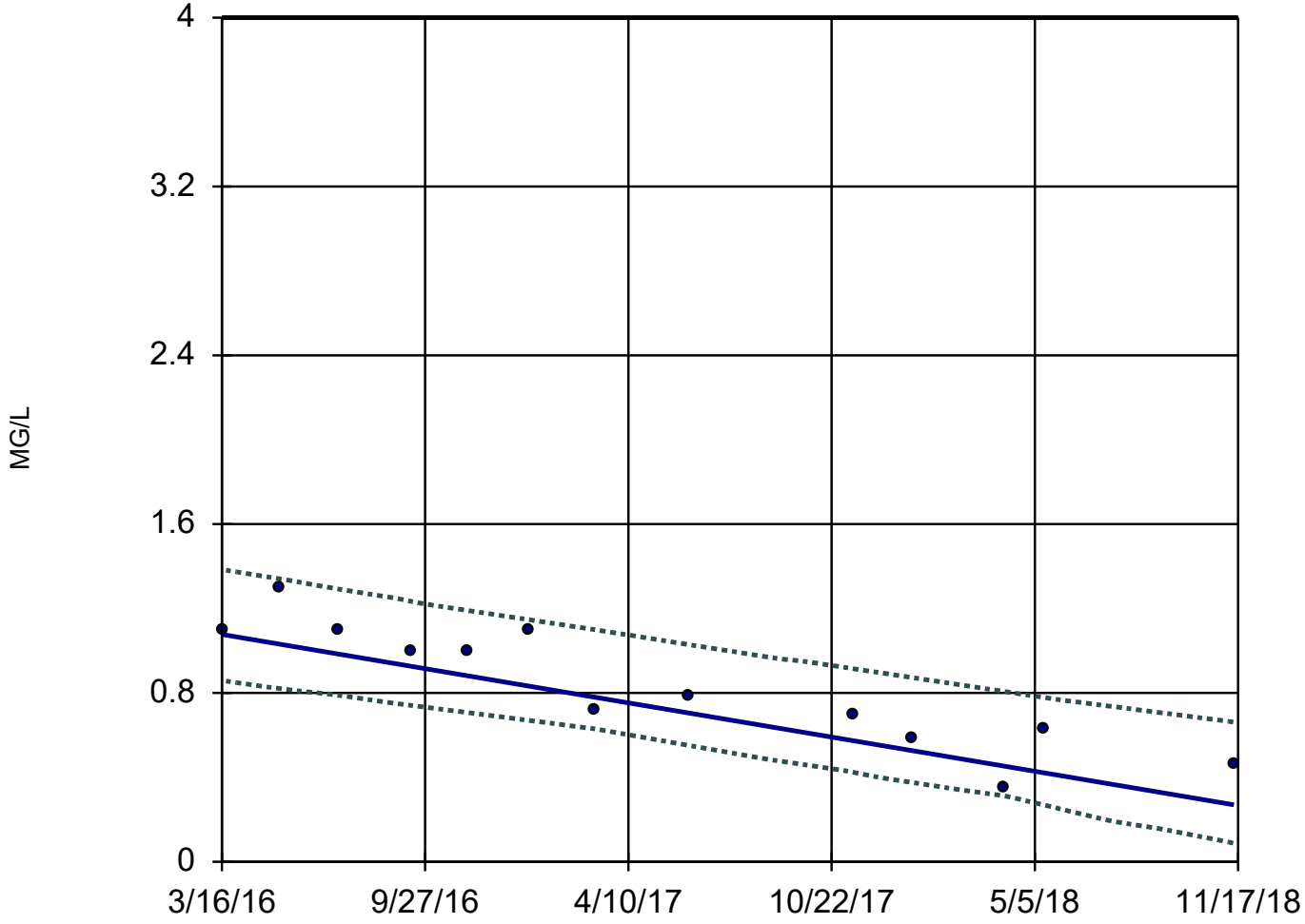
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 13

Slope = -0.303 units per year.

Mann-Kendall statistic = -60
critical = -39

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

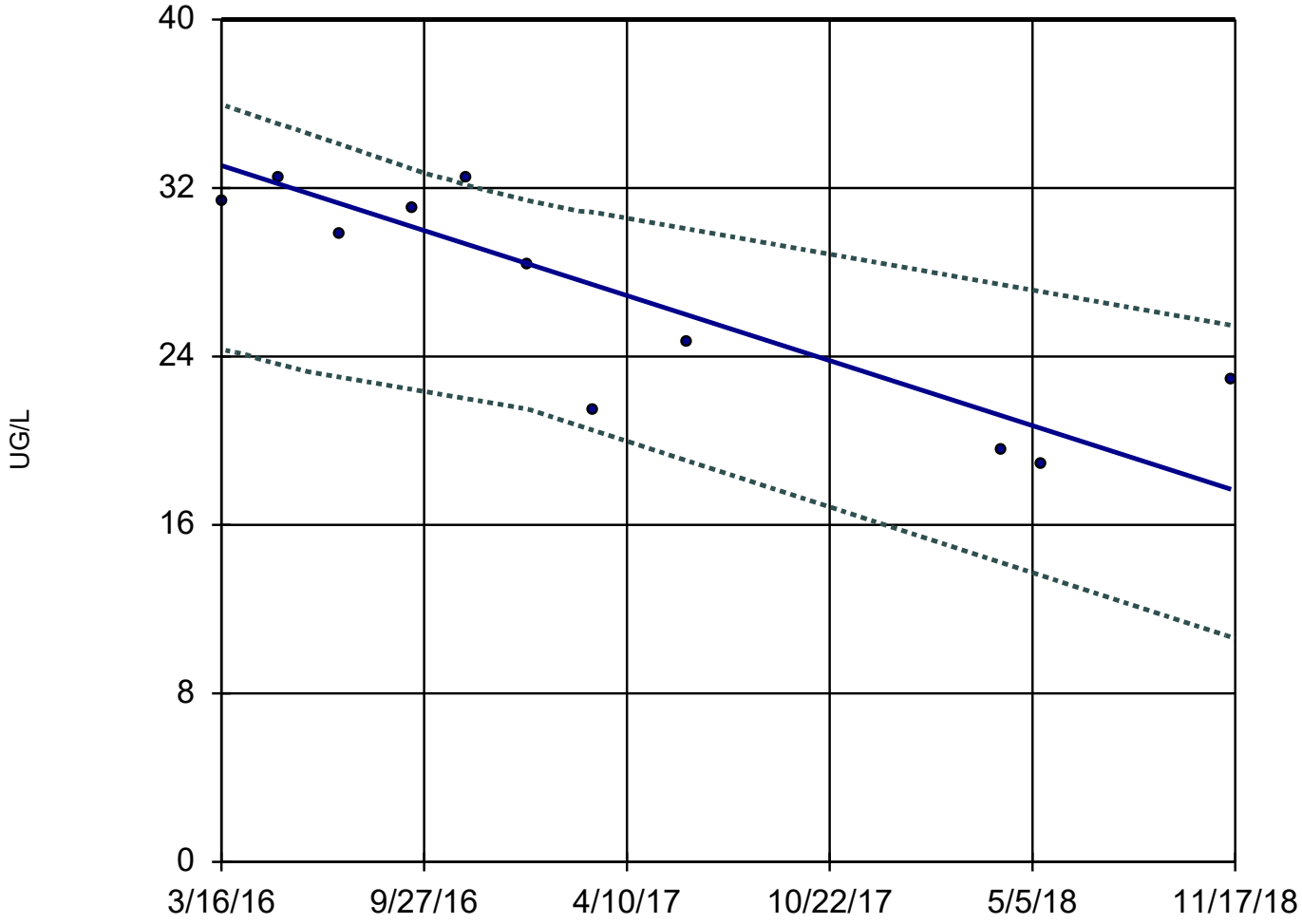
GWPS = 4.

Constituent: FLUORIDE, TOTAL Analysis Run 2/20/2019 8:46 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 11

Slope = -5.775 units per year.

Mann-Kendall statistic = -36
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

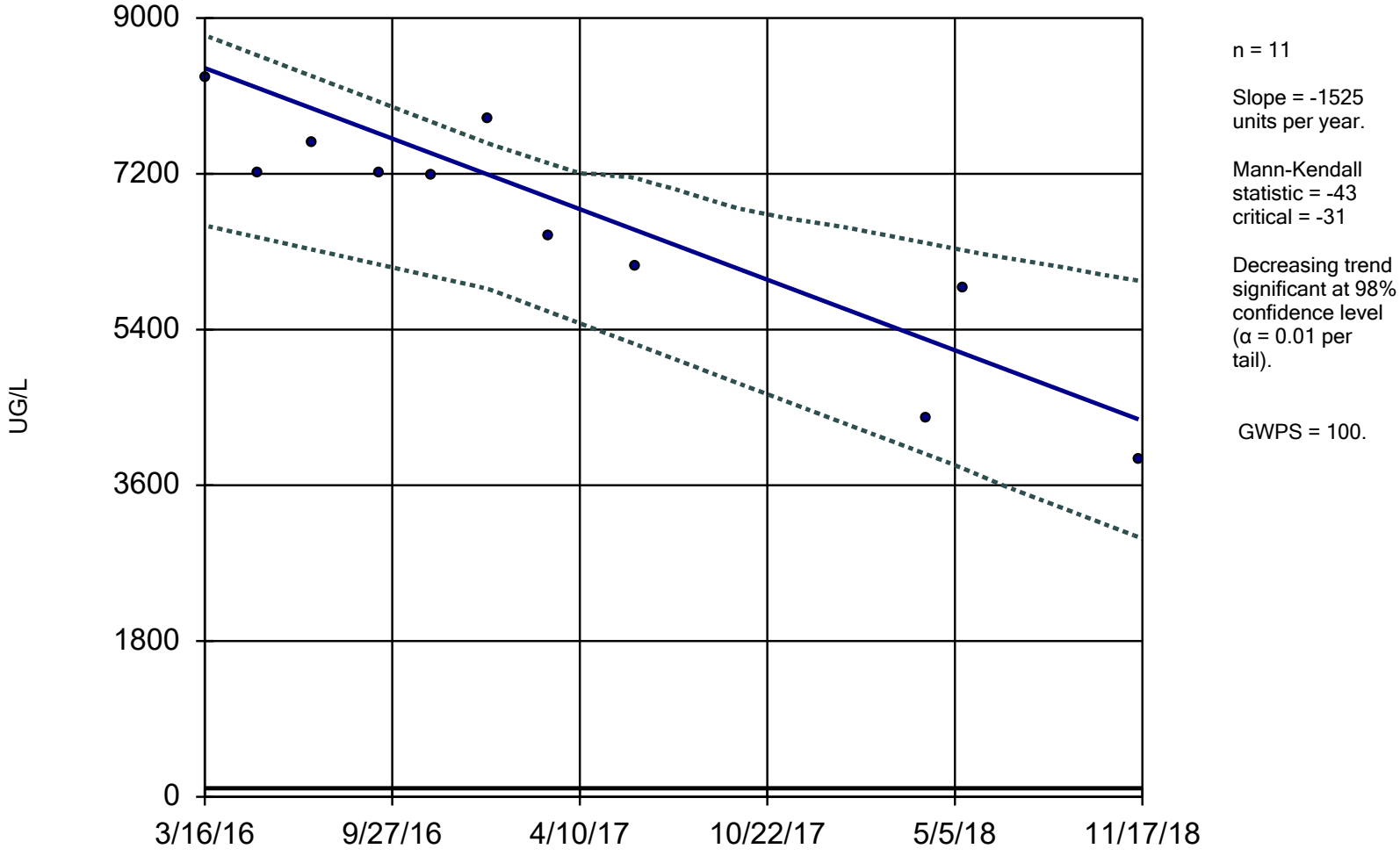
GWPS = 40.

Constituent: LITHIUM, TOTAL Analysis Run 2/20/2019 8:47 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 11

Slope = -1525 units per year.

Mann-Kendall statistic = -43 critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

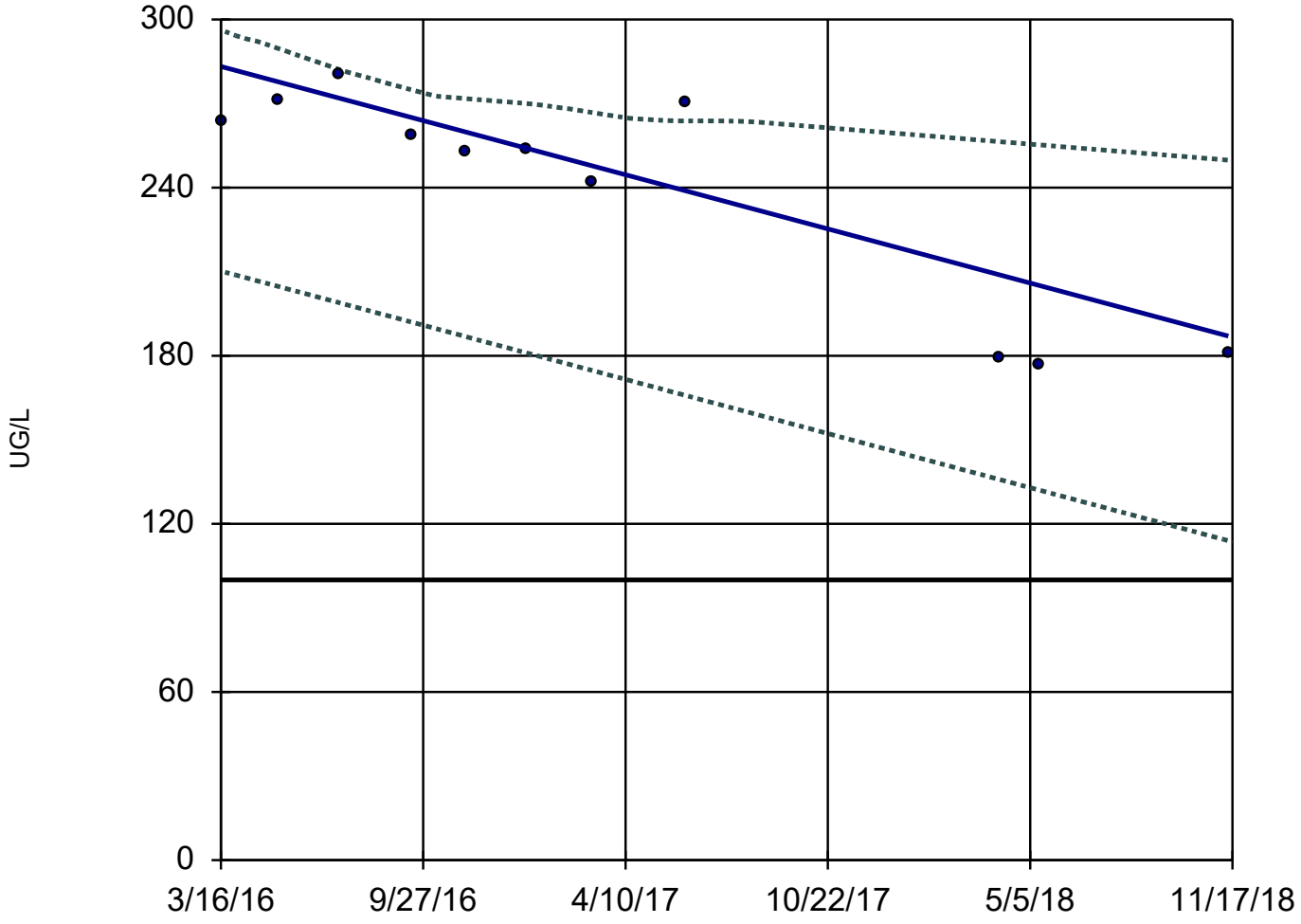
GWPS = 100.

Constituent: MOLYBDENUM, TOTAL Analysis Run 2/20/2019 8:47 AM

Sioux E.C. Client: Ameren Data: SEC Data

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 11

Slope = -36.13 units per year.

Mann-Kendall statistic = -33
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 100.

Constituent: MOLYBDENUM, TOTAL Analysis Run 2/20/2019 8:47 AM

Sioux E.C. Client: Ameren Data: SEC Data

APPENDIX E

August 2019 Assessment Monitoring Statistical Evaluation

TECHNICAL MEMORANDUM

DATE November 19, 2019 **Project No.** 153-140601

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Paul Pike, Charlie Henderson

FROM Jeffrey Ingram - Golder Associates **EMAIL JIngram@Golder.com**

ASSESSMENT MONITORING STATISTICAL EVALUATION FOR THE SCPA SURFACE IMPOUNDMENT, SIOUX ENERGY CENTER, ST CHARLES COUNTY MISSOURI

This Technical Memorandum provides the results of the Assessment Monitoring Statistical Evaluation for the SCPA Surface Impoundment August 2019 sampling event at the Sioux Energy Center located in St. Charles County Missouri. Included in this memorandum is a brief summary of constituents that are present at a Statistically Significant Level (SSL), a list of site-specific Groundwater Protection Standards (**Table 1**), and the Sanitas Technologies™ (Sanitas) statistical software output for each of the Appendix IV parameters (**Appendix A** and **Appendix B**).

SSLs were calculated using the methods and procedures outlined in the Groundwater Monitoring Plan's (GMP) Statistical Analysis Plan (SAP). The following outliers was removed prior to the calculation of confidence limits:

- Arsenic – BMW-1D on 5/14/18: result is statistically higher than other values at the same well
- Arsenic – BMW-3D on 5/14/18: result is statistically higher than other values at the same well
- Arsenic – UMW-3D on 5/15/18: result is statistically higher than other values at the same well
- Arsenic – UMW-4D on 5/14/18: result is statistically higher than other values at the same well
- Arsenic – UMW-5D on 5/15/18: result is statistically higher than other values at the same well
- Arsenic – UMW-6D on 5/14/18: result is statistically higher than other values at the same well
- Barium – UMW-6D on 11/14/18: result is statistically higher than other values at the same well
- Cobalt – BMW-3D on 1/3/17: result is statistically higher than other values at the same well
- Lithium – BMW-3D on 11/17/16: result is statistically lower than other values at the same well
- Molybdenum – BMW-3D on 1/3/17: result is statistically higher than other values at the same well
- Radium 226 + 228 – UMW-2D on 7/6/16: result is statistically higher than other values at the same well
- Radium 226 + 228 - UMW-3D on 9/14/16: result is statistically higher than other values at the same well

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021 T: +1 314 984-8800 F: +1 314 984-8770

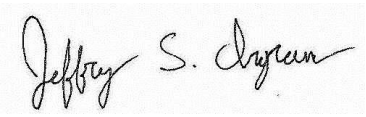
- Radium 226 + 228 – UMW-4D on 7/6/16: result is statistically higher than other values at the same well

No new SSLs were identified in the August 2019 sampling event. A summary of the continuing SSLs at corresponding wells is as follows:

- Molybdenum at UMW-2D, UMW-3D, UMW-4D, and UMW-5D

Golder appreciates this opportunity to provide hydrogeological and engineering support services to Ameren. If you have any questions or comments regarding the information provided, please call our office at (314) 984-8800.

Sincerely,



Jeffrey Ingram, R.G.
Project Geologist

Sean Paulsen, PG
Associate, Senior Consultant

JSI/SCP

Enclosures:
Table 1 – SCPA Groundwater Protection Standards
Appendix A – Sanitas Confidence Interval Statistical Output
Appendix B – Sanitas Trending Confidence Bands Statistical Output

Table 1 - SCPA Groundwater Protection Standards
SCPA Surface Impoundment
Sioux Energy Center

Parameter	Units	MCL or Health Based GWPS	Site GWPS	Value to Return to Detection Monitoring[7]
Antimony	µg/L	6	6	DQR
Arsenic	µg/L	10	10	1.054
Barium	µg/L	2000	2000	699
Beryllium	µg/L	4	4	DQR
Cadmium	µg/L	5	5	DQR
Chromium	µg/L	100	100	DQR
Cobalt	µg/L	6	6	DQR
Fluoride	mg/L	4	4	0.372
Lead	µg/L	15	15	DQR
Lithium	µg/L	40	40	28.48
Mercury	µg/L	2	2	DQR
Molybdenum	µg/L	100	100	DQR
Radium 226 + 228	pCi/L	5	5	2.537
Selenium	µg/L	50	50	DQR
Thallium	µg/L	2	2	DQR

Notes:

Prepared by: JSI
Checked by: LMS
Reviewed by: SCP

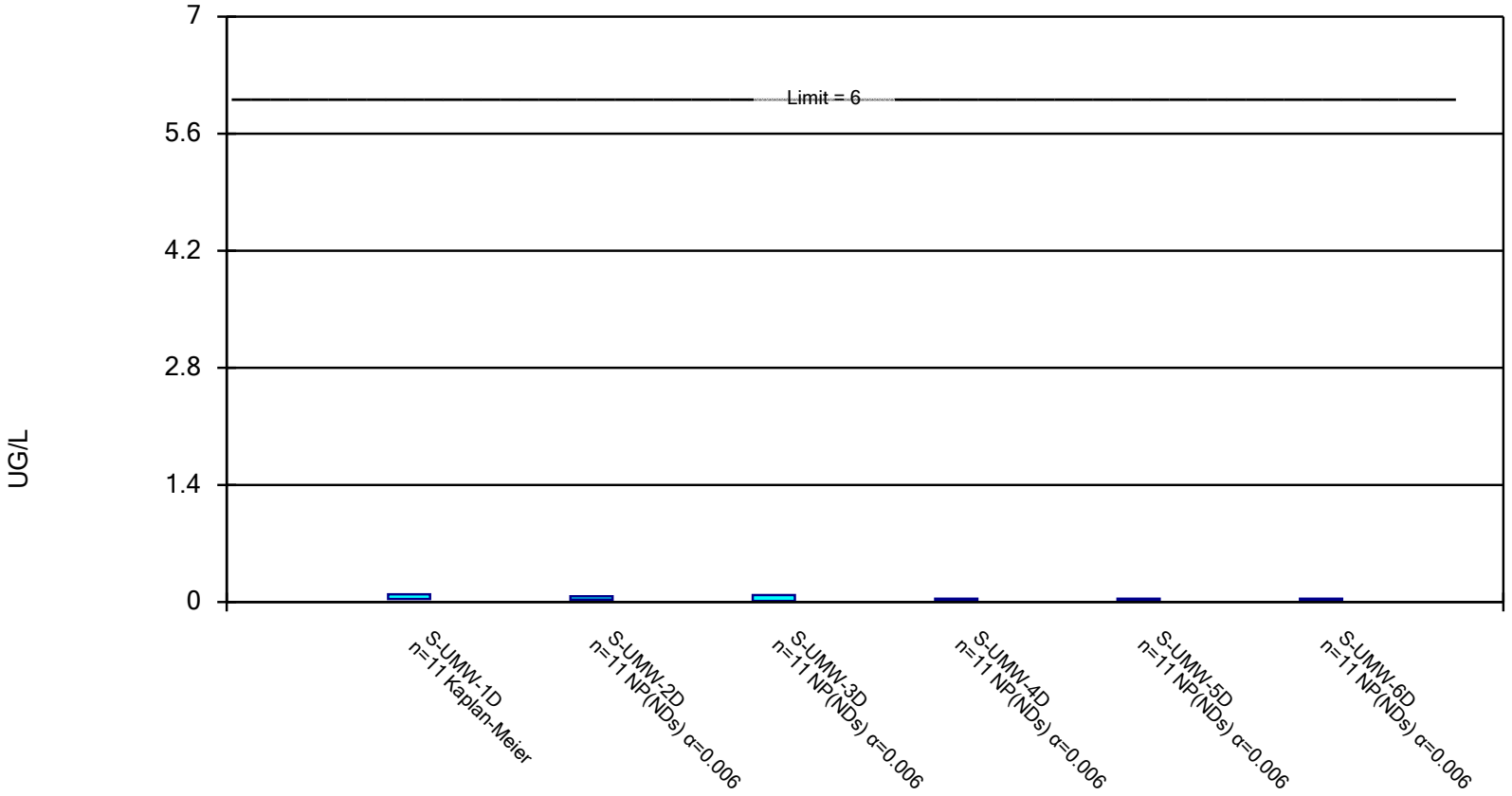
1. µg/L - micrograms per liter
2. mg/L - milligrams per liter
3. pCi/L - picocuries per liter
4. MCL - Maximum Contaminant Level. MCLs from United States Environmental Protection Agency (USEPA) 2012 Edition of the Drinking Water Standards and Health Advisories. Spring 2012. http://water.epa.gov/drink/contaminants/index.cfm.
5. Health Based Groundwater Protection Standards (GWPS) were adoped for Appendix IV parameters without an MCL (i.e. cobalt, lithium, molybdenum, and lead). Information available at https://www.epa.gov/coalash/coal-ash-rule.
6. Values were calculated using statistical methods outlined for Detection Monitoring and are used for returning to Detection Monitoring based on available data to date.
7. DQR - Double Quantification Rule. If all baseline data are less than the Practical Quantitation Limit (PQL), then the DQR will be used. More information on the DQR is provided in the Statistical Analysis Plan.
8. Site GWPS is either the MCL/Health Based GWPS or based on background levels (calculated as described in the Statistical Analysis Plan for Assessment Monitoring), whichever is higher.
9. GWPS and background values calculated using results up through August 2019 from monitoring wells BMW-1D and BMW-3D.

APPENDIX A

Sanitas Confidence Interval Statistical Output

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

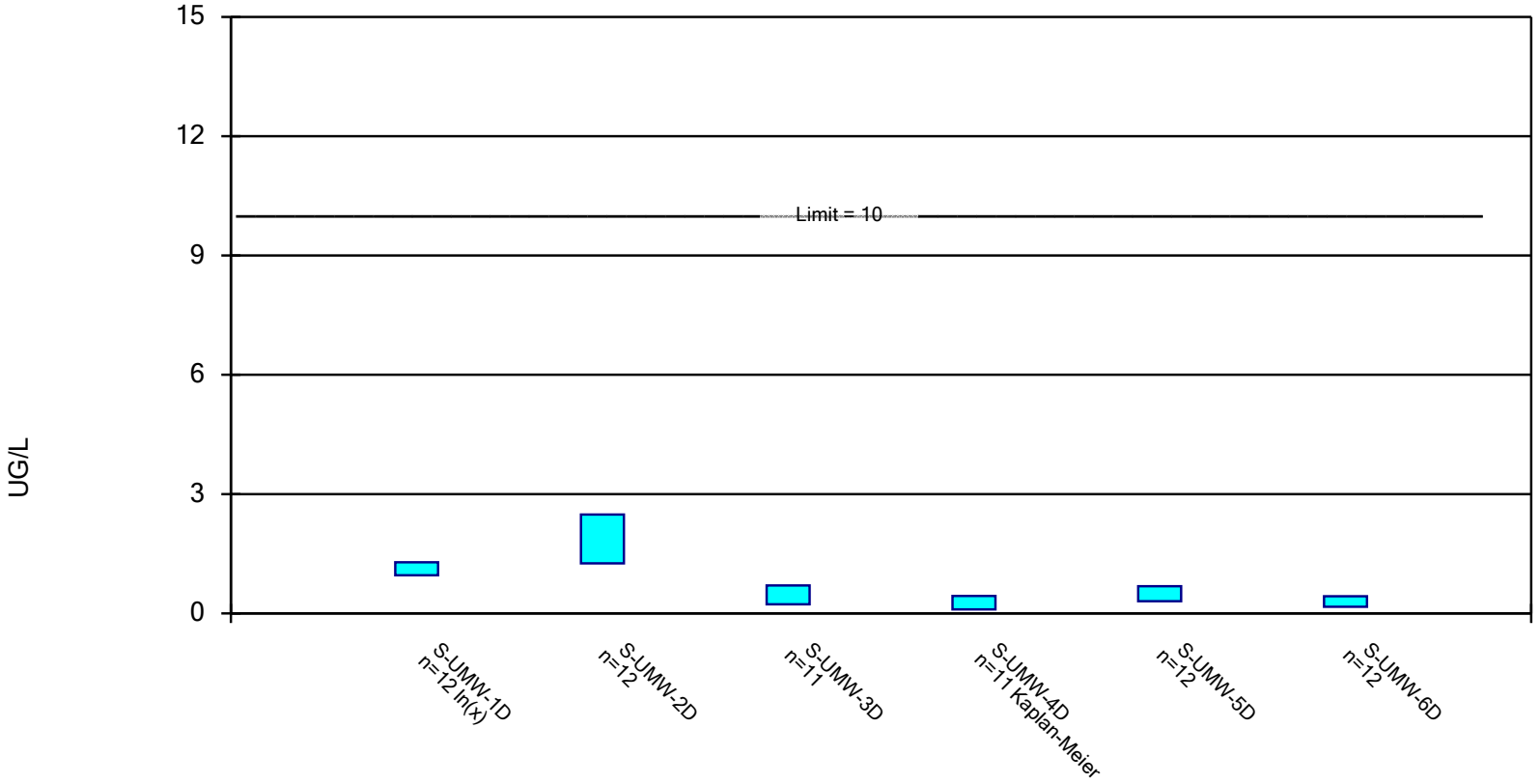


Constituent: ANTIMONY, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

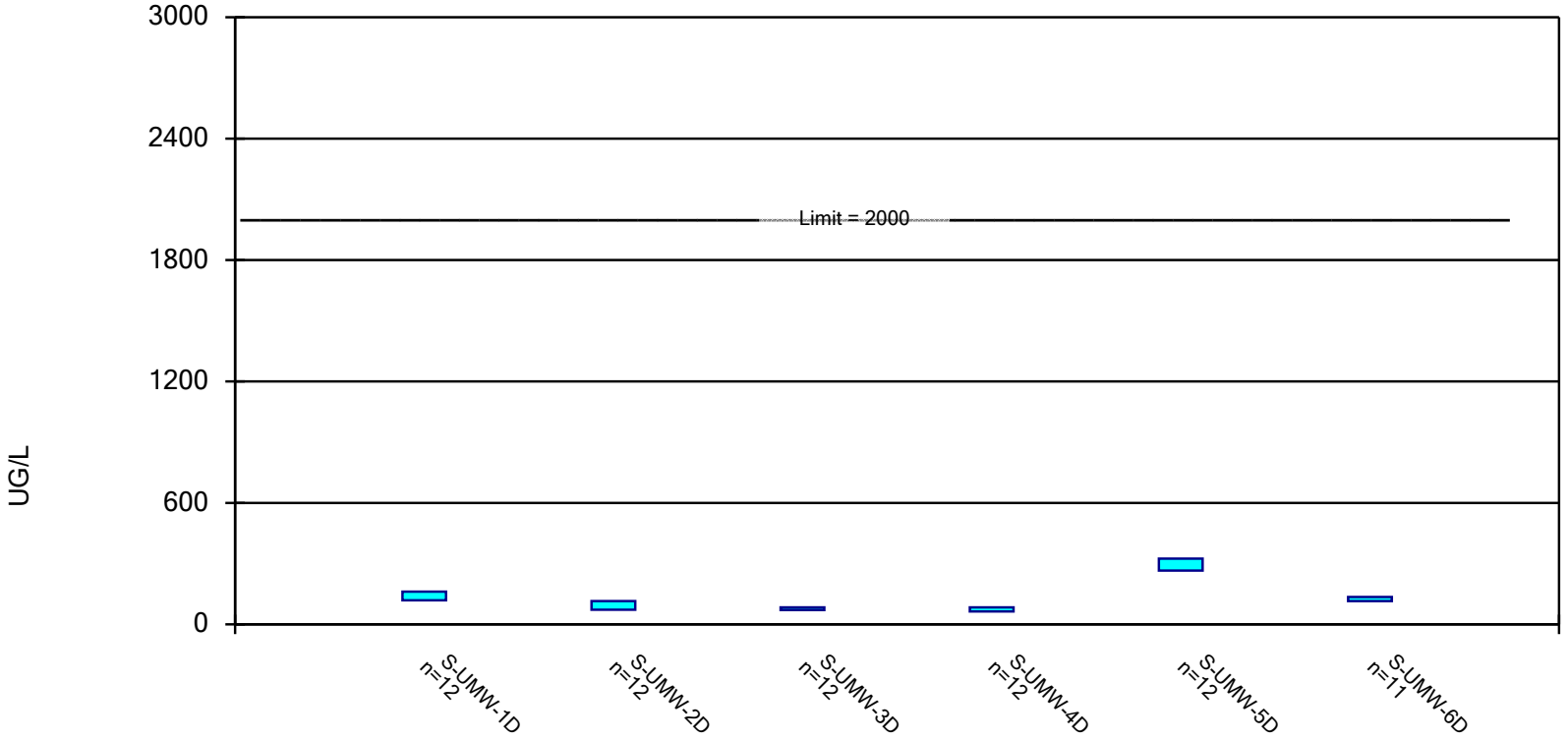


Constituent: ARSENIC, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

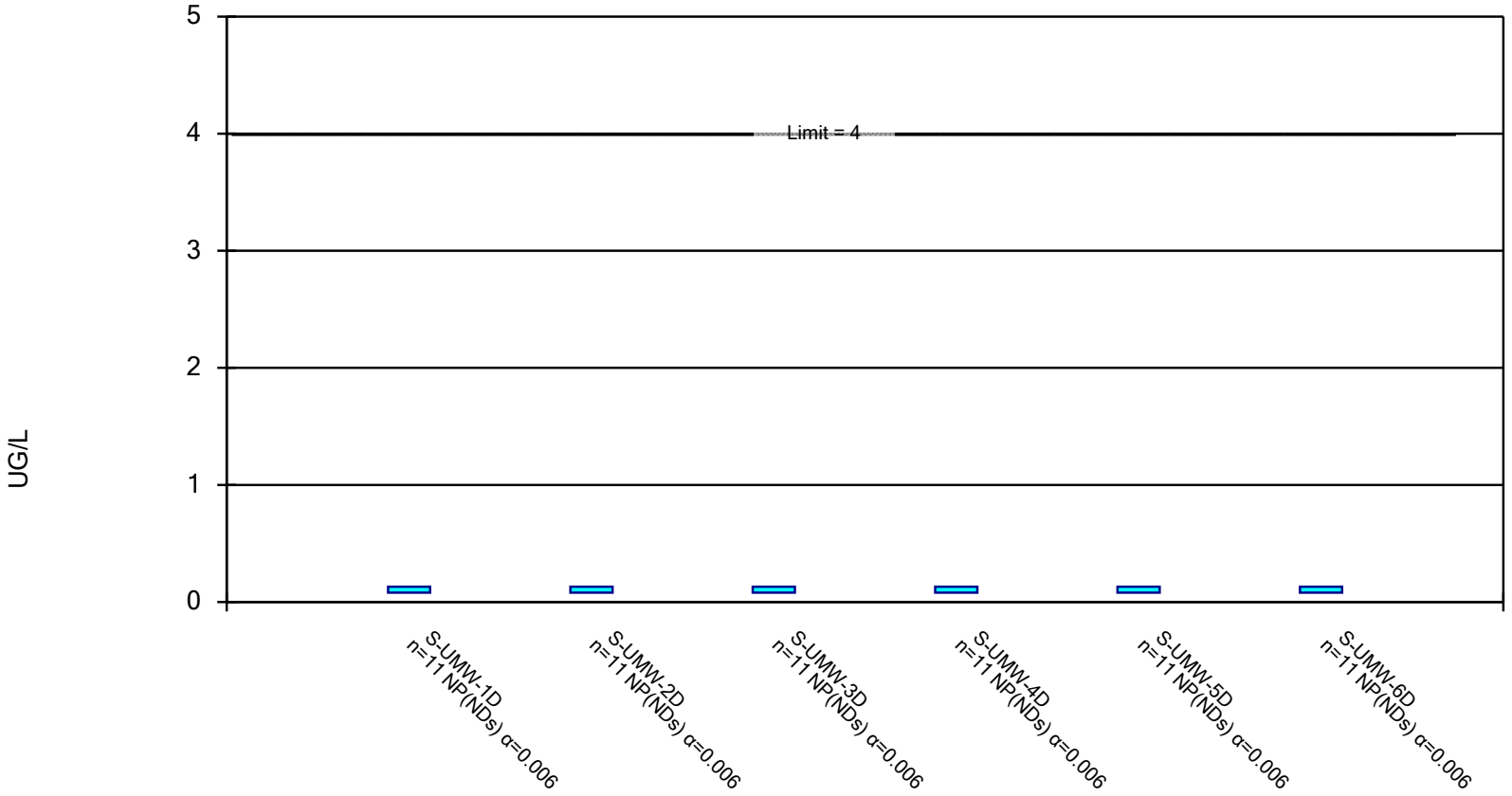


Constituent: BARIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

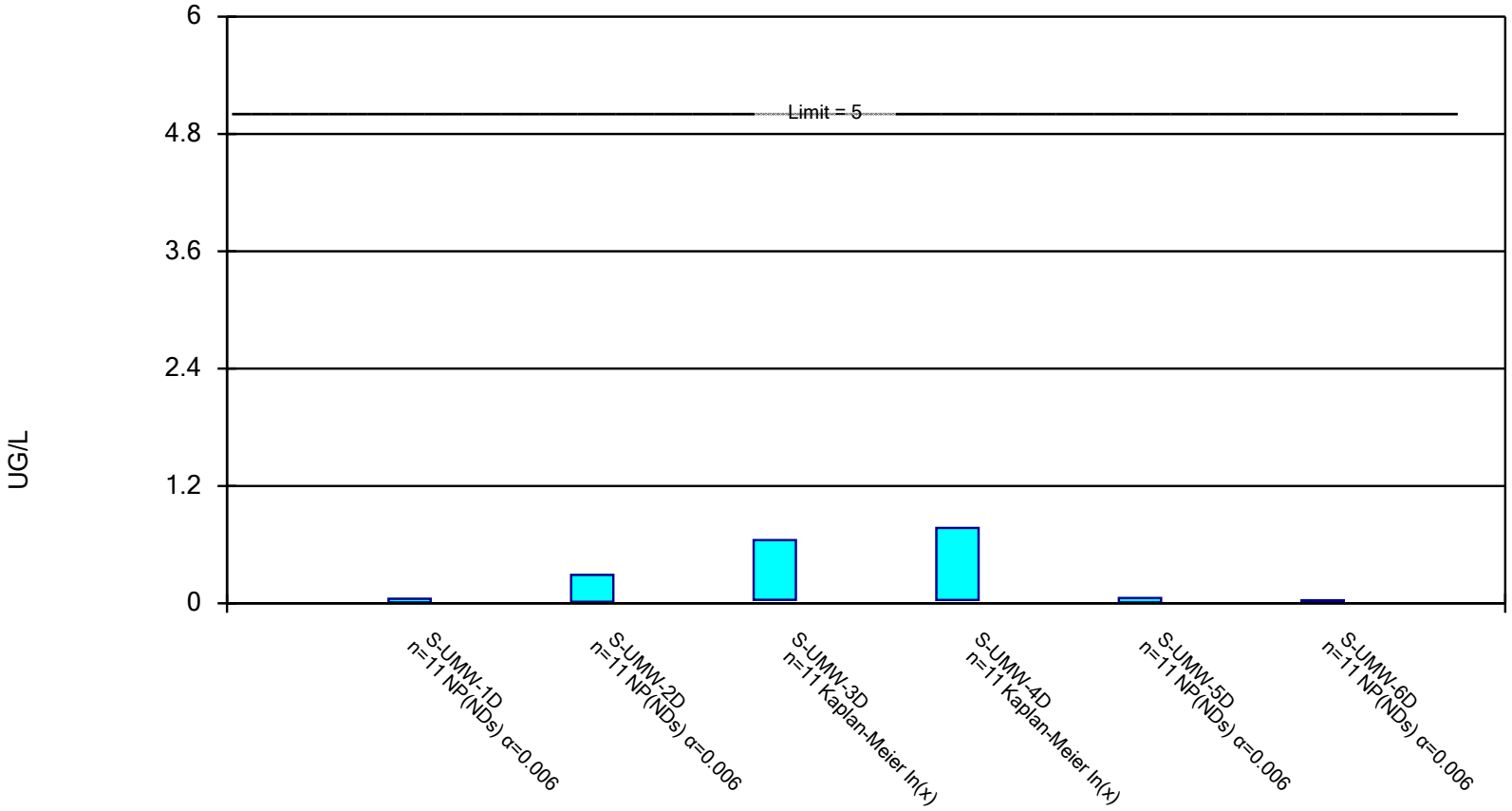


Constituent: BERYLLIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

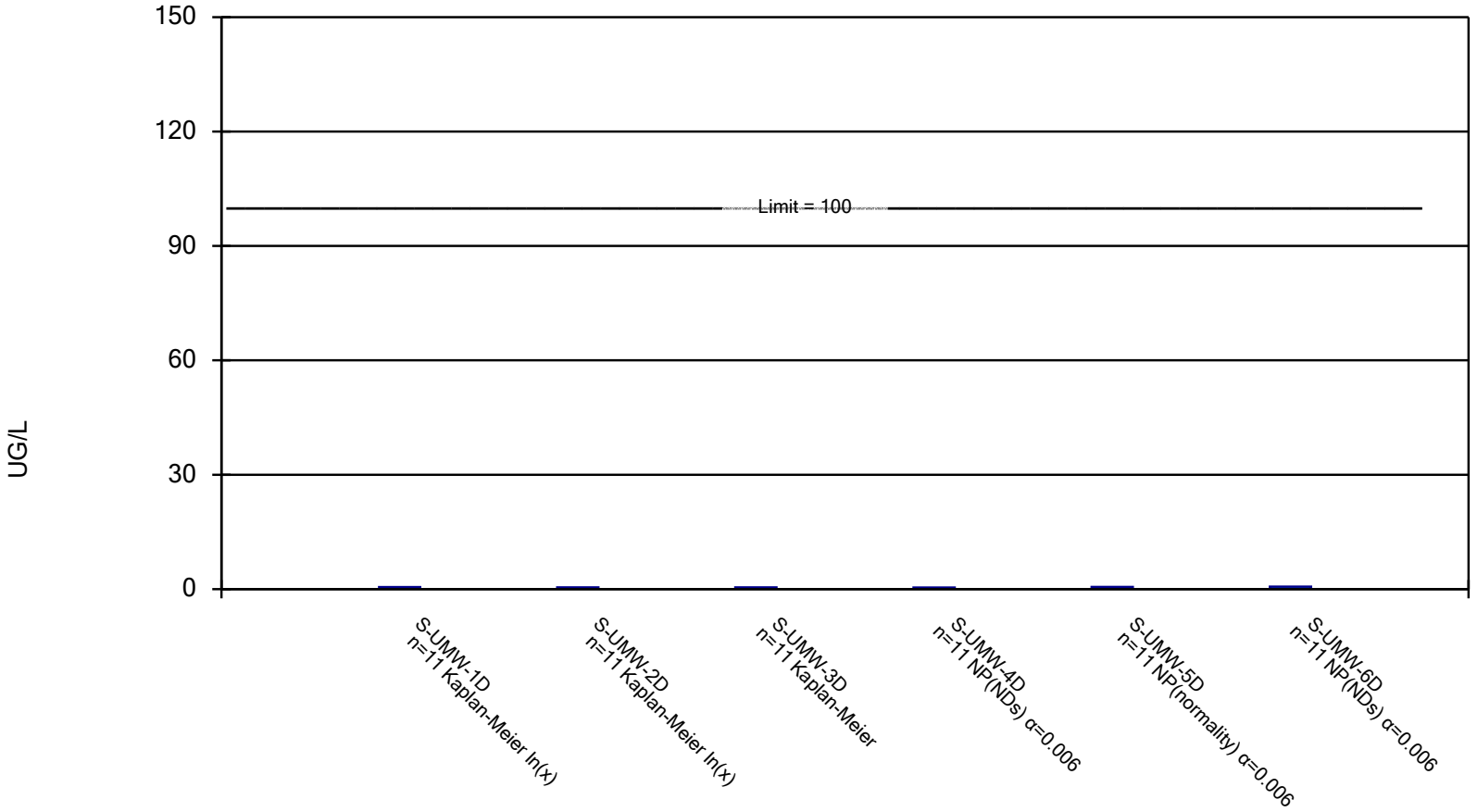


Constituent: CADMIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

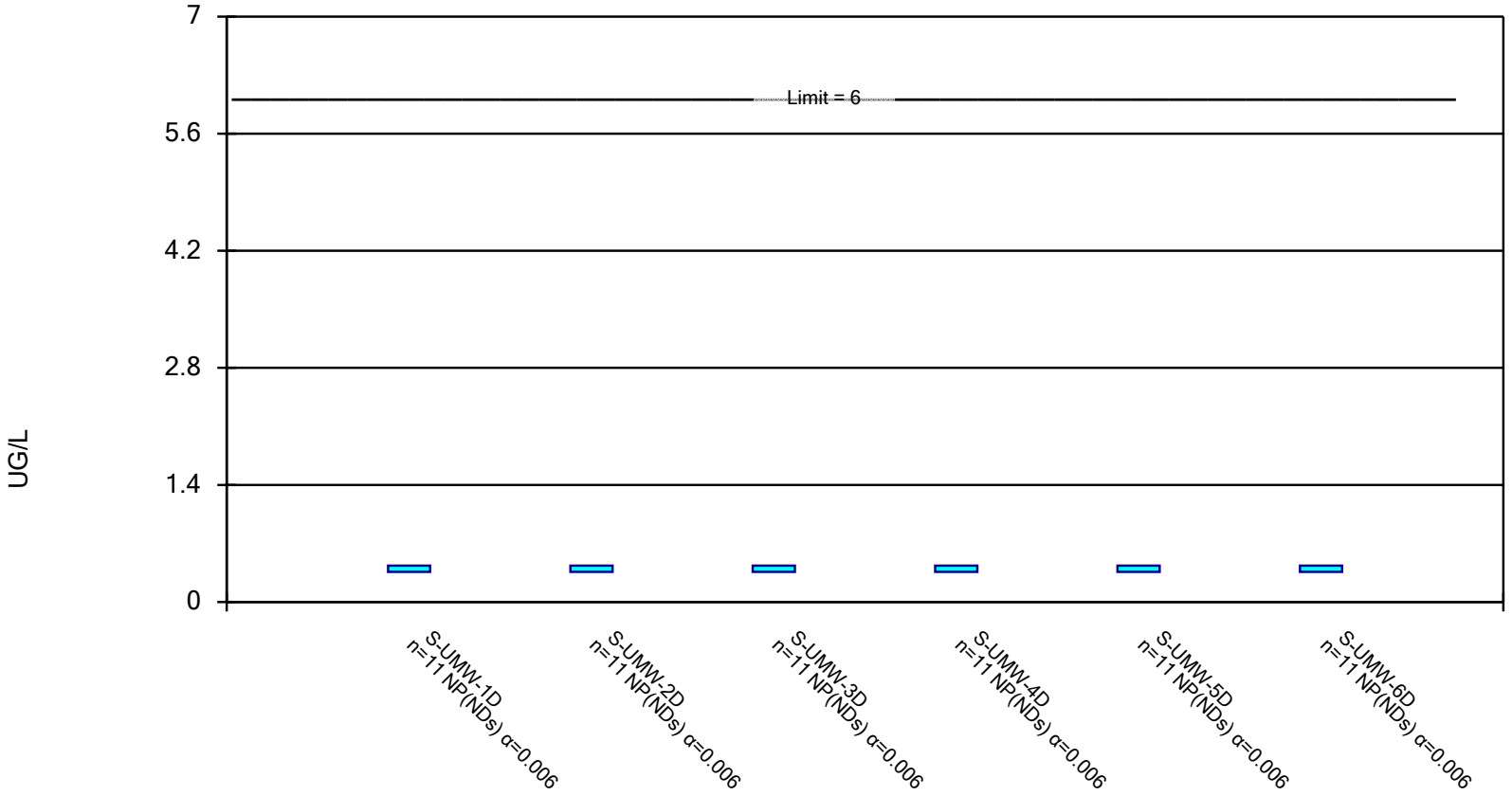


Constituent: CHROMIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

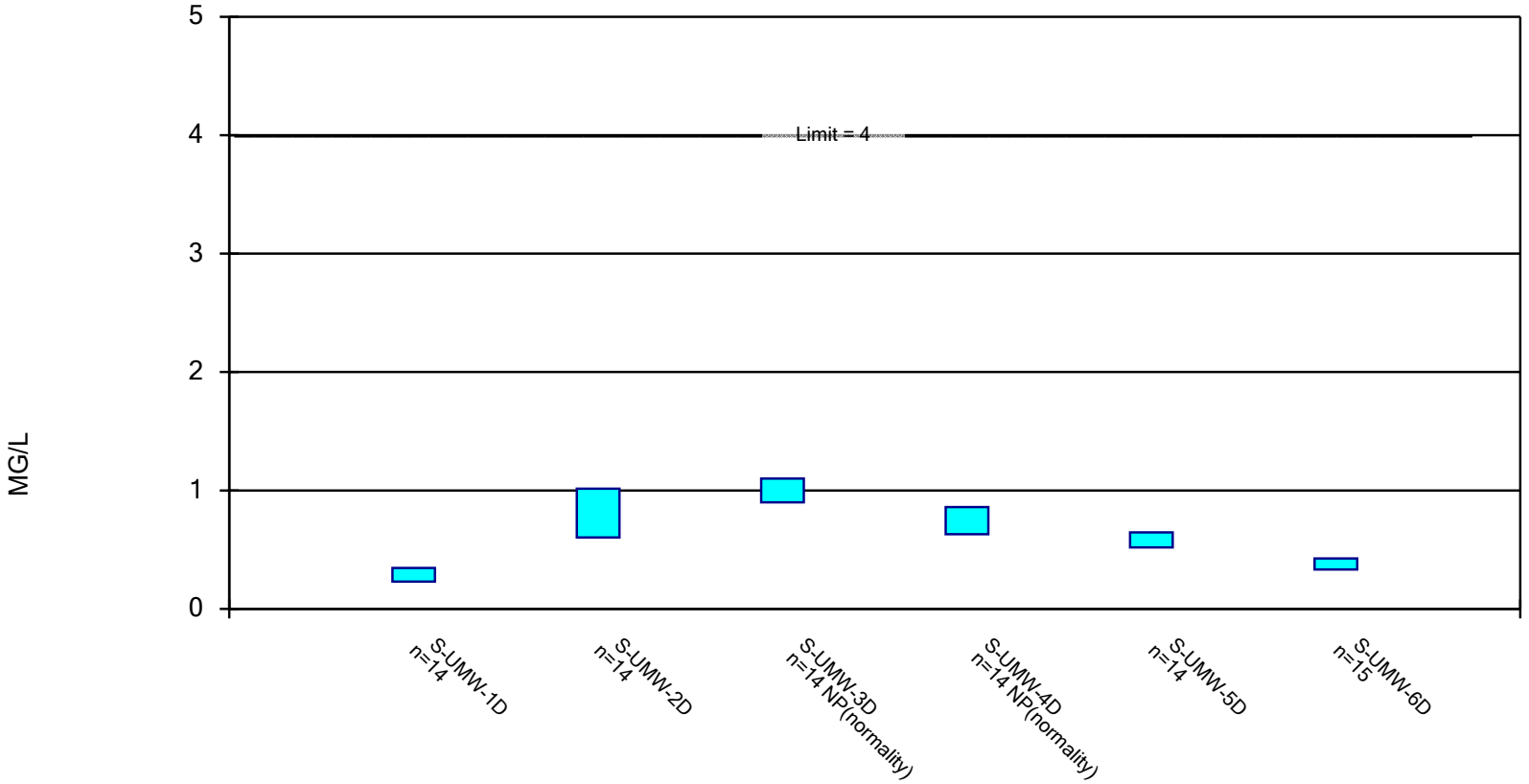


Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

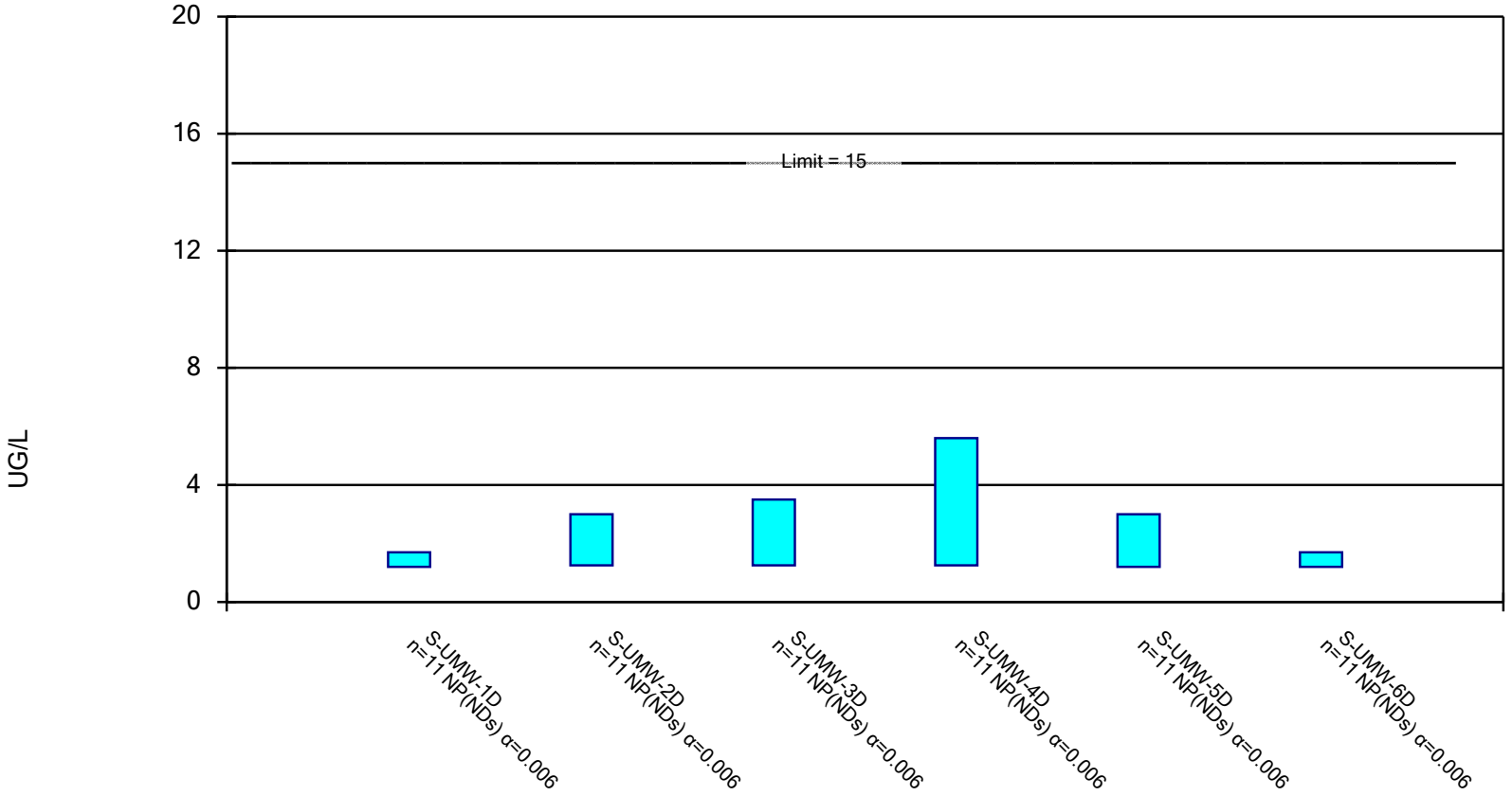


Constituent: FLUORIDE, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

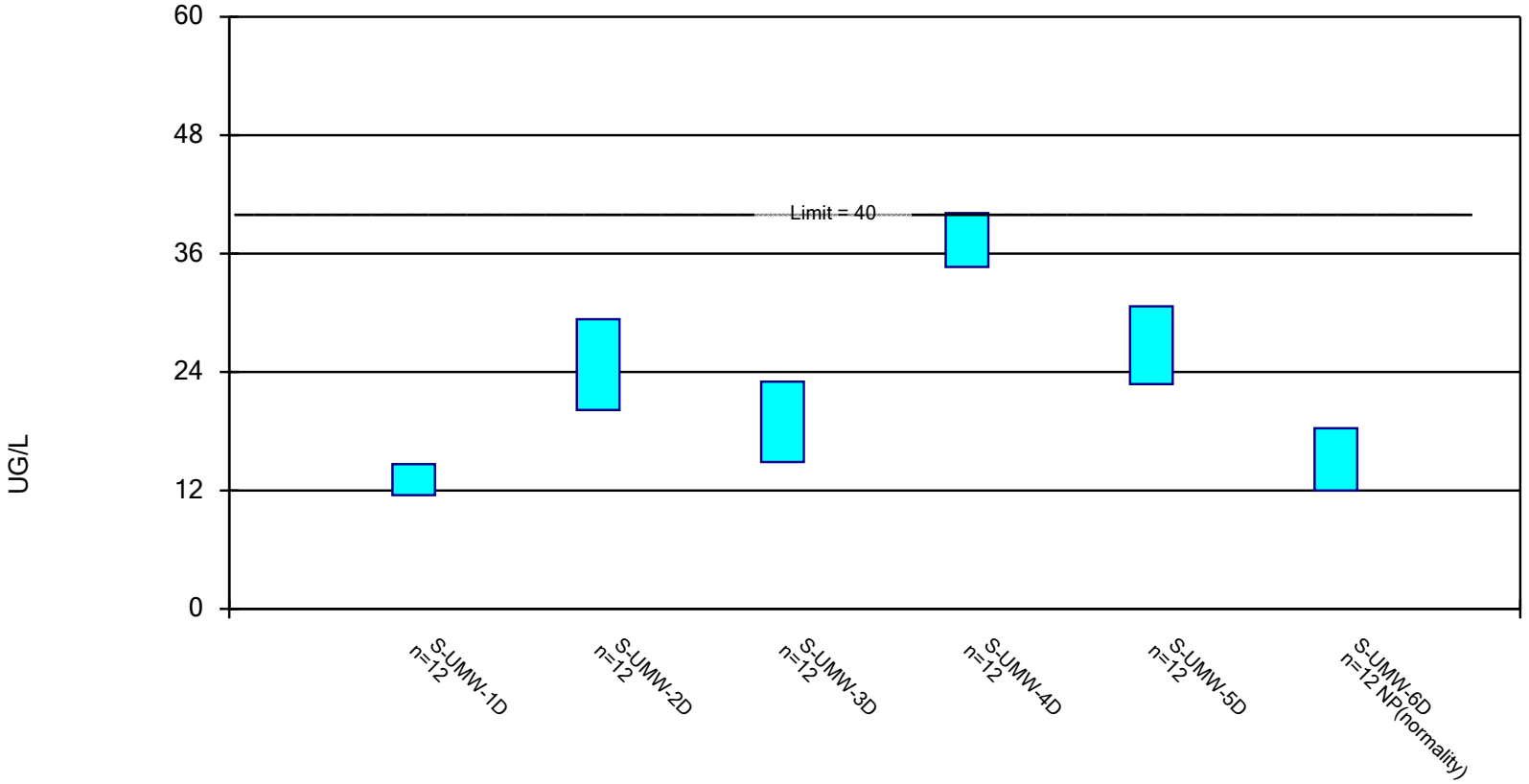


Constituent: LEAD, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

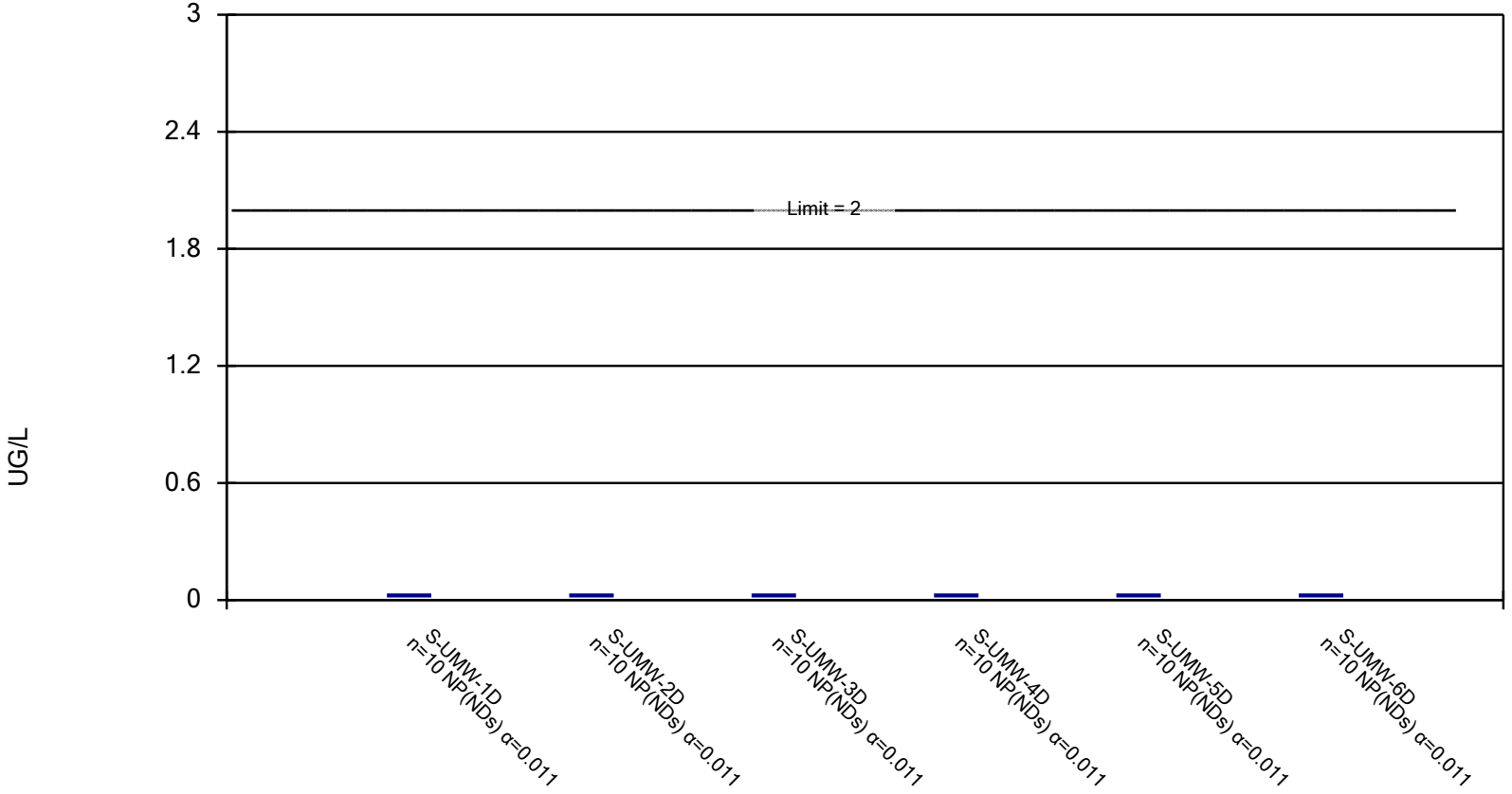


Constituent: LITHIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

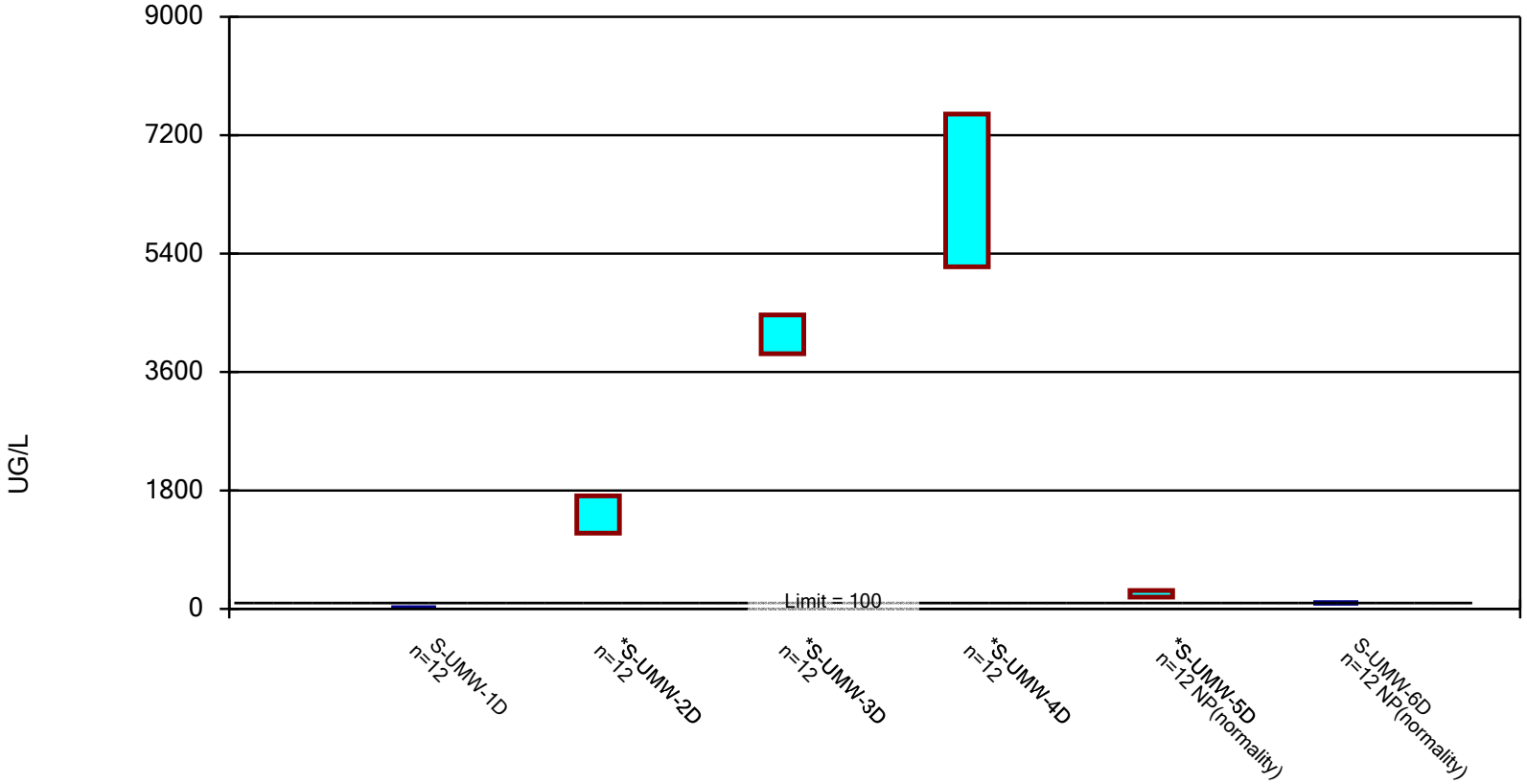


Constituent: MERCURY, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

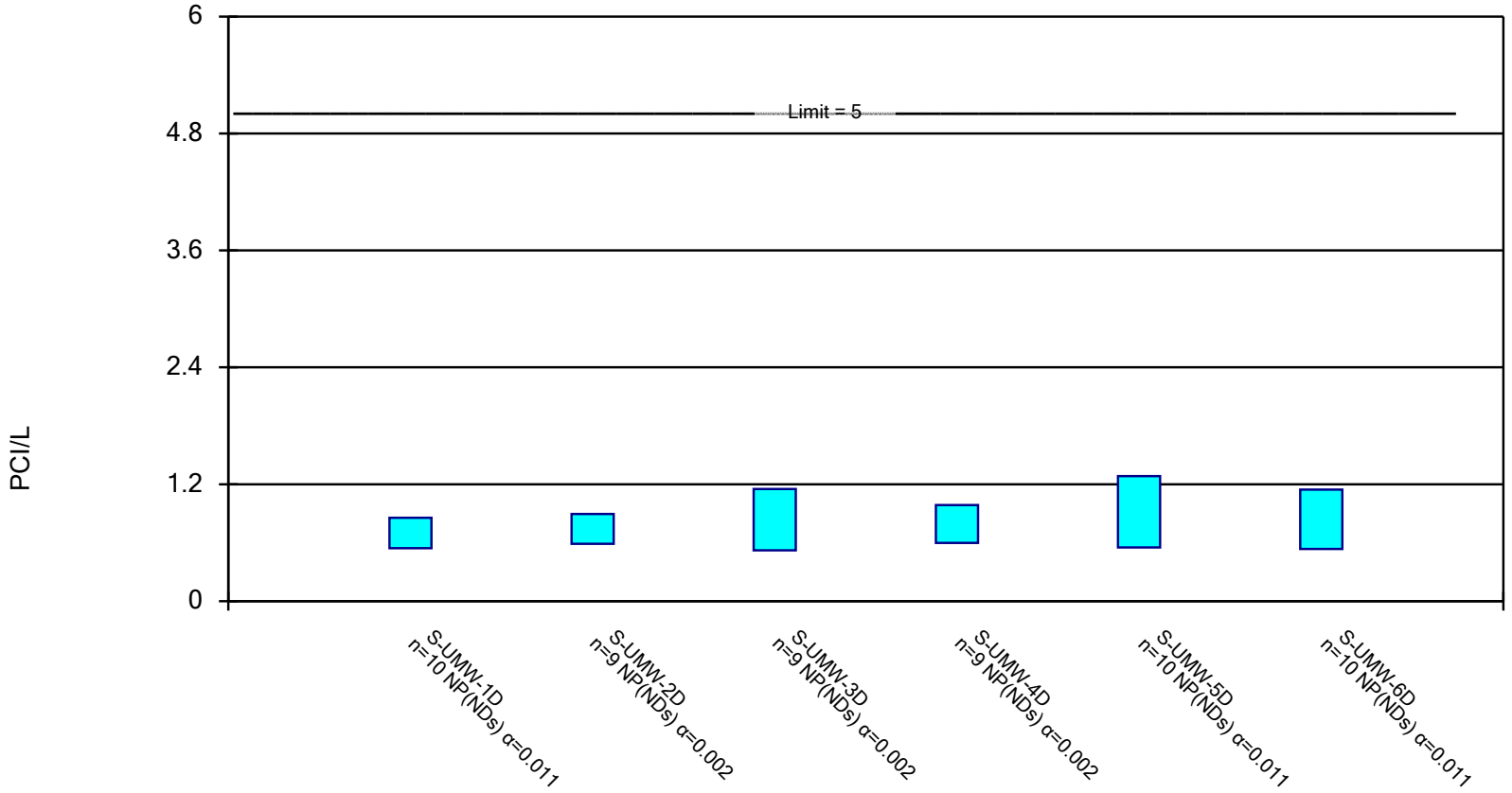


Constituent: MOLYBDENUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

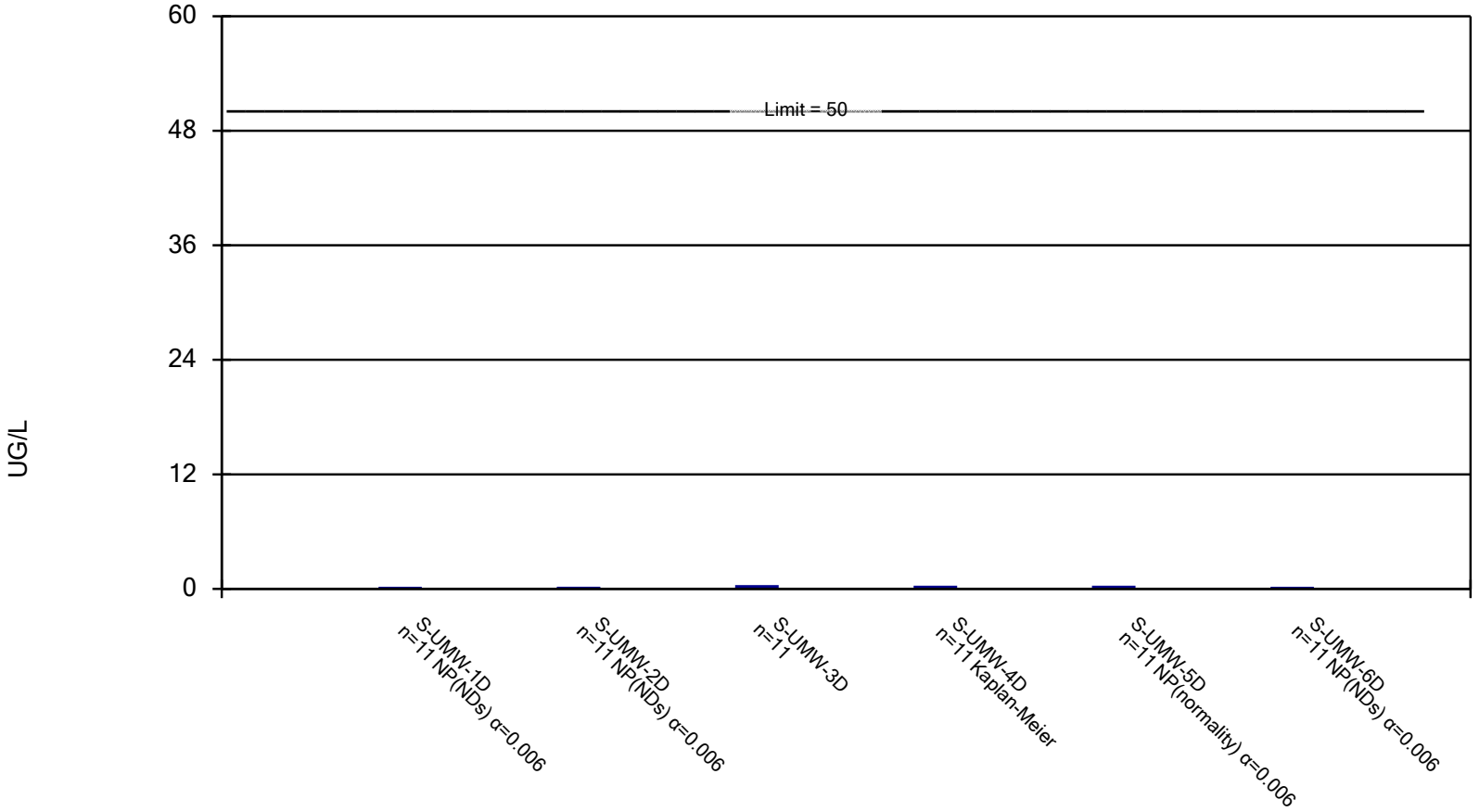


Constituent: RADIUM [226 + 228] Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

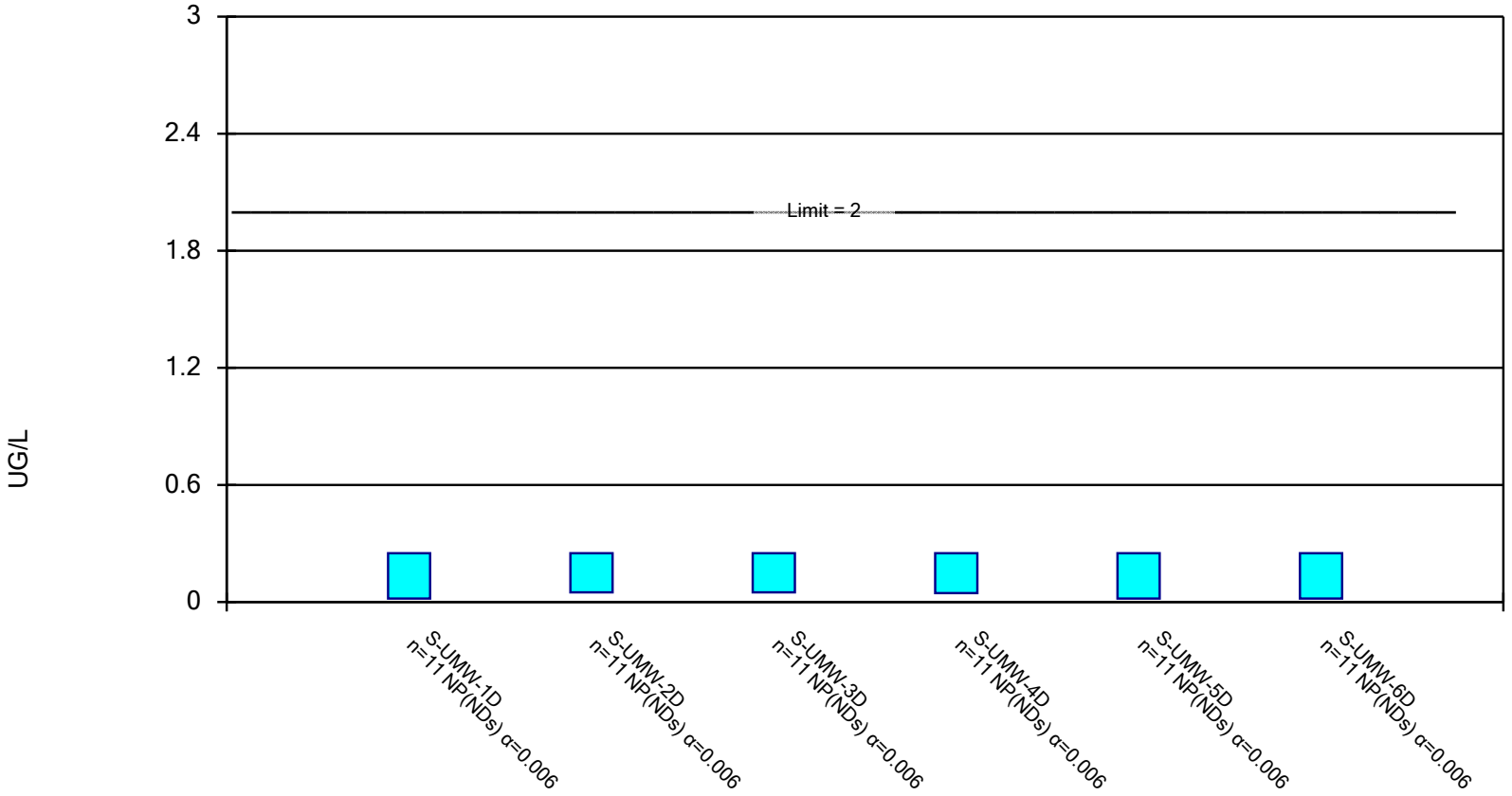


Constituent: SELENIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: THALLIUM, TOTAL Analysis Run 11/19/2019 7:24 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Confidence Interval

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_ Printed 11/19/2019, 7:25 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
ANTIMONY, TOTAL (UG/L)	S-UMW-1D	0.09251	0.03506	6	No	11	36.36	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	S-UMW-2D	0.068	0.029	6	No	11	54.55	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-3D	0.083	0.013	6	No	11	72.73	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-4D	0.039	0.013	6	No	11	90.91	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-5D	0.039	0.013	6	No	11	100	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-6D	0.039	0.013	6	No	11	100	No	0.006	NP (NDs)
ARSENIC, TOTAL (UG/L)	S-UMW-1D	1.286	0.9579	10	No	12	0	ln(x)	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-2D	2.487	1.258	10	No	12	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-3D	0.7023	0.2297	10	No	11	9.091	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-4D	0.4374	0.09819	10	No	11	27.27	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-5D	0.6824	0.3069	10	No	12	8.333	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-6D	0.4296	0.1647	10	No	12	8.333	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-1D	161.6	119	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-2D	114.6	72.44	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-3D	83.94	70.81	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-4D	83.73	63.19	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-5D	324.5	265.5	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-6D	134.8	114.9	2000	No	11	0	No	0.01	Param.
BERYLLIUM, TOTAL (UG/L)	S-UMW-1D	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-2D	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-3D	0.13	0.08	4	No	11	90.91	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-4D	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-5D	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-6D	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-1D	0.046	0.009	5	No	11	81.82	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-2D	0.29	0.0145	5	No	11	54.55	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-3D	0.6463	0.03525	5	No	11	36.36	ln(x)	0.01	Param.
CADMIUM, TOTAL (UG/L)	S-UMW-4D	0.7703	0.03339	5	No	11	36.36	ln(x)	0.01	Param.
CADMIUM, TOTAL (UG/L)	S-UMW-5D	0.054	0.009	5	No	11	63.64	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-6D	0.031	0.009	5	No	11	72.73	No	0.006	NP (NDs)
CHROMIUM, TOTAL (UG/L)	S-UMW-1D	0.5453	0.09564	100	No	11	36.36	ln(x)	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-2D	0.4576	0.07805	100	No	11	36.36	ln(x)	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-3D	0.459	0.06863	100	No	11	45.45	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-4D	0.4	0.027	100	No	11	54.55	No	0.006	NP (NDs)
CHROMIUM, TOTAL (UG/L)	S-UMW-5D	0.56	0.027	100	No	11	45.45	No	0.006	NP (normality)
CHROMIUM, TOTAL (UG/L)	S-UMW-6D	0.67	0.027	100	No	11	54.55	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-1D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-2D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-3D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-4D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-5D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-6D	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
FLUORIDE, TOTAL (MG/L)	S-UMW-1D	0.346	0.2297	4	No	14	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-2D	1.015	0.6037	4	No	14	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-3D	1.1	0.9	4	No	14	0	No	0.01	NP (normality)
FLUORIDE, TOTAL (MG/L)	S-UMW-4D	0.86	0.63	4	No	14	0	No	0.01	NP (normality)
FLUORIDE, TOTAL (MG/L)	S-UMW-5D	0.6453	0.519	4	No	14	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-6D	0.4262	0.3325	4	No	15	0	No	0.01	Param.
LEAD, TOTAL (UG/L)	S-UMW-1D	1.7	1.2	15	No	11	90.91	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-2D	3	1.25	15	No	11	81.82	No	0.006	NP (NDs)

Confidence Interval

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_ Printed 11/19/2019, 7:25 AM

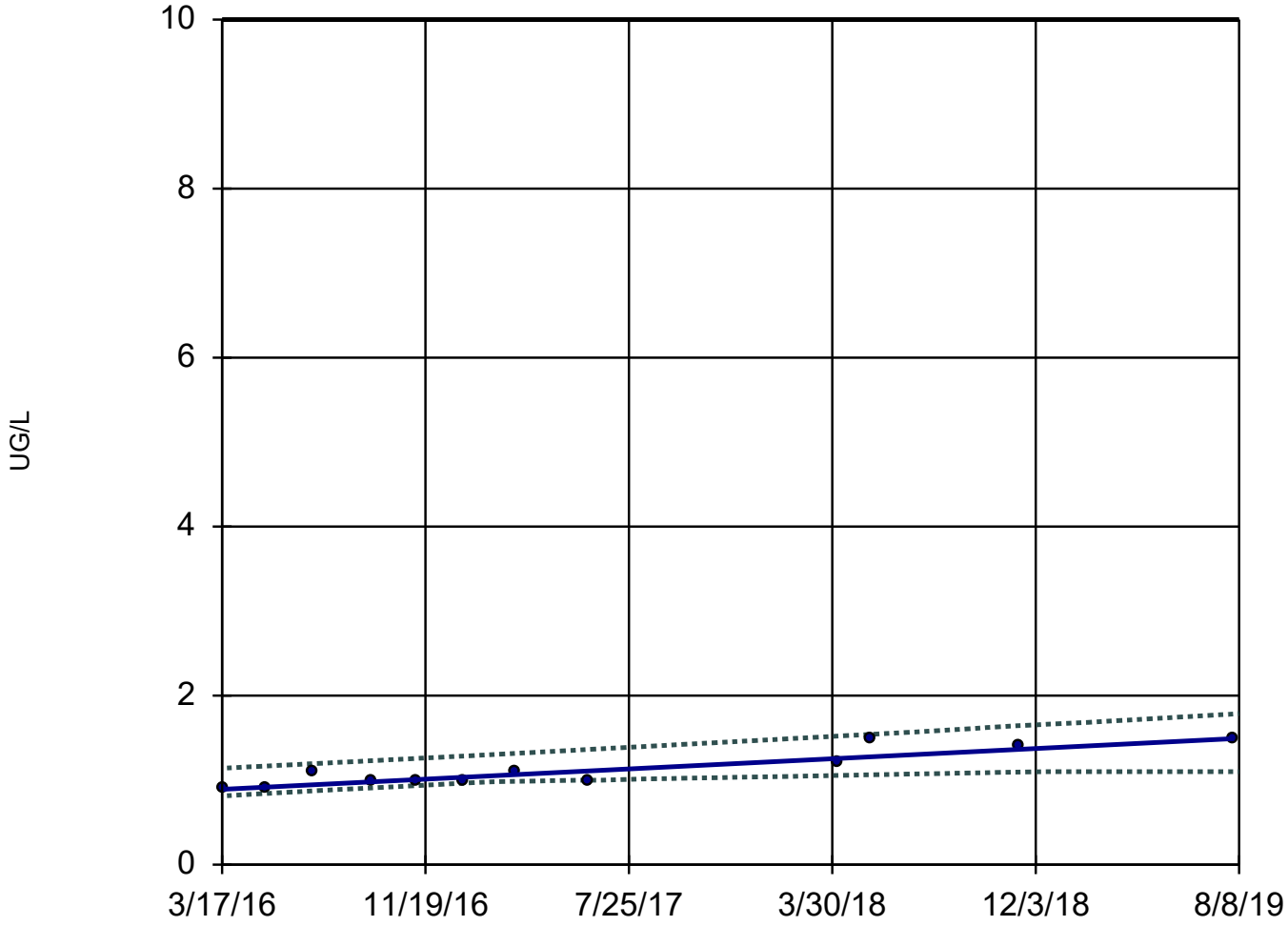
Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
LEAD, TOTAL (UG/L)	S-UMW-3D	3.5	1.25	15	No	11	54.55	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-4D	5.6	1.25	15	No	11	54.55	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-5D	3	1.2	15	No	11	72.73	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-6D	1.7	1.2	15	No	11	90.91	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	S-UMW-1D	14.66	11.52	40	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-2D	29.35	20.15	40	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-3D	23.02	14.88	40	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-4D	40.1	34.65	40	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-5D	30.66	22.78	40	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-6D	18.3	12	40	No	12	0	No	0.01	NP (normality)
MERCURY, TOTAL (UG/L)	S-UMW-1D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-2D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-3D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-4D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-5D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-6D	0.0275	0.0195	2	No	10	100	No	0.011	NP (NDs)
MOLYBDENUM, TOTAL (UG/L)	S-UMW-1D	37.06	26	100	No	12	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-2D**	**1716**	**1152**	**100**	**Yes**	**12**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-3D**	**4469**	**3878**	**100**	**Yes**	**12**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-4D**	**7521**	**5199**	**100**	**Yes**	**12**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-5D**	**280**	**179**	**100**	**Yes**	**12**	**0**	**No**	**0.01**	**NP (normality)**
MOLYBDENUM, TOTAL (UG/L)	S-UMW-6D	114	67.8	100	No	12	0	No	0.01	NP (normality)
RADIUM [226 + 228] (PCI/L)	S-UMW-1D	0.8565	0.543	5	No	10	100	No	0.011	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-2D	0.8955	0.589	5	No	9	100	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-3D	1.151	0.521	5	No	9	88.89	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-4D	0.987	0.5985	5	No	9	100	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-5D	1.283	0.552	5	No	10	70	No	0.011	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-6D	1.145	0.535	5	No	10	90	No	0.011	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-1D	0.09	0.043	50	No	11	90.91	No	0.006	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-2D	0.11	0.09	50	No	11	63.64	No	0.006	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-3D	0.2739	0.1588	50	No	11	9.091	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	S-UMW-4D	0.2196	0.135	50	No	11	18.18	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	S-UMW-5D	0.22	0.09	50	No	11	18.18	No	0.006	NP (normality)
SELENIUM, TOTAL (UG/L)	S-UMW-6D	0.09	0.0425	50	No	11	100	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-1D	0.25	0.018	2	No	11	90.91	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-2D	0.25	0.0495	2	No	11	81.82	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-3D	0.25	0.0495	2	No	11	81.82	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-4D	0.25	0.046	2	No	11	81.82	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-5D	0.25	0.018	2	No	11	90.91	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-6D	0.25	0.018	2	No	11	100	No	0.006	NP (NDs)

APPENDIX B

Sanitas Trending Confidence Band Statistical Output

Sen's Slope and 95% Confidence Band

S-UMW-1D



n = 12

Slope = 0.1778 units per year.

Mann-Kendall statistic = 44
critical = 35

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

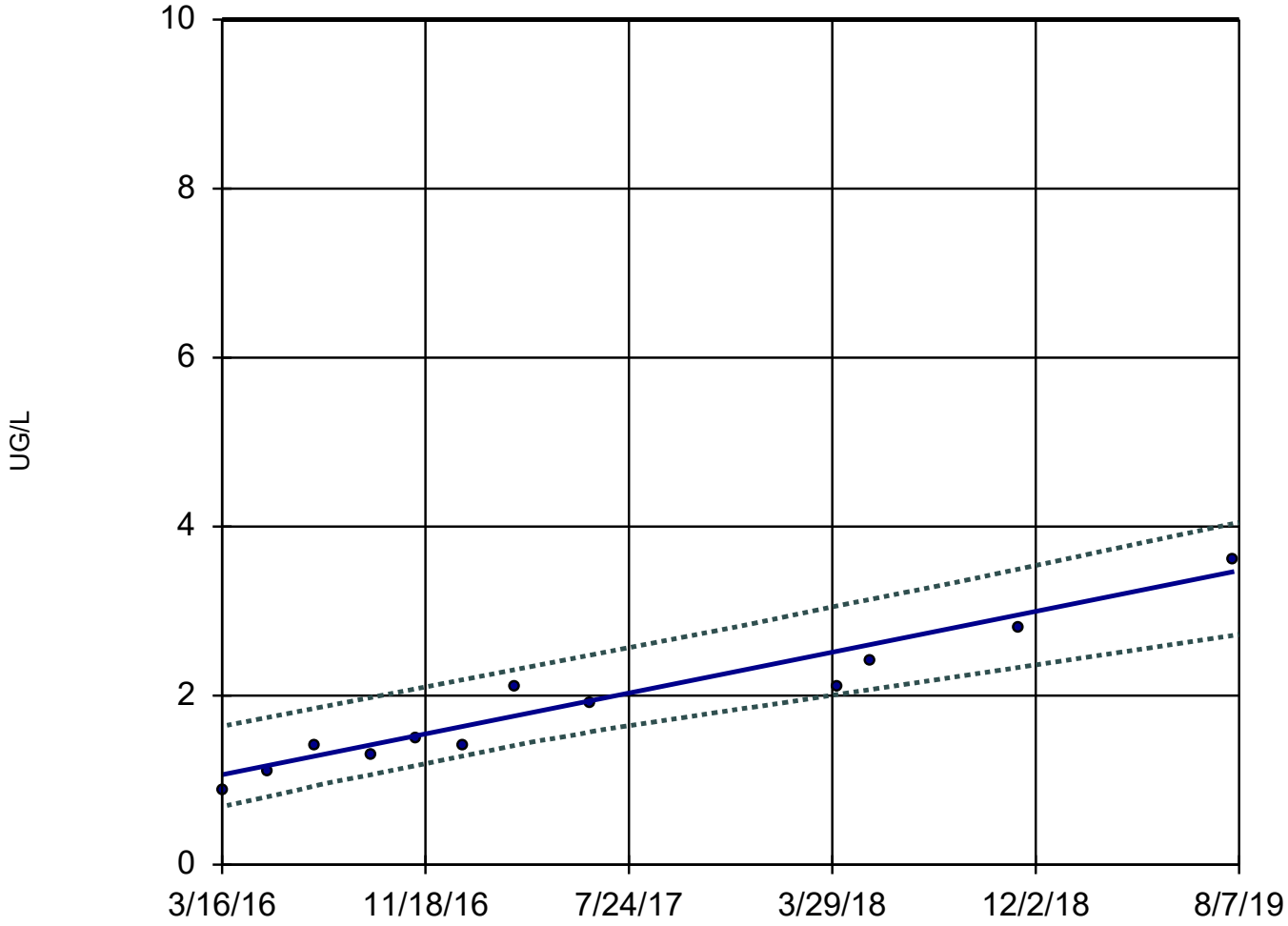
GWPS = 10.

Constituent: ARSENIC, TOTAL Analysis Run 11/19/2019 7:25 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 12

Slope = 0.7121 units per year.

Mann-Kendall statistic = 58
critical = 35

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

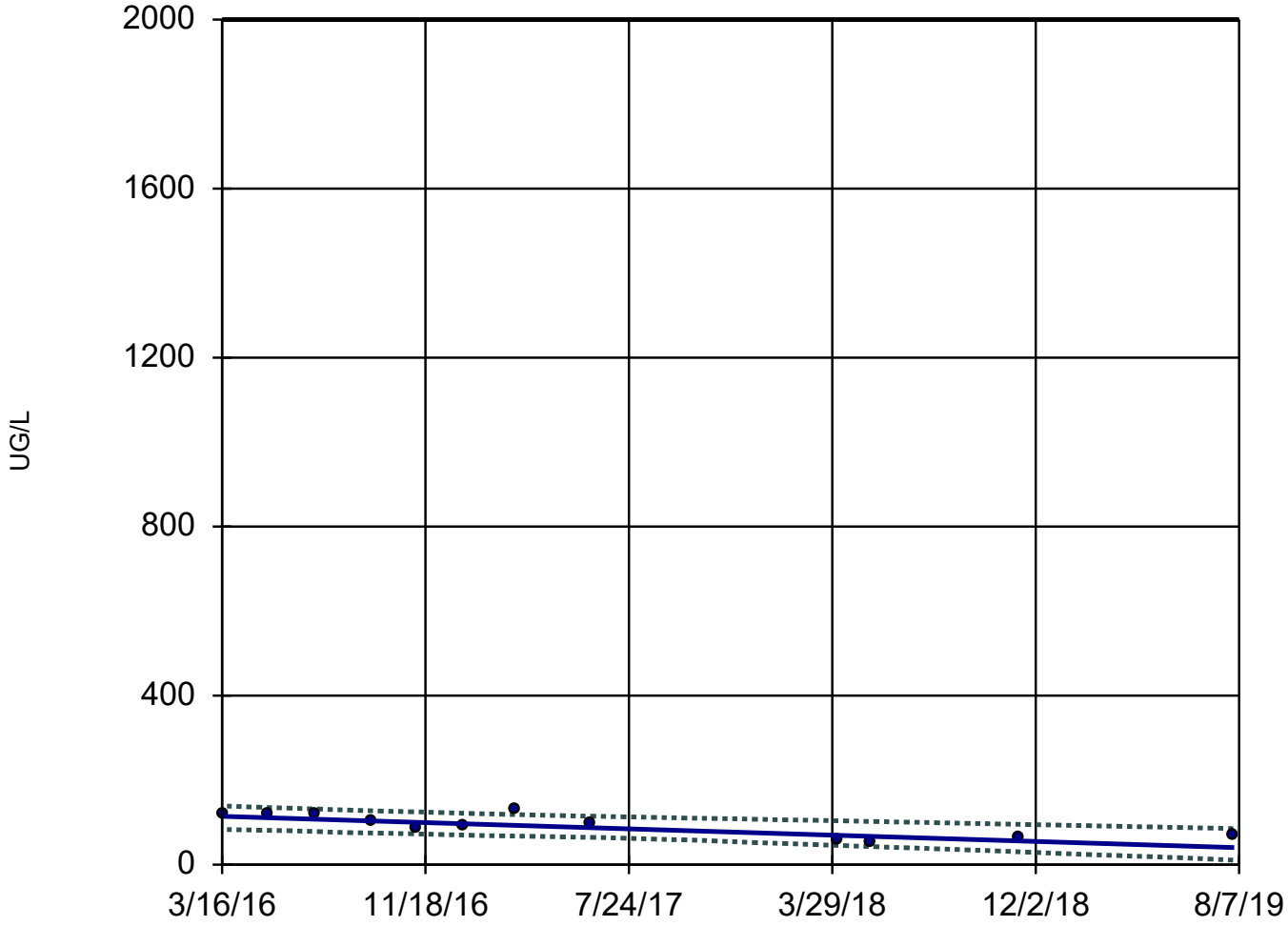
GWPS = 10.

Constituent: ARSENIC, TOTAL Analysis Run 11/19/2019 7:25 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 12

Slope = -21.84 units per year.

Mann-Kendall statistic = -38
critical = -35

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

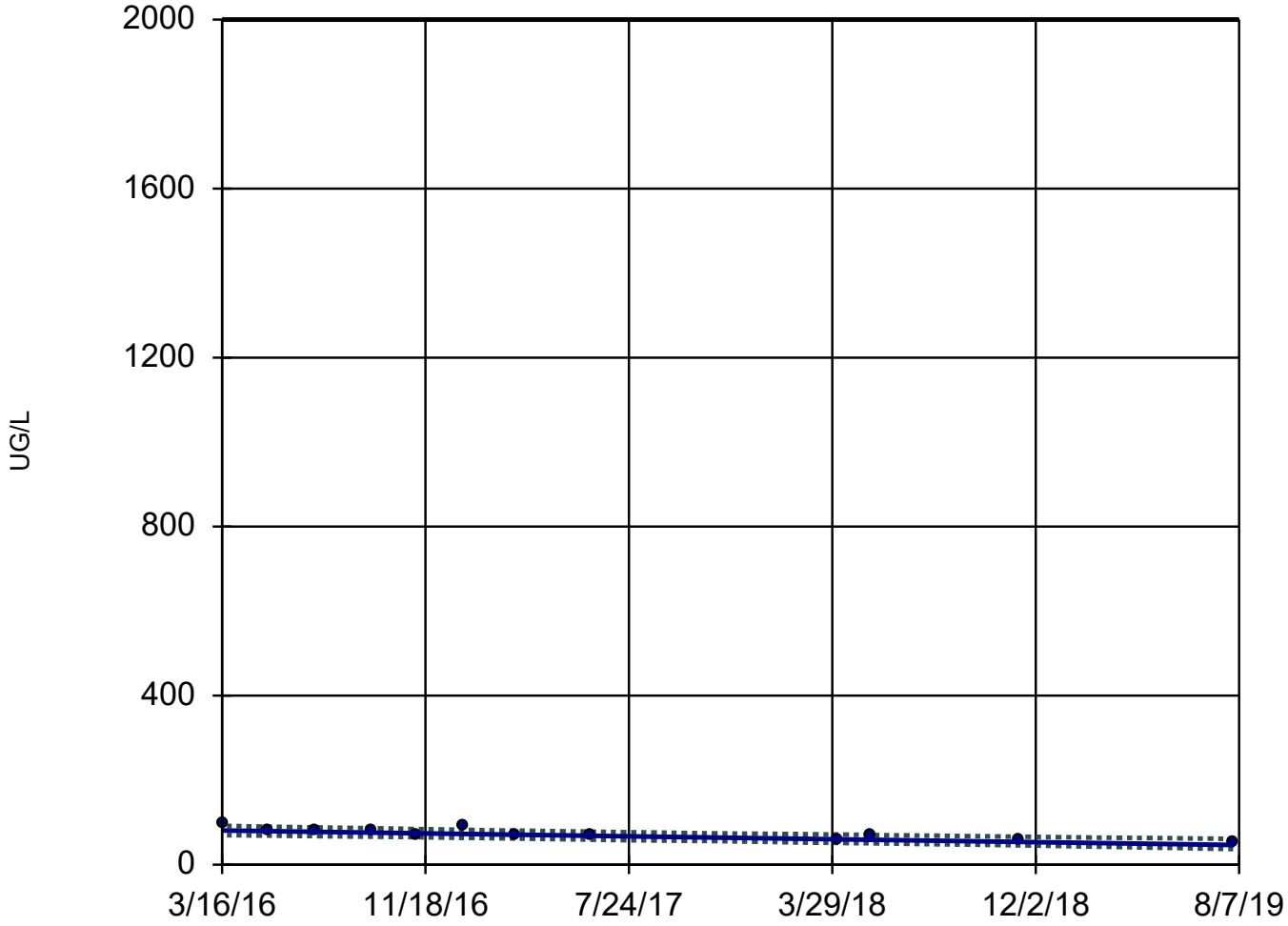
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 12

Slope = -10.1 units per year.

Mann-Kendall statistic = -48
critical = -35

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 2000.

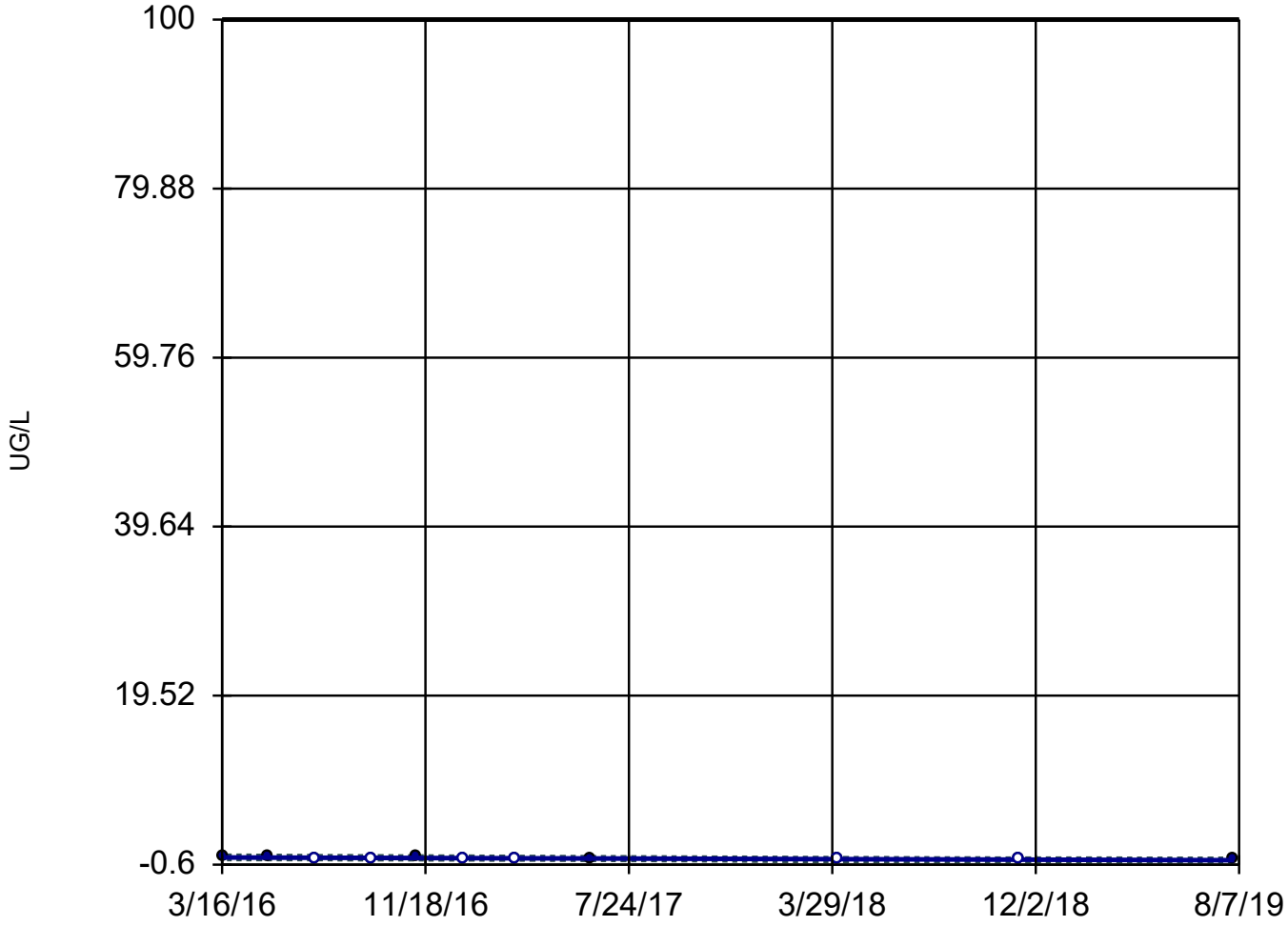
Constituent: BARIUM, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 11

Slope = -0.09519 units per year.

Mann-Kendall statistic = -33
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 100.

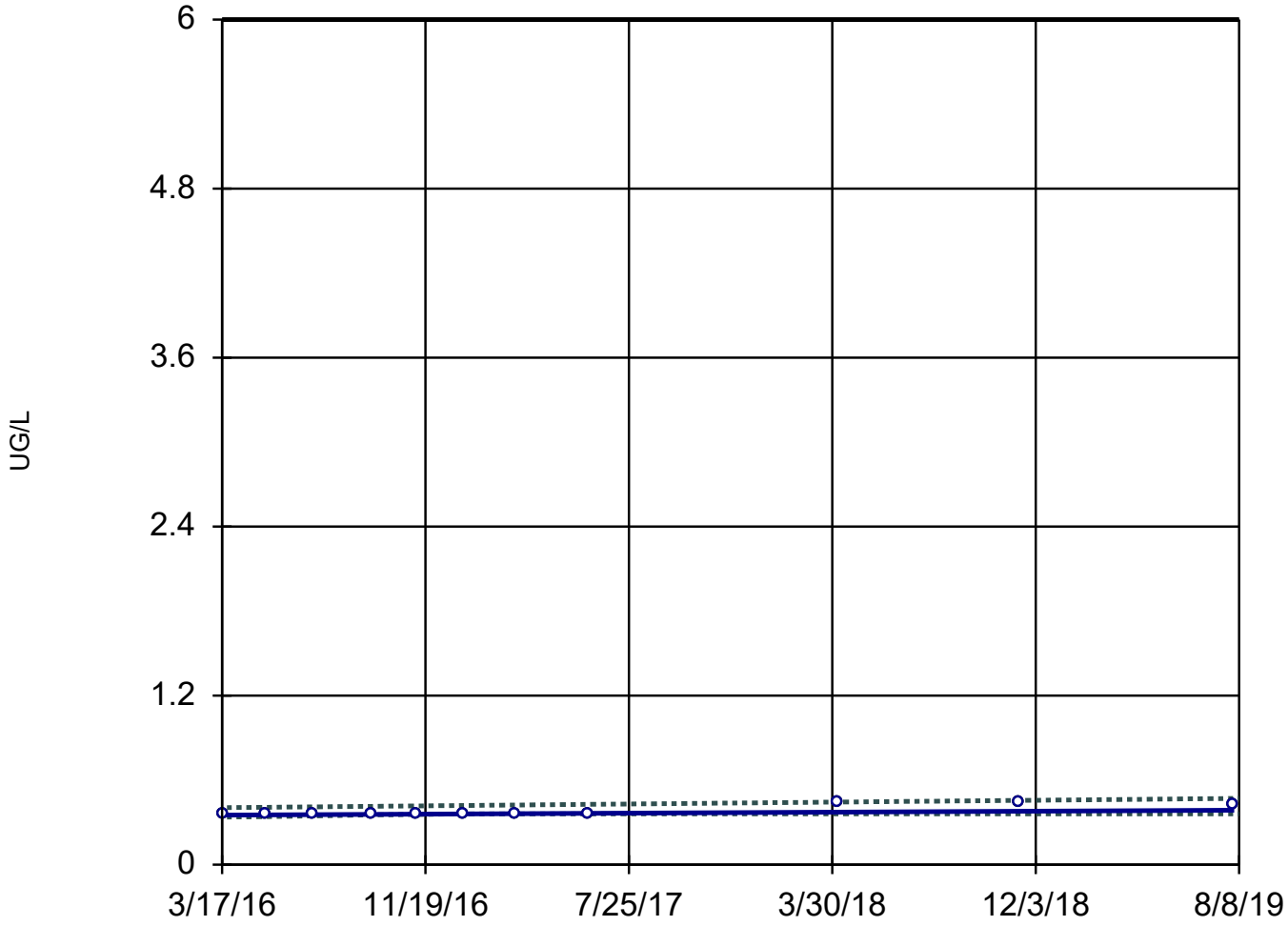
Constituent: CHROMIUM, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-1D



n = 11

Slope = 0.01043 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 6.

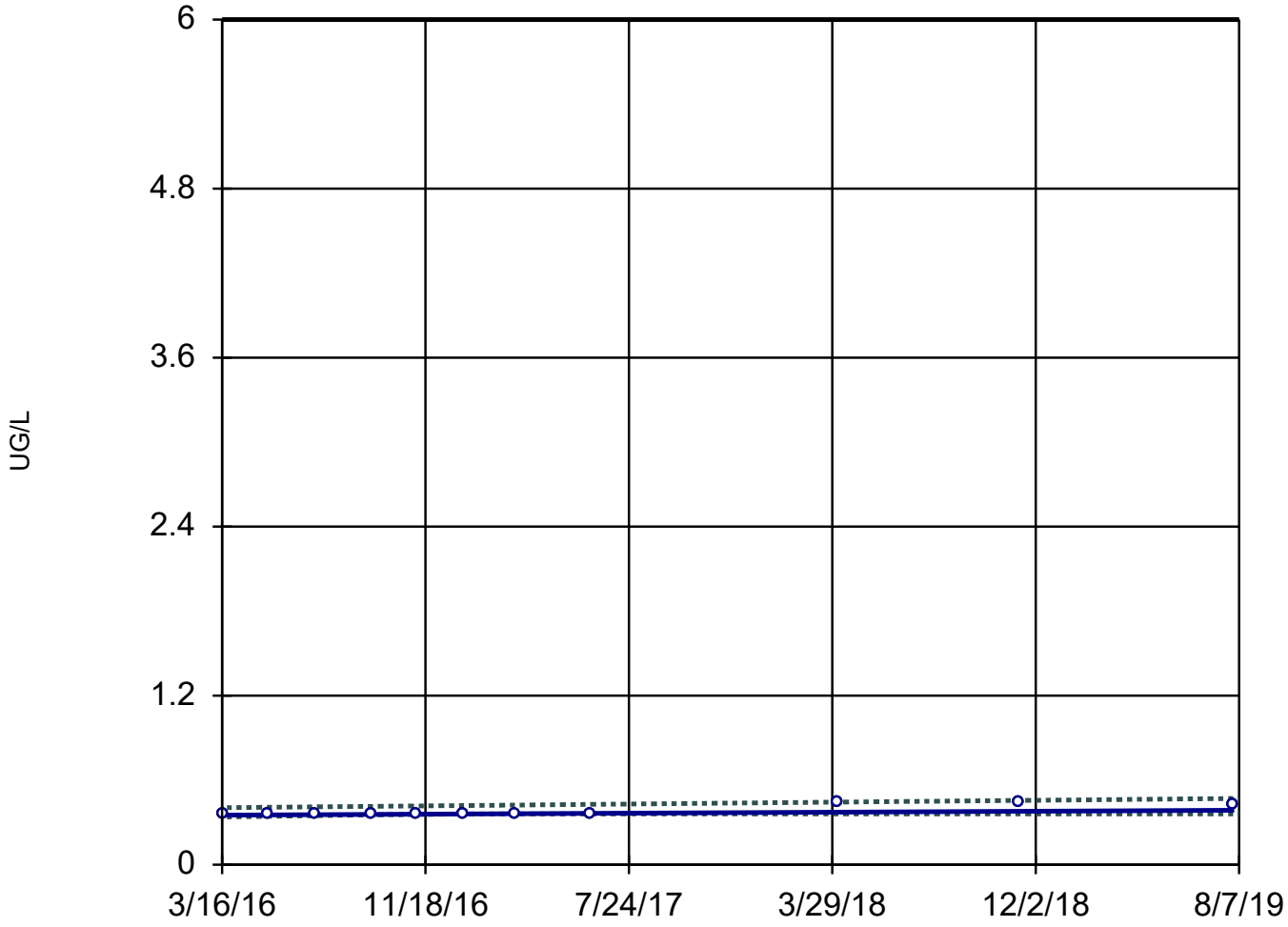
Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 11

Slope = 0.01037 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 6.

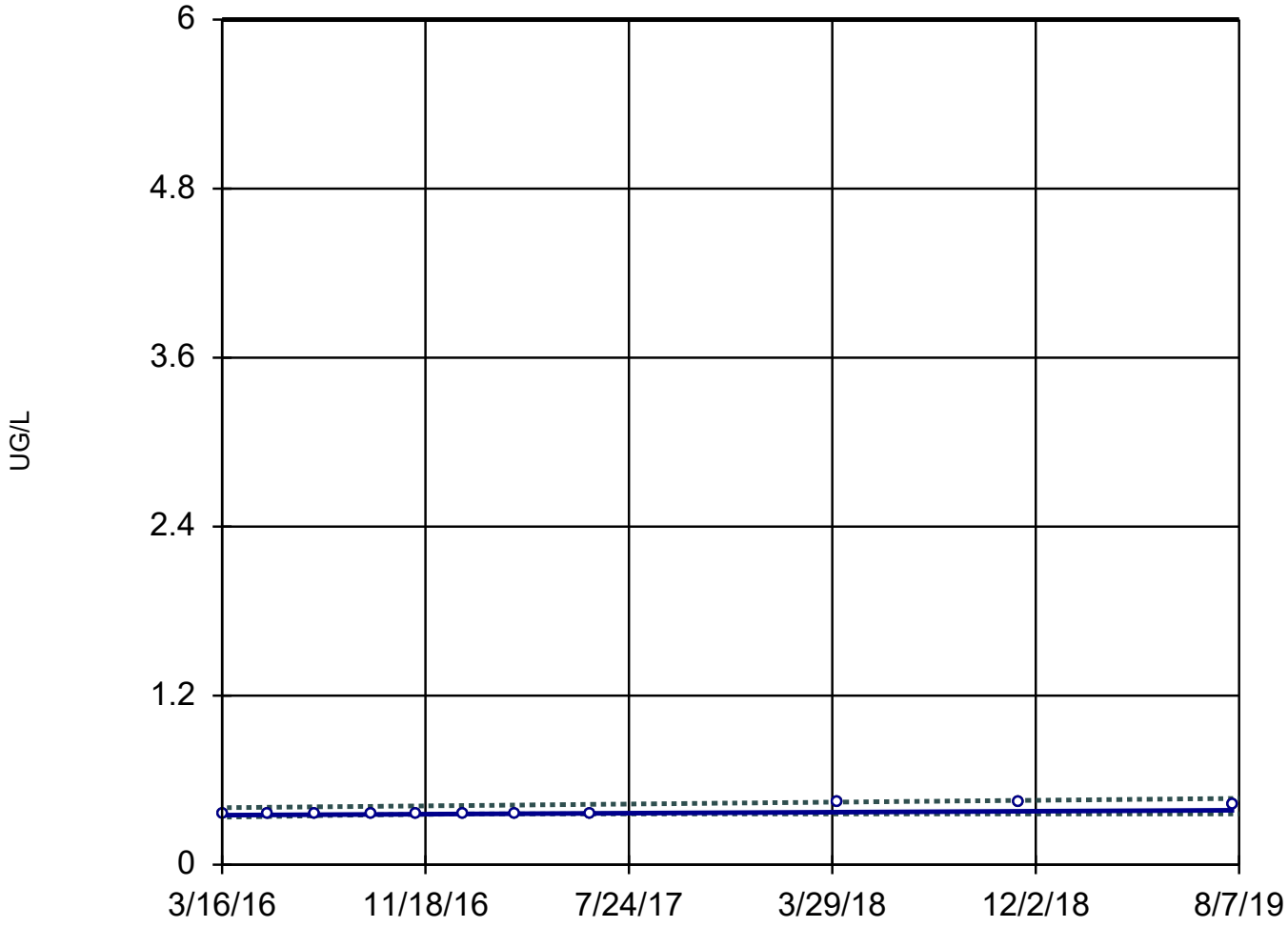
Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sanitas™ v.9.6.23 For the statistical analyses of ground water by Golder Associates only. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-3D



n = 11

Slope = 0.01037 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 6.

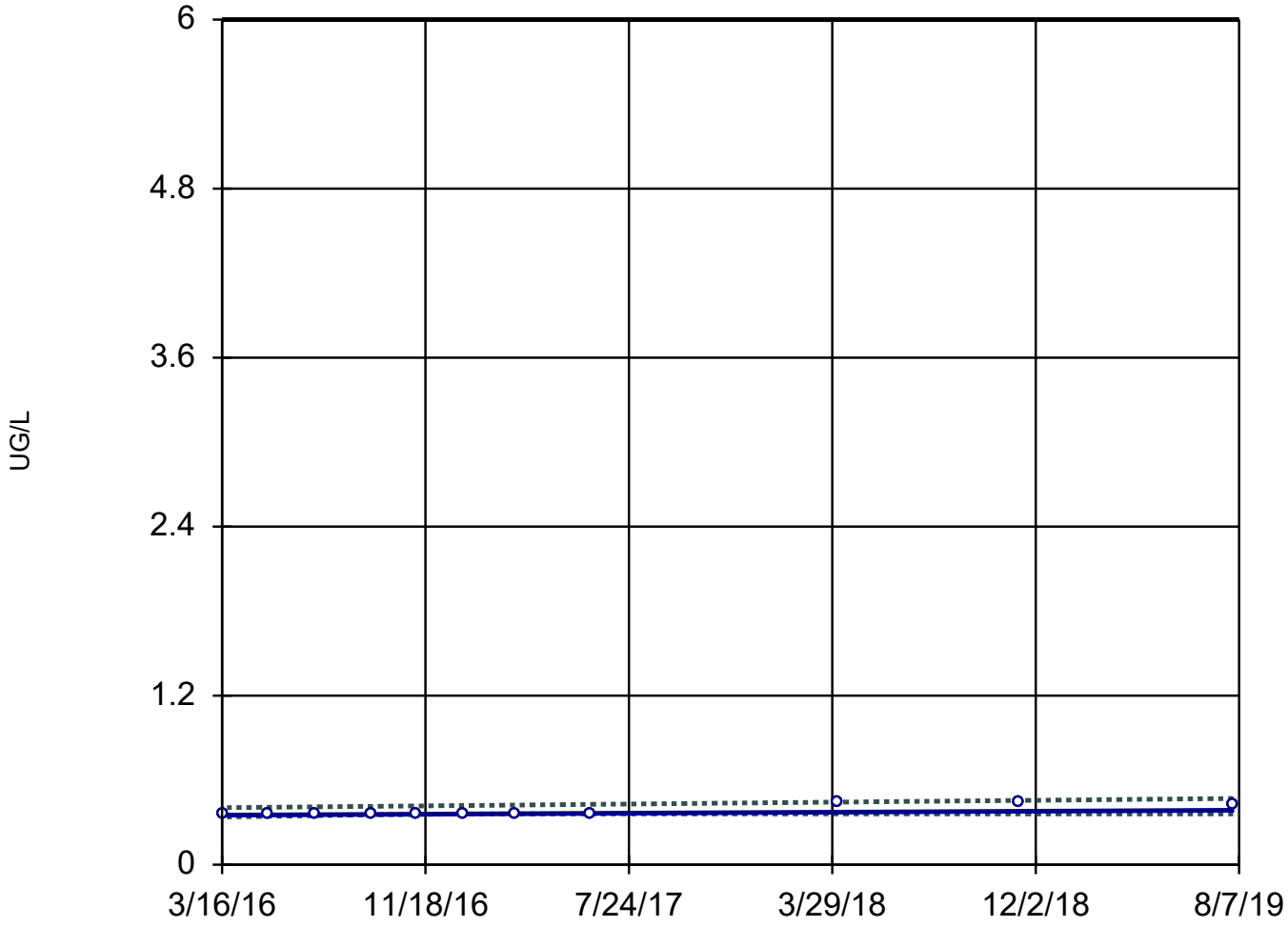
Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sanitas™ v.9.6.23 For the statistical analyses of ground water by Golder Associates only. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 11

Slope = 0.01037 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 6.

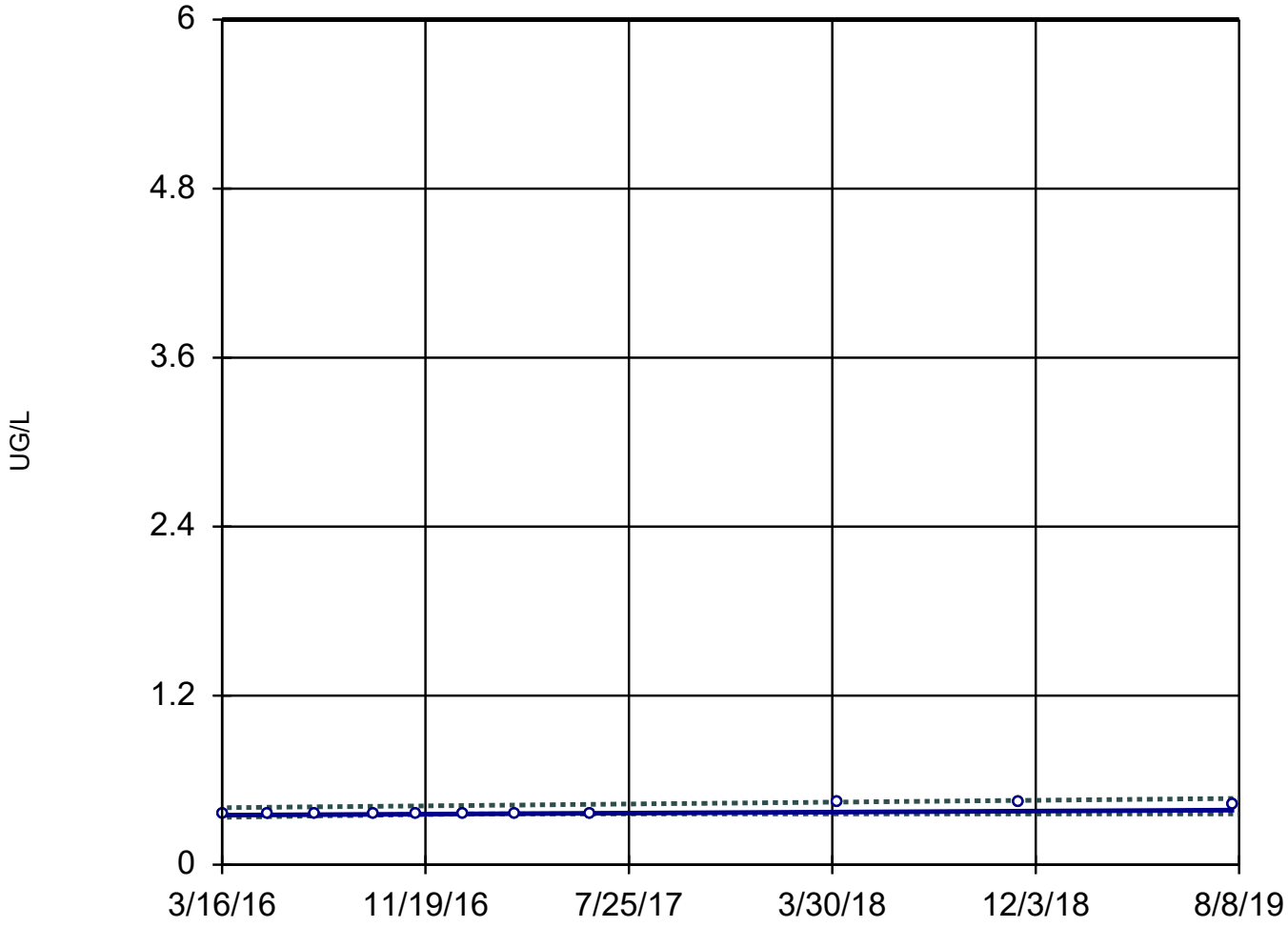
Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 11

Slope = 0.01055 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 6.

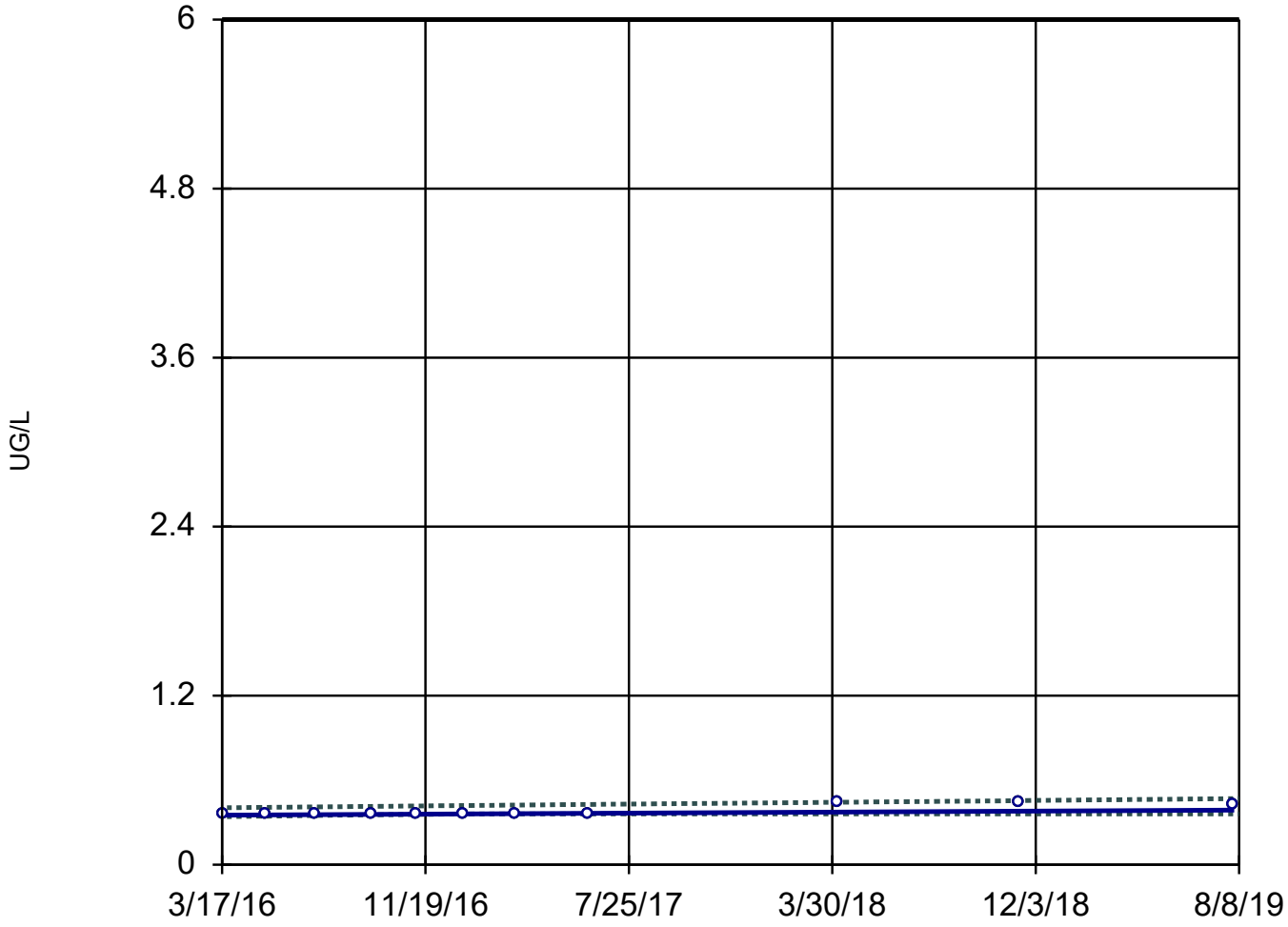
Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sanitas™ v.9.6.23 For the statistical analyses of ground water by Golder Associates only. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-6D



n = 11

Slope = 0.01055 units per year.

Mann-Kendall statistic = 34
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

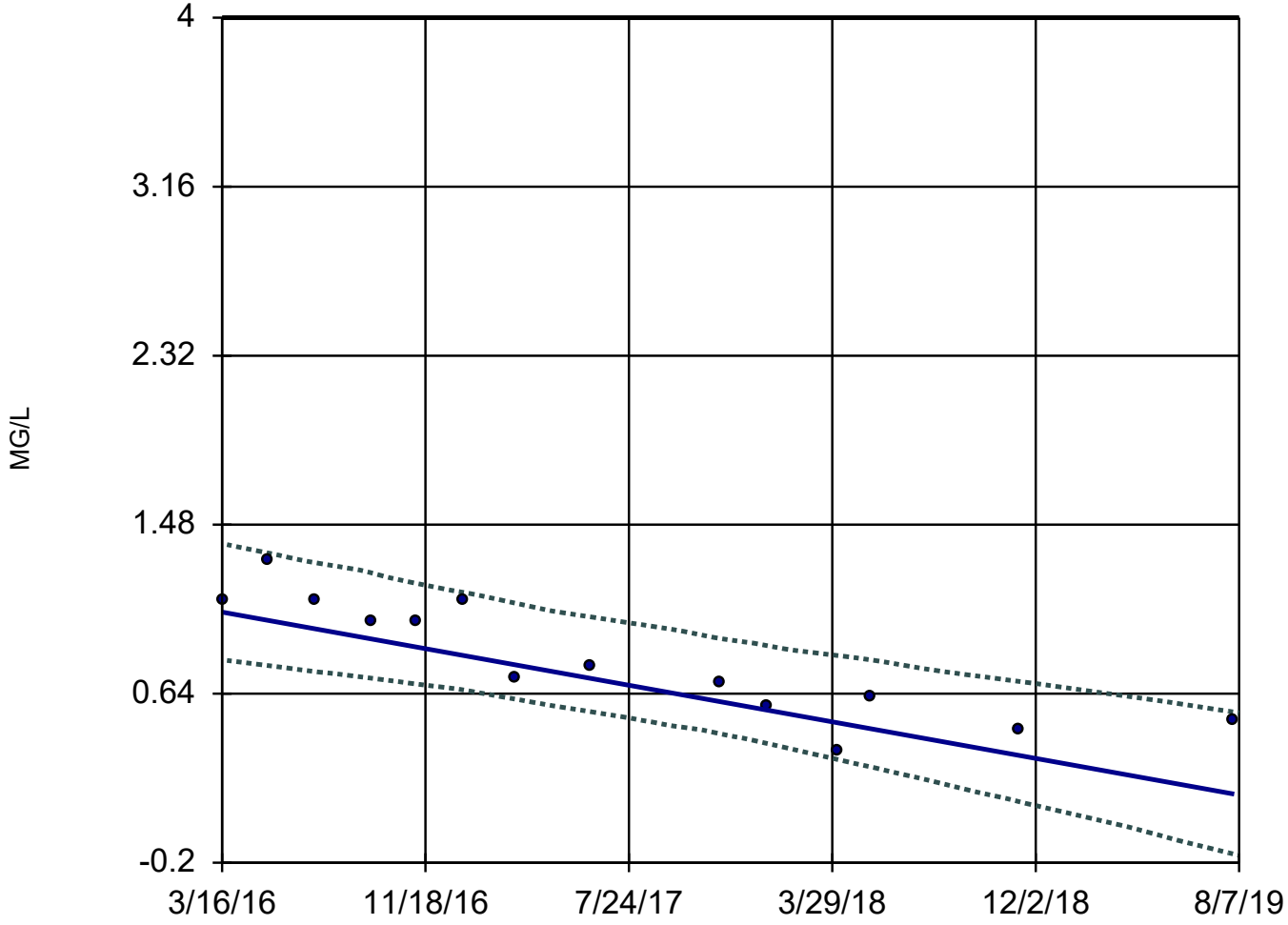
GWPS = 6.

Constituent: COBALT, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 14

Slope = -0.2678 units per year.

Mann-Kendall statistic = -69
critical = -44

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

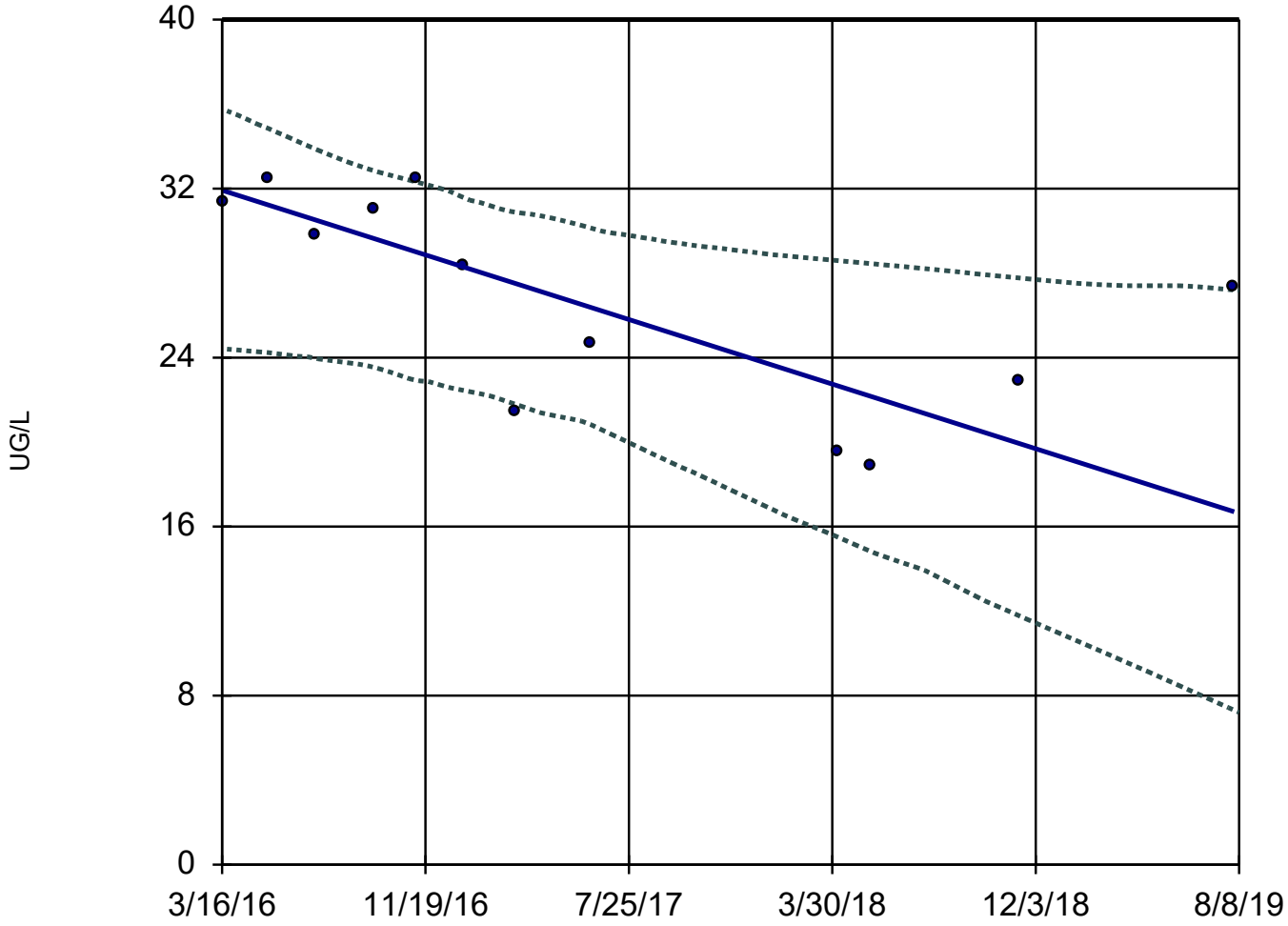
GWPS = 4.

Constituent: FLUORIDE, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 12

Slope = -4.503 units per year.

Mann-Kendall statistic = -37
critical = -35

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

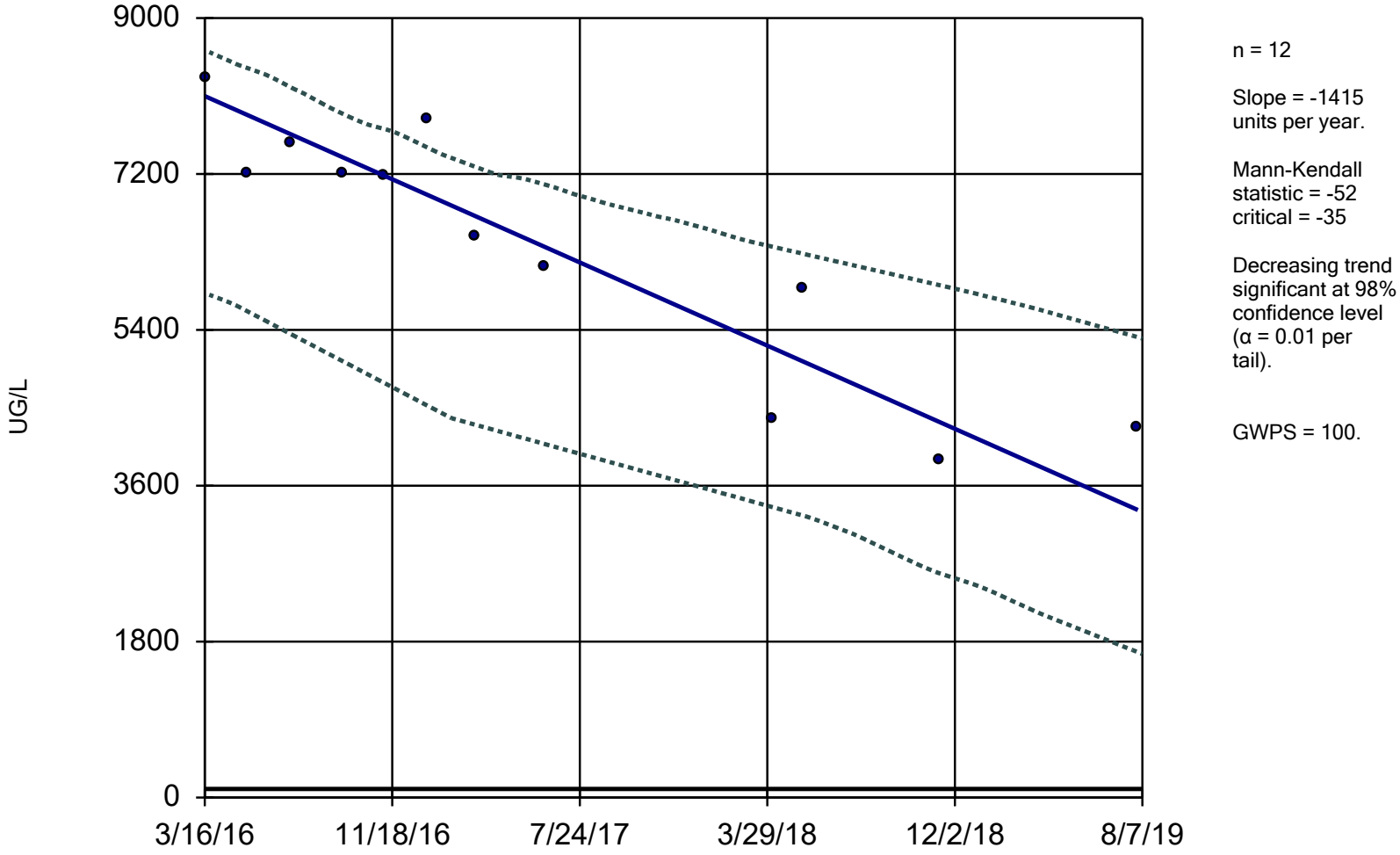
GWPS = 40.

Constituent: LITHIUM, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 12

Slope = -1415 units per year.

Mann-Kendall statistic = -52 critical = -35

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 100.

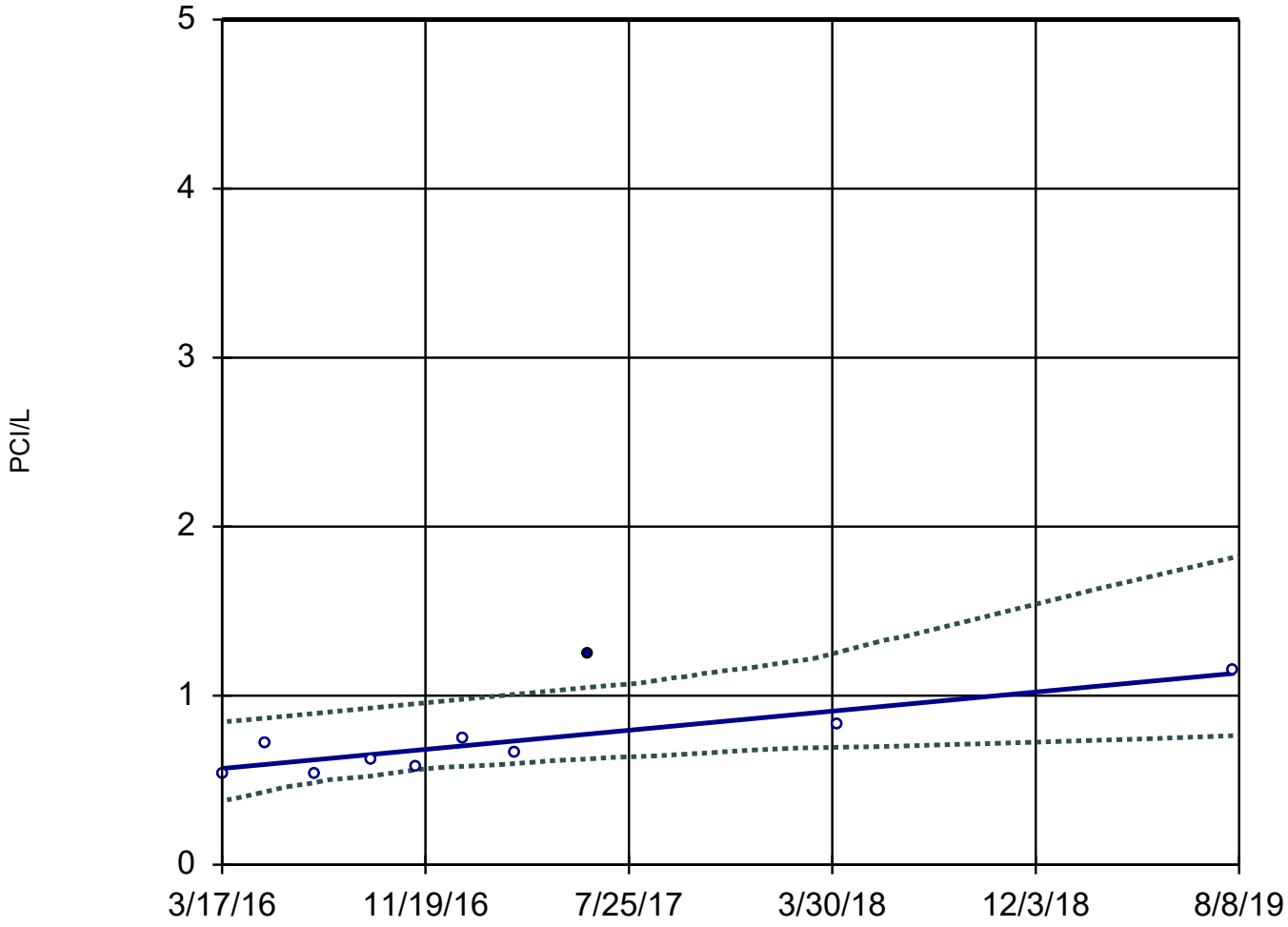
Constituent: MOLYBDENUM, TOTAL Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-6D



n = 10

Slope = 0.1665 units per year.

Mann-Kendall statistic = 28
critical = 27

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 5.

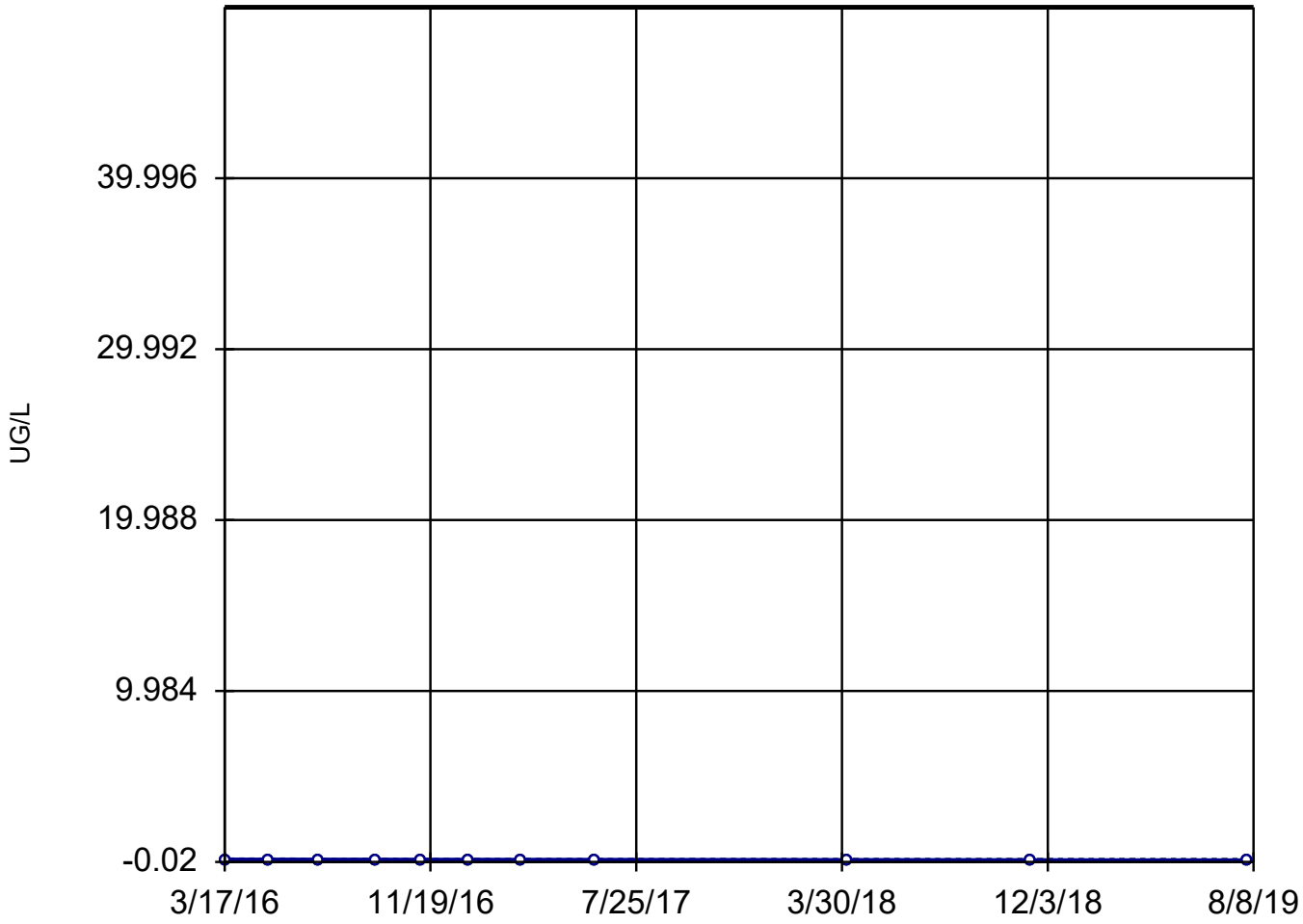
Constituent: RADIUM [226 + 228] Analysis Run 11/19/2019 7:26 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-6D



n = 11

Slope = -0.01547 units per year.

Mann-Kendall statistic = -36
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 50.

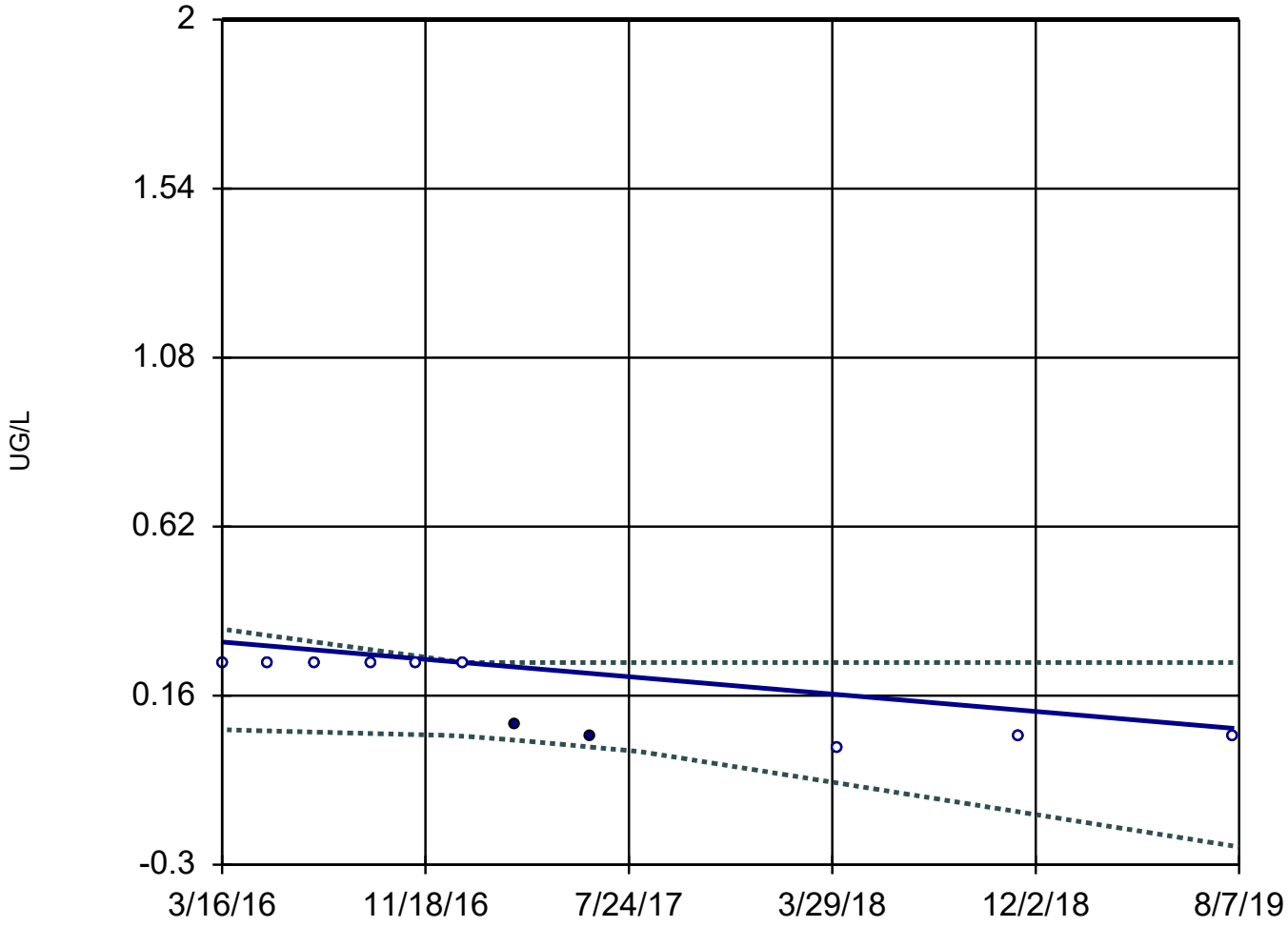
Constituent: SELENIUM, TOTAL Analysis Run 11/19/2019 7:27 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-UMW-3D



n = 11

Slope = -0.06963 units per year.

Mann-Kendall statistic = -35
critical = -31

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

GWPS = 2.

Constituent: THALLIUM, TOTAL Analysis Run 11/19/2019 7:27 AM

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_

Trend Test

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_ Printed 11/19/2019, 7:27 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
ANTIMONY, TOTAL (UG/L)	S-UMW-1D	-0.02823	-20	-31	No	11	36.36	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	S-UMW-2D	0	0	31	No	11	54.55	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	S-UMW-3D	0	-7	-31	No	11	72.73	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	S-UMW-4D	0	8	31	No	11	90.91	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	S-UMW-5D	0	0	31	No	11	100	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	S-UMW-6D	0	0	31	No	11	100	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	**S-UMW-1D**	**0.1778**	**44**	**35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
ARSENIC, TOTAL (UG/L)	**S-UMW-2D**	**0.7121**	**58**	**35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
ARSENIC, TOTAL (UG/L)	S-UMW-3D	-0.08831	-8	-31	No	11	9.091	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	S-UMW-4D	-0.139	-14	-31	No	11	27.27	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	S-UMW-5D	-0.1207	-26	-35	No	12	8.333	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	S-UMW-6D	0.03203	10	35	No	12	8.333	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	S-UMW-1D	-11.53	-20	-35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	**S-UMW-2D**	**-21.84**	**-38**	**-35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
BARIUM, TOTAL (UG/L)	S-UMW-3D	0.09785	0	35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	**S-UMW-4D**	**-10.1**	**-48**	**-35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
BARIUM, TOTAL (UG/L)	S-UMW-5D	-27.57	-31	-35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	S-UMW-6D	-1.573	-1	-31	No	11	0	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-1D	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-2D	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-3D	0	-15	-31	No	11	90.91	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-4D	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-5D	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	S-UMW-6D	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-1D	0	11	31	No	11	81.82	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-2D	0.08692	29	31	No	11	54.55	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-3D	0.3923	30	31	No	11	36.36	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-4D	0.3684	25	31	No	11	36.36	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-5D	0.01254	16	31	No	11	63.64	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	S-UMW-6D	0.000751	12	31	No	11	72.73	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	S-UMW-1D	-0.0382	-6	-31	No	11	36.36	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	S-UMW-2D	-0.06671	-26	-31	No	11	36.36	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	S-UMW-3D	-0.06166	-14	-31	No	11	45.45	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	**S-UMW-4D**	**-0.09519**	**-33**	**-31**	**Yes**	**11**	**54.55**	**n/a**	**n/a**	**0.02**	**NP**
CHROMIUM, TOTAL (UG/L)	S-UMW-5D	-0.191	-26	-31	No	11	45.45	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	S-UMW-6D	-0.09205	-23	-31	No	11	54.55	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	**S-UMW-1D**	**0.01043**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
COBALT, TOTAL (UG/L)	**S-UMW-2D**	**0.01037**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
COBALT, TOTAL (UG/L)	**S-UMW-3D**	**0.01037**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
COBALT, TOTAL (UG/L)	**S-UMW-4D**	**0.01037**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
COBALT, TOTAL (UG/L)	**S-UMW-5D**	**0.01055**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
COBALT, TOTAL (UG/L)	**S-UMW-6D**	**0.01055**	**34**	**31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
FLUORIDE, TOTAL (MG/L)	S-UMW-1D	0	2	44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	**S-UMW-2D**	**-0.2678**	**-69**	**-44**	**Yes**	**14**	**0**	**n/a**	**n/a**	**0.02**	**NP**
FLUORIDE, TOTAL (MG/L)	S-UMW-3D	-0.01848	-24	-44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	S-UMW-4D	-0.05123	-38	-44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	S-UMW-5D	-0.02786	-15	-44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	S-UMW-6D	0.02286	25	48	No	15	0	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	S-UMW-1D	0	5	31	No	11	90.91	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	S-UMW-2D	0	8	31	No	11	81.82	n/a	n/a	0.02	NP

Trend Test

Sioux E.C. Client: Ameren Data: SEC_DATA_STATS_ Printed 11/19/2019, 7:27 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
LEAD, TOTAL (UG/L)	S-UMW-3D	-0.5093	-13	-31	No	11	54.55	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	S-UMW-4D	-0.1629	-7	-31	No	11	54.55	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	S-UMW-5D	-0.1508	-14	-31	No	11	72.73	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	S-UMW-6D	0	5	31	No	11	90.91	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	S-UMW-1D	-0.7734	-9	-35	No	12	0	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	S-UMW-2D	-2.745	-21	-35	No	12	0	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	S-UMW-3D	-1.679	-15	-35	No	12	0	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	S-UMW-4D	-1.194	-17	-35	No	12	0	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	**S-UMW-5D**	**-4.503**	**-37**	**-35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
LITHIUM, TOTAL (UG/L)	S-UMW-6D	0.7338	19	35	No	12	0	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-1D	0.002858	12	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-2D	0.002852	12	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-3D	0.002852	12	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-4D	0.002852	12	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-5D	0.002852	12	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	S-UMW-6D	0.002864	12	27	No	10	100	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	S-UMW-1D	-4.114	-31	-35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	S-UMW-2D	60.58	7	35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	S-UMW-3D	-63.45	-9	-35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-4D**	**-1415**	**-52**	**-35**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.02**	**NP**
MOLYBDENUM, TOTAL (UG/L)	S-UMW-5D	-33.57	-22	-35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	S-UMW-6D	-9.297	-18	-35	No	12	0	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	S-UMW-1D	0.0206	3	27	No	10	100	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	S-UMW-2D	0.03216	4	23	No	9	100	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	S-UMW-3D	0.1656	22	23	No	9	88.89	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	S-UMW-4D	0.05648	8	23	No	9	100	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	S-UMW-5D	-0.03599	-1	-27	No	10	70	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	**S-UMW-6D**	**0.1665**	**28**	**27**	**Yes**	**10**	**90**	**n/a**	**n/a**	**0.02**	**NP**
SELENIUM, TOTAL (UG/L)	S-UMW-1D	0	-17	-31	No	11	90.91	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	S-UMW-2D	0.001776	18	31	No	11	63.64	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	S-UMW-3D	-0.00...	-3	-31	No	11	9.091	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	S-UMW-4D	-0.01205	-3	-31	No	11	18.18	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	S-UMW-5D	0	1	31	No	11	18.18	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	**S-UMW-6D**	**-0.01547**	**-36**	**-31**	**Yes**	**11**	**100**	**n/a**	**n/a**	**0.02**	**NP**
THALLIUM, TOTAL (UG/L)	S-UMW-1D	-0.0734	-30	-31	No	11	90.91	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	S-UMW-2D	-0.06212	-29	-31	No	11	81.82	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	**S-UMW-3D**	**-0.06963**	**-35**	**-31**	**Yes**	**11**	**81.82**	**n/a**	**n/a**	**0.02**	**NP**
THALLIUM, TOTAL (UG/L)	S-UMW-4D	-0.06963	-29	-31	No	11	81.82	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	S-UMW-5D	-0.06528	-24	-31	No	11	90.91	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	S-UMW-6D	-0.06528	-24	-31	No	11	100	n/a	n/a	0.02	NP

APPENDIX F

Nature and Extent Technical Memorandum

Technical Memorandum

DATE January 2020 **Project No.** 153140601

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Charley Henderson, Paul Pike

FROM Jeffrey Ingram, Mark Haddock **EMAIL Jingram@Golder.com**

NATURE AND EXTENT INVESTIGATION, SIOUX ENERGY CENTER, ST. CHARLES COUNTY, MISSOURI

Dear Mr. Kutosky,

Golder Associates Inc. (Golder) is pleased to submit this Technical Memorandum summarizing recent groundwater sampling and groundwater level measurements near the Ameren Missouri (Ameren) Sioux Energy Center (SEC) in St. Charles County, Missouri. This Technical Memorandum provides the groundwater sampling results and groundwater level measurement results from this ongoing investigation of Coal Combustion Residual (CCR) impacts from the SCPA Surface Impoundment to groundwater. A figure displaying the locations of the monitoring wells used for this investigation is provided as **Figure 1**.

1.0 PROJECT SCOPE OF WORK

The scope of work for this investigation included the following:

- Collect multiple samples in the nature and extent monitoring network for CCR Rule constituents
- Complete multiple rounds of groundwater elevation measurements to produce potentiometric surface maps
- Tabulate sampling results and prepare a Technical Memorandum

2.0 GROUNDWATER SAMPLING

Groundwater sampling was completed in November 2018 and August 2019. Sampling was completed using low flow sampling techniques and guidelines as provided in the SCPA Groundwater Monitoring Plan. Tables summarizing the analytical results are provided in **Tables 1** and **2**. Laboratory data report packets and data validation memos are included in the 2018 and 2019 Annual Reports.

Samples were collected from monitoring wells used to monitor the SCPB, SCPC and SCL4A as well as 26 monitoring wells and piezometers installed for nature and extent purposes. Well construction diagrams for these monitoring wells are provided in the 2017, 2018 or 2019 Annual Reports for the SCPA, SCPB, SCPC and SCL4A.

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021 T: +1 314 984-8800 F: +1 314 984-8770

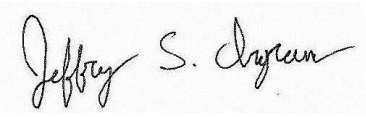
3.0 GROUNDWATER LEVEL MONITORING

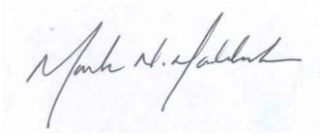
Multiple rounds of water level measurements were collected from available monitoring wells. A table displaying the groundwater level monitoring results is provided in **Table 3.** Measurements were used to create site-wide potentiometric surface maps for evaluating groundwater flow direction. Potentiometric surface maps are provided in the 2018 and 2019 Annual Reports for the SCPA.

4.0 CLOSING

Golder appreciates the opportunity to serve as your consultant on this project. If you have any questions concerning this letter report or need additional information, please contact the undersigned at 314-984-8800.

GOLDER ASSOCIATES INC.





Jeffrey Ingram, R.G.
Project Geologist

Mark Haddock, P.E., R.G.
Principal, Practice Leader

JSI/MNH

Attachments or Enclosures:

Tables
Table 1 – Nature and Extent Groundwater Sampling Analytical Results – November 2018
Table 2 – Nature and Extent Groundwater Sampling Analytical Results – August 2019
Table 3 – Summary of Groundwater Elevation Monitoring Results

Figures
Figure 1 – Site Location and Monitoring Well Location Map

Tables

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Nature and Extent Piezometers										
		AM-1D	AM-1S	TP-1D	TP-1M	TP-1S	TP-2D	TP-2M	TP-2S	TP-3D	TP-3M	TP-3S
Field Parameters												
DATE	NA	11/13/2018	11/13/2018	11/16/2018	11/16/2018	11/16/2018	11/12/2018	11/12/2018	11/12/2018	11/14/2018	11/14/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	1.03	1.48	0.57	0.26	0.37	0.15	0.13	0.16	0.97	1.01	0.86
pH	SU	7.25	7.09	7.31	7.07	6.88	6.11	6.15	6.22	7.17	7.12	7.30
REDOX POTENTIAL	mV	2.6	94.8	-107.7	-106.2	-139.2	-81.0	-71.8	6.3	-18.8	18.1	134.6
SPECIFIC CONDUCTIVITY	mS/cm	0.63	0.56	0.52	0.73	1.89	1.07	0.79	0.65	0.76	0.72	0.79
TURBIDITY	NTU	0.0*	0.0*	1.07	0.64	1.18	1.23	0.84	2.51	0.0*	0.0*	0.0*
Appendix III Parameters												
BORON, TOTAL	µg/L	11,700	432	492	293	122	70.3 J	121	80.5 J	52.0 J	48.2 J	71.3 J
CALCIUM, TOTAL	µg/L	75,000	67,500	54,400	78,400	204,000	274,000	191,000	151,000	119,000	109,000	113,000
CHLORIDE, TOTAL	mg/L	20.7	21.8	23.5	55.6	325	86.6	11.4 J	11.5	7.6	8.4	7.2
FLUORIDE, TOTAL	mg/L	0.45	0.60	0.38	0.35	0.36	ND	ND	ND	0.23	0.29	0.42
SULFATE, TOTAL	mg/L	40.1	11.4	51.6	50.4	34.8	520	254	50.5	87.5	62.5	30.4
TOTAL DISSOLVED SOLIDS	mg/L	430	326	295	423	1,020	1,280	875	633	495	428	468
Appendix IV Parameters												
ANTIMONY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J
ARSENIC, TOTAL	µg/L	0.29 J	1.3	0.16 J	0.12 J	25.3	0.12 J	0.19 J	13.9	0.17 J	0.26 J	4.2
BARIUM, TOTAL	µg/L	244	112	98.0	212	369	87.2	178	283	574	434	222
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	0.12 J	0.055 J	ND	ND	ND	ND	ND	ND	ND	ND	0.033 J
CHROMIUM, TOTAL	µg/L	ND	ND	0.11 J	0.19 J	0.24 J	ND	ND	ND	0.16 J	0.22 J	0.18 J
COBALT, TOTAL	µg/L	ND	1.5 J	ND	ND	2.7 J	ND	ND	2.9 J	ND	ND	1.1 J
FLUORIDE, TOTAL	mg/L	0.45	0.60	0.38	0.35	0.36	ND	ND	ND	0.23	0.29	0.42
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	3.5 J	3.3 J	ND	ND	ND
LITHIUM, TOTAL	µg/L	32.6	19.3	16.4	17.5	6.5 J	47.1	26.7	13.2	32.1	21.0	11.9
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	446	58.0	3.5 J	1.8 J	5.8 J	ND	ND	11.8 J	ND	1.2 J	30.8
RADIUM [226 + 228]	pCi/L	ND	ND	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	0.12 J	ND	ND	ND	0.16 J	0.095 J	ND	0.15 J	ND	ND	0.18 J
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters												
ALKALINITY	mg/L	250	260	187	241	438	457	435	502	355	335	410
IRON, TOTAL	µg/L	3,330	1,700	2,880	6,700	22,500	17,400	16,800	12,600	8,080	9,760	3,440
MAGNESIUM, TOTAL	µg/L	16,100	14,400	13,800	20,300	53,000	68,900	44,500	37,800	28,100	23,900	22,200
MANGANESE, TOTAL	µg/L	389	576	329	398	11,600	1,160	862	4,860	603	600	1,810
PHOSPHORUS, TOTAL	mg/L	0.28	0.68	0.28	0.67	2.0	0.28	0.29	0.82	0.35	0.27	ND
POTASSIUM, TOTAL	µg/L	8,080	10,200	6,880	1,350	1,800	6,110	5,160	1,140 J	4,150	4,210	6,370
SODIUM, TOTAL	µg/L	21,600	17,300	17,100	38,000	71,600	20,700	18,100	12,900	7,400	12,000	30,200

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2) "0.0*" - Turbidity reading underrange.
3) "-" Not sampled.
4) J - Result is an estimated value.
5) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
6) NA - Not Applicable.
7.) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By:TJG
Reviewed By: CMR

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Nature and Extent Piezometers										
		TP-4D	TP-4M	TP-4S	TP-5D	TP-5M	TP-5S	TP-6D	TP-6M	TP-6S	TP-7D	TP-7M
Field Parameters												
DATE	NA	11/16/2018	11/16/2018	11/16/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	0.19	0.18	0.24	0.27	0.38	0.46	0.14	0.13	0.11	0.20	0.19
pH	SU	7.14	7.15	7.15	7.11	7.15	7.29	6.34	6.42	6.23	6.37	6.36
REDOX POTENTIAL	mV	63.0	146.9	212.2	-80.2	-67.9	-28.7	-61.9	-29.8	68.9	-71.3	-19.3
SPECIFIC CONDUCTIVITY	mS/cm	0.55	0.59	0.69	0.98	0.96	0.96	0.61	0.67	0.59	0.74	0.68
TURBIDITY	NTU	4.50	4.98	4.82	0.0*	0.0*	0.0*	4.12	4.09	3.66	4.98	3.84
Appendix III Parameters												
BORON, TOTAL	µg/L	56.5 J	73.0 J	112	5,460	3,190	263	70.4 J	63.8 J	104	85.4 J	87.3 J
CALCIUM, TOTAL	µg/L	104,000	112,000	90,700	141,000	149,000	124,000	121,000	132,000	121,000	140,000	131,000
CHLORIDE, TOTAL	mg/L	8.3	6.1	30.9	26.8	8.9	47.7	13.3	14.3	6.7	32.7	16.6
FLUORIDE, TOTAL	mg/L	0.31	0.37	0.35	0.34	0.30	0.28 J	ND	0.26	0.27	0.26	0.33
SULFATE, TOTAL	mg/L	78.4	60.4	43.0	218	170	11.3	78.5	80.4	50.0	169	57.7
TOTAL DISSOLVED SOLIDS	mg/L	444	455	466	1,330	648	567	356	540 J	452	624	487
Appendix IV Parameters												
ANTIMONY, TOTAL	µg/L	ND	ND	ND	ND	ND	0.18 J	ND	ND	ND	0.11 J	ND
ARSENIC, TOTAL	µg/L	0.95 J	0.33 J	5.8	0.30 J	3.5	3.7	0.17 J	0.52 J	2.0	0.23 J	0.67 J
BARIUM, TOTAL	µg/L	557	408	192	183	252	440	391	454	224	410	382
BERYLLIUM, TOTAL	µg/L	ND	0.26 J	ND	ND	ND	0.43 J	0.33 J	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	ND	ND	ND	0.056 J	ND	0.040 J	ND	0.034 J	ND	ND	ND
CHROMIUM, TOTAL	µg/L	0.16 J	0.21 J	ND	ND	ND	ND	ND	ND	ND	0.22 J	0.84 J
COBALT, TOTAL	µg/L	ND	ND	1.4 J	ND	ND	0.95 J	ND	ND	1.2 J	ND	ND
FLUORIDE, TOTAL	mg/L	0.31	0.37	0.35	0.34	0.30	0.28 J	ND	0.26	0.27	0.26	0.33
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LITHIUM, TOTAL	µg/L	29.6	24.9	14.8	33.0 J	31.0 J	16.6 J	28.0 J	22.8 J	33.7 J	43.8	40.2
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	ND	1.8 J	33.1	175	12.8 J	31.7	2.0 J	2.9 J	4.3 J	ND	2.4 J
RADIUM [226 + 228]	pCi/L	-	-	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	ND	ND	0.21 J	0.12 J	ND	0.19 J	ND	ND	ND	ND	ND
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters												
ALKALINITY	mg/L	305	337	366	275	318	430	353	386	376	335	415
IRON, TOTAL	µg/L	6,540	7,150	1,890	10,300	8,560	4,390	9,130	10,200	1,020	16,600	17,300
MAGNESIUM, TOTAL	µg/L	25,600	25,000	19,500	32,400	26,500	27,400	28,600	27,000	24,600	35,600	30,800
MANGANESE, TOTAL	µg/L	438	605	2,180	993	360	1,120	472	452	615	716	610
PHOSPHORUS, TOTAL	mg/L	0.30	0.24	ND	0.31	0.20	0.054 J	0.32	0.12	0.086 J	0.42	0.41
POTASSIUM, TOTAL	µg/L	3,110	4,060	5,730	5,160	5,620	5,230	4,090	4,130	3,450	5,330	5,990
SODIUM, TOTAL	µg/L	6,600	9,800	59,700	24,800	17,200	30,000	6,230	16,300	7,870	10,100	7,020

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2) "0.0*" - Turbidity reading underrange.
3) "-" Not sampled.
4) J - Result is an estimated value.
5) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
6) NA - Not Applicable.
7.) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By:TJG
Reviewed By: CMR

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Nature and Extent Piezometers				SCPB Monitoring Wells								
		TP-7S	TP-8D	TP-8M	TP-8S	BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S
Field Parameters														
DATE	NA	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/12/2018	11/12/2018	11/14/2018	11/16/2018	11/16/2018	11/14/2018	11/16/2018	11/14/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	0.18	0.19	0.24	0.19	1.27	0.65	0.90	1.07	0.9	1.20	0.24	0.25	1.18
pH	SU	6.40	6.34	6.37	6.43	7.46	7.49	7.40	6.95	6.75	6.05	6.74	6.81	6.84
REDOX POTENTIAL	mV	101.6	-68.8	-65.9	-61.8	14.3	63.7	-18.3	89.8	82.2	-32.5	171.8	194.8	125.3
SPECIFIC CONDUCTIVITY	mS/cm	0.92	0.57	0.60	0.68	0.876	0.704	0.670	1.28	0.90	0.83	1.927	1.314	1.344
TURBIDITY	NTU	2.65	3.05	3.16	1.27	2.16	2.71	1.09	2.84	4.87	2.67	6.97	3.61	0.89
Appendix III Parameters														
BORON, TOTAL	µg/L	120	65.9 J	81.7 J	84.5 J	72.9 J	61.5 J	539	8,530	298	1,020	13,400	10,400	2,740
CALCIUM, TOTAL	µg/L	124,000	110,000	114,000	112,000	157,000	124,000	79,400	197,000	188,000	179,000	280,000	199,000	221,000
CHLORIDE, TOTAL	mg/L	26.1	30.6	36.2	28.2	6.7	10.1	42.6	174	51.3	2.9	27.9	2.2	11.6
FLUORIDE, TOTAL	mg/L	0.38	0.26	0.29	0.25	0.34	0.36	0.37	0.32	0.26	0.35	0.34	0.32	0.34
SULFATE, TOTAL	mg/L	16.2	32.7	22.0	28.9	28.8	25.6	62.2	188	54.3	50.0	912	385	396
TOTAL DISSOLVED SOLIDS	mg/L	648	435	339	509	556	436	346 J	1,040	709	814	1,530	771	1,020
Appendix IV Parameters														
ANTIMONY, TOTAL	µg/L	ND	ND	ND	0.32 J	-	-	0.38 J	0.20 J	0.19 J	0.21 J	0.18 J	0.25 J	0.091 J
ARSENIC, TOTAL	µg/L	8.4	0.88 J	0.91 J	0.43 J	0.95 J	0.45 J	2.0	1.0	0.57 J	0.54 J	0.73 J	0.64 J	0.45 J
BARIUM, TOTAL	µg/L	443	363	248	167	160	157	127	127	200	247	73.5	45.5	91.0
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
CADMIUM, TOTAL	µg/L	ND	ND	0.041 J	0.085 J	-	-	0.049 J	0.38 J	0.11 J	0.17 J	1.1	1.5	0.26 J
CHROMIUM, TOTAL	µg/L	0.083 J	0.36 J	0.15 J	0.079 J	-	-	ND	ND	0.30 J	ND	0.22 J	ND	ND
COBALT, TOTAL	µg/L	1.0 J	ND	ND	ND	-	-	-	-	-	-	-	-	-
FLUORIDE, TOTAL	mg/L	0.38	0.26	0.29	0.25	0.34	0.36	0.37	0.32	0.26	0.35	0.34	0.32	0.34
LEAD, TOTAL	µg/L	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
LITHIUM, TOTAL	µg/L	25.4	33.1	27.6	18.3	ND	12.1	21.0	41.6	29.4	38.9	52.1	24.9	22.1
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
MOLYBDENUM, TOTAL	µg/L	59.2	1.5 J	1.0 J	16.6 J	2.2 J	2.8 J	43.6	709	1.1 J	2.1 J	690	1.1 J	1.5 J
RADIUM [226 + 228]	pCi/L	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	0.17 J	ND	ND	3.9	-	-	3.0	0.12 J	2.4	1.0	0.17 J	0.21 J	3.5
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND
Additional Parameters														
ALKALINITY	mg/L	605	334	356	374	464	368	227	428	529	540	357	430	391
IRON, TOTAL	µg/L	8,770	6,660	8,810	ND	ND	57.5 J	ND	158	12.7 J	ND	260	ND	ND
MAGNESIUM, TOTAL	µg/L	43,100	23,700	25,100	24,400	29,000	21,400	20,100	41,700	36,900	36,900	54,200	52,500	60,200
MANGANESE, TOTAL	µg/L	1,720	408	402	594	607	400	59.4	545	4.3 J	260	1,700	373	118
PHOSPHORUS, TOTAL	mg/L	0.053 J	0.39	0.23	ND	0.50	0.23	0.26	ND	ND	ND	ND	ND	ND
POTASSIUM, TOTAL	µg/L	9,780	3,680	3,810	9,760	580 J	772 J	6,800	6,720	5,120	5,050	4,560	4,650	3,990
SODIUM, TOTAL	µg/L	63,800	8,330	10,500	28,900	5,600	5,070	33,400	91,700	16,900	14,300	136,000	44,100	16,900

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2) "0.0*" - Turbidity reading underrange.
3) "-" Not sampled.
4) J - Result is an estimated value.
5) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
6) NA - Not Applicable.
7.) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By:TJG
Reviewed By: CMR

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Sioux Energy Center, St. Charles County, MO

Analyte	Units	SCPB		SCPC Monitoring Wells						SCL4A Monitoring Wells			
		LMW-8S	LMW-9S	UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4	UG-3	TMW-1	TMW-2	TMW-3
Field Parameters													
DATE	NA	11/14/2018	11/16/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	0.29	0.95	0.54	0.84	0.37	0.30	0.25	0.31	0.32	0.40	0.39	0.27
pH	SU	6.93	6.82	7.00	6.76	6.11	6.20	6.12	7.05	7.10	6.51	6.97	7.03
REDOX POTENTIAL	mV	174.6	41.8	200.1	15.4	149.6	132.9	114.1	201.9	127.0	199.3	156.1	114.5
SPECIFIC CONDUCTIVITY	mS/cm	1.321	1.451	0.896	0.856	0.63	0.62	0.67	1.046	0.926	0.558	0.728	0.758
TURBIDITY	NTU	0.39	1.11	0.48	0.0*	5.55	4.06	4.87	0.21	0.0*	4.29	0.44	0.0*
Appendix III Parameters													
BORON, TOTAL	µg/L	8,500	1,760	145	145	125	114	108	73.2 J	425	69.5 J	81.4 J	87.4 J
CALCIUM, TOTAL	µg/L	177,000	194,000	116,000	105,000	129,000	122,000	137,000	121,000	129,000	96,400	131,000	137,000
CHLORIDE, TOTAL	mg/L	38.9	278	65.4	24.4	8.6	6.9	9.1	80.2	67.0	2.9	2.9	2.4
FLUORIDE, TOTAL	mg/L	0.87	0.56	ND	ND	ND	ND	ND	ND	0.21	0.40 J	0.36	ND
SULFATE, TOTAL	mg/L	405	163	65.9	17.7	27.1	29.0	64.7	39.3	63.9	46.1	49.8	51.3
TOTAL DISSOLVED SOLIDS	mg/L	925	1,020	549	607 J	511	470	545	611	575	334	414	457
Appendix IV Parameters													
ANTIMONY, TOTAL	µg/L	0.24 J	0.20 J	-	-	-	-	-	-	-	-	-	-
ARSENIC, TOTAL	µg/L	1.1	0.91 J	0.60 J	0.56 J	0.61 J	0.72 J	1.1	0.35 J	0.34 J	0.46 J	3.5	2.7
BARIUM, TOTAL	µg/L	105	73.4	212	287	323	238	299	254	238	170	233	280
BERYLLIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM, TOTAL	µg/L	0.71	0.26 J	-	-	-	-	-	-	-	-	-	-
CHROMIUM, TOTAL	µg/L	ND	0.17 J	-	-	-	-	-	-	-	-	-	-
COBALT, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE, TOTAL	mg/L	0.87	0.56	ND	ND	ND	ND	ND	ND	0.21	0.40 J	0.36	ND
LEAD, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
LITHIUM, TOTAL	µg/L	23.1 J	43.4	37.3	19.3	37.6	32.7	40.4	43.3 J	32.0	28.7	37.7	42.2
MERCURY, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
MOLYBDENUM, TOTAL	µg/L	390	11.4 J	1.8 J	2.4 J	1.2 J	1.7 J	1.6 J	1.2 J	3.2 J	4.0 J	2.0 J	2.7 J
RADIUM [226 + 228]	pCi/L	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	0.31 J	0.59 J	-	-	-	-	-	-	-	-	-	-
THALLIUM, TOTAL	µg/L	ND	ND	-	-	-	-	-	-	-	-	-	-
Additional Parameters													
ALKALINITY	mg/L	306	415	339	351	418	426	432	412	365	275	370	390
IRON, TOTAL	µg/L	ND	123	ND	ND	1,120	265	2,260	ND	ND	86.9 J	889	2,280
MAGNESIUM, TOTAL	µg/L	41,000	60,600	27,800	22,100	29,800	29,700	29,500	37,800	23,300	17,000	23,200	24,500
MANGANESE, TOTAL	µg/L	488	583	219	266	371	519	737	574	545	373	470	695
PHOSPHORUS, TOTAL	mg/L	0.097 J	ND	ND	ND	ND	ND	0.050 J	0.057 J	ND	0.050 J	0.11	0.15
POTASSIUM, TOTAL	µg/L	4,880	4,720	7,260	5,110	5,400	5,930	5,120	7,540	6,300	4,960	5,980	6,420
SODIUM, TOTAL	µg/L	77,800	49,900	22,100	38,400	4,460	4,410	4,420	33,800	40,800	3,330	3,800	5,670

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2) "0.0*" - Turbidity reading underrange.
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4) J - Result is an estimated value.
5) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
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7.) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By:TJG
Reviewed By: CMR

Table 2
Nature and Extent Groundwater Sampling Analytical Results - August 2019
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Nature and Extent Piezometers											
		TP-1D	TP-1M	TP-1S	TP-2D	TP-2M	TP-2S	TP-3D	TP-3M	TP-3S	TP-4D	TP-4M	TP-4S
Field Parameters													
DATE	NA	8/6/2019	8/5/2019	8/5/2019	8/6/2019	8/5/2019	8/2/2019	8/7/2019	8/7/2019	8/7/2019	8/6/2019	8/6/2019	8/6/2019
DISSOLVED OXYGEN	mg/L	0.60	0.51	0.19	0.28	0.43	1.75	0.20	0.21	0.17	0.15	0.17	0.15
pH	SU	7.01	6.79	6.91	6.92	9.87	8.83	8.99	8.92	9.19	7.26	7.16	7.40
REDOX POTENTIAL	mV	150.2	110.9	-147.1	-72.2	-146.4	-142.7	-132.6	-128.9	-129.3	-85.4	-62.3	-0.9
SPECIFIC CONDUCTIVITY	mS/cm	0.477	0.74	1.698	1.740	1.263	0.972	0.896	0.719	0.766	0.732	0.747	0.737
TURBIDITY	NTU	4.24	1.62	3.65	3.11	1.20	2.84	2.31	3.68	4.45	2.13	3.58	2.13
Appendix III Parameters													
BORON, TOTAL	µg/L	481	246	120	67.8 J	238	88.5 J	54.7 J	44.3 J	71.3 J	57.8 J	66.8 J	101
CALCIUM, TOTAL	µg/L	57,000	75,100	188,000	236,000	198,000	138,000 J	114,000	105,000	116,000	105,000	116,000	78,900
CHLORIDE, TOTAL	mg/L	25.3	66.9	287	81.9	26.9	11.1	8.5	8.5	5.6	8.4	6.9	14.1
FLUORIDE, TOTAL	mg/L	0.35	0.33	0.35	0.22	0.22	0.29	0.21	0.28	0.38	0.30	0.35	0.32
SULFATE, TOTAL	mg/L	47.2	56.8	20.2	488	343	60.0	81.3	63.9	40.0	81.9	65.8	29.4
TOTAL DISSOLVED SOLIDS	mg/L	314	463	1,140	1,380	1,010	605	565	486	466	481	199	440
Appendix IV Parameters													
ANTIMONY, TOTAL	µg/L	0.25 J	ND	ND	ND	ND	ND	ND	ND	0.14 J	ND	ND	0.17 J
ARSENIC, TOTAL	µg/L	0.19 J	0.14 J	36.0	0.27 J	0.25 J	11.9	0.18 J	0.28 J	5.3	1.4	0.50 J	3.1
BARIUM, TOTAL	µg/L	87.7	155	323	54.3	167	217	575	450	273	514	393	143
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	0.049 J	0.065 J	ND	ND	ND
CHROMIUM, TOTAL	µg/L	0.10 J	0.091 J	ND	0.21 J	0.095 J	ND	ND	ND	ND	0.13 J	ND	0.16 J
COBALT, TOTAL	µg/L	ND	ND	1.5 J	ND	ND	2.4 J	ND	ND	ND	ND	ND	1.1 J
FLUORIDE, TOTAL	mg/L	0.35	0.33	0.35	0.22	0.22	0.29	0.21	0.28	0.38	0.30	0.35	0.32
LEAD, TOTAL	µg/L	ND	ND	6.5 J	4.2 J	4.0 J	4.5 J	ND	ND	ND	5.2 J	ND	ND
LITHIUM, TOTAL	µg/L	18.7	16.6	ND	42.1	28.8	13.8	33.9	23.9	12.3	31.8	32.0	18.6
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	ND	ND	5.4 J	ND	ND	4.3 J	ND	ND	16.8 J	ND	ND	28.6
RADIUM [226 + 228]	pCi/L	ND	ND	ND	1.670	2.162	ND	2.496	2.031	1.961	2.452	2.74	ND
SELENIUM, TOTAL	µg/L	ND	ND	0.18 J	ND	0.11 J	0.093 J	ND	ND	0.14 J	ND	ND	1.9
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters													
ALKALINITY	mg/L	174	241 J	488 J	449	423 J	514 J	341	332	375	311	350	352
IRON, TOTAL	µg/L	2,740	5,680	21,800	13,500	14,600	10,300	7,600	6,480	3,740	6,160	6,990	330
MAGNESIUM, TOTAL	µg/L	13,800	18,400	49,500	66,800	50,000	42,700 J	29,100	24,500	24,200	25,800	25,500	16,000
MANGANESE, TOTAL	µg/L	314	302	9,820	1,140	999	3,480	605	535	1,680	434	638	1,250
POTASSIUM, TOTAL	µg/L	6,780	1,460	1,540	5,190	4,840	698	3,880	3,730	3,860	3,350	4,200	4,620
SODIUM, TOTAL	mg/L	16.6	37.5	66.8	17.0	14.0	8.3	6.7	7.0	14.0	7.0	7.1	60.3

1) Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - Standard Units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit , pCi/L - picoCuries per liter.
2) "-" Not sampled.
3) J - Result is an estimated value.
4) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
5) NA - Not Applicable.
6) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By: TJG
Reviewed By: CMR

Table 2
Nature and Extent Groundwater Sampling Analytical Results - August 2019
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Nature and Extent Piezometers											
		TP-5D	TP-5M	TP-5S	TP-6D	TP-6M	TP-6S	TP-7D	TP-7M	TP-7S	TP-8D	TP-8M	TP-8S
Field Parameters													
DATE	NA	8/2/2019	8/2/2019	8/2/2019	8/7/2019	8/6/2019	8/6/2019	8/6/2019	8/6/2019	8/6/2019	8/5/2019	8/5/2019	8/5/2019
DISSOLVED OXYGEN	mg/L	0.29	3.0	0.35	0.12	0.14	0.14	0.07	0.07	0.29	0.18	0.13	0.99
pH	SU	7.03	6.90	6.98	7.01	7.00	7.12	7.20	7.18	6.99	7.16	7.21	6.99
REDOX POTENTIAL	mV	135.6	109.7	111.7	-123.8	105.2	58.7	-129.3	-143.4	8.6	-82.2	-65.6	91.3
SPECIFIC CONDUCTIVITY	mS/cm	1.00	0.95	1.05	0.852	0.81	0.770	0.978	0.908	1.067	0.668	0.659	0.84
TURBIDITY	NTU	3.03	4.85	2.88	3.94	3.77	4.01	3.73	4.46	4.83	5.31	1.33	3.98
Appendix III Parameters													
BORON, TOTAL	µg/L	5,780	3,120	211	66.1 J	53.1 J	99.5 J	110	93.5 J	144	66.9 J	85.1 J	72.6 J
CALCIUM, TOTAL	µg/L	30,400	147,000	135,000	114,000	118,000	128,000	120,000 J	118,000	110,000	102,000	98,800	113,000
CHLORIDE, TOTAL	mg/L	27.0	20.6	35.4 J	14.0	12.8	7.0	22.0	19.8	6.3	29.6	29.6	14.2
FLUORIDE, TOTAL	mg/L	0.38	0.36	0.19 J	0.26	0.32	0.36	0.26	0.35	0.45	0.36	0.37	0.30
SULFATE, TOTAL	mg/L	223	171	7.4 J	67.5	69.2	20.6	189	39.4	69.9	19.6	19.6	28.0
TOTAL DISSOLVED SOLIDS	mg/L	744	660	612	482	527	493	636	497	609	433	422	569
Appendix IV Parameters													
ANTIMONY, TOTAL	µg/L	ND	ND	0.11 J	0.10 J	ND	0.14 J	ND	ND	0.090 J	ND	ND	0.22 J
ARSENIC, TOTAL	µg/L	0.27 J	5.8	3.5	0.15 J	0.18 J	0.45 J	0.24 J	0.73 J	0.49 J	1.3	4.8	0.40 J
BARIUM, TOTAL	µg/L	39.5	244	558	406	436	253	363	365	177	352	191	208
BERYLLIUM, TOTAL	µg/L	0.34 J	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND
CADMIUM, TOTAL	µg/L	0.12 J	ND	ND	ND	ND	0.066 J	ND	ND	0.040 J	ND	ND	ND
CHROMIUM, TOTAL	µg/L	0.080 J	ND	ND	0.14 J	0.49 J	ND	0.11 J	ND	0.29 J	0.16 J	ND	0.61 J
COBALT, TOTAL	µg/L	ND	1.5 J	1.1 J	ND	ND	ND	ND	ND	1.0 J	ND	ND	ND
FLUORIDE, TOTAL	mg/L	0.38	0.36	0.19 J	0.26	0.32	0.36	0.26	0.35	0.45	0.36	0.37	0.30
LEAD, TOTAL	µg/L	ND	ND	ND	ND	3.8 J	ND	3.7 J	ND	ND	ND	ND	4.0 J
LITHIUM, TOTAL	µg/L	8.5 J	33.2	17.7	27.8	25.1	34.9	42.5	37.8	43.3	31.7	29.0	21.8
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	245	7.6 J	13.1 J	ND	ND	ND	ND	ND	14.1 J	ND	ND	6.5 J
RADIUM [226 + 228]	pCi/L	ND	ND	ND	2.818	ND	1.510	3.23 J	2.91	ND	ND	ND	ND
SELENIUM, TOTAL	µg/L	0.099 J	ND	ND	ND	ND	1.1	ND	ND	4.1	ND	ND	5.7
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters													
ALKALINITY	mg/L	285	316 J	438	338	352	354	274	394	466	321 J	342 J	348 J
IRON, TOTAL	µg/L	2,240	8,360	8,470	8,230	6,310	29.5 J	10,400	11,800	160	5,990	6,020	ND
MAGNESIUM, TOTAL	µg/L	36,000	27,200	29,900	29,400	26,600	28,700	32,600 J	30,300	61,400	23,400	23,700	26,500
MANGANESE, TOTAL	µg/L	1,090	388	1,230	471	368	238	637	418	568	391	341	41.0
POTASSIUM, TOTAL	µg/L	1,150	5,300	4,500	3,690	3,170	2,630	4,270	4,850	4,880	3,430	3,310	7,770
SODIUM, TOTAL	mg/L	5.6	16.8	39.6	5.8	5.9	6.6	9.6	8.4	11.3	5.4	7.6	13.3

1) Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - Standard Units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit , pCi/L - picoCuries per liter.
2) "-" Not sampled.
3) J - Result is an estimated value.
4) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
5) NA - Not Applicable.
6) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By: TJG
Reviewed By: CMR

Table 2
Nature and Extent Groundwater Sampling Analytical Results - August 2019
Sioux Energy Center, St. Charles County, MO

Analyte	Units	SCPB Monitoring Wells										
		BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S
Field Parameters												
DATE	NA	8/2/2019	8/2/2019	8/2/2019	8/6/2019	8/5/2019	8/5/2019	8/5/2019	8/5/2019	8/5/2019	8/6/2019	8/9/2019
DISSOLVED OXYGEN	mg/L	0.40	0.41	1.23	0.64	1.41	0.17	1.21	0.31	0.69	0.67	0.52
pH	SU	6.90	7.53	7.41	7.14	6.99	6.82	6.83	6.87	6.82	6.96	6.66
REDOX POTENTIAL	mV	-159.2	-93.0	50.0	13.9	18.5	32.3	39.0	47.3	34.7	62.9	63.3
SPECIFIC CONDUCTIVITY	mS/cm	0.84	0.70	0.488	1.405	1.128	1.214	2.271	2.002	1.544	1.431	1.692
TURBIDITY	NTU	3.41	2.67	2.95	4.97	2.13	3.92	7.99	4.63	4.51	3.57	5.20
Appendix III Parameters												
BORON, TOTAL	µg/L	ND	ND	279	9,830	804	4,090	14,500	18,600	4,360	8,060	1,660
CALCIUM, TOTAL	µg/L	149,000	122,000	61,200	150,000	140,000	149,000	277,000	268,000	214,000	160,000	214,000
CHLORIDE, TOTAL	mg/L	8.8	10.6	16.5	76.9	36.1	25.3	36.6	3.6	29.1	35.1	75.6
FLUORIDE, TOTAL	mg/L	0.31	0.35	0.34	0.37	0.35	0.24	ND	ND	0.37	0.92	0.38
SULFATE, TOTAL	mg/L	34.1	25.3	38.9	339	273	210	930	787	431	432	281
TOTAL DISSOLVED SOLIDS	mg/L	548	452	285	982	800	851	1,870	1,660	1,150	1,010	1,110
Appendix IV Parameters												
ANTIMONY, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
ARSENIC, TOTAL	µg/L	1.0	0.42 J	2.2	1.0	0.53 J	0.65 J	0.85 J	0.96 J	0.58 J	1.2	0.89 J
BARIUM, TOTAL	µg/L	155	192	115	98.7	159	195	63.4	59.6	94.4	99.8	78.6
BERYLLIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
CADMIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
COBALT, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE, TOTAL	mg/L	0.31	0.35	0.34	0.37	0.35	0.24	ND	ND	0.37	0.92	0.38
LEAD, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
LITHIUM, TOTAL	µg/L	ND	ND	18.0	30.4	29.9	25.1	44.8	14.4	18.2	12.8	47.4
MERCURY, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
MOLYBDENUM, TOTAL	µg/L	ND	ND	33.9	896	ND	ND	1,140	4.4 J	ND	282	8.7 J
RADIUM [226 + 228]	pCi/L	-	-	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
THALLIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-	-
Additional Parameters												
ALKALINITY	mg/L	432	358	186	248	284	419	310	377	402	261	492
IRON, TOTAL	µg/L	ND	44.3 J	ND	64.6	ND	ND	114	202	ND	ND	66.7
MAGNESIUM, TOTAL	µg/L	28,400	22,400	15,100	25,200	28,700	31,900	56,500	66,900	63,700	41,500	70,100
MANGANESE, TOTAL	µg/L	472	298	187	289	110	395	1,660	511	377	460	401
POTASSIUM, TOTAL	µg/L	383 J	648	5,320	8,030	5,240	4,210	5,050	5,390	4,910	4,810	5,060
SODIUM, TOTAL	mg/L	5.4	5.3	15.4	75.4	41.5	21.6	148	102	38.4	77.2	52.3

1) Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - Standard Units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit , pCi/L - picoCuries per liter.
2) "-" Not sampled.
3) J - Result is an estimated value.
4) ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect.
5) NA - Not Applicable.
6) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

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Checked By: TJG
Reviewed By: CMR

Table 2
Nature and Extent Groundwater Sampling Analytical Results - August 2019
Sioux Energy Center, St. Charles County, MO

Analyte	Units	SCPC Monitoring Wells						SCL4A Monitoring Wells			
		UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4	UG-3	TMW-1	TMW-2	TMW-3
Field Parameters											
DATE	NA	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019
DISSOLVED OXYGEN	mg/L	0.44	0.98	0.31	0.34	0.28	0.36	0.24	0.25	0.80	0.37
pH	SU	6.55	6.65	6.77	6.83	6.76	6.64	6.72	6.65	6.52	6.57
REDOX POTENTIAL	mV	130.4	42.6	139.8	129.4	112.5	20.2	6.1	21.1	-2.5	-144.9
SPECIFIC CONDUCTIVITY	mS/cm	1.25	0.741	0.78	0.79	0.89	1.044	1.023	0.542	0.676	0.677
TURBIDITY	NTU	3.26	1.87	4.62	4.70	4.41	3.45	2.96	3.97	1.37	4.94
Appendix III Parameters											
BORON, TOTAL	µg/L	270	144	106	104	95.1 J	61.1 J	1,040	66.6 J	84.6 J	86.2 J
CALCIUM, TOTAL	µg/L	177,000	116,000	135,000	133,000	148,000	136,000	159,000	99,800	123,000	123,000 J
CHLORIDE, TOTAL	mg/L	145	30.0	6.2	8.2	4.8	103	85.0	2.1	3.3	2.6
FLUORIDE, TOTAL	mg/L	0.28	0.25	0.34	0.38	0.37	0.32	0.33	0.35	0.32	0.29
SULFATE, TOTAL	mg/L	57.7	45.2	41.7	37.1	49.5	31.5	144	40.2	52.1	37.2
TOTAL DISSOLVED SOLIDS	mg/L	785 J	519	503	511	624	671	710 J	390 J	481 J	454 J
Appendix IV Parameters											
ANTIMONY, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
ARSENIC, TOTAL	µg/L	0.61 J	0.64 J	1.3	1.8	0.68 J	0.53 J	0.42 J	0.50 J	1.6	2.0
BARIUM, TOTAL	µg/L	318	287	262	242	282	262	262	169	208	233
BERYLLIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
CADMIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
CHROMIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
COBALT, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
FLUORIDE, TOTAL	mg/L	0.28	0.25	0.34	0.38	0.37	0.32	0.33	0.35	0.32	0.29
LEAD, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
LITHIUM, TOTAL	µg/L	40.3	19.1	31.6	35.5	35.2	34.8	32.6	20.6	28.6	27.2
MERCURY, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
MOLYBDENUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	2.9 J	3.1 J	ND	ND
RADIUM [226 + 228]	pCi/L	-	-	-	-	-	-	-	-	-	-
SELENIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
THALLIUM, TOTAL	µg/L	-	-	-	-	-	-	-	-	-	-
Additional Parameters											
ALKALINITY	mg/L	437	362	411	425	450	403	337 J	269 J	361 J	369 J
IRON, TOTAL	µg/L	ND	ND	1,230	691	480	115	110	69.7	398	1,380
MAGNESIUM, TOTAL	µg/L	42,000	24,600	32,300	33,300	39,100	39,500	32,300	18,200	23,100	23,300
MANGANESE, TOTAL	µg/L	1,080	285	275	693	722	499	1,030	180	466	631
POTASSIUM, TOTAL	µg/L	9,530	4,700	4,010	5,140	6,470	7,570	5,750	4,900	5,150	5,550
SODIUM, TOTAL	mg/L	39.1	30.4	4.2	4.8	4.7	44.6	24.2	2.8	3.2	4.1

1) Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - Standard Units, mV - millivolts, mS/cm - millisiemens per centimeter, NTU - nephelometric turbidity unit , pCi/L - picoCuries per liter.
2) "-" Not sampled.
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5) NA - Not Applicable.
6) Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.

Prepared By: JSI
Checked By: TJG
Reviewed By: CMR

Table 3
Summary of Groundwater Elevation Monitoring Results
Sioux Energy Center, St. Charles County, MO

	Well ID	Location		Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation Measurements 11/12/2018		Groundwater Elevation measurements 1/7/2019		Groundwater Elevation Measurements 8/1/2019		Groundwater Elevation Measurements 10/1/2019	
		Northing	Easting	FT MSL[4]	FT MSL[4]	DTW[2]	GWE[3]	DTW[2]	GWE[3]	DTW[2]	GWE[3]	DTW[2]	GWE[3]
SCPA Monitoring Wells	UMW-1D	1121321.4	879420.0	447.16	445.36	27.43	419.73	27.87	419.29	25.23	421.93	26.59	420.57
	UMW-2D	1120266.7	878981.6	433.86	431.74	13.90	419.96	14.54	419.32	11.42	422.44	13.00	420.86
	UMW-3D	1120570.4	878251.1	431.67	430.14	11.96	419.71	12.43	419.24	9.65	422.02	11.04	420.63
	UMW-4D	1121077.9	877859.9	423.52	421.71	4.18	419.34	4.61	418.91	2.20	421.32	3.21	420.31
	UMW-5D	1121815.0	877799.1	446.66	444.81	27.94	418.72	28.26	418.40	26.31	420.35	26.96	419.70
	UMW-6D	1122312.0	878639.5	447.02	444.91	29.55	417.47	29.01	418.01	23.78	423.24	27.36	419.66
	BMW-1D	1121713.6	876740.9	428.28	426.04	9.30	418.98	9.57	418.71	7.32	420.96	8.44	419.84
	BMW-3D	1121798.8	875798.3	426.41	424.16	7.43	418.98	7.63	418.78	5.43	420.98	6.42	419.99
	AM-1M	1122156.7	877672.7	425.47	423.49	7.03	418.44	7.35	418.12	6.00	419.47	5.94	419.53
	AM-1S	1122151.7	877672.3	425.56	423.34	7.23	418.33	7.48	418.08	6.16	419.40	5.45	420.11
SCPB Monitoring Wells	LMW-1S	1121320.4	879427.2	447.10	445.39	27.32	419.78	27.76	419.34	25.10	422.00	26.50	420.60
	LMW-2S	1120332.8	879283.7	447.16	445.24	27.24	419.92	27.69	419.47	24.53	422.63	26.28	420.88
	LMW-3S	1119348.8	878856.4	430.17	428.36	10.63	419.54	10.81	419.36	7.14	423.03	8.95	421.22
	LMW-4S	1119226.6	879561.5	429.40	427.27	9.68	419.72	10.20	419.20	6.12	423.28	8.28	421.12
	LMW-5S	1119250.6	880348.6	447.36	445.54	27.80	419.56	28.03	419.33	23.93	423.43	26.22	421.14
	LMW-6S	1119782.0	880867.8	446.00	444.10	26.58	419.42	26.83	419.17	22.85	423.15	25.16	420.84
	LMW-7S	1120261.0	880650.0	444.26	442.24	24.80	419.46	25.07	419.19	21.41	422.85	23.53	420.73
	LMW-8S	1121024.3	880328.8	446.80	444.77	27.43	419.37	27.76	419.04	24.83	421.97	26.38	420.42
	LMW-9S	1121905.9	879849.3	445.57	443.66	26.76	418.81	27.15	418.42	24.87	420.70	25.66	419.91
	BMW-1S	1121709.2	876755.6	427.77	425.98	8.73	419.04	9.00	418.77	6.89	420.88	7.97	419.80
	BMW-3S	1121792.9	875809.5	426.69	424.12	7.68	419.01	7.92	418.77	5.71	420.98	6.35	420.34
SCPC Monitoring Wells	UG-1A	1118825.2	877789.8	427.74	425.18	7.68	420.06	7.88	419.86	3.72	424.02	5.95	421.79
	UG-2	1118859.7	879319.5	429.27	426.46	9.79	419.48	10.10	419.17	6.05	423.22	8.19	421.08
	DG-1	1117388.3	877383.5	431.81	428.93	11.73	420.08	11.97	419.84	5.88	425.93	9.29	422.52
	DG-2	1116940.7	877617.7	431.75	428.90	11.76	419.99	11.97	419.78	5.46	426.29	9.11	422.64
	DG-3	1116644.1	877845.2	433.84	430.98	13.89	419.95	14.03	419.81	7.59	426.25	11.11	422.73
	DG-4	1116403.2	878420.7	432.75	430.11	12.91	419.84	13.05	419.70	6.65	426.10	10.05	422.70
SCL4A Monitoring Wells	UG-3	1118608.5	880519.4	429.71	427.07	9.87	419.84	10.11	419.60	5.51	424.20	8.04	421.67
	TMW-1	1117385.1	880121.2	428.08	425.86	8.67	419.41	8.78	419.30	3.39	424.69	6.24	421.84
	TMW-2	1117320.7	880442.9	428.17	425.85	8.78	419.39	8.91	419.26	3.51	424.66	6.33	421.84
	TMW-3	1117259.2	880762.4	427.88	425.66	8.54	419.34	8.68	419.20	3.27	424.61	6.09	421.79
Nature and Extent Temporary Piezometers	TP-1S	1122831.7	879480.2	447.69	445.48	30.64	417.05	31.29	416.40	29.78	417.91	28.67	419.02
	TP-1M	1122831.7	879480.2	447.70	445.48	29.16	418.54	30.48	417.22	28.87	418.83	28.25	419.45
	TP-1D	1122831.7	879480.2	447.70	445.48	29.12	418.58	30.45	417.25	28.83	418.87	28.24	419.46
	TP-2S	1123221.1	881698.8	429.26	426.66	12.13	417.13	12.61	416.65	11.13	418.13	10.26	419.00
	TP-2M	1123221.1	881698.8	429.26	426.66	12.14	417.12	12.61	416.65	11.12	418.14	10.29	418.97
	TP-2D	1123221.1	881698.8	429.26	426.66	12.13	417.13	12.63	416.63	11.14	418.12	10.27	418.99
	TP-3S	1120614.0	882877.1	434.83	432.10	16.20	418.63	16.55	418.28	13.10	421.73	14.76	420.07
	TP-3M	1120614.0	882877.1	434.72	432.10	16.10	418.62	16.45	418.27	13.00	421.72	14.75	419.97
	TP-3D	1120614.0	882877.1	434.82	432.10	16.25	418.57	16.54	418.28	13.14	421.68	14.87	419.95
	TP-4S	1118472.8	882589.0	428.74	426.37	9.64	419.10	9.90	418.84	6.15	422.59	7.74	421.00
	TP-4M	1118472.8	882589.0	428.70	426.37	9.70	419.00	9.87	418.83	6.03	422.67	7.67	421.03
	TP-4D	1118472.8	882589.0	428.72	426.37	9.61	419.11	9.87	418.85	5.91	422.81	7.76	420.96
	TP-5S	1118812.3	879517.5	429.71	427.08	9.89	419.82	10.28	419.43	5.05	424.66	8.33	421.38
	TP-5M	1118812.3	879517.5	429.49	427.08	9.80	419.69	10.08	419.41	5.09	424.40	8.12	421.37
	TP-5D	1118812.3	879517.5	429.60	427.08	10.00	419.60	10.19	419.41	5.14	424.46	8.20	421.40
	TP-6S	1119284.6	876381.5	428.07	426.07	8.13	419.94	8.48	419.59	4.04	424.03	6.54	421.53
	TP-6M	1119284.6	876381.5	428.08	426.07	8.15	419.93	8.50	419.58	4.04	424.04	6.54	421.54
	TP-6D	1119284.6	876381.5	428.06	426.07	8.13	419.93	8.49	419.57	4.05	424.01	6.53	421.53
	TP-7S	1116352.1	877768.3	432.58	430.13	13.01	419.57	13.29	419.29	6.54	426.04	10.13	422.45
	TP-7M	1116352.1	877768.3	432.56	430.13	12.99	419.57	13.19	419.37	6.50	426.06	10.06	422.50
	TP-7D	1116352.1	877768.3	432.56	430.13	13.01	419.55	13.22	419.34	6.52	426.04	10.09	422.47
	TP-8S	1114533.1	881307.7	431.31	428.84	12.29	419.02	12.29	419.02	6.03	425.28	9.21	422.10
	TP-8M	1114533.1	881307.7	431.22	428.84	12.19	419.03	12.19	419.03	5.91	425.31	9.11	422.11
	TP-8D	1114533.1	881307.7	431.31	428.84	12.34	418.97	12.28	419.03	6.04	425.27	9.18	422.13
Utility Waste Landfill Monitoring Wells for State Monitoring	UG-4	1118616.1	881530.7	429.75	427.10	10.09	419.66	10.31	419.44	5.50	424.25	8.19	421.56
	DG-5	1116330.2	878919.2	432.03	429.30	12.23	419.80	12.35	419.68	6.05	425.98	9.41	422.62
	DG-6	1116257.1	879417.1	431.44	428.66	11.70	419.74	11.81	419.63	5.58	425.86	9.89	421.55
	DG-7	1116184.8	879911.5	430.93	428.14	11.27	419.66	11.35	419.58	5.19	425.74	8.44	422.49
	DG-8	1116113.5	880398.2	430.39	427.41	10.90	419.49	10.98	419.41	4.91	425.48	8.12	422.27
	DG-9	1116162.3	880902.0	429.25	426.54	9.74	419.51	9.79	419.46	3.82	425.43	7.09	422.16
	DG-10	1116074.8	881453.2	428.31	425.53	8.81	419.50	8.84	419.47	2.96	425.35	6.12	422.19
	DG-11	1115984.9	882003.6	429.66	427.03	9.68	419.98	8.95	420.71	3.12	426.54	6.30	423.36
	DG-12	1116385.5	882289.8	429.66	427.03	10.32	419.34	10.38	419.28	4.66	425.00	7.71	421.95

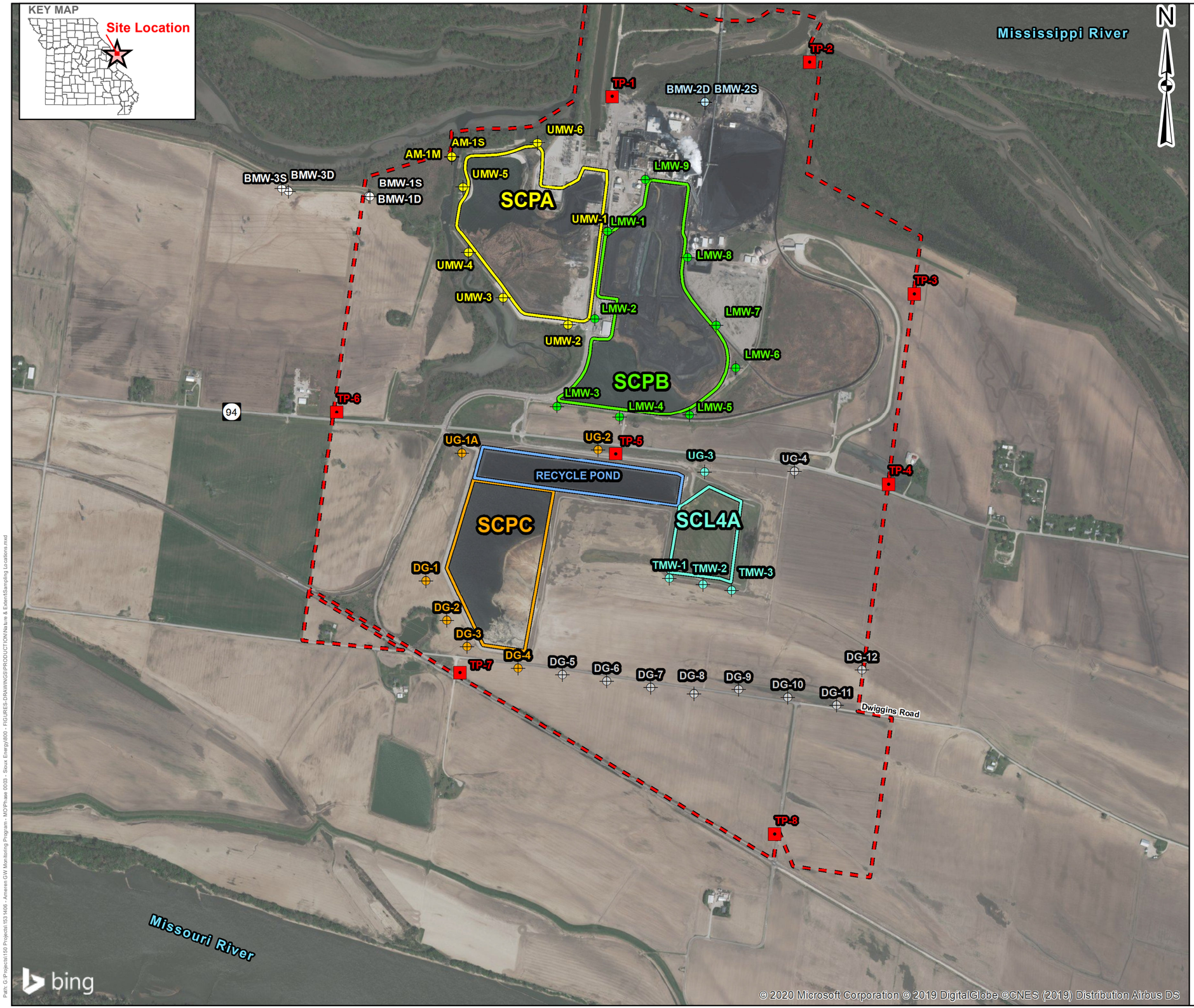
Table 3
Summary of Groundwater Elevation Monitoring Results
Sioux Energy Center, St. Charles County, MO

	Well ID	Location		Top of Casing Elevation	Ground Surface Elevation	Groundwater Elevation Measurements 11/12/2018		Groundwater Elevation measurements 1/7/2019		Groundwater Elevation Measurements 8/1/2019		Groundwater Elevation Measurements 10/1/2019	
		Northing	Easting	FT MSL[4]	FT MSL[4]	DTW[2]	GWE[3]	DTW[2]	GWE[3]	DTW[2]	GWE[3]	DTW[2]	GWE[3]
NPDES[9] Monitoring Wells	PZ-1S	1121157.5	877799.8	423.94	422.06	4.57	419.37	4.92	419.02	2.63	421.31	3.59	420.35
	PZ-1D	1121152.4	877803.4	424.00	422.10	4.64	419.36	5.02	418.98	2.69	421.31	3.65	420.35
	PZ-2S	1122251.4	878500.1	448.17	446.23	29.52	418.65	29.99	418.18	28.39	419.78	28.40	419.77
	PZ-2D	1122252.3	878506.8	448.05	446.26	29.41	418.64	29.85	418.20	28.25	419.80	28.26	419.79
	PZ-3S	1121966.9	879304.1	447.23	445.12	28.12	419.11	28.57	418.66	26.54	420.69	27.06	420.17
	PZ-3D	1121967.5	879297.8	447.19	445.10	28.14	419.05	28.63	418.56	27.60	419.59	27.04	420.15
	PZ-4S	1120281.3	878884.6	434.86	432.83	14.82	420.04	15.71	419.15	12.32	422.54	13.92	420.94
	PZ-4D	1120280.2	878890.1	434.75	432.79	14.69	420.06	15.19	419.56	12.18	422.57	13.78	420.97
	PZ-5S	1119354.9	878825.3	431.25	429.28	11.29	419.96	11.68	419.57	8.05	423.20	9.86	421.39
	PZ-6S	1119235.4	880348.1	448.72	446.01	28.06	420.66	28.31	420.41	24.19	424.53	26.30	422.42
	PZ-7S	1120272.9	880644.0	445.16	442.82	25.50	419.66	25.78	419.38	22.13	423.03	24.26	420.90
	PZ-8S	1121907.5	879837.8	444.56	442.93	23.52	421.04	25.95	418.61	NA	NA	NA	NA
	PZ-9S	1119526.5	881119.7	434.15	432.41	NA	NA	NA	NA	10.66	423.49	NA	NA
	PZ-9D	1119526.8	881125.3	434.30	432.39	NA	NA	NA	NA	10.80	423.50	NA	NA
Piezometers	BMW-2S	1122772.1	880524.1	437.86	436.13	20.21	417.65	20.69	417.17	18.90	418.96	18.65	419.21
	BMW-2D	1122766.5	880522.6	438.67	436.79	21.04	417.63	21.51	417.16	19.72	418.95	19.36	419.31
River Levels	Mississippi[8]	1124029*	879444*	NA	NA	NA	417.10	NA	416.00	NA	417.90	NA	419.80
	Missouri[1]	1112870*	878170*	NA	NA	NA	418.32	NA	417.52	NA	423.83	NA	424.15

Notes:
1.) River Elevation for the Missouri River are calculated based on nearby USGS (United States Geological Survey) river elevation gauges.
2.) DTW - Depth to water measured in feet below top of casing.
3.) GWE - Groundwater elevation measured in feet above mean sea level.
4.) FT MSL - Feet above mean sea level.
5.) Horizontal Datum: State Plane Coordinates NAD83 (2000) Missouri East Zone feet.
6.) Vertical Datum: NAVD88 feet.
7.) NA - Not Applicable.
8.) Mississippi River level is provided by Ameren.
9.) NPDES - National Pollutant Discharge Elimination System.
* Mississippi and Missouri River gauge locations are estimated.

Created By: EMS
Checked By: TJG
Reviewed By: CMR

Figures



LEGEND

- Sioux Energy Center Property Boundary

Surface Impoundments

- SCPB - Lined Fly Ash Surface Impoundment
- SCPA - Unlined Bottom Ash Surface Impoundment

Utility Waste Landfill (UWL)

- Active Dry CCR Disposal Area (SCL4A)
- Active WFGD Disposal Area (SCPC)
- Active Water Recycle Pond

CCR Rule Monitoring Wells

- Background Monitoring Well
- SCPA - Bottom Ash Surface Impoundment Monitoring Well
- SCPB - Fly Ash Surface Impoundment Monitoring Well
- Existing UWL Monitoring Well Currently Used for CCR Monitoring of the SCPC
- Existing UWL Monitoring Well Currently Used for CCR Monitoring of the SCL4A
- Groundwater Elevation Piezometer
- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring
- Nature and Extent Investigation Triple Nested Temporary Piezometers

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
6.) NATURE AND EXTENT INVESTIGATION TEMPORARY PIEZOMETERS HAVE A SHALLOW, MIDDLE, AND DEEP PIEZOMETER AT EACH LOCATION.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

0 500 1,000 1,500 2,000 2,500
Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AND MONITORING WELL LOCATION MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-22
PREPARED	EMS
DESIGN	JSI
REVIEW	RJF
APPROVED	CMR

PROJECT No.
153-140601

FIGURE
1

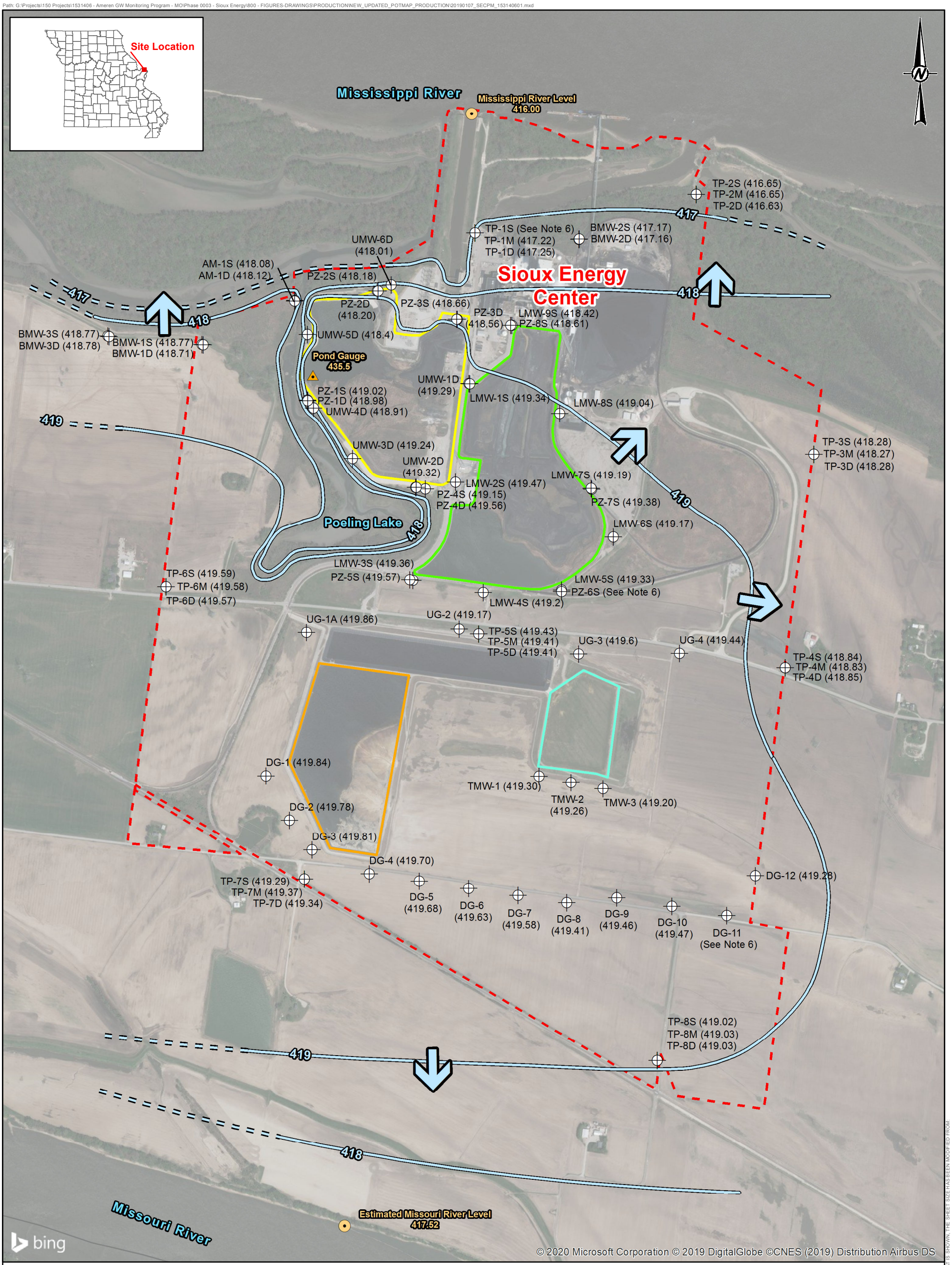
Path: G:\Projects\153\Projects\153-1406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\Nature & Extent\Sampling Locations.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

APPENDIX G

2019 Potentiometric Surface Maps

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\NEW_UPDATED_POTMAP_PRODUCTION\20190107_SECPM_153140601.mxd



LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) TP-1S, PZ-6S, AND DG-11 WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 1,500 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
JANUARY 07, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-24
PREPARED	JSI
DESIGN	JSI
REVIEW	AMM
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

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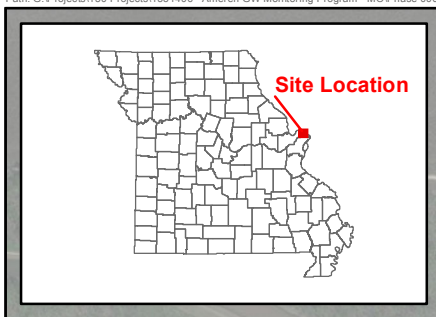

Mississippi River
Mississippi River Level
417.90
TP-1S (417.91)
TP-1M (418.83)
TP-1D (418.87)
TP-2S (418.13)
TP-2M (418.14)
TP-2D (418.12)
BMW-2S (418.96)
BMW-2D (418.95)
AM-1S (419.40)
AM-1D (419.47)
UMW-6D
(See Note 6)
Sioux Energy
Center
PZ-2S (419.78)
PZ-2D (419.80)
PZ-3S (420.69)
BMW-3S (420.98)
BMW-3D (420.98)
UMW-5D (420.35)
PZ-3D (See Note 6)
LMW-9S (420.70)
BMW-1D (420.96)
BMW-1S (420.88)
Pond Gauge
NA - Below Gauge
LMW-1S (422.00)
UMW-1D (421.93)
PZ-1S (421.31)
PZ-1D (421.31)
UMW-4D (421.32)
LMW-8S (421.97)
TP-3S (421.73)
TP-3M (421.72)
TP-3D (421.68)
UMW-3D (422.02)
PZ-4D
(422.57)
PZ-4S
(422.54)
LMW-2S (422.63)
LMW-7S (422.85)
LMW-2D (422.44)
PZ-7S (423.03)
Poeling Lake
LMW-6S (423.15)
PZ-5S (423.20)
LMW-5S (423.43)
TP-6S (424.03)
TP-6M (424.04)
TP-6D (424.01)
LMW-3S (423.03)
LMW-4S (423.28)
PZ-6S (See Note 6)
UG-1A (424.02)
UG-2 (423.22)
TP-5S (424.66)
TP-5M (424.40)
TP-5D (424.46)
UG-3 (424.20)
UG-4 (424.25)
TP-4S (422.59)
TP-4M (422.67)
TP-4D (422.81)
DG-1 (425.93)
TMW-1 (424.69)
TMW-2 (424.66)
TMW-3 (424.61)
DG-2 (426.29)
DG-3 (426.25)
DG-12 (425.00)
TP-7S (426.04)
TP-7M (426.06)
TP-7D (426.04)
DG-4
(426.10)
DG-5 (425.98)
DG-6
(425.86)
DG-7
(425.74)
DG-8
(425.48)
DG-9
(425.43)
DG-10
(425.35)
DG-11
(See Note 6)
TP-8S (425.28)
TP-8M (425.31)
TP-8D (425.27)
Estimated Missouri River Level
423.83
Missouri River
418
419
420
421
422
423
424
425
426
bing
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LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11, PZ-3D, PZ-6S, AND UMW-6D WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 1,500 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

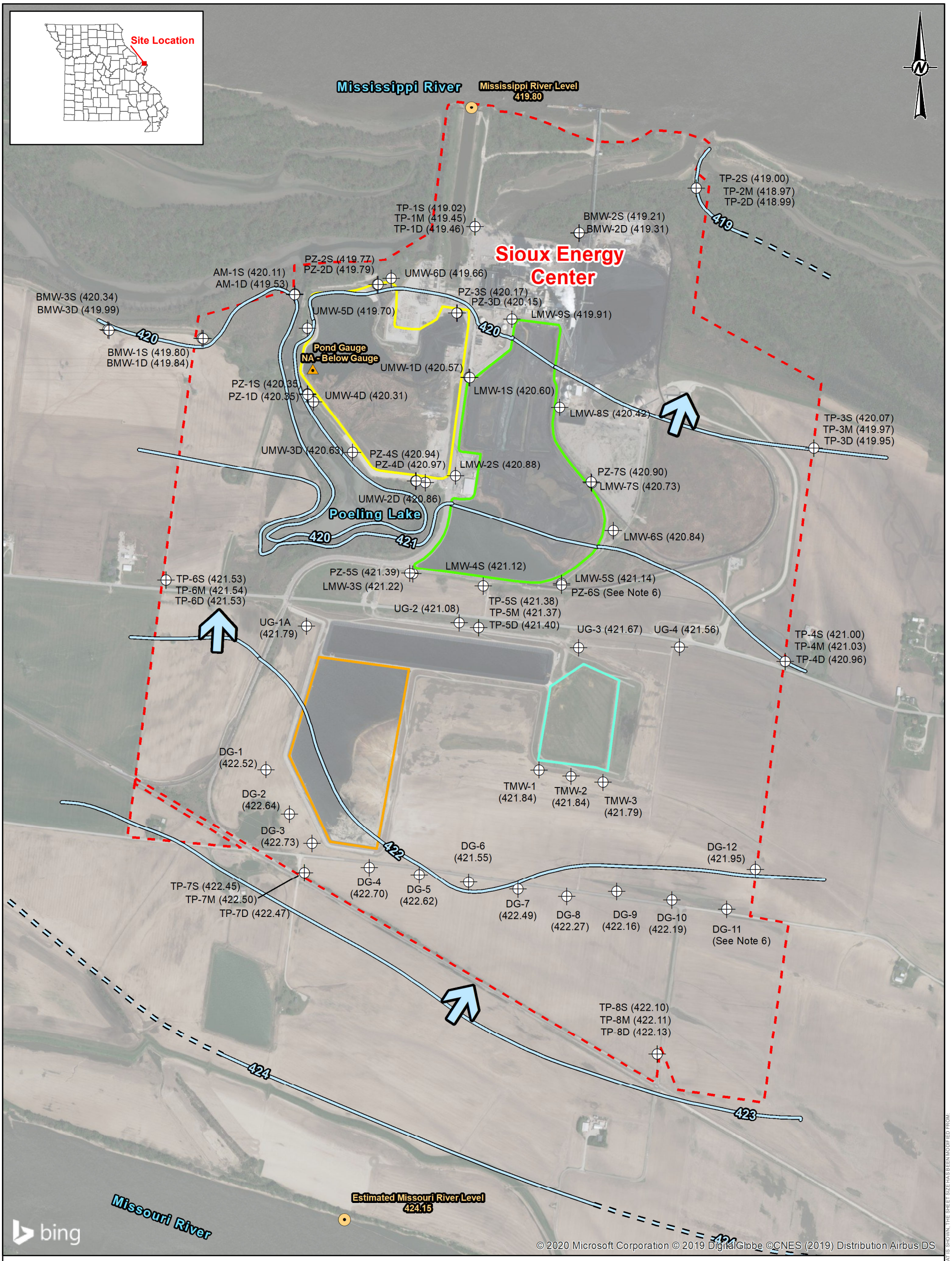
TITLE
AUGUST 1, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-09
PREPARED	EMS
DESIGN	JSI
REVIEW	AMM
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
1 in
0



LEGEND

- Sioux Energy Center Property Boundary

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- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

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- River Gauge Location
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0 500 1,000 1,500 2,000 Feet

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5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11 AND PZ-6S WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
OCTOBER 1, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-21
PREPARED	AMM
DESIGN	JSI
REVIEW	BCW
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

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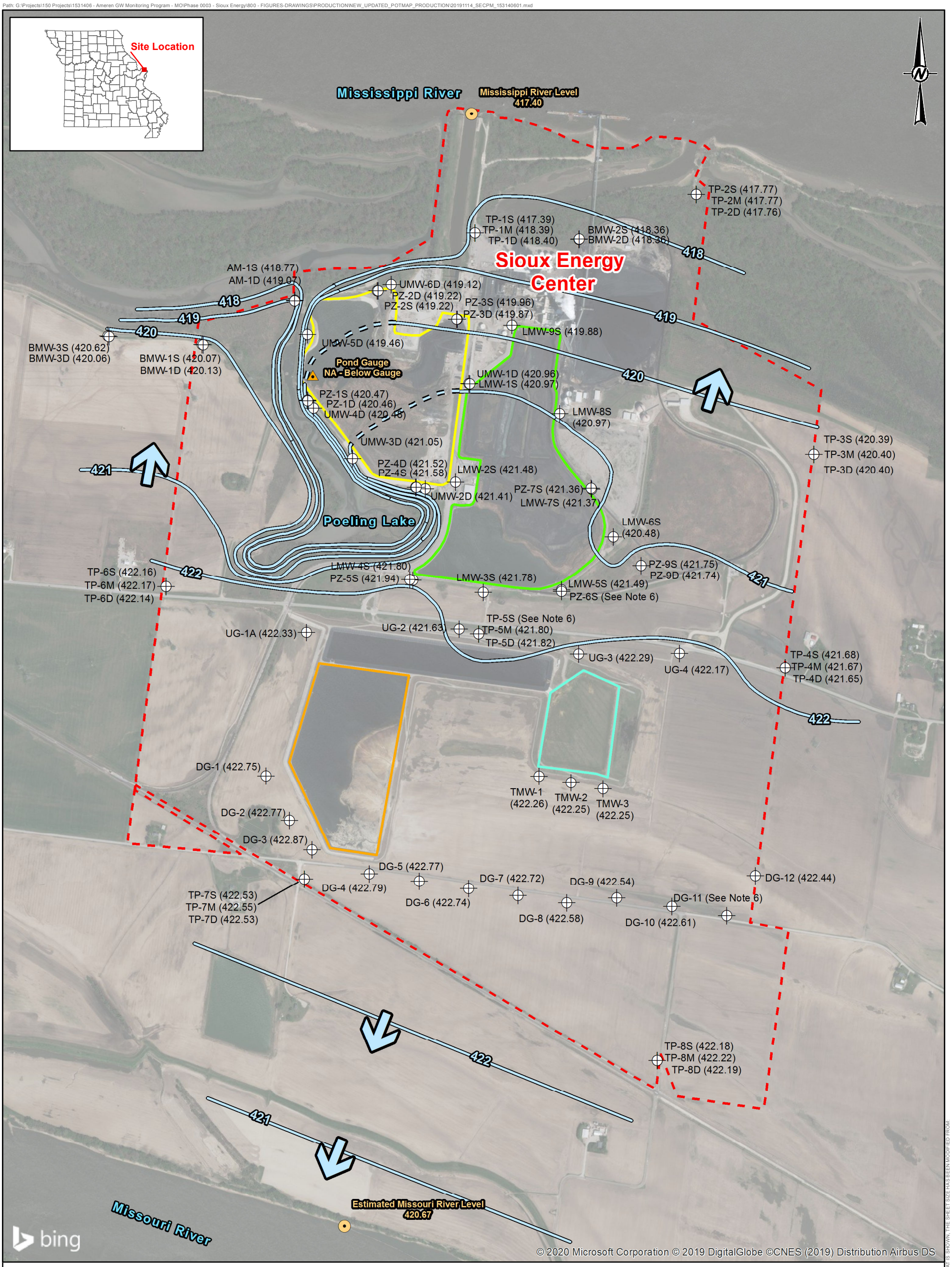

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

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- SCPB - Fly Ash Surface Impoundment
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- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

0 500 1,000 1,500 2,000 Feet

NOTES

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3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11, PZ-6S AND TP-5S WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
NOVEMBER 13, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-07
PREPARED	EMS
DESIGN	JSI
REVIEW	TJG
APPROVED	CMR

PROJECT No. 153-140601
PHASE 0003
FIGURE **P4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

golder.com