2018 Annual Groundwater Monitoring and Corrective Action Report

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

Submitted to:

Ameren Missouri
1901 Chouteau Avenue
St. Louis, Missouri 63103

Submitted by:

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

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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, 2018 through December 31, 2018.

2.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

In accordance with the CCR Rule, a groundwater monitoring system has been installed to monitor the SCPA. The groundwater monitoring system consists of eight (8) monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. Information on these monitoring wells is available in the 2017 Annual Groundwater Monitoring Report for the SCPA.

In 2018, a nature and extent investigation was initiated and eight (8) triple-nested piezometers and two (2) monitoring wells were installed. A summary of the construction details of these new piezometers, wells, and the SCPA well network is provided in **Table 1** and **Appendix A**. A map displaying the locations of these piezometers and wells is provided in **Figure 1**.

3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCPA CCR Unit in 2018. **Table 2** provides a summary including the date of sample collection and the monitoring program.

3.1 Detection Monitoring Program

A Detection Monitoring event was completed November 13-14, 2017. Verification sampling and the statistical analysis to evaluate for Statistically Significant Increases (SSI) for the November 2017 event were not completed until 2018 and are included in this report. Detections of Appendix III analytes triggered a verification sampling event, which was completed on January 8, 2018 and verified SSIs. A table summarizing the results of the statistical analysis of the November 2017 Detection Monitoring event is provided in **Table 3** and laboratory analytical data are provided in **Appendix B**. The results of this analysis indicated SSIs and a notification of the establishment of an Assessment Monitoring Program was placed in the operating record and on the publicly available website.

A Detection Monitoring event was completed May 14-16, 2018, and testing was completed for all Appendix III analytes. Statistical analysis of these data determined that there were SSIs. A table summarizing the results of the statistical analysis of the May 2018 Detection Monitoring event is provided in **Table 4** and laboratory analytical data are provided in **Appendix B**.

A Detection Monitoring event was completed November 12-14, 2018 and testing was performed for all Appendix III analytes. Statistical analyses to evaluate for SSIs in the November 2018 data were not completed in 2018. Results of the statistical evaluation for the November 2018 data will be included in the 2019 annual report. A table summarizing the results of the November 2018 Detection Monitoring event is provided in **Table 5** and laboratory analytical data are provided in **Appendix B.**

3.2 Assessment Monitoring Program

After the determination of a verified SSI, an Assessment Monitoring Program was established for the SCPA. The April 2018 Assessment Monitoring event was completed April 5-6, 2018 and testing was completed for all Appendix IV parameters. A summary of the results is provided in **Table 6** and laboratory analytical data are provided in **Appendix B**. Based on the results from the initial analysis, the May 2018 Assessment Monitoring event was completed to analyze the Appendix IV constituents detected in groundwater during the initial assessment monitoring sampling event. This sampling was completed on May 14-16, 2018. A summary of the results is provided in **Table 7** and laboratory analytical data are provided in **Appendix B**.

Using the data collected in these two sampling events along with data collected during baseline sampling, a statistical analysis was completed to identify parameters at a Statistically Significant Level (SSL) over the SCPA Groundwater Protection Standards (GWPS). The results from this analysis and a table that displays the site-specific GWPS are provided in **Appendix C**. Results from this evaluation indicated SSLs and a notification of the detection of the SSLs above SCPA GWPS was placed in the operating record and on the publicly available website. A summary of SSLs and their well locations are as follows:

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

On November 12-14, 2018, the November 2018 Assessment Monitoring event was completed. This sampling event analyzed the Appendix IV constituents detected in groundwater during the initial assessment monitoring sampling event (the same parameters as the May 2018 sampling event). A summary of the results is provided in **Table 8**, however statistical analyses to evaluate for SSLs over GWPS were not completed in 2018. Results of the statistical evaluation will be included in the 2019 annual report.

3.2.1 Nature and Extent Evaluation

As required by the CCR Rule, after an SSL is determined to be above site GWPS, an investigation into the nature and extent of impacts that may affect the corrective measures selection must be initiated. This investigation began in 2018, however, data validation, evaluation, and statistical analysis of this data were not completed in 2018. A characterization of the nature and extent of the groundwater impacts and evaluation of site conditions that may affect the assessment of corrective measures or corrective measures selection is underway. Nature and extent data and results will be provided in 2019.

3.3 Assessment of Corrective Measures

Since an SSL was determined above the SCPA GWPS, a notification that an Assessment of Corrective Measures has been initiated was posted to the operating record and to the publicly available website. An Assessment of Corrective Measures will be completed in 2019 and will be posted as required by the CCR Rule.

3.4 Groundwater Elevation, Flow Rate and Direction

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

Groundwater elevations were used to generate potentiometric surface maps included in **Appendix D**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and 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 gradient were estimated for the downgradient CCR 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 feet/foot with an estimated net annual groundwater velocity of approximately 11 feet per year.

4.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

As required by the CCR Rule, in 2018 Ameren posted a notification of Assessment Monitoring and notification of constituents exceeding CCR Groundwater Protection Standards for the SCPA. Currently, the SCPA CCR Unit is in Assessment Monitoring and has begun an Assessment of Corrective Measures. Detection and Assessment Monitoring will continue as required by the CCR Rule.

4.1 Sampling Issues

No sampling issues were encountered during the sampling events in 2018.

5.0 ACTIVITIES PLANNED FOR 2019

Detection and Assessment Monitoring is scheduled to continue on a semi-annual basis in the second and fourth quarters of 2019. Statistical analysis of the November 2018 Detection and Assessment Monitoring data will be competed in 2019 and included in the 2019 Annual Report.

As required by the Assessment Monitoring Program, a characterization of the nature and extent of impacts began in 2018 and will continue in 2019. Additionally, an Assessment of Corrective Measures will be performed in 2019. After this assessment is completed and as soon as feasible, a corrective measure will be selected. A semiannual report describing the progress in selecting and designing the corrective measures will be completed and posted to the website as required by the CCR Rule.

Tables

Table 1
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 MONITORING WELLS								
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
NATURE AND EXTENT MONITORING WELLS								
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
TP-1S	7/10/2018	1122831.7	879480.2	447.69	445.5	405.9	400.8	44.6
TP-1M	7/10/2018	1122831.7	879480.2	447.70	445.5	383.1	378.0	67.5
TP-1D	7/10/2018	1122831.7	879480.2	447.70	445.5	351.6	346.5	99.0
TP-2S	7/9/2018	1123221.1	881698.8	429.26	426.7	402.0	396.9	29.7
TP-2M	7/9/2018	1123221.1	881698.8	429.26	426.7	377.6	372.5	54.2
TP-2D	7/9/2018	1123221.1	881698.8	429.26	426.7	347.3	342.2	84.4
TP-3S	7/9/2018	1120614.0	882877.1	434.83	432.1	415.4	410.4	21.8
TP-3M	7/9/2018	1120614.0	882877.1	434.72	432.1	385.4	380.3	51.8
TP-3D	7/9/2018	1120614.0	882877.1	434.82	432.1	356.1	351.0	81.1
TP-4S	7/8/2018	1118472.8	882589.0	428.74	426.4	409.4	404.3	22.1
TP-4M	7/8/2018	1118472.8	882589.0	428.70	426.4	376.9	371.8	54.5
TP-4D	7/8/2018	1118472.8	882589.0	428.72	426.4	349.3	344.2	82.2
TP-5S	7/6/2018	1118812.3	879517.5	429.71	427.1	412.5	407.4	19.7
TP-5M	7/6/2018	1118812.3	879517.5	429.49	427.1	382.1	377.0	50.1
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-6M	7/11/2018	1119284.6	876381.5	428.08	426.1	378.2	373.1	53.0
TP-6D	7/11/2018	1119284.6	876381.5	428.06	426.1	345.6	340.5	85.6
TP-7S	7/13/2018	1116352.1	877768.3	432.58	430.1	411.6	406.5	23.6
TP-7M	7/13/2018	1116352.1	877768.3	432.56	430.1	380.6	375.5	54.6
TP-7D	7/13/2018	1116352.1	877768.3	432.56	430.1	350.2	345.1	85.1
TP-8S	7/14/2018	1114533.1	881307.7	431.31	428.8	411.8	406.7	22.2
TP-8M	7/14/2018	1114533.1	881307.7	431.22	428.8	381.9	376.8	52.0
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.

Prepared by: EMS
Checked by: JAP
Reviewed by: MNH

Table 2
Summary of Groundwater Sampling Dates
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

Groundwater Monitoring Wells	Date of Sample Collection					
	January 2018 - Verification Sampling	April 2018 - Assessment Monitoring Sampling	May 2018 - Assessment/ Detection Monitoring Sampling	July 2018 - Verification Sampling	November 2018 - Assessment/ Detection Monitoring Sampling	November 2018 - Nature and Extent Sampling
BMW-1D	-	4/5/2018	5/14/2018	-	11/12/2018	-
BMW-3D	-	4/5/2018	5/14/2018	-	11/12/2018	-
UMW-1D	1/8/2018	4/5/2018	5/16/2018	7/5/2018	11/14/2018	-
UMW-2D	1/8/2018	4/6/2018	5/14/2018	-	11/13/2018	-
UMW-3D	1/8/2018	4/6/2018	5/14/2018	7/6/2018	11/13/2018	-
UMW-4D	1/8/2018	4/6/2018	5/14/2018	-	11/13/2018	-
UMW-5D	1/8/2018	4/6/2018	5/15/2018	-	11/13/2018	-
UMW-6D	1/8/2018	4/6/2018	5/14/2018	-	11/14/2018	-
TP-1S	-	-	-	-	-	11/16/2018
TP-1M	-	-	-	-	-	11/16/2018
TP-1D	-	-	-	-	-	11/16/2018
TP-2S	-	-	-	-	-	11/12/2018
TP-2M	-	-	-	-	-	11/12/2018
TP-2D	-	-	-	-	-	11/12/2018
TP-3S	-	-	-	-	-	11/14/2018
TP-3M	-	-	-	-	-	11/14/2018
TP-3D	-	-	-	-	-	11/14/2018
TP-4S	-	-	-	-	-	11/16/2018
TP-4M	-	-	-	-	-	11/16/2018
TP-4D	-	-	-	-	-	11/16/2018
TP-5S	-	-	-	-	-	11/13/2018
TP-5M	-	-	-	-	-	11/13/2018
TP-5D	-	-	-	-	-	11/13/2018
TP-6S	-	-	-	-	-	11/13/2018
TP-6M	-	-	-	-	-	11/13/2018
TP-6D	-	-	-	-	-	11/13/2018
TP-7S	-	-	-	-	-	11/14/2018
TP-7M	-	-	-	-	-	11/14/2018
TP-7D	-	-	-	-	-	11/14/2018
TP-8S	-	-	-	-	-	11/14/2018
TP-8M	-	-	-	-	-	11/14/2018
TP-8D	-	-	-	-	-	11/14/2018
UMW-7S- (AM-1S)	-	-	-	-	-	11/13/2018
UMW-7D (AM-1D)	-	-	-	-	-	11/13/2018
Detection or Assessment Monitoring	Detection	Assessment	Assesment/ Detection	Detection	Assessment/ Detection	Assessment

Notes:

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

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

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

4.) "-" No sample collected.

Prepared By: JAP/RJF
Checked By: TJG
Reviewed By: MNH

Table 3
November 2017 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 2017 Detection Monitoring Event										
DATE	NA	NA	11/13/2017	11/13/2017	11/14/2017	11/13/2017	11/13/2017	11/13/2017	11/13/2017	11/13/2017
pH	SU	6.052-7.934	7.20	7.15	7.66	8.05	7.76	6.89	7.38	7.14
BORON, TOTAL	µg/L	240	ND	ND	266	22,100	24,100	27,000	3,450	1,130
CALCIUM, TOTAL	µg/L	152,297	131,000	110,000	71,200	224,000	237,000	192,000	70,000	81,400
CHLORIDE, TOTAL	mg/L	11.2	5.2	8.7	18.7	19.3	20.4	25.4	25.8	18.2
FLUORIDE, TOTAL	mg/L	0.3722	0.28	0.29	0.41	0.70	1.0	0.80	0.55	0.43
SULFATE, TOTAL	mg/L	48.16	37.6	27.5	49.1	722	710	544	18.3	86.4
TOTAL DISSOLVED SOLIDS	mg/L	517.6	450	409	318	1,000	1,150	1,010	310	353
January 2018 Verification Sampling										
DATE	NA	NA			1/8/2018	1/8/2018	1/8/2018	1/8/2018	1/8/2018	1/8/2018
pH	SU	6.052-7.934				7.97				
BORON, TOTAL	µg/L	240			169	23,100	27,300	19,000	1,440	1,010
CALCIUM, TOTAL	µg/L	152,297				234,000	268,000	157,000		
CHLORIDE, TOTAL	mg/L	11.2			21.0	20.0	17.5	25.5	26.0	18.1
FLUORIDE, TOTAL	mg/L	0.3722			0.42	0.58	1.1	0.82	0.60	0.47
SULFATE, TOTAL	mg/L	48.16			58.7	691	793	420		85.7
TOTAL DISSOLVED SOLIDS	mg/L	517.6				1,170	1,360	861		

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. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
7. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
8. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

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

Table 4
May 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
May 2018 Detection Monitoring Event										
DATE	NA	NA	5/14/2018	5/14/2018	5/16/2018	5/14/2018	5/14/2018	5/14/2018	5/15/2018	5/14/2018
pH	SU	6.052-7.934	7.11	6.87	7.42	8.06	8.05	7.23	7.27	7.00
BORON, TOTAL	µg/L	240	170	89.1 J	320	15,600 J	29,600	22,600	1,490	845
CALCIUM, TOTAL	µg/L	152,297	127,000	110,000	70,500	147,000	281,000	181,000	68,900	96,000
CHLORIDE, TOTAL	mg/L	11.2	5.2	9.2	22.2	22.6	11.9	25.0	25.8	13.8
FLUORIDE, TOTAL	mg/L	0.3722	0.30	0.32	0.33	0.63	0.98	0.76	0.62	0.41
SULFATE, TOTAL	mg/L	48.16	35.3	26.9	78.7	495 J	931	531	13.5	64.6
TOTAL DISSOLVED SOLIDS	mg/L	517.6	485	488	360	800 J	1,660 J	1,030	400 J	438
July 2018 Verification Sampling										
DATE	NA	NA			7/5/2018		7/6/2018			
pH	SU	6.052-7.934			7.51		7.78			
BORON, TOTAL	µg/L	240			306					
CALCIUM, TOTAL	µg/L	152,297								
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. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
7. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
8. Only analytes/wells that were detected above the prediction limit and that had not already been verified were tested during Verification Sampling.

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

Table 5
November 2018 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
November 2018 Detection Monitoring Event									
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
pH	SU	7.63	7.60	7.60	8.28	8.34	7.35	7.47	6.86
BORON, TOTAL	µg/L	140	47.3 J	163	18,400	31,900	16,800	5,530	589
CALCIUM, TOTAL	µg/L	128,000	108,000	75,300	175,000	248,000	153,000	72,700	123,000
CHLORIDE, TOTAL	mg/L	5.5	8.4	21.8	20.0	12.8	23.8	24.9	8.6
FLUORIDE, TOTAL	mg/L	0.29	0.30	0.19 J	0.46	0.96	0.49	0.49	0.33
SULFATE, TOTAL	mg/L	13.3	27.5	63.4	522	994	459	12.0	53.4
TOTAL DISSOLVED SOLIDS	mg/L	474	410	348 J	895	1,410	1,000	375	464

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. 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: JAP
Reviewed By: MNH

Table 6
April 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	4/5/2018	4/5/2018	4/5/2018	4/6/2018	4/6/2018	4/6/2018	4/6/2018	4/6/2018
DISSOLVED OXYGEN	mg/L	1.62	1.48	0.94	1.07	1.58	1.15	0.31	0.75
pH	SU	7.10	7.01	7.51	7.74	7.82	7.01	7.57	7.19
REDOX POTENTIAL	mV	-85.7	-59.5	-110.3	-88.8	-120.2	18.2	19.8	55.9
SPECIFIC CONDUCTIVITY	mS/cm	0.809	0.715	0.552	1.074	1.758	1.159	0.593	0.650
TURBIDITY	NTU	2.55	1.03	0.71	0.79	1.30	0.73	1.86	4.53
Appendix IV Parameters									
ANTIMONY, TOTAL	µg/L	ND	ND	0.037 J	0.068 J	ND	ND	ND	ND
ARSENIC, TOTAL	µg/L	0.16 J	ND	1.2	2.1	0.58 J	0.22 J	0.32 J	0.26 J
BARIUM, TOTAL	µg/L	370	652	130	57.4	90.0	59.2	249	126
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	0.40 J	ND	ND	ND
CADMIUM, TOTAL	µg/L	ND	ND	0.38 J	0.15 J	0.37 J	0.063 J	ND	ND
CHROMIUM, TOTAL	µg/L	ND	ND	0.062 J	0.066 J	0.083 J	ND	ND	ND
COBALT, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
FLUORIDE. TOTAL	mg/L	0.078 J	0.13 J	0.15 J	0.35	0.90	0.42	0.40	0.21
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
LITHIUM, TOTAL	µg/L	10.7	19.5	14.3	19.1	25.9 J	34.0	19.6	12.5
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	ND	ND	31.4	1,590	4,600	4,380	179	95.4
RADIUM [226 + 228]	pCi/L	ND	2.220	ND	ND	ND	ND	ND	ND
SELENIUM, TOTAL	µg/L	ND	ND	ND	0.094 J	0.22 J	0.14 J	0.094 J	ND
THALLIUM, TOTAL	µg/L	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, and pCi/L - picocuries per liter, 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. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the 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 B.

Prepared By: JAP
Checked By: MSG
Reviewed By: MNH

Table 7
May 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	5/14/2018	5/14/2018	5/16/2018	5/14/2018	5/14/2018	5/14/2018	5/15/2018	5/14/2018
DISSOLVED OXYGEN	mg/L	0.79	1.20	1.38	0.50	1.19	0.97	0.65	0.75
pH	SU	7.11	6.87	7.42	8.06	8.05	7.23	7.27	7.00
REDOX POTENTIAL	mV	-75.3	-43.8	-28.9	-95.3	-98.2	-79.6	29.4	-32.7
SPECIFIC CONDUCTIVITY	mS/cm	0.828	0.727	0.606	0.962	1.801	1.302	0.553	0.693
TURBIDITY	NTU	4.12	1.91	1.08	4.10	1.25	2.06	2.97	3.73
Appendix IV Parameters									
ARSENIC, TOTAL	µg/L	0.85 J	0.63 J	1.5	2.4	1.8 J	1.1	0.64 J	0.72 J
BARIUM, TOTAL	µg/L	327	685	133	54.3	92.4	71.6	265	152
FLUORIDE. TOTAL	mg/L	0.30	0.32	0.33	0.63	0.98	0.76	0.62	0.41
LITHIUM, TOTAL	µg/L	13.4	21.6	11.6	12.5	14.8	37.3	18.9	13.6
MOLYBDENUM, TOTAL	µg/L	1.3 J	ND	25.7	1,530	4,560	5,870	177	67.8

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, and pCi/L - picocuries per liter, 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. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the 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 B.

Prepared By: JAP
Checked By: MSG
Reviewed By: MNH

Table 8
November 2018 Assessment Monitoring Results
SCPA Surface Impoundment
Sioux Energy Center, St. Charles County, MO

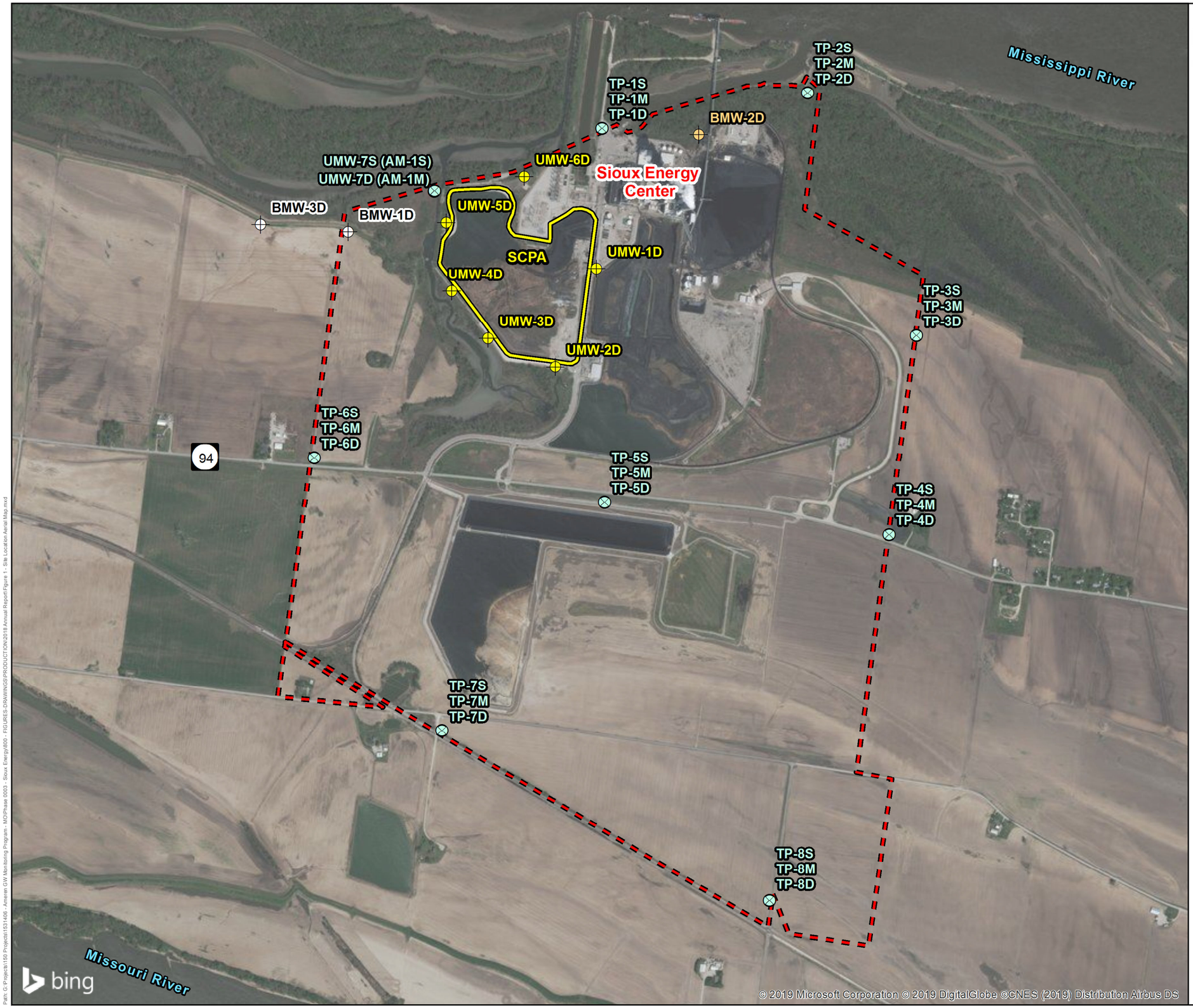
ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS					
		BMW-1D	BMW-3D	UMW-1D	UMW-2D	UMW-3D	UMW-4D	UMW-5D	UMW-6D
Field Parameters									
DATE	NA	11/12/2018	11/12/2018	11/14/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018
DISSOLVED OXYGEN	mg/L	1.90	1.19	0.23	0.66	0.70	0.67	0.43	0.23
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
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, and pCi/L - picocuries per liter, 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. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
6. "-" Turbidity read underange for the turbidmeter.

Prepared By: JAP
Checked By: MSG
Reviewed By: MNH

Figures



LEGEND

- SCPA - Bottom Ash Surface Impoundment
- Sioux Energy Center Property Boundary

Sampling Locations

- Background Monitoring Well
- SCPA Bottom Ash Surface Impoundment Monitoring Well
- SCPA Bottom Ash Surface Impoundment Piezometer Location
- Nature and Extent Monitoring Well

KEY MAP

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER MONITORING WELLS SURVEYED BY ZAHNER AND ASSOCIATES, INC.

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.

0 500 1,000 2,000 3,000 4,000
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	2018-12-19
PREPARED	JSI
DESIGN	JSI
REVIEW	MSG
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE 1

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

Path: G:\Projects\153 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\2018 Annual Report\Figure 1 - Site Location Aerial Map.mxd

Appendices

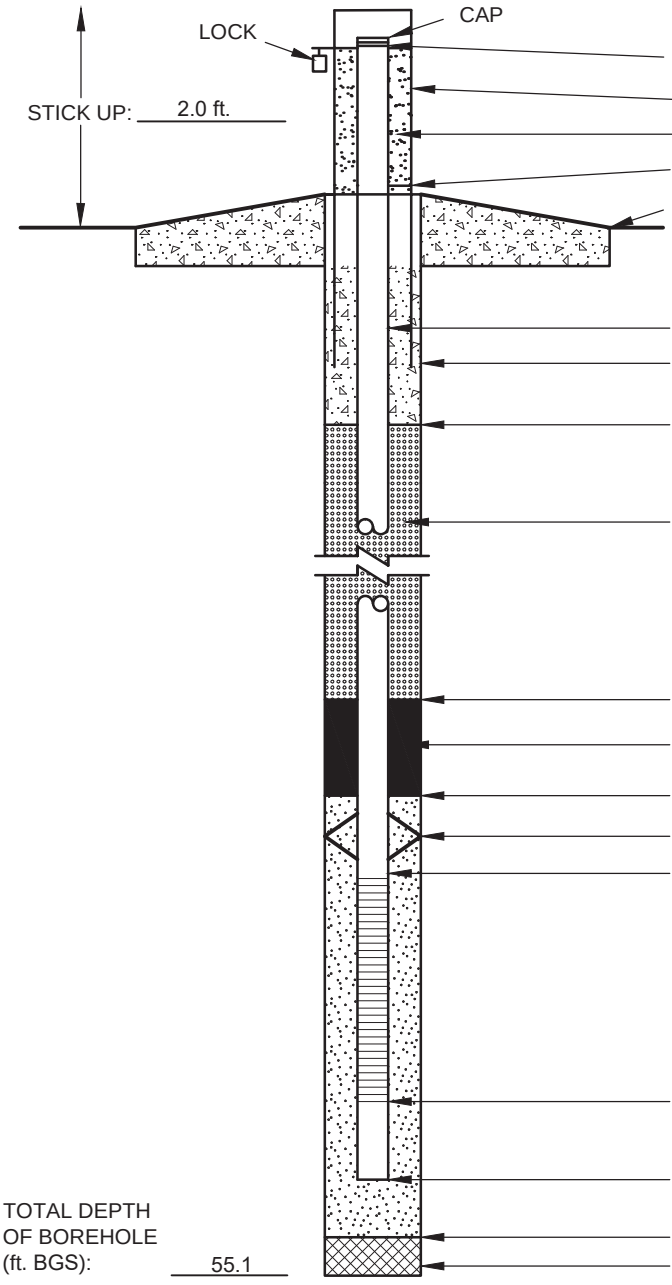
APPENDIX A

Well Construction Diagrams

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

UMW-7D (AM-1D)

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 153-1406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: AM-1M	
CLIENT: AMEREN MISSOURI	SURFACE ELEVATION: 423.49 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1122156.7	EASTING: 877672.7
DRILLER: J. DRABEK	STATIC WATER LEVEL: 7.03 ft. BTOC	COMPLETION DATE: 7/11/2018
DRILLING COMPANY: CASCADE	DRILLING METHODS: SONIC	



TOP OF CASING ELEVATION: 425.47 ft. MSL

PROTECTIVE CASING (yes / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 423.49 ft. MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 6.0

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLID BENTONITE

TOP OF BENTONITE SEAL DEPTH (ft. BGS): 38.0

AMOUNT OF 3/8 in. BENTONITE CHIPS: 1 BAG

TOP OF SAND PACK DEPTH (ft. BGS): COARSE: 43.0 FINE: 42.0

CENTRALIZER (yes / no) - TYPE: STAINLESS STEEL (TOP + BOTTOM)

TOP OF SCREEN DEPTH (ft. BGS): 44.8

TYPE OF SCREEN: 2 in. X 9.8 ft. SCHEDULE 40 PVC

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: COARSE: #1 FINE: #00

AMOUNT OF SAND: COARSE: 3 BAGS FINE: 1/2 BAG

BOTTOM OF SCREEN DEPTH (ft. BGS): 54.6

BOTTOM OF WELL DEPTH (ft. BGS): 55.1

TOTAL DEPTH OF BOREHOLE (ft. BGS): 55.1

BOTTOM OF FILTER PACK (ft. BGS): 55.1

TYPE AND AMOUNT OF BACKFILL: NONE

ADDITIONAL NOTES: ft. BGS = FEET BELOW GROUND SURFACE, ft. MSL = FEET ABOVE MEAN SEA LEVEL, in. = INCHES. 150 GALLONS OF H2O USED DURING DRILLING. 2 CENTRALIZERS AT TOP AND BOTTOM OF SCREEN. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018. ft. BTOC = FEET BELOW TOP OF CASING. SAND AND BENTONITE BAGS WEIGH 50 LBS EACH.

CHECKED BY: J. PEREZ

DATE CHECKED: 10/09/2018

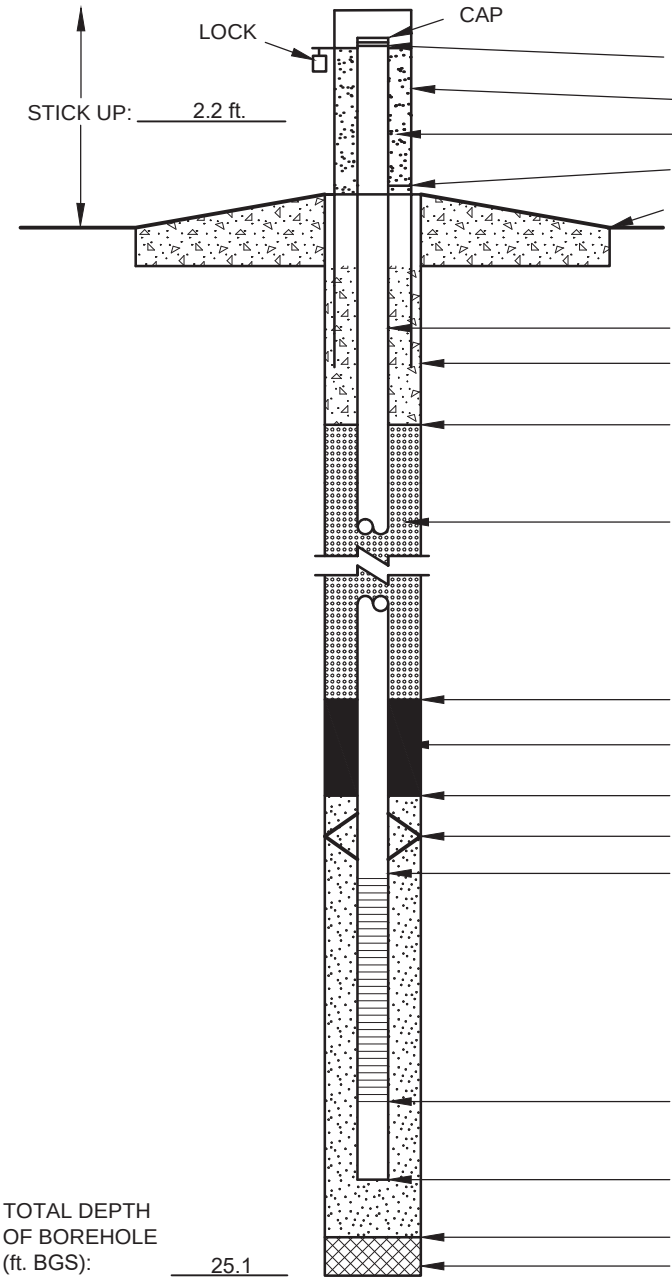
PREPARED BY: L. SWINDLE

GOLDER

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

UMW-7S (AM-1S)

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: AM-1S	
CLIENT: AMEREN MISSOURI	SURFACE ELEVATION: 423.34 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1122151.7	EASTING: 877672.3
DRILLER: J. DRABEK	STATIC WATER LEVEL: 7.13 ft. BTOC	COMPLETION DATE: 7/11/2018
DRILLING COMPANY: CASCADE	DRILLING METHODS: SONIC	



TOP OF CASING ELEVATION: 425.56 ft. MSL

PROTECTIVE CASING (yes)/ no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 423.34 ft. MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 6.0

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. BGS): 2.0

AMOUNT OF 3/8 in. BENTONITE CHIPS: 2 BAGS

TOP OF SAND PACK DEPTH (ft. BGS): COARSE: 13.0 FINE: 12.0

CENTRALIZER (yes /(no) - TYPE: NONE

TOP OF SCREEN DEPTH (ft. BGS): 14.8

TYPE OF SCREEN: 2 in. X 9.8 ft. SCHEDULE 40 PVC

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: COARSE: #1 FINE: #00

AMOUNT OF SAND: COARSE: 3 BAGS FINE: 1/3 BAG

BOTTOM OF SCREEN DEPTH (ft. BGS): 24.6

BOTTOM OF WELL DEPTH (ft. BGS): 25.1

BOTTOM OF FILTER PACK (ft. BGS): 25.1

TYPE AND AMOUNT OF BACKFILL: NONE

ADDITIONAL NOTES: ft. BGS = FEET BELOW GROUND SURFACE, ft. MSL = FEET ABOVE MEAN SEA LEVEL, in. = INCHES. 30 GALLONS OF H20 USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018. ft. BTOC = FEET BELOW TOP OF CASING. SAND AND BENTONITE BAGS WEIGH 50 LBS EACH.

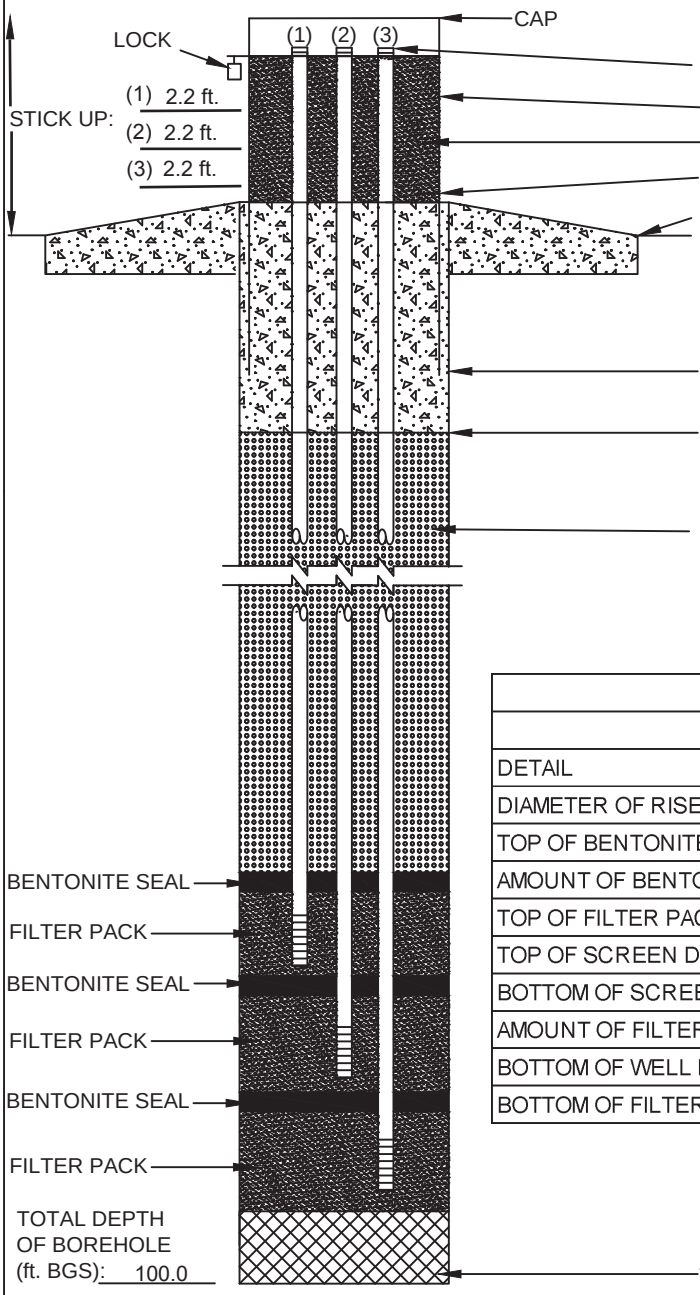
CHECKED BY: J. PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-1

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-1	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 445.48 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1122831.7	EASTING: 879480.2
DRILLER: J. DRABEK	COMPLETION DATE: 7/10/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC DRILLING		



TOP OF CASING ELEVATION (ft. MSL): (1) 447.69 (2) 447.70 (3) 447.70

PROTECTIVE CASING (yes) / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 445.48

STATIC WATER LEVEL (ft. BGS): (1) 26.84 (2) 27.25 (3) 26.61

DIAMETER OF BOREHOLE (in.): 8 in. (0-69 ft.), 6 in. (69-100 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 4 BAGS

TYPE AND AMOUNT OF BACKFILL: 1.0 ft. NATURAL CAVE-IN

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1	1	1
TOP OF BENTONITE SEAL (ft. BGS)	35.0	47.0	68.0
AMOUNT OF BENTONITE	1 BAG	5 BAGS	4 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	37.0	60.0	91.0
TOP OF SCREEN DEPTH (ft. BGS)	39.5	62.4	93.9
BOTTOM OF SCREEN DEPTH (ft. BGS)	44.2	67.1	98.6
AMOUNT OF FILTER PACK	5 BAGS	5 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	44.6	67.5	99.0
BOTTOM OF FILTER PACK (ft. BGS)	47.0	68.0	99.0

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. = INCHES. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. 500 GALLONS OF H2O USED DURING DRILLING.

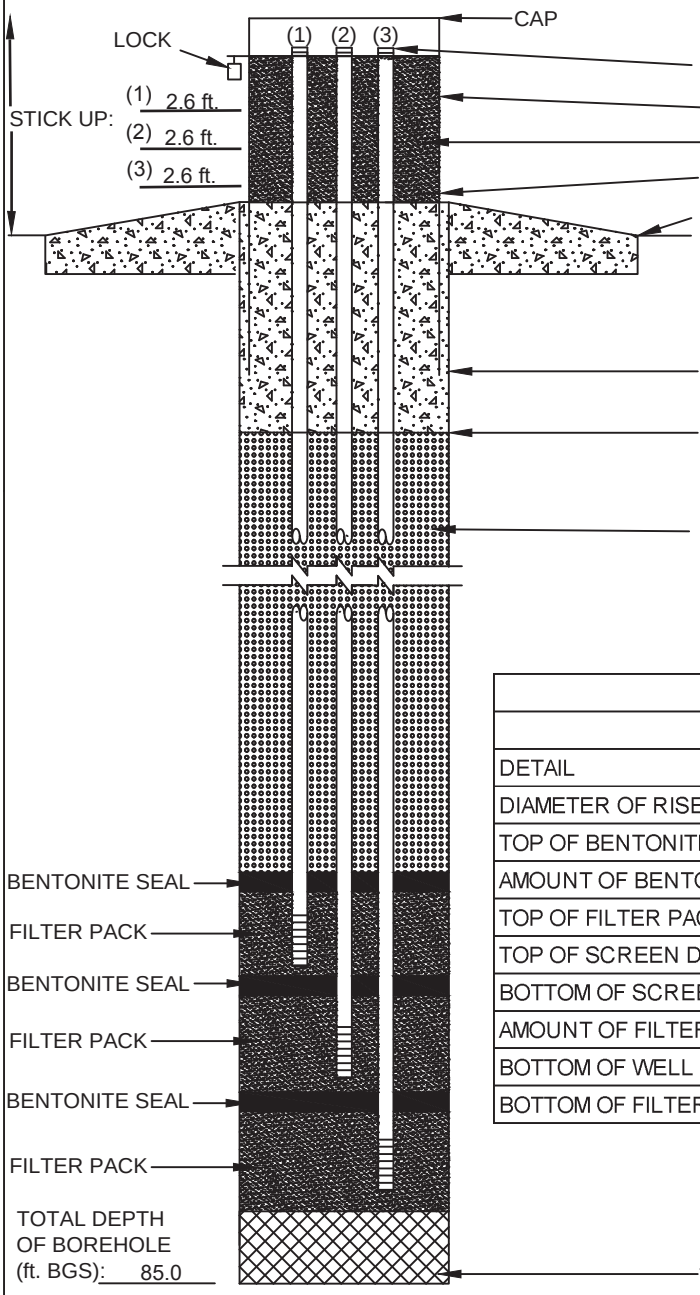
CHECKED BY: J. PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-2

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-2	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 426.66 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1123221.1	EASTING: 881698.8
DRILLER: J. DRABEK	COMPLETION DATE: 07/09/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC DRILLING		



TOP OF CASING ELEVATION (ft. MSL): (1) 429.26 (2) 429.26 (3) 429.26

PROTECTIVE CASING (yes)/ no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 426.66

STATIC WATER LEVEL (ft. BGS): (1) 7.96 (2) 7.88 (3) 7.82

DIAMETER OF BOREHOLE (in.): 8 in. (0-55 ft.), 6 in. (55-85 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 3 BAGS

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	21.0	32.0	57.0
AMOUNT OF BENTONITE	1 BAG	6 BAGS	3.5 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	22.5	47.0	77.0
TOP OF SCREEN DEPTH (ft. BGS)	24.6	49.1	79.3
BOTTOM OF SCREEN DEPTH (ft. BGS)	29.3	53.8	84.0
AMOUNT OF FILTER PACK	5 BAGS	3 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	29.7	54.2	84.4
BOTTOM OF FILTER PACK (ft. BGS)	32.0	57.0	85.0

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELLOW TOP OF CASING. in. - INCHES. 400 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER ASSOCIATES, INC ON JULY 19, 2018. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH.

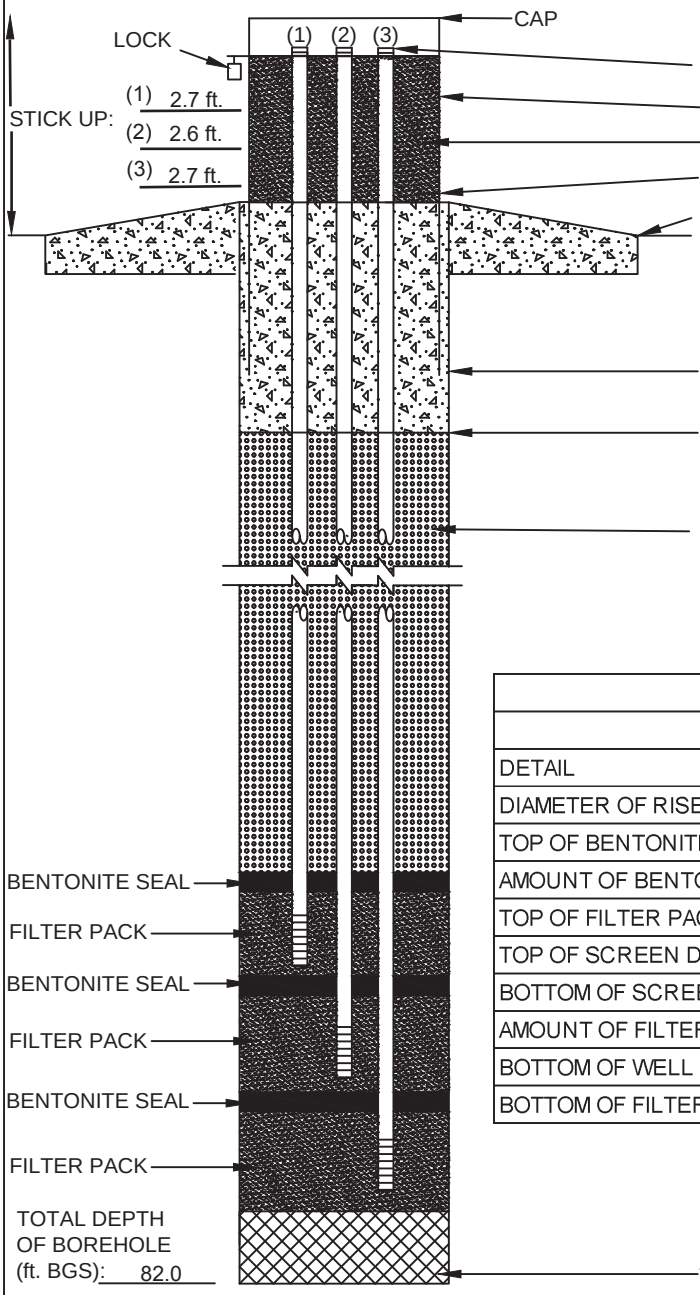
CHECKED BY: J.PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-3

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-3	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 432.10 ft. MSL	
GEOLOGIST: J. INGRAM	NORTHING: 1120614.0	EASTING: 882877.1
DRILLER: J. DRABEK	COMPLETION DATE: 07/09/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 434.83 (2) 434.72 (3) 434.82

PROTECTIVE CASING (yes)/ no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 432.10

STATIC WATER LEVEL (ft. BGS): (1) 14.19 (2) 14.22 (3) 14.13

DIAMETER OF BOREHOLE (in.): 8 in. (0-52 ft.), 6 in. (52-82 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 2 BAGS

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	12.5	24.0	54.0
AMOUNT OF BENTONITE	1 BAG	7 BAGS	5 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	14.5	44.5	74.0
TOP OF SCREEN DEPTH (ft. BGS)	16.7	46.7	76.0
BOTTOM OF SCREEN DEPTH (ft. BGS)	21.4	51.4	80.7
AMOUNT OF FILTER PACK	4 BAGS	4 BAGS	2.5 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	21.8	51.8	81.1
BOTTOM OF FILTER PACK (ft. BGS)	24.0	54.0	82.0

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. - INCHES. 400 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH.

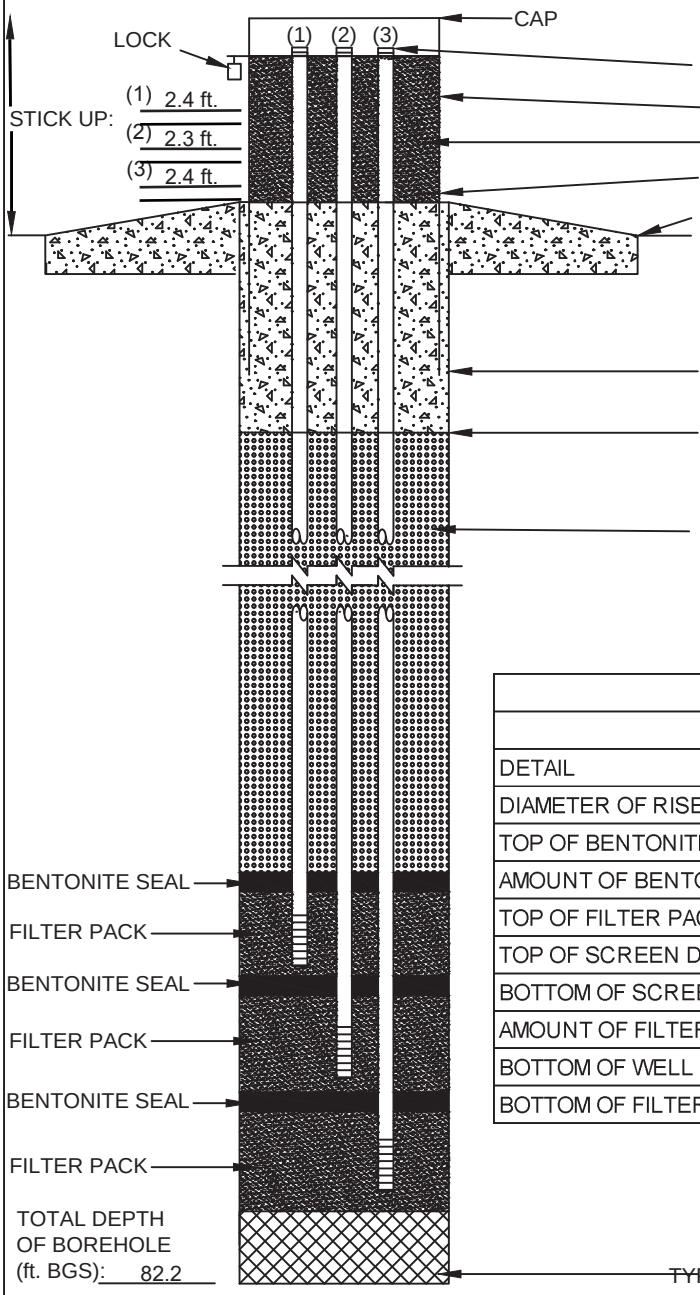
CHECKED BY: J.PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-4

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-4	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 426.37 ft. MSL	
GEOLOGIST: R. FELDMAN	NORTHING: 1118472.8	EASTING: 882589.0
DRILLER: J. DRABEK	COMPLETION DATE: 07/08/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 428.74 (2) 428.70 (3) 428.72

PROTECTIVE CASING (yes) / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 426.37

STATIC WATER LEVEL (ft. BGS): (1) 10.75 (2) 10.74 (3) 10.78

DIAMETER OF BOREHOLE (in.): 6 in (0.0-15.0), 4 in. (15.0-82.2). ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 1.5 BAGS

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	13.0	24.0	56.0
AMOUNT OF BENTONITE	1 BAG	8.5 BAGS	5 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	15.0	47.4	75.0
TOP OF SCREEN DEPTH (ft. BGS)	17.0	49.4	77.1
BOTTOM OF SCREEN DEPTH (ft. BGS)	21.7	54.1	81.8
AMOUNT OF FILTER PACK	4.5 BAGS	3 BAGS	1.75 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	22.1	54.5	82.2
BOTTOM OF FILTER PACK (ft. BGS)	24.0	56.0	82.2

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. - INCHES. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. GROUT PLACED WITH TREMIE PIPE. 450 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018.

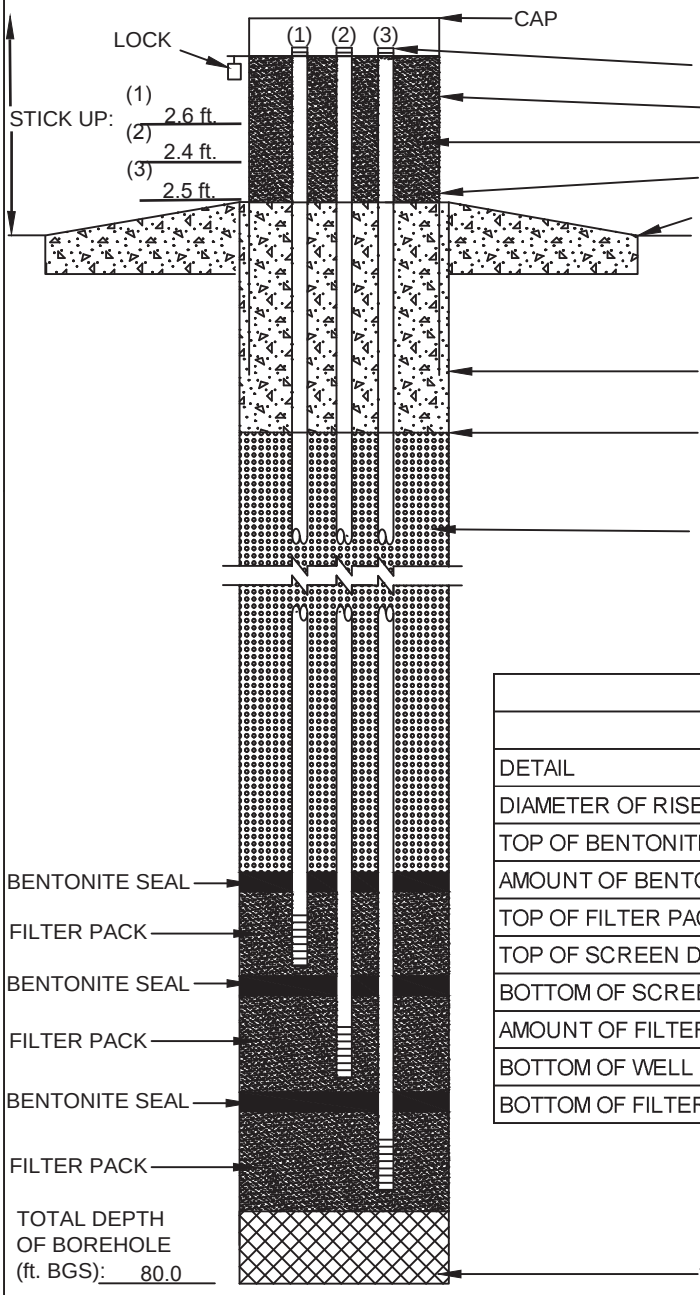
CHECKED BY: J.PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-5

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-5	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 427.08 ft. MSL	
GEOLOGIST: R. FELDMAN	NORTHING: 1118812.3	EASTING: 879517.5
DRILLER: J. DRABEK	COMPLETION DATE: 07/06/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 429.71 (2) 429.49 (3) 429.60

PROTECTIVE CASING (yes) / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 427.08

STATIC WATER LEVEL (ft. BGS): (1) 7.20 (2) 8.50 (3) 8.37

DIAMETER OF BOREHOLE (in.): 6 in. (0.0-5.0), 4 in. (5.0-80.0) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 2 BAGS

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	11.0	22.0	52.0
AMOUNT OF BENTONITE	1 BAG	8 BAGS	4 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	13.0	43.0	72.0
TOP OF SCREEN DEPTH (ft. BGS)	14.6	45.0	74.6
BOTTOM OF SCREEN DEPTH (ft. BGS)	19.3	49.7	79.3
AMOUNT OF FILTER PACK	4 BAGS	4 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	19.7	50.1	79.7
BOTTOM OF FILTER PACK (ft. BGS)	22.0	52.0	80.0

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. - INCHES. 450 GALLONS OF H2O USED DURING DRILLING. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018.

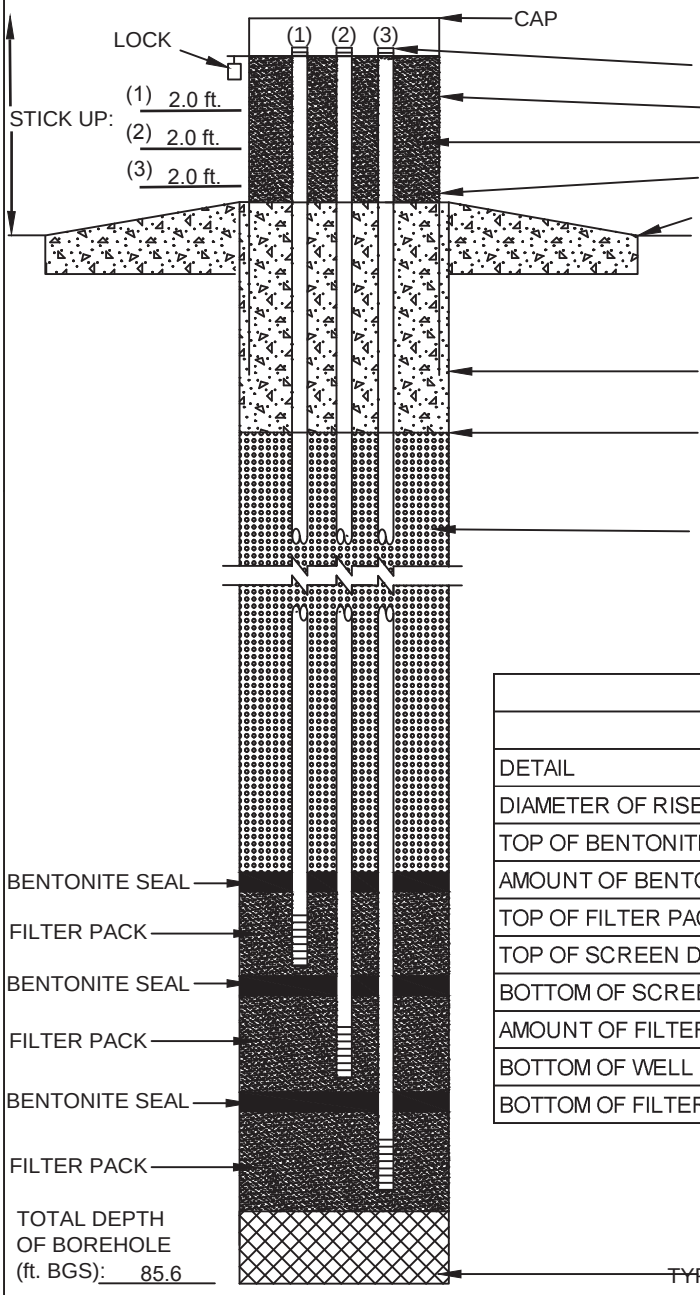
CHECKED BY: J.PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-6

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-6	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 426.07 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1119284.6	EASTING: 876381.5
DRILLER: J. DRABEK	COMPLETION DATE: 07/11/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 428.07 (2) 428.08 (3) 428.06

PROTECTIVE CASING (yes / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 426.07

STATIC WATER LEVEL (ft. BGS): (1) 7.38 (2) 7.32 (3) 7.34

DIAMETER OF BOREHOLE (in.): 8 in. (0-54 ft.), 6 in. (54-85 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. bgs): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: HIGH SOLIDS BENTONITE: 2 BAGS

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	14.0	26.0	55.0
AMOUNT OF BENTONITE	1 BAG	7.5 BAGS	3 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	16.0	46.0	76.0
TOP OF SCREEN DEPTH (ft. BGS)	17.9	47.9	80.5
BOTTOM OF SCREEN DEPTH (ft. BGS)	22.6	52.6	85.2
AMOUNT OF FILTER PACK	6 BAGS	3.5 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	23.0	53.0	85.6
BOTTOM OF FILTER PACK (ft. BGS)	26.0	55.0	85.6

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft.BTOC = FEET BELOW TOP OF CASING. in. - INCHES. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. 400 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018.

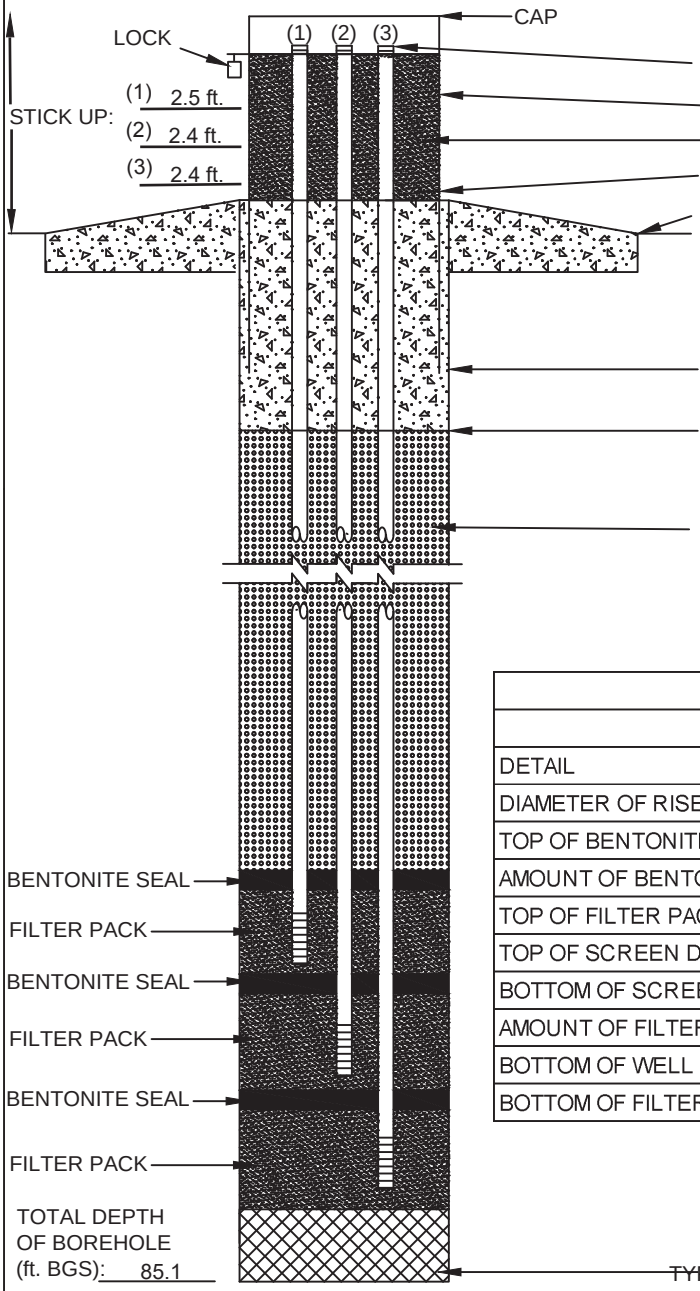
CHECKED BY: J. PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

GOLDER — ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-7

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-7	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 430.13 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1116352.1	EASTING: 877768.3
DRILLER: J. DRABEK	COMPLETION DATE: 07/13/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 432.58 (2) 432.56 (3) 432.56

PROTECTIVE CASING (yes)/ no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 430.13

STATIC WATER LEVEL (ft. BGS): (1) 11.42 (2) 11.40 (3) 11.39

DIAMETER OF BOREHOLE (in.): 8 in. (0-55 ft.), 6 in. (55-85.1 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	3.0	27.0	57.0
AMOUNT OF BENTONITE	3 BAGS	6 BAGS	3.5 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	16.0	47.0	78.0
TOP OF SCREEN DEPTH (ft. BGS)	18.5	49.5	80.0
BOTTOM OF SCREEN DEPTH (ft. BGS)	23.2	54.2	84.7
AMOUNT OF FILTER PACK	5 BAGS	5 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	23.6	54.6	85.1
BOTTOM OF FILTER PACK (ft. BGS)	27.0	57.0	85.1

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. = INCHES. 450 GALLONS OF H2O USED DURING DRILLING. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018.

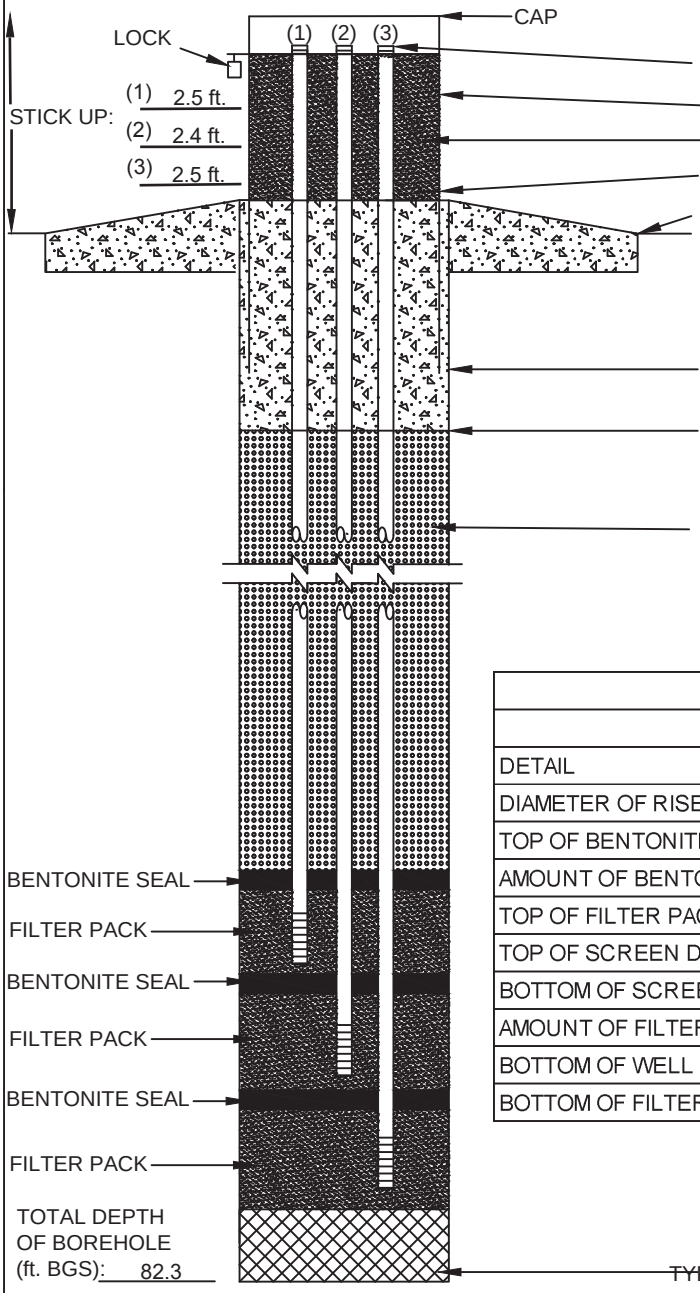
CHECKED BY: J.PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

ABOVE GROUND NESTED MONITORING WELL CONSTRUCTION LOG TP-8

PROJECT NAME: AMEREN NATURE AND EXTENT	PROJECT NUMBER: 1531406.0003L	
SITE NAME: SIOUX ENERGY CENTER	LOCATION: TP-8	
CLIENT: AMEREN - MISSOURI	SURFACE ELEVATION: 428.84 ft. MSL	
GEOLOGIST: B. WORKS	NORTHING: 1114533.1	EASTING: 881307.7
DRILLER: J. DRABEK	COMPLETION DATE: 07/14/2018	DRILLING COMPANY: CASCADE
DRILLING METHODS: SONIC		



TOP OF CASING ELEVATION (ft. MSL): (1) 431.31 (2) 431.22 (3) 431.30

PROTECTIVE CASING (yes) / no): 6 in. ALUMINUM

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION (ft. MSL): 428.84

STATIC WATER LEVEL (ft. BGS): (1) 10.29 (2) 10.40 (3) 10.22

DIAMETER OF BOREHOLE (in.): 8 in. (0-52 ft.), 6 in. (52-82.3 ft.) ft. BGS

CONCRETE SEAL DEPTH (ft. BGS): 2.0

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TYPE AND AMOUNT OF BACKFILL: NONE

WELL CONSTRUCTION DETAILS			
	NESTED WELL NUMBER		
DETAIL	(1)	(2)	(3)
DIAMETER OF RISER PIPE (in.)	1.0	1.0	1.0
TOP OF BENTONITE SEAL (ft. BGS)	2.0	24.0	54.5
AMOUNT OF BENTONITE	5 BAGS	7 BAGS	3 BAGS
TOP OF FILTER PACK DEPTH (ft. BGS)	15.0	45.0	73.0
TOP OF SCREEN DEPTH (ft. BGS)	17.1	47.0	77.2
BOTTOM OF SCREEN DEPTH (ft. BGS)	21.8	51.6	81.9
AMOUNT OF FILTER PACK	5 BAGS	3 BAGS	2 BAGS
BOTTOM OF WELL DEPTH (ft. BGS)	22.2	52.0	82.3
BOTTOM OF FILTER PACK (ft. BGS)	24.0	54.5	82.3

ADDITIONAL NOTES: TYPE AND LENGTH OF SCREEN: 3 OF 1 in. X 4.7 ft. SCHEDULE 40 PVC, 0.010 in. SCREEN SLOT SIZE. FILTER PACK TYPE: #0 SAND. ft. MSL = FEET ABOVE MEAN SEA LEVEL. ft. BGS = FEET BELOW GROUND SURFACE. ft. BTOC = FEET BELOW TOP OF CASING. in. - INCHES. 300 GALLONS OF H2O USED DURING DRILLING. BAGS OF SAND AND BENTONITE (3/8 in.) CHIPS ARE 50 LBS EACH. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON JULY 19, 2018.

CHECKED BY: J. PEREZ

DATE CHECKED: 10/09/2018

PREPARED BY: L. SWINDLE

APPENDIX B

Laboratory Analytical Data

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

January 12, 2018

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

RE: Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on January 10, 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 ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri 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-BOTTOM
Pace Project No.: 60261738

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60261738001	**S-UMW-1D**	Water	01/08/18 15:00	01/10/18 03:50
60261738002	**S-UMW-2D**	Water	01/08/18 12:55	01/10/18 03:50
60261738003	**S-UMW-3D**	Water	01/08/18 11:40	01/10/18 03:50
60261738004	**S-UMW-4D**	Water	01/08/18 10:35	01/10/18 03:50
60261738005	**S-UMW-5D**	Water	01/08/18 15:25	01/10/18 03:50
60261738006	**S-UMW-6D**	Water	01/08/18 16:25	01/10/18 03:50
60261738007	**S-UMW-DUP-1**	Water	01/08/18 08:00	01/10/18 03:50
60261738008	**S-UMW-FB-1**	Water	01/08/18 10:10	01/10/18 03:50

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60261738001	**S-UMW-1D**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
60261738002	**S-UMW-2D**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
60261738003	**S-UMW-3D**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
60261738004	**S-UMW-4D**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
60261738005	**S-UMW-5D**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB, OL	2	PASI-K
60261738006	**S-UMW-6D**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
60261738007	**S-UMW-DUP-1**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261738008	**S-UMW-FB-1**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-1D **Lab ID: 60261738001** Collected: 01/08/18 15:00 Received: 01/10/18 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								
Boron	**169**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 12:55	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.0**	mg/L	2.0	1.0	2		01/11/18 13:46	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.10	1		01/10/18 15:23	16984-48-8	
Sulfate	**58.7**	mg/L	5.0	2.5	5		01/11/18 14:00	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-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-2D **Lab ID: 60261738002** Collected: 01/08/18 12:55 Received: 01/10/18 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								
Boron	**23100**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 12:58	7440-42-8	M1
Calcium	**234000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 12:58	7440-70-2	M1
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1170**	mg/L	5.0	5.0	1		01/11/18 09:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.0**	mg/L	2.0	1.0	2		01/11/18 14:14	16887-00-6	
Fluoride	**0.58**	mg/L	0.20	0.10	1		01/10/18 15:37	16984-48-8	M1
Sulfate	**691**	mg/L	100	50.0	100		01/11/18 14:28	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-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-3D **Lab ID: 60261738003** Collected: 01/08/18 11:40 Received: 01/10/18 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								
Boron	**27300**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:05	7440-42-8	
Calcium	**268000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:05	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1360**	mg/L	5.0	5.0	1		01/11/18 09:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17.5**	mg/L	1.0	0.50	1		01/10/18 16:20	16887-00-6	
Fluoride	**1.1**	mg/L	0.20	0.10	1		01/10/18 16:20	16984-48-8	
Sulfate	**793**	mg/L	100	50.0	100		01/11/18 16:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-4D **Lab ID: 60261738004** Collected: 01/08/18 10:35 Received: 01/10/18 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								
Boron	**19000**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:07	7440-42-8	
Calcium	**157000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:07	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**861**	mg/L	5.0	5.0	1		01/11/18 09:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.5**	mg/L	2.0	1.0	2		01/11/18 16:19	16887-00-6	
Fluoride	**0.82**	mg/L	0.20	0.10	1		01/10/18 16:35	16984-48-8	
Sulfate	**420**	mg/L	50.0	25.0	50		01/11/18 16:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-5D **Lab ID: 60261738005** Collected: 01/08/18 15:25 Received: 01/10/18 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								
Boron	**1440**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:27	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.0**	mg/L	2.0	1.0	2		01/11/18 16:47	16887-00-6	
Fluoride	**0.60**	mg/L	0.20	0.10	1		01/10/18 16:49	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-6D **Lab ID: 60261738006** Collected: 01/08/18 16:25 Received: 01/10/18 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								
Boron	**1010**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:29	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18.1**	mg/L	1.0	0.50	1		01/10/18 17:04	16887-00-6	
Fluoride	**0.47**	mg/L	0.20	0.10	1		01/10/18 17:04	16984-48-8	
Sulfate	**85.7**	mg/L	10.0	5.0	10		01/11/18 17:01	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-DUP-1 **Lab ID: 60261738007** Collected: 01/08/18 08:00 Received: 01/10/18 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								
Boron	**27700**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:31	7440-42-8	
Calcium	**270000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:31	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1340**	mg/L	5.0	5.0	1		01/11/18 09:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17.0**	mg/L	1.0	0.50	1		01/11/18 17:15	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	0.10	1		01/11/18 17:15	16984-48-8	
Sulfate	**802**	mg/L	100	50.0	100		01/11/18 17:29	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

Sample: S-UMW-FB-1 **Lab ID: 60261738008** Collected: 01/08/18 10:10 Received: 01/10/18 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								
Boron	**67.4J**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:34	7440-42-8	
Calcium	**45.2J**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:34	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**6.0**	mg/L	5.0	5.0	1		01/11/18 09:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**0.65J**	mg/L	1.0	0.50	1		01/11/18 17:42	16887-00-6	
Fluoride	**<0.10**	mg/L	0.20	0.10	1		01/11/18 17:42	16984-48-8	
Sulfate	**<0.50**	mg/L	1.0	0.50	1		01/11/18 17:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

QC Batch: 510171 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006, 60261738007, 60261738008

METHOD BLANK: 2089193 Matrix: Water
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006, 60261738007, 60261738008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<3.5	100	3.5	01/11/18 12:53	
Calcium	ug/L	<36.0	100	36.0	01/11/18 12:53	

LABORATORY CONTROL SAMPLE: 2089194

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1010	101	85-115	
Calcium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089195 2089196

Parameter	Units	60261738002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	23100	1000	1000	23700	24300	56	118	70-130	3	20	M1
Calcium	ug/L	234000	10000	10000	236000	242000	22	86	70-130	3	20	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089197 2089198

Parameter	Units	60261746008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	8800	1000	1000	9980	9930	117	113	70-130	0	20	
Calcium	ug/L	175000	10000	10000	188000	187000	130	124	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-BOTTOM
Pace Project No.: 60261738

QC Batch: 510170 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60261738002, 60261738003, 60261738004, 60261738007, 60261738008

METHOD BLANK: 2089188 Matrix: Water
Associated Lab Samples: 60261738002, 60261738003, 60261738004, 60261738007, 60261738008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/11/18 09:17	

LABORATORY CONTROL SAMPLE: 2089189

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	961	96	80-120	

SAMPLE DUPLICATE: 2089190

Parameter	Units	60261611002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	445	442	1	10	

SAMPLE DUPLICATE: 2089191

Parameter	Units	60261613007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	949	940	1	10	

SAMPLE DUPLICATE: 2089192

Parameter	Units	60261738002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1170	1200	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

QC Batch: 510146 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006

METHOD BLANK: 2089061 Matrix: Water
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	01/10/18 14:55	
Fluoride	mg/L	<0.10	0.20	0.10	01/10/18 14:55	

LABORATORY CONTROL SAMPLE: 2089062

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	101	90-110	
Fluoride	mg/L	2.5	2.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089063 2089064

Parameter	Units	60261738002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.58	2.5	2.5	3.5	3.6	116	122	80-120	4	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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-BOTTOM
Pace Project No.: 60261738

QC Batch: 510259 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006, 60261738007, 60261738008

METHOD BLANK: 2089535 Matrix: Water
Associated Lab Samples: 60261738001, 60261738002, 60261738003, 60261738004, 60261738005, 60261738006, 60261738007, 60261738008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	01/11/18 13:04	
Fluoride	mg/L	<0.10	0.20	0.10	01/11/18 13:04	
Sulfate	mg/L	<0.50	1.0	0.50	01/11/18 13:04	

LABORATORY CONTROL SAMPLE: 2089536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Fluoride	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	5	5.4	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089537 2089538

Parameter	Units	60261738002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.0	10	10	31.5	31.6	116	116	80-120	0	15	
Sulfate	mg/L	691	500	500	1230	1230	108	108	80-120	0	15	

MATRIX SPIKE SAMPLE: 2089539

Parameter	Units	60261746008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	48.8	25	78.6	120	80-120	
Fluoride	mg/L	0.94	2.5	3.5	102	80-120	
Sulfate	mg/L	441	250	715	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 CTR-BOTTOM
Pace Project No.: 60261738

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.

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 CTR-BOTTOM
Pace Project No.: 60261738

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60261738001	**S-UMW-1D**	EPA 200.7	510171	EPA 200.7	510212
60261738002	**S-UMW-2D**	EPA 200.7	510171	EPA 200.7	510212
60261738003	**S-UMW-3D**	EPA 200.7	510171	EPA 200.7	510212
60261738004	**S-UMW-4D**	EPA 200.7	510171	EPA 200.7	510212
60261738005	**S-UMW-5D**	EPA 200.7	510171	EPA 200.7	510212
60261738006	**S-UMW-6D**	EPA 200.7	510171	EPA 200.7	510212
60261738007	**S-UMW-DUP-1**	EPA 200.7	510171	EPA 200.7	510212
60261738008	**S-UMW-FB-1**	EPA 200.7	510171	EPA 200.7	510212
60261738002	**S-UMW-2D**	SM 2540C	510170		
60261738003	**S-UMW-3D**	SM 2540C	510170		
60261738004	**S-UMW-4D**	SM 2540C	510170		
60261738007	**S-UMW-DUP-1**	SM 2540C	510170		
60261738008	**S-UMW-FB-1**	SM 2540C	510170		
60261738001	**S-UMW-1D**	EPA 300.0	510146		
60261738001	**S-UMW-1D**	EPA 300.0	510259		
60261738002	**S-UMW-2D**	EPA 300.0	510146		
60261738002	**S-UMW-2D**	EPA 300.0	510259		
60261738003	**S-UMW-3D**	EPA 300.0	510146		
60261738003	**S-UMW-3D**	EPA 300.0	510259		
60261738004	**S-UMW-4D**	EPA 300.0	510146		
60261738004	**S-UMW-4D**	EPA 300.0	510259		
60261738005	**S-UMW-5D**	EPA 300.0	510146		
60261738005	**S-UMW-5D**	EPA 300.0	510259		
60261738006	**S-UMW-6D**	EPA 300.0	510146		
60261738006	**S-UMW-6D**	EPA 300.0	510259		
60261738007	**S-UMW-DUP-1**	EPA 300.0	510259		
60261738008	**S-UMW-FB-1**	EPA 300.0	510259		

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Sample Condition Upon Receipt

WO# : 60261738

60261738

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-266 / T-239 (CF 0.0 / CF +0.2) **Type of Ice:** Wet Blue None

Cooler Temperature (°C): As-read 1-9/13/20 **Corr. Factor** (CF 0.0 / CF +0.2) **Corrected** 1-9/13/2-0

Date and initials of person examining contents: PW 1/10/18

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	
Rush Turn Around Time requested:	☑Yes ☐No ☐N/A	2Day
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	
Cyanide water sample checks: ☑ N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐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	

JLS

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jam Check 1/10/18

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 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: 1-12-2018	Standard

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
	Ryan_Feldmann@golder.com
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Ctr - Bottom Ash
Project Number:	153-1406.0003

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Pace Project No./ Lab I.D.: 60261738

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	Boron	Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-UMW-1D	WT	G			1-8-18	1500		2	1		1						I		I	I	I			BP3N 20 BP2U 001
2	S-UMW-2D	WT	G				1255											I	I	I	I	I	I		3BP3N 20 3BP2U [illegible] 002
3	S-UMW-2D-MS	WT	G															I	I	I	I	I	I		
4	S-UMW-2D-MSD	WT	G															I	I	I	I	I	I		
5	S-UMW-3D	WT	G				1140											I	I	I	I	I	I		BP3N 30 BP2U 003
6	S-UMW-4D	WT	G				1035											I	I	I	I	I	I		004
7	S-UMW-5D	WT	G				1525											I		I	I				005
8	S-UMW-6D	WT	G				1625											I		I	I	I			006
9	S-UMW-Dup-1	WT	G				—											I	I	I	I	I	I		007
10	S-UMW-FB-1	WT	G				1010											I	I	I	I	I	I		008
11		WT	G																						
12		WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
See Jeff Ingram to confirm analysis	[signature] / Golder	1/09/18	1400	[signature] / PACE	1/9/18	1400				
	[signature] / PACE	1/9/18	1700	[signature] PASI	1/10/18	0350	1.9	Y	Y	Y
							1.3			
							2.0			
							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): 01/09/18

*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 15, 2018 **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 – VERIFICATION SAMPLING 2018 JANUARY – DATA PACKAGE 60261738

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

- Reported results with high levels of non-target analytes or other matrix interference were analyzed at dilution and qualified as a diluted result (D).
- Reported results with high levels of non-target analytes or other matrix interference were analyzed at dilution and qualified as dilution (D).
- 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-Sioux-SCPA-VS 2018 Jan
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003
Validation Date: 4/15/18

Laboratory: Pace Analytical
SDG #: 60261738
Analytical Method (type and no.): Metals, Total 200.7; TDS 2540C; Anions 300.0
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-UMW1D, S-UMW-2D, S-UMW-3D, S-UMW-4D, S-UMW-5D, S-UMW-6D, 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?	☒	☐	☐	
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, Flow, 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?	☒	☐	☐	Chloride, Sulfate
g) Were any matrix problems noted?	☑	☐	☐	B, Ca,

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)?	☑	☐	☐	B(67.4), Ca(45.2), Chloride(0.65)
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-3D
	☑	☐	☐	FB-1@S-UMW-4D
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?	☐	☑	☐	B(56/70-130), Ca(22/70-130),
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☑	☐	Fluoride(122/80-120)
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-UMW-1D	Chloride	21.0	D	Result has a dilution factor of 2
⊥	Sulfate	58.7	D	5
S-UMW-2D	Chloride	20.0	D	2
⊥	Sulfate	691	D	100
S-UMW-3D	⊥	793	D	100
S-UMW-4D	⊥	420	D	50
⊥	Chloride	25.5	D	2
S-UMW-5D	Chloride	26.0	D	2
S-UMW-6D	Sulfate	85.7	D	10
S-UMW-DUP-1	Sulfate	802	D	100
S-UMW-FB-1	Boron (B)	67.4	J	Result was detected between MDL+PQL
⊥	Calcium (Ca)	45.2	J	⊥
	Chloride	0.65	J	
			(Ta)	

Signature: Tommy J. Goodwin Date: 1/15/2018

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

May 01, 2018

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

RE: Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on April 07, 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 SEC ASSESSMENT
Pace Project No.: 60267665

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
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

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

SAMPLE SUMMARY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60267665001	**S-UMW-1D**	Water	04/05/18 15:10	04/07/18 03:25
60267665002	**S-UMW-2D**	Water	04/06/18 10:30	04/07/18 03:25
60267665003	**S-UMW-3D**	Water	04/06/18 09:15	04/07/18 03:25
60267665004	**S-UMW-4D**	Water	04/06/18 08:00	04/07/18 03:25
60267665005	**S-UMW-5D**	Water	04/06/18 10:00	04/07/18 03:25
60267665006	**S-UMW-6D**	Water	04/06/18 08:55	04/07/18 03:25
60267665007	**S-BMW-1D**	Water	04/05/18 13:40	04/07/18 03:25
60267665008	**S-BMW-3D**	Water	04/05/18 12:30	04/07/18 03:25
60267665009	**S-UMW-DUP-1**	Water	04/06/18 08:00	04/07/18 03:25
60267665010	**S-UMW-FB-1**	Water	04/06/18 10:35	04/07/18 03:25
60267665011	**S-UMW-1D MS**	Water	04/05/18 15:10	04/07/18 03:25
60267665012	**S-UMW-1D MSD**	Water	04/05/18 15:10	04/07/18 03:25

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60267665001	S-UMW-1D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	SMW	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665002	S-UMW-2D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	SMW	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665003	S-UMW-3D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	SMW	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665004	S-UMW-4D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665005	S-UMW-5D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665006	S-UMW-6D	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K

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

SAMPLE ANALYTE COUNT

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665007	**S-BMW-1D**	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665008	**S-BMW-3D**	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665009	**S-UMW-DUP-1**	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665010	**S-UMW-FB-1**	EPA 200.7	JGP	12	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	SMW	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60267665011	**S-UMW-1D MS**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60267665012	**S-UMW-1D MSD**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-1D **Lab ID: 60267665001** Collected: 04/05/18 15:10 Received: 04/07/18 03:25 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	**130**	ug/L	5.0	1.5	1	04/11/18 15:04	04/12/18 16:47	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/11/18 15:04	04/12/18 16:47	7440-41-7	
Calcium	**73000**	ug/L	200	53.5	1	04/11/18 15:04	04/12/18 16:47	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/11/18 15:04	04/12/18 16:47	7440-48-4	
Iron	**591**	ug/L	50.0	6.1	1	04/11/18 15:04	04/12/18 16:47	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/11/18 15:04	04/12/18 16:47	7439-92-1	
Lithium	**14.3**	ug/L	10.0	4.6	1	04/11/18 15:04	04/12/18 16:47	7439-93-2	
Magnesium	**23100**	ug/L	50.0	14.0	1	04/11/18 15:04	04/12/18 16:47	7439-95-4	
Manganese	**123**	ug/L	5.0	0.73	1	04/11/18 15:04	04/12/18 16:47	7439-96-5	
Molybdenum	**31.4**	ug/L	20.0	0.90	1	04/11/18 15:04	04/12/18 16:47	7439-98-7	
Potassium	**4730**	ug/L	500	79.3	1	04/11/18 15:04	04/12/18 16:47	7440-09-7	
Sodium	**12400**	ug/L	500	157	1	04/11/18 15:04	04/12/18 16:47	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.037J**	ug/L	1.0	0.026	1	04/11/18 15:04	04/26/18 22:51	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.052	1	04/11/18 15:04	04/26/18 22:51	7440-38-2	
Cadmium	**0.38J**	ug/L	0.50	0.018	1	04/11/18 15:04	04/26/18 22:51	7440-43-9	
Chromium	**0.062J**	ug/L	1.0	0.054	1	04/11/18 15:04	04/26/18 22:51	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	04/11/18 15:04	04/26/18 22:51	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/11/18 15:04	04/26/18 22:51	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:25	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**226**	mg/L	20.0	4.9	1		04/11/18 15:17		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.6**	mg/L	1.0	0.46	1		04/13/18 21:56	16887-00-6	
Fluoride	**0.15J**	mg/L	0.20	0.063	1		04/13/18 21:56	16984-48-8	
Sulfate	**48.2**	mg/L	5.0	1.2	5		04/13/18 22:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-2D **Lab ID: 60267665002** Collected: 04/06/18 10:30 Received: 04/07/18 03:25 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	**57.4**	ug/L	5.0	1.5	1	04/11/18 15:04	04/12/18 16:55	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/11/18 15:04	04/12/18 16:55	7440-41-7	
Calcium	**165000**	ug/L	200	53.5	1	04/11/18 15:04	04/12/18 16:55	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/11/18 15:04	04/12/18 16:55	7440-48-4	
Iron	**169**	ug/L	50.0	6.1	1	04/11/18 15:04	04/12/18 16:55	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/11/18 15:04	04/12/18 16:55	7439-92-1	
Lithium	**19.1**	ug/L	10.0	4.6	1	04/11/18 15:04	04/12/18 16:55	7439-93-2	
Magnesium	**7050**	ug/L	50.0	14.0	1	04/11/18 15:04	04/12/18 16:55	7439-95-4	
Manganese	**180**	ug/L	5.0	0.73	1	04/11/18 15:04	04/12/18 16:55	7439-96-5	
Molybdenum	**1590**	ug/L	20.0	0.90	1	04/11/18 15:04	04/12/18 16:55	7439-98-7	
Potassium	**21200**	ug/L	500	79.3	1	04/11/18 15:04	04/12/18 16:55	7440-09-7	
Sodium	**54500**	ug/L	500	157	1	04/11/18 15:04	04/12/18 16:55	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.068J**	ug/L	1.0	0.026	1	04/11/18 15:04	04/26/18 23:01	7440-36-0	
Arsenic	**2.1**	ug/L	1.0	0.052	1	04/11/18 15:04	04/26/18 23:01	7440-38-2	
Cadmium	**0.15J**	ug/L	0.50	0.018	1	04/11/18 15:04	04/26/18 23:01	7440-43-9	
Chromium	**0.066J**	ug/L	1.0	0.054	1	04/11/18 15:04	04/26/18 23:01	7440-47-3	
Selenium	**0.094J**	ug/L	1.0	0.086	1	04/11/18 15:04	04/26/18 23:01	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/11/18 15:04	04/26/18 23:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:40	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**77.8**	mg/L	20.0	4.9	1		04/11/18 15:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.4**	mg/L	2.0	0.92	2		04/18/18 01:26	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.063	1		04/13/18 23:28	16984-48-8	
Sulfate	**561**	mg/L	50.0	11.8	50		04/13/18 23:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-3D **Lab ID: 60267665003** Collected: 04/06/18 09:15 Received: 04/07/18 03:25 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	**90.0**	ug/L	5.0	1.5	1	04/11/18 15:04	04/12/18 16:57	7440-39-3	
Beryllium	**0.40J**	ug/L	1.0	0.16	1	04/11/18 15:04	04/12/18 16:57	7440-41-7	
Calcium	**290000**	ug/L	200	53.5	1	04/11/18 15:04	04/12/18 16:57	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/11/18 15:04	04/12/18 16:57	7440-48-4	
Iron	**1060**	ug/L	50.0	6.1	1	04/11/18 15:04	04/12/18 16:57	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/11/18 15:04	04/12/18 16:57	7439-92-1	
Lithium	**25.9**	ug/L	10.0	4.6	1	04/11/18 15:04	04/12/18 16:57	7439-93-2	
Magnesium	**7320**	ug/L	50.0	14.0	1	04/11/18 15:04	04/12/18 16:57	7439-95-4	
Manganese	**618**	ug/L	5.0	0.73	1	04/11/18 15:04	04/12/18 16:57	7439-96-5	
Molybdenum	**4600**	ug/L	20.0	0.90	1	04/11/18 15:04	04/12/18 16:57	7439-98-7	
Potassium	**20100**	ug/L	500	79.3	1	04/11/18 15:04	04/12/18 16:57	7440-09-7	
Sodium	**107000**	ug/L	500	157	1	04/11/18 15:04	04/12/18 16:57	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/11/18 15:04	04/26/18 23:11	7440-36-0	
Arsenic	**0.58J**	ug/L	1.0	0.052	1	04/11/18 15:04	04/26/18 23:11	7440-38-2	
Cadmium	**0.37J**	ug/L	0.50	0.018	1	04/11/18 15:04	04/26/18 23:11	7440-43-9	
Chromium	**0.083J**	ug/L	1.0	0.054	1	04/11/18 15:04	04/26/18 23:11	7440-47-3	
Selenium	**0.22J**	ug/L	1.0	0.086	1	04/11/18 15:04	04/26/18 23:11	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/11/18 15:04	04/26/18 23:11	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:43	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**59.3**	mg/L	20.0	4.9	1		04/11/18 15:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.6**	mg/L	1.0	0.46	1		04/14/18 01:00	16887-00-6	
Fluoride	**0.90**	mg/L	0.20	0.063	1		04/14/18 01:00	16984-48-8	
Sulfate	**1040**	mg/L	100	23.6	100		04/18/18 01:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-4D **Lab ID: 60267665004** Collected: 04/06/18 08:00 Received: 04/07/18 03:25 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	**59.2**	ug/L	5.0	1.5	1	04/16/18 11:35	04/20/18 13:15	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:15	7440-41-7	
Calcium	**155000**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:15	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:15	7440-48-4	
Iron	**6840**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:15	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:15	7439-92-1	
Lithium	**34.0**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:15	7439-93-2	
Magnesium	**22400**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:15	7439-95-4	
Manganese	**1450**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:15	7439-96-5	
Molybdenum	**4380**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:15	7439-98-7	
Potassium	**12900**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:15	7440-09-7	
Sodium	**61300**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:15	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 11:52	7440-36-0	
Arsenic	**0.22J**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 11:52	7440-38-2	
Cadmium	**0.063J**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 11:52	7440-43-9	
Chromium	**0.093J**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 11:52	7440-47-3	B
Selenium	**0.14J**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 11:52	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 11:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:45	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**195**	mg/L	20.0	4.9	1		04/11/18 15:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24.4**	mg/L	2.0	0.92	2		04/14/18 01:31	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.063	1		04/14/18 01:16	16984-48-8	
Sulfate	**459**	mg/L	50.0	11.8	50		04/14/18 01:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-5D **Lab ID: 60267665005** Collected: 04/06/18 10:00 Received: 04/07/18 03:25 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	**249**	ug/L	5.0	1.5	1	04/16/18 11:35	04/20/18 13:22	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:22	7440-41-7	
Calcium	**71400**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:22	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:22	7440-48-4	
Iron	**3840**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:22	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:22	7439-92-1	
Lithium	**19.6**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:22	7439-93-2	
Magnesium	**17300**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:22	7439-95-4	
Manganese	**455**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:22	7439-96-5	
Molybdenum	**179**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:22	7439-98-7	
Potassium	**9490**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:22	7440-09-7	
Sodium	**17100**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:22	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:04	7440-36-0	
Arsenic	**0.32J**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:04	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:04	7440-43-9	
Chromium	**0.15J**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:04	7440-47-3	B
Selenium	**0.094J**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:04	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 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	04/17/18 12:14	04/17/18 15:47	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**238**	mg/L	20.0	4.9	1		04/11/18 15:47		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24.1**	mg/L	5.0	2.3	5		04/14/18 02:18	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.063	1		04/14/18 02:02	16984-48-8	
Sulfate	**14.9**	mg/L	1.0	0.24	1		04/14/18 02:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-6D **Lab ID: 60267665006** Collected: 04/06/18 08:55 Received: 04/07/18 03:25 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	1.5	1	04/16/18 11:35	04/20/18 13:24	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:24	7440-41-7	
Calcium	**85600**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:24	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:24	7440-48-4	
Iron	**6260**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:24	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:24	7439-92-1	
Lithium	**12.5**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:24	7439-93-2	
Magnesium	**22200**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:24	7439-95-4	
Manganese	**488**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:24	7439-96-5	
Molybdenum	**95.4**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:24	7439-98-7	
Potassium	**4400**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:24	7440-09-7	
Sodium	**13100**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:24	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:08	7440-36-0	
Arsenic	**0.26J**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:08	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:08	7440-43-9	
Chromium	**0.13J**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:08	7440-47-3	B
Selenium	**<0.086**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:08	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 12:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:49	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**224**	mg/L	20.0	4.9	1		04/11/18 15:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17.1**	mg/L	1.0	0.46	1		04/14/18 02:33	16887-00-6	
Fluoride	**0.21**	mg/L	0.20	0.063	1		04/14/18 02:33	16984-48-8	
Sulfate	**78.2**	mg/L	5.0	1.2	5		04/14/18 02:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-BMW-1D **Lab ID: 60267665007** Collected: 04/05/18 13:40 Received: 04/07/18 03:25 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	1.5	1	04/16/18 11:35	04/20/18 13:26	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:26	7440-41-7	
Calcium	**144000**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:26	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:26	7440-48-4	
Iron	**11800**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:26	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:26	7439-92-1	
Lithium	**10.7**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:26	7439-93-2	
Magnesium	**32200**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:26	7439-95-4	
Manganese	**1320**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:26	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:26	7439-98-7	
Potassium	**2640**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:26	7440-09-7	
Sodium	**7150**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:26	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:12	7440-36-0	
Arsenic	**0.16J**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:12	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:12	7440-43-9	
Chromium	**0.084J**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:12	7440-47-3	B
Selenium	**<0.086**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:12	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 12:12	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:51	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**415**	mg/L	20.0	4.9	1		04/11/18 16:03		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.0**	mg/L	1.0	0.46	1		04/14/18 03:50	16887-00-6	
Fluoride	**0.078J**	mg/L	0.20	0.063	1		04/14/18 03:50	16984-48-8	
Sulfate	**35.0**	mg/L	5.0	1.2	5		04/14/18 03:04	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-BMW-3D **Lab ID: 60267665008** Collected: 04/05/18 12:30 Received: 04/07/18 03:25 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	**652**	ug/L	5.0	1.5	1	04/16/18 11:35	04/20/18 13:28	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:28	7440-41-7	
Calcium	**113000**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:28	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:28	7440-48-4	
Iron	**8670**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:28	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:28	7439-92-1	
Lithium	**19.5**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:28	7439-93-2	
Magnesium	**27100**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:28	7439-95-4	
Manganese	**537**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:28	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:28	7439-98-7	
Potassium	**3430**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:28	7440-09-7	
Sodium	**6100**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:28	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:16	7440-36-0	
Arsenic	**<0.052**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:16	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:16	7440-43-9	
Chromium	**<0.054**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:16	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:16	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 12:16	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 15:58	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**358**	mg/L	20.0	4.9	1		04/11/18 16:09		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.8**	mg/L	1.0	0.46	1		04/14/18 04:05	16887-00-6	
Fluoride	**0.13J**	mg/L	0.20	0.063	1		04/14/18 04:05	16984-48-8	
Sulfate	**26.8**	mg/L	2.0	0.47	2		04/14/18 04:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-DUP-1 **Lab ID: 60267665009** Collected: 04/06/18 08:00 Received: 04/07/18 03:25 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	04/16/18 11:35	04/20/18 13:31	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:31	7440-41-7	
Calcium	**301000**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:31	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:31	7440-48-4	
Iron	**1210**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:31	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:31	7439-92-1	
Lithium	**12.3**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:31	7439-93-2	
Magnesium	**7540**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:31	7439-95-4	
Manganese	**624**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:31	7439-96-5	
Molybdenum	**4650**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:31	7439-98-7	
Potassium	**20900**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:31	7440-09-7	
Sodium	**108000**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:31	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.079J**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:32	7440-36-0	
Arsenic	**0.58J**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:32	7440-38-2	
Cadmium	**0.13J**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:32	7440-43-9	
Chromium	**0.15J**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:32	7440-47-3	B
Selenium	**0.25J**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:32	7782-49-2	
Thallium	**0.086J**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 12:32	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 16:01	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**60.1**	mg/L	20.0	4.9	1		04/11/18 16:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.6**	mg/L	1.0	0.46	1		04/14/18 04:36	16887-00-6	
Fluoride	**0.88**	mg/L	0.20	0.063	1		04/14/18 04:36	16984-48-8	
Sulfate	**1040**	mg/L	100	23.6	100		04/18/18 02:06	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-FB-1 **Lab ID: 60267665010** Collected: 04/06/18 10:35 Received: 04/07/18 03:25 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	04/16/18 11:35	04/20/18 13:40	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	04/16/18 11:35	04/20/18 13:40	7440-41-7	
Calcium	**<53.5**	ug/L	200	53.5	1	04/16/18 11:35	04/20/18 13:40	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	04/16/18 11:35	04/20/18 13:40	7440-48-4	
Iron	**<6.1**	ug/L	50.0	6.1	1	04/16/18 11:35	04/20/18 13:40	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	04/16/18 11:35	04/20/18 13:40	7439-92-1	
Lithium	**<4.6**	ug/L	10.0	4.6	1	04/16/18 11:35	04/20/18 13:40	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	04/16/18 11:35	04/20/18 13:40	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	04/16/18 11:35	04/20/18 13:40	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	04/16/18 11:35	04/20/18 13:40	7439-98-7	
Potassium	**<79.3**	ug/L	500	79.3	1	04/16/18 11:35	04/20/18 13:40	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	04/16/18 11:35	04/20/18 13:40	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	04/16/18 11:35	04/17/18 12:28	7440-36-0	
Arsenic	**<0.052**	ug/L	1.0	0.052	1	04/16/18 11:35	04/17/18 12:28	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	04/16/18 11:35	04/17/18 12:28	7440-43-9	
Chromium	**<0.054**	ug/L	1.0	0.054	1	04/16/18 11:35	04/17/18 12:28	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	04/16/18 11:35	04/17/18 12:28	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	04/16/18 11:35	04/17/18 12:28	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.090**	ug/L	0.20	0.090	1	04/17/18 12:14	04/17/18 16:03	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		04/11/18 16:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		04/14/18 05:07	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		04/14/18 05:07	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		04/14/18 05:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521564 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

METHOD BLANK: 2134959 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	04/17/18 15:16	

LABORATORY CONTROL SAMPLE: 2134960

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: 2134961 2134962

Parameter	Units	60267665001 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	4.7	4.7	94	94	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521375 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60267665001, 60267665002, 60267665003

METHOD BLANK: 2134189 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	2.4J	5.0	1.5	04/12/18 16:01	
Beryllium	ug/L	<0.16	1.0	0.16	04/12/18 16:01	
Calcium	ug/L	<53.5	200	53.5	04/12/18 16:01	
Cobalt	ug/L	<0.87	5.0	0.87	04/12/18 16:01	
Iron	ug/L	<6.1	50.0	6.1	04/12/18 16:01	
Lead	ug/L	<3.0	10.0	3.0	04/12/18 16:01	
Lithium	ug/L	<4.6	10.0	4.6	04/12/18 16:01	
Magnesium	ug/L	<14.0	50.0	14.0	04/12/18 16:01	
Manganese	ug/L	<0.73	5.0	0.73	04/12/18 16:01	
Molybdenum	ug/L	<0.90	20.0	0.90	04/12/18 16:01	
Potassium	ug/L	<79.3	500	79.3	04/12/18 16:01	
Sodium	ug/L	<157	500	157	04/12/18 16:01	

LABORATORY CONTROL SAMPLE: 2134190

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1000	100	85-115	
Beryllium	ug/L	1000	1030	103	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Cobalt	ug/L	1000	1050	105	85-115	
Iron	ug/L	10000	9970	100	85-115	
Lead	ug/L	1000	1050	105	85-115	
Lithium	ug/L	1000	983	98	85-115	
Magnesium	ug/L	10000	10700	107	85-115	
Manganese	ug/L	1000	1040	104	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	9740	97	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134191 2134192

Parameter	Units	60267676003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	253	2000	2000	2220	2270	98	101	70-130	3	20	
Beryllium	ug/L	<0.16	2000	2000	2000	2050	100	102	70-130	2	20	
Calcium	ug/L	155000	20000	20000	169000	171000	71	80	70-130	1	20	
Cobalt	ug/L	<0.87	2000	2000	2010	2060	100	103	70-130	3	20	
Iron	ug/L	39600	20000	20000	57300	58000	88	92	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134191 2134192

Parameter	Units	60267676003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	ug/L	<3.0	2000	2000	2000	2050	100	102	70-130	3	20	
Lithium	ug/L	9.0J	2000	2000	1970	2020	98	100	70-130	2	20	
Magnesium	ug/L	49000	20000	20000	68500	69600	98	103	70-130	2	20	
Manganese	ug/L	2970	2000	2000	4870	4940	95	99	70-130	2	20	
Molybdenum	ug/L	2.6J	2000	2000	2020	2070	101	103	70-130	3	20	
Potassium	ug/L	3670	20000	20000	23100	23600	97	99	70-130	2	20	
Sodium	ug/L	41000	20000	20000	59800	60800	94	99	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134193 2134194

Parameter	Units	60267665001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	130	1000	1000	1120	1100	99	97	70-130	2	20	
Beryllium	ug/L	<0.16	1000	1000	1030	1020	103	102	70-130	1	20	
Calcium	ug/L	73000	10000	10000	83500	82300	104	93	70-130	1	20	
Cobalt	ug/L	<0.87	1000	1000	1030	1020	103	102	70-130	1	20	
Iron	ug/L	591	10000	10000	10300	10300	97	97	70-130	0	20	
Lead	ug/L	<3.0	1000	1000	1040	1020	104	102	70-130	1	20	
Lithium	ug/L	14.3	1000	1000	989	985	97	97	70-130	0	20	
Magnesium	ug/L	23100	10000	10000	34100	33700	110	106	70-130	1	20	
Manganese	ug/L	123	1000	1000	1160	1150	104	103	70-130	1	20	
Molybdenum	ug/L	31.4	1000	1000	1050	1040	102	101	70-130	1	20	
Potassium	ug/L	4730	10000	10000	14400	14300	97	96	70-130	1	20	
Sodium	ug/L	12400	10000	10000	22500	22200	101	98	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521847 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

METHOD BLANK: 2136532 Matrix: Water
Associated Lab Samples: 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	04/20/18 13:11	
Beryllium	ug/L	<0.16	1.0	0.16	04/20/18 13:11	
Calcium	ug/L	<53.5	200	53.5	04/20/18 13:11	
Cobalt	ug/L	<0.87	5.0	0.87	04/20/18 13:11	
Iron	ug/L	7.2J	50.0	6.1	04/20/18 13:11	
Lead	ug/L	<3.0	10.0	3.0	04/20/18 13:11	
Lithium	ug/L	<4.6	10.0	4.6	04/20/18 13:11	
Magnesium	ug/L	<14.0	50.0	14.0	04/20/18 13:11	
Manganese	ug/L	<0.73	5.0	0.73	04/20/18 13:11	
Molybdenum	ug/L	<0.90	20.0	0.90	04/20/18 13:11	
Potassium	ug/L	<79.3	500	79.3	04/20/18 13:11	
Sodium	ug/L	<157	500	157	04/20/18 13:11	

LABORATORY CONTROL SAMPLE: 2136533

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	994	99	85-115	
Beryllium	ug/L	1000	1040	104	85-115	
Calcium	ug/L	10000	10400	104	85-115	
Cobalt	ug/L	1000	1040	104	85-115	
Iron	ug/L	10000	10800	108	85-115	
Lead	ug/L	1000	1060	106	85-115	
Lithium	ug/L	1000	986	99	85-115	
Magnesium	ug/L	10000	10600	106	85-115	
Manganese	ug/L	1000	1060	106	85-115	
Molybdenum	ug/L	1000	1030	103	85-115	
Potassium	ug/L	10000	9880	99	85-115	
Sodium	ug/L	10000	9900	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136534 2136535

Parameter	Units	60267665005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	249	1000	1000	1240	1250	99	100	70-130	1	20	
Beryllium	ug/L	<0.16	1000	1000	1040	1050	104	105	70-130	1	20	
Calcium	ug/L	71400	10000	10000	82000	83000	106	116	70-130	1	20	
Cobalt	ug/L	<0.87	1000	1000	1020	1020	102	102	70-130	0	20	
Iron	ug/L	3840	10000	10000	14400	14400	105	106	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136534 2136535

Parameter	Units	60267665005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	ug/L	<3.0	1000	1000	1030	1030	103	103	70-130	0	20	
Lithium	ug/L	19.6	1000	1000	1020	1030	100	101	70-130	1	20	
Magnesium	ug/L	17300	10000	10000	27200	27200	98	98	70-130	0	20	
Manganese	ug/L	455	1000	1000	1510	1510	105	105	70-130	0	20	
Molybdenum	ug/L	179	1000	1000	1210	1210	103	103	70-130	1	20	
Potassium	ug/L	9490	10000	10000	19100	19300	96	98	70-130	1	20	
Sodium	ug/L	17100	10000	10000	27200	27500	101	104	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521376 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60267665001, 60267665002, 60267665003

METHOD BLANK: 2134196 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	04/26/18 21:50	
Arsenic	ug/L	<0.052	1.0	0.052	04/26/18 21:50	
Cadmium	ug/L	<0.018	0.50	0.018	04/26/18 21:50	
Chromium	ug/L	<0.054	1.0	0.054	04/26/18 21:50	
Selenium	ug/L	<0.086	1.0	0.086	04/26/18 21:50	
Thallium	ug/L	<0.036	1.0	0.036	04/26/18 21:50	

LABORATORY CONTROL SAMPLE: 2134197

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	41.3	103	85-115	
Arsenic	ug/L	40	41.3	103	85-115	
Cadmium	ug/L	40	40.8	102	85-115	
Chromium	ug/L	40	41.6	104	85-115	
Selenium	ug/L	40	38.4	96	85-115	
Thallium	ug/L	40	37.4	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134198 2134199

Parameter	Units	60267676003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.026	40	40	41.5	40.9	104	102	70-130	2	20	
Arsenic	ug/L	8.1	40	40	49.3	48.7	103	101	70-130	1	20	
Cadmium	ug/L	0.11J	40	40	39.4	39.0	98	97	70-130	1	20	
Chromium	ug/L	0.34J	40	40	41.4	43.3	103	108	70-130	5	20	
Selenium	ug/L	<0.086	40	40	36.6	36.5	91	91	70-130	0	20	
Thallium	ug/L	<0.036	40	40	46.5	45.9	116	115	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134200 2134201

Parameter	Units	60267665001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.037J	40	40	41.4	41.4	103	103	70-130	0	20	
Arsenic	ug/L	1.2	40	40	41.8	42.2	102	103	70-130	1	20	
Cadmium	ug/L	0.38J	40	40	41.7	39.6	103	98	70-130	5	20	
Chromium	ug/L	0.062J	40	40	40.8	40.6	102	101	70-130	1	20	
Selenium	ug/L	<0.086	40	40	36.4	36.8	91	92	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2134200 2134201

Parameter	Units	60267665001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Thallium	ug/L	<0.036	40	40	44.5	42.8	111	107	70-130	4	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521834 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

METHOD BLANK: 2136464 Matrix: Water
Associated Lab Samples: 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	04/17/18 11:40	
Arsenic	ug/L	<0.052	1.0	0.052	04/17/18 11:40	
Cadmium	ug/L	<0.018	0.50	0.018	04/17/18 11:40	
Chromium	ug/L	0.14J	1.0	0.054	04/17/18 11:40	
Selenium	ug/L	<0.086	1.0	0.086	04/17/18 11:40	
Thallium	ug/L	<0.036	1.0	0.036	04/17/18 11:40	

LABORATORY CONTROL SAMPLE: 2136465

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.7	102	85-115	
Arsenic	ug/L	40	41.0	103	85-115	
Cadmium	ug/L	40	40.7	102	85-115	
Chromium	ug/L	40	40.9	102	85-115	
Selenium	ug/L	40	39.5	99	85-115	
Thallium	ug/L	40	38.7	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136466 2136467

Parameter	Units	60267665004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.026	40	40	41.2	40.6	103	101	70-130	2	20	
Arsenic	ug/L	0.22J	40	40	41.3	40.8	103	102	70-130	1	20	
Cadmium	ug/L	0.063J	40	40	39.9	39.3	100	98	70-130	2	20	
Chromium	ug/L	0.093J	40	40	39.8	39.6	99	99	70-130	1	20	
Selenium	ug/L	0.14J	40	40	37.5	37.6	94	94	70-130	0	20	
Thallium	ug/L	<0.036	40	40	40.0	39.6	100	99	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136469 2136470

Parameter	Units	60267725002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	40	40	39.8	40.6	99	101	70-130	2	20	
Arsenic	ug/L	ND	40	40	40.0	40.4	99	100	70-130	1	20	
Cadmium	ug/L	ND	40	40	38.4	38.7	96	97	70-130	1	20	
Chromium	ug/L	ND	40	40	39.5	40.0	98	99	70-130	1	20	
Selenium	ug/L	ND	40	40	37.0	37.3	92	92	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136469 2136470

Parameter	Units	60267725002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Thallium	ug/L	ND	40	40	39.8	40.1	99	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521390 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

METHOD BLANK: 2134228 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	04/11/18 14:55	

LABORATORY CONTROL SAMPLE: 2134229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	494	99	90-110	

SAMPLE DUPLICATE: 2134230

Parameter	Units	60267665001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	226	231	2	10	

SAMPLE DUPLICATE: 2134231

Parameter	Units	60267665005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	238	244	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521682 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

METHOD BLANK: 2135581 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	04/13/18 20:54	
Fluoride	mg/L	<0.063	0.20	0.063	04/13/18 20:54	
Sulfate	mg/L	<0.24	1.0	0.24	04/13/18 20:54	

LABORATORY CONTROL SAMPLE: 2135582

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	2.6	105	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2135583 2135584

Parameter	Units	60267665001 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	25	25	40.9	40.7	85	84	80-120	0	15	
Fluoride	mg/L	0.15J	2.5	2.5	2.5	2.6	96	98	80-120	2	15	
Sulfate	mg/L	48.2	25	25	72.3	72.1	96	96	80-120	0	15	

MATRIX SPIKE SAMPLE: 2135585

Parameter	Units	60267820002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	ND	25	24.1	97	80-120	
Sulfate	mg/L	188		234			E

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QUALITY CONTROL DATA

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 521864 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60267665002, 60267665003, 60267665009

METHOD BLANK: 2136545 Matrix: Water
Associated Lab Samples: 60267665002, 60267665003, 60267665009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	04/17/18 14:55	
Sulfate	mg/L	<0.24	1.0	0.24	04/17/18 14:55	

LABORATORY CONTROL SAMPLE: 2136546

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2136547 2136548

Parameter	Units	60268108001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	608	250	250	906	926	119	127	80-120	2	15	M1
Sulfate	mg/L	71.0	250	250	342	349	109	111	80-120	2	15	

MATRIX SPIKE SAMPLE: 2136549

Parameter	Units	60267665002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	25.4	10	36.8	114	80-120	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-1D **Lab ID: 60267665001** Collected: 04/05/18 15:10 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.215 ± 0.395 (0.705) C:NA T:94%**	pCi/L	04/26/18 20:33	13982-63-3	
Radium-228	EPA 904.0	**0.768 ± 0.470 (0.867) C:79% T:86%**	pCi/L	04/27/18 15:24	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-2D **Lab ID: 60267665002** Collected: 04/06/18 10:30 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.561 ± 0.496 (0.735) C:NA T:84%**	pCi/L	04/26/18 20:33	13982-63-3	
Radium-228	EPA 904.0	**1.15 ± 0.585 (1.03) C:81% T:80%**	pCi/L	04/27/18 15:23	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-3D **Lab ID: 60267665003** Collected: 04/06/18 09:15 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.108 ± 0.367 (0.709) C:NA T:87%**	pCi/L	04/26/18 20:10	13982-63-3	
Radium-228	EPA 904.0	**0.698 ± 0.525 (1.04) C:79% T:79%**	pCi/L	04/27/18 17:21	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-4D **Lab ID: 60267665004** Collected: 04/06/18 08:00 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.166 ± 0.420 (0.779) C:NA T:92%**	pCi/L	04/26/18 20:23	13982-63-3	
Radium-228	EPA 904.0	**0.911 ± 0.476 (0.836) C:77% T:88%**	pCi/L	04/27/18 17:21	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-5D **Lab ID: 60267665005** Collected: 04/06/18 10:00 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.366 ± 0.341 (0.449) C:NA T:91%**	pCi/L	04/26/18 20:33	13982-63-3	
Radium-228	EPA 904.0	**0.718 ± 0.454 (0.852) C:77% T:89%**	pCi/L	04/27/18 17:21	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-6D **Lab ID: 60267665006** Collected: 04/06/18 08:55 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.183 ± 0.431 (0.799) C:NA T:82%**	pCi/L	04/26/18 20:33	13982-63-3	
Radium-228	EPA 904.0	**0.200 ± 0.388 (0.853) C:75% T:91%**	pCi/L	04/27/18 17:21	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-BMW-1D **Lab ID: 60267665007** Collected: 04/05/18 13:40 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.332 ± 0.309 (0.407) C:NA T:86%**	pCi/L	04/26/18 20:45	13982-63-3	
Radium-228	EPA 904.0	**0.101 ± 0.297 (0.667) C:81% T:97%**	pCi/L	04/27/18 15:41	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-BMW-3D **Lab ID: 60267665008** Collected: 04/05/18 12:30 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**1.12 ± 0.509 (0.152) C:NA T:89%**	pCi/L	04/26/18 20:45	13982-63-3	
Radium-228	EPA 904.0	**1.10 ± 0.484 (0.815) C:76% T:92%**	pCi/L	04/27/18 15:42	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-DUP-1 **Lab ID: 60267665009** Collected: 04/06/18 08:00 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.470 ± 0.344 (0.385) C:NA T:91%**	pCi/L	04/26/18 20:34	13982-63-3	
Radium-228	EPA 904.0	**0.279 ± 0.360 (0.767) C:77% T:89%**	pCi/L	04/27/18 15:42	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-FB-1 **Lab ID: 60267665010** Collected: 04/06/18 10:35 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.342 ± 0.449 (0.748) C:NA T:84%**	pCi/L	04/26/18 20:46	13982-63-3	
Radium-228	EPA 904.0	**-0.0229 ± 0.320 (0.752) C:78% T:87%**	pCi/L	04/27/18 15:43	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-1D MS **Lab ID: 60267665011** Collected: 04/05/18 15:10 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**104.92 %REC ± NA (NA) C:NA T:NA**	pCi/L	04/26/18 21:03	13982-63-3	
Radium-228	EPA 904.0	**87.64 %REC ± NA (NA) C:NA T:NA**	pCi/L	04/27/18 15:23	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Sample: S-UMW-1D MSD **Lab ID: 60267665012** Collected: 04/05/18 15:10 Received: 04/07/18 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**76.34 %REC 31.54 RPD ± NA (NA) C:NA T:NA**	pCi/L	04/26/18 21:03	13982-63-3	
Radium-228	EPA 904.0	**81.73 %REC 6.98 RPD ± NA (NA) C:NA T:NA**	pCi/L	04/27/18 15:24	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 294502 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010, 60267665011, 60267665012

METHOD BLANK: 1441730 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010, 60267665011, 60267665012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.290 (0.650) C:NA T:80%	pCi/L	04/26/18 20:10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

QC Batch: 294503 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010, 60267665011, 60267665012

METHOD BLANK: 1441731 Matrix: Water
Associated Lab Samples: 60267665001, 60267665002, 60267665003, 60267665004, 60267665005, 60267665006, 60267665007, 60267665008, 60267665009, 60267665010, 60267665011, 60267665012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.598 ± 0.375 (0.695) C:80% T:74%	pCi/L	04/27/18 11:07	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

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.

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC ASSESSMENT
Pace Project No.: 60267665

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60267665001	**S-UMW-1D**	EPA 200.7	521375	EPA 200.7	521434
60267665002	**S-UMW-2D**	EPA 200.7	521375	EPA 200.7	521434
60267665003	**S-UMW-3D**	EPA 200.7	521375	EPA 200.7	521434
60267665004	**S-UMW-4D**	EPA 200.7	521847	EPA 200.7	521861
60267665005	**S-UMW-5D**	EPA 200.7	521847	EPA 200.7	521861
60267665006	**S-UMW-6D**	EPA 200.7	521847	EPA 200.7	521861
60267665007	**S-BMW-1D**	EPA 200.7	521847	EPA 200.7	521861
60267665008	**S-BMW-3D**	EPA 200.7	521847	EPA 200.7	521861
60267665009	**S-UMW-DUP-1**	EPA 200.7	521847	EPA 200.7	521861
60267665010	**S-UMW-FB-1**	EPA 200.7	521847	EPA 200.7	521861
60267665001	**S-UMW-1D**	EPA 200.8	521376	EPA 200.8	521433
60267665002	**S-UMW-2D**	EPA 200.8	521376	EPA 200.8	521433
60267665003	**S-UMW-3D**	EPA 200.8	521376	EPA 200.8	521433
60267665004	**S-UMW-4D**	EPA 200.8	521834	EPA 200.8	521860
60267665005	**S-UMW-5D**	EPA 200.8	521834	EPA 200.8	521860
60267665006	**S-UMW-6D**	EPA 200.8	521834	EPA 200.8	521860
60267665007	**S-BMW-1D**	EPA 200.8	521834	EPA 200.8	521860
60267665008	**S-BMW-3D**	EPA 200.8	521834	EPA 200.8	521860
60267665009	**S-UMW-DUP-1**	EPA 200.8	521834	EPA 200.8	521860
60267665010	**S-UMW-FB-1**	EPA 200.8	521834	EPA 200.8	521860
60267665001	**S-UMW-1D**	EPA 7470	521564	EPA 7470	522082
60267665002	**S-UMW-2D**	EPA 7470	521564	EPA 7470	522082
60267665003	**S-UMW-3D**	EPA 7470	521564	EPA 7470	522082
60267665004	**S-UMW-4D**	EPA 7470	521564	EPA 7470	522082
60267665005	**S-UMW-5D**	EPA 7470	521564	EPA 7470	522082
60267665006	**S-UMW-6D**	EPA 7470	521564	EPA 7470	522082
60267665007	**S-BMW-1D**	EPA 7470	521564	EPA 7470	522082
60267665008	**S-BMW-3D**	EPA 7470	521564	EPA 7470	522082
60267665009	**S-UMW-DUP-1**	EPA 7470	521564	EPA 7470	522082
60267665010	**S-UMW-FB-1**	EPA 7470	521564	EPA 7470	522082
60267665001	**S-UMW-1D**	EPA 903.1	294502		
60267665002	**S-UMW-2D**	EPA 903.1	294502		
60267665003	**S-UMW-3D**	EPA 903.1	294502		
60267665004	**S-UMW-4D**	EPA 903.1	294502		
60267665005	**S-UMW-5D**	EPA 903.1	294502		
60267665006	**S-UMW-6D**	EPA 903.1	294502		
60267665007	**S-BMW-1D**	EPA 903.1	294502		
60267665008	**S-BMW-3D**	EPA 903.1	294502		
60267665009	**S-UMW-DUP-1**	EPA 903.1	294502		
60267665010	**S-UMW-FB-1**	EPA 903.1	294502		
60267665011	**S-UMW-1D MS**	EPA 903.1	294502		
60267665012	**S-UMW-1D MSD**	EPA 903.1	294502		
60267665001	**S-UMW-1D**	EPA 904.0	294503		
60267665002	**S-UMW-2D**	EPA 904.0	294503		
60267665003	**S-UMW-3D**	EPA 904.0	294503		
60267665004	**S-UMW-4D**	EPA 904.0	294503		

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 SEC ASSESSMENT
Pace Project No.: 60267665

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60267665005	**S-UMW-5D**	EPA 904.0	294503		
60267665006	**S-UMW-6D**	EPA 904.0	294503		
60267665007	**S-BMW-1D**	EPA 904.0	294503		
60267665008	**S-BMW-3D**	EPA 904.0	294503		
60267665009	**S-UMW-DUP-1**	EPA 904.0	294503		
60267665010	**S-UMW-FB-1**	EPA 904.0	294503		
60267665011	**S-UMW-1D MS**	EPA 904.0	294503		
60267665012	**S-UMW-1D MSD**	EPA 904.0	294503		
60267665001	**S-UMW-1D**	SM 2320B	521390		
60267665002	**S-UMW-2D**	SM 2320B	521390		
60267665003	**S-UMW-3D**	SM 2320B	521390		
60267665004	**S-UMW-4D**	SM 2320B	521390		
60267665005	**S-UMW-5D**	SM 2320B	521390		
60267665006	**S-UMW-6D**	SM 2320B	521390		
60267665007	**S-BMW-1D**	SM 2320B	521390		
60267665008	**S-BMW-3D**	SM 2320B	521390		
60267665009	**S-UMW-DUP-1**	SM 2320B	521390		
60267665010	**S-UMW-FB-1**	SM 2320B	521390		
60267665001	**S-UMW-1D**	EPA 300.0	521682		
60267665002	**S-UMW-2D**	EPA 300.0	521682		
60267665002	**S-UMW-2D**	EPA 300.0	521864		
60267665003	**S-UMW-3D**	EPA 300.0	521682		
60267665003	**S-UMW-3D**	EPA 300.0	521864		
60267665004	**S-UMW-4D**	EPA 300.0	521682		
60267665005	**S-UMW-5D**	EPA 300.0	521682		
60267665006	**S-UMW-6D**	EPA 300.0	521682		
60267665007	**S-BMW-1D**	EPA 300.0	521682		
60267665008	**S-BMW-3D**	EPA 300.0	521682		
60267665009	**S-UMW-DUP-1**	EPA 300.0	521682		
60267665009	**S-UMW-DUP-1**	EPA 300.0	521864		
60267665010	**S-UMW-FB-1**	EPA 300.0	521682		

Pace Analytical®
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60267665

60267665

Client Name: Goldor

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: 296 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 2.3 12.2 **Corr. Factor** +0.3 **Corrected** 3.6 13.5 / 13.8

Temperature should be above freezing to 6°C 12.5

Date and initials of person examining contents: 4/7/18

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Check 4/9/18 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 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:	820 South Main Street, Suite 100	Copy To:	Jeffrey Ingram	Company Name:	
	St Charles, MO 63301		Ryan Feldmann	Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux Energy Ctr Assessment	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	1531406.0003	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* + Hg	Fluoride/Chloride/Sulfate	Radium 226	Radium 228	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																				Y/N	N	N	N	N	N		60267665
1	S-UMW-1D		WT	G			4-5-18	1510		12	3		9							3	3	3	3	3		6(BRAN) 3(BR2N) 3(BR3N) 001
2	S-UMW-2D		WT	G			4-6-18	1030		4	1		3							1	1	1	1	1		2(BRAN) BR2N BR3N 002
3	S-UMW-3D		WT	G				0915																		003
4	S-UMW-4D		WT	G				0800																		004
5	S-UMW-5D		WT	G				1000																		005
6	S-UMW-6D		WT	G				0855																		006
7	S-BMW-1D		WT	G			4-5-18	1340																		007
8	S-BMW-3D		WT	G			4-5-18	1230																		008
9	S-UMW-DUP-1		WT	G			4-6-18	—																		009
10	S-UMW-FB-1		WT	G				1035																		010
11			WT	G																						
12			WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: Ba, Be, Co, Pb, Li, Mo, Ca, Mg, Na, K, Fe, Mn EPA 200.8: Sb, As, Cd, Cr, Se, Tl	Eric Schneider / Golder	4/6/18	1205	Jamie Church / PACE	4/6/18	1205				
	Jamie Church / PACE	4/6/18	1700	[illegible] PACE	4/7/18	0825	3.6	Y	N	Y
							13.5	N	N	Y
							13.8	N	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 04/06/18

*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 May 2, 2018 **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 – AMEREN GROUNDWATER – DATA PACKAGE 60267665

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).
- Reported results with high levels of non-target analytes or other matrix interference were analyzed at dilution and qualified as dilution (D).
- 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 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-Sioux-UMW- AM
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003
Validation Date: 5/2/2018

Laboratory: Pace Analytical
SDG #: 60267665
Analytical Method (type and no.): Metals 200.7 & 200.8, Hg 7470, Alkalinity 2302B, Anions 300.0, Rads 903.1 & 904.0
Matrix: ☐ Air ☐ Soil/Sed. ☐ Water ☐ Waste ☐
Sample Names S-UMW1D, 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

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?	☒	☐	☐	4/6/18
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, Flow, 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?	☑	☐	☐	

x

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☑	☐	☐	Ba(2.4), Fe(7.2), Cr(0.14),
b) Were analytes detected in the field blank(s)?	☐	☑	☐	None
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-3D
	☑	☐	☐	FB-1@ S-UMW-2D
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Be(200), Li(71), Sb(200), Cd(96), Cr(58),
c) Were lab duplicates analyzed (note original and duplicate samples)?				Tl(200), Ra226(125), Ra228(86)
	☑	☐	☐	
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?	☐	☑	☐	Chloride (High)
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-UMW-1D	Sulfate	48.2	D	DF of 5
S-UMW-2D	Chloride	25.4	D	2
⊥	Sulfate	561	D	50
S-UMW-3D	Sulfate	1040	D	100
	Beryllium (Be)	0.40	J	RPD exceeded limit; Result > MDL
	Lithium (Li)	25.9	J	⊥
	Antimony (Sb)	<0.026	UJ	MDL > Result
	Cadmium (Cd)	0.37	J	Result > MDL
	Chromium (Cr)	0.083	J	⊥
	Thallium (Tl)	<0.036	UJ	MDL > Result
	Radium-226 (Ra-226)	0.709	UJ	MDC < Result
S-UMW-4D	Cr	1.0	U	Detected in Blank; PQL > Result > MDL
	Chloride	24.4	D	DF of 2
	Sulfate	459	D	50
S-UMW-5D	Chloride	24.1	D	5
⊥	Cr	1.0	U	Blank; PQL > Result > MDL
S-UMW-6D	Cr	1.0	U	⊥ ⊥
⊥	Sulfate	78.2	D	DF of 5
S-BMW-1D	Sulfate	35.0	D	⊥ 5
⊥	Cr	1.0	U	Blank; PQL > Result > MDL
S-BMW-3D	Sulfate	26.8	D	DF of 2
S-UMW-DUP-1	Be	1.0	UJ	RPD exceeded limit; MDL > Result
	Li	12.3	J	Result > MDL
	Sb	0.079	J	
	Cd	0.13	J	
	Cr	0.15	J	
	Tl	0.086	J	
⊥	Ra-226	0.470	J	Result > MDC
	Sulfate	1040	D	DF of 100
S-UMW-FB-1	None	—	—	—
				(12)

Signature: Tommy J Good-Jr Date: 5/2/2018

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

June 19, 2018

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

RE: Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between May 16, 2018 and May 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, 6/19/18: 200.8 metals list trimmed.

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 SEC SCPA
Pace Project No.: 60270506

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New Jersey Certification #: FL022
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Certification Number: 10090
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070
Missouri Certification Number: 10090

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(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60270506001	**S-UMW-2D**	Water	05/14/18 15:35	05/16/18 03:20
60270506002	**S-UMW-3D**	Water	05/14/18 14:35	05/16/18 03:20
60270506003	**S-UMW-4D**	Water	05/14/18 13:30	05/16/18 03:20
60270506004	**S-UMW-5D**	Water	05/15/18 10:40	05/16/18 03:20
60270506005	**S-UMW-6D**	Water	05/14/18 15:30	05/16/18 03:20
60270506006	**S-BMW-1D**	Water	05/14/18 11:30	05/16/18 03:20
60270506007	**S-BMW-3D**	Water	05/14/18 09:45	05/16/18 03:20
60270506008	**S-UMW-DUP-1**	Water	05/14/18 09:45	05/16/18 03:20
60270506009	**S-UMW-FB-1**	Water	05/15/18 10:45	05/16/18 03:20
60270634001	**S-UMW-1D**	Water	05/16/18 10:15	05/17/18 04:25

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60270506001	**S-UMW-2D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506002	**S-UMW-3D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506003	**S-UMW-4D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506004	**S-UMW-5D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506005	**S-UMW-6D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506006	**S-BMW-1D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506007	**S-BMW-3D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506008	**S-UMW-DUP-1**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270506009	**S-UMW-FB-1**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	KPP	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270634001	**S-UMW-1D**	EPA 200.7	TDS	10	PASI-K
		EPA 200.8	CRT	1	PASI-O
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-2D **Lab ID: 60270506001** Collected: 05/14/18 15:35 Received: 05/16/18 03:20 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	1.5	1	05/17/18 13:15	05/18/18 18:58	7440-39-3	
Boron	**15600**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 18:58	7440-42-8	M1
Calcium	**147000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 18:58	7440-70-2	
Iron	**73.5**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 18:58	7439-89-6	
Lithium	**12.5**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 18:58	7439-93-2	
Magnesium	**5670**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 18:58	7439-95-4	
Manganese	**159**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 18:58	7439-96-5	
Molybdenum	**1530**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 18:58	7439-98-7	
Potassium	**21300**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 18:58	7440-09-7	
Sodium	**48200**	ug/L	500	157	1	05/17/18 13:15	05/18/18 18:58	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.4**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 12:47	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**80.8**	mg/L	20.0	4.9	1		05/23/18 18:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**800**	mg/L	5.0	5.0	1		05/19/18 12:28		D6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.6**	mg/L	2.0	0.92	2		05/30/18 10:10	16887-00-6	
Fluoride	**0.63**	mg/L	0.20	0.063	1		05/26/18 14:20	16984-48-8	
Sulfate	**495**	mg/L	50.0	11.8	50		05/30/18 11:39	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-3D **Lab ID: 60270506002** Collected: 05/14/18 14:35 Received: 05/16/18 03:20 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	**92.4**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:09	7440-39-3	
Boron	**29600**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:09	7440-42-8	
Calcium	**281000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:09	7440-70-2	
Iron	**1130**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:09	7439-89-6	
Lithium	**14.8**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:09	7439-93-2	
Magnesium	**7000**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:09	7439-95-4	
Manganese	**588**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:09	7439-96-5	
Molybdenum	**4560**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:09	7439-98-7	
Potassium	**21000**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:09	7440-09-7	
Sodium	**111000**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:09	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.8**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 12:50	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**54.0**	mg/L	20.0	4.9	1		05/23/18 18:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1660**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.9**	mg/L	1.0	0.46	1		05/26/18 15:04	16887-00-6	
Fluoride	**0.98**	mg/L	0.20	0.063	1		05/26/18 15:04	16984-48-8	
Sulfate	**931**	mg/L	100	23.6	100		05/30/18 12:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-4D **Lab ID: 60270506003** Collected: 05/14/18 13:30 Received: 05/16/18 03:20 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	**71.6**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:11	7440-39-3	
Boron	**22600**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:11	7440-42-8	
Calcium	**181000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:11	7440-70-2	
Iron	**7680**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:11	7439-89-6	
Lithium	**37.3**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:11	7439-93-2	
Magnesium	**24000**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:11	7439-95-4	
Manganese	**1700**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:11	7439-96-5	
Molybdenum	**5870**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:11	7439-98-7	
Potassium	**14700**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:11	7440-09-7	
Sodium	**69400**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:11	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.1**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 12:53	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**193**	mg/L	20.0	4.9	1		05/23/18 18:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1030**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.0**	mg/L	2.0	0.92	2		05/30/18 12:39	16887-00-6	
Fluoride	**0.76**	mg/L	0.20	0.063	1		05/26/18 15:19	16984-48-8	
Sulfate	**531**	mg/L	50.0	11.8	50		05/30/18 12:54	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-5D **Lab ID: 60270506004** Collected: 05/15/18 10:40 Received: 05/16/18 03:20 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	**265**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:14	7440-39-3	
Boron	**1490**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:14	7440-42-8	
Calcium	**68900**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:14	7440-70-2	
Iron	**3720**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:14	7439-89-6	
Lithium	**18.9**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:14	7439-93-2	
Magnesium	**16200**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:14	7439-95-4	
Manganese	**432**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:14	7439-96-5	
Molybdenum	**177**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:14	7439-98-7	
Potassium	**9660**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:14	7440-09-7	
Sodium	**17400**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:14	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.64J**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 12:55	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**248**	mg/L	20.0	4.9	1		05/24/18 09:22		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**400**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.8**	mg/L	2.0	0.92	2		05/30/18 13:09	16887-00-6	
Fluoride	**0.62**	mg/L	0.20	0.063	1		05/26/18 15:34	16984-48-8	
Sulfate	**13.5**	mg/L	1.0	0.24	1		05/26/18 15:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-6D **Lab ID: 60270506005** Collected: 05/14/18 15:30 Received: 05/16/18 03:20 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	**152**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:16	7440-39-3	
Boron	**845**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:16	7440-42-8	
Calcium	**96000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:16	7440-70-2	
Iron	**6780**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:16	7439-89-6	
Lithium	**13.6**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:16	7439-93-2	
Magnesium	**23900**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:16	7439-95-4	
Manganese	**576**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:16	7439-96-5	
Molybdenum	**67.8**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:16	7439-98-7	
Potassium	**4700**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:16	7440-09-7	
Sodium	**11900**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:16	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.72J**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 12:58	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**287**	mg/L	20.0	4.9	1		05/23/18 18:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**438**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**13.8**	mg/L	1.0	0.46	1		05/26/18 16:19	16887-00-6	
Fluoride	**0.41**	mg/L	0.20	0.063	1		05/26/18 16:19	16984-48-8	
Sulfate	**64.6**	mg/L	5.0	1.2	5		05/30/18 13:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-BMW-1D **Lab ID: 60270506006** Collected: 05/14/18 11:30 Received: 05/16/18 03:20 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	**335**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:18	7440-39-3	
Boron	**170**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:18	7440-42-8	
Calcium	**127000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:18	7440-70-2	
Iron	**10200**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:18	7439-89-6	
Lithium	**13.4**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:18	7439-93-2	
Magnesium	**28100**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:18	7439-95-4	
Manganese	**1160**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:18	7439-96-5	
Molybdenum	**1.3J**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:18	7439-98-7	
Potassium	**2420**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:18	7440-09-7	
Sodium	**6190**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:18	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.85J**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 13:01	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**410**	mg/L	20.0	4.9	1		05/23/18 18:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**485**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.2**	mg/L	1.0	0.46	1		05/26/18 16:34	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.063	1		05/26/18 16:34	16984-48-8	
Sulfate	**35.3**	mg/L	2.0	0.47	2		05/30/18 14:09	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-BMW-3D **Lab ID: 60270506007** Collected: 05/14/18 09:45 Received: 05/16/18 03:20 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	1.5	1	05/17/18 13:15	05/18/18 19:20	7440-39-3	
Boron	**89.1J**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:20	7440-42-8	
Calcium	**110000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:20	7440-70-2	
Iron	**8310**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:20	7439-89-6	
Lithium	**21.6**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:20	7439-93-2	
Magnesium	**26300**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:20	7439-95-4	
Manganese	**518**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:20	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:20	7439-98-7	
Potassium	**3550**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:20	7440-09-7	
Sodium	**6300**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:20	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**0.63J**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 13:03	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**361**	mg/L	20.0	4.9	1		05/23/18 19:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**488**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**9.2**	mg/L	1.0	0.46	1		05/26/18 16:49	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.063	1		05/26/18 16:49	16984-48-8	
Sulfate	**26.9**	mg/L	2.0	0.47	2		05/30/18 14:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-DUP-1 **Lab ID: 60270506008** Collected: 05/14/18 09:45 Received: 05/16/18 03:20 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	**94.9**	ug/L	5.0	1.5	1	05/17/18 13:15	05/18/18 19:23	7440-39-3	
Boron	**30200**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:23	7440-42-8	
Calcium	**288000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:23	7440-70-2	
Iron	**1130**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:23	7439-89-6	
Lithium	**15.0**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:23	7439-93-2	
Magnesium	**7000**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:23	7439-95-4	
Manganese	**594**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:23	7439-96-5	
Molybdenum	**4630**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:23	7439-98-7	
Potassium	**21700**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:23	7440-09-7	
Sodium	**115000**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:23	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**2.3**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 13:12	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**56.9**	mg/L	20.0	4.9	1		05/23/18 19:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**583**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.9**	mg/L	1.0	0.46	1		05/26/18 17:04	16887-00-6	
Fluoride	**0.96**	mg/L	0.20	0.063	1		05/26/18 17:04	16984-48-8	
Sulfate	**971**	mg/L	100	23.6	100		05/30/18 14:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-FB-1 **Lab ID: 60270506009** Collected: 05/15/18 10:45 Received: 05/16/18 03:20 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	05/17/18 13:15	05/18/18 19:25	7440-39-3	
Boron	**85.7J**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:25	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:25	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:25	7439-89-6	
Lithium	**<4.6**	ug/L	10.0	4.6	1	05/17/18 13:15	05/18/18 19:25	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:25	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:25	7439-96-5	
Molybdenum	**1.1J**	ug/L	20.0	0.90	1	05/17/18 13:15	05/18/18 19:25	7439-98-7	
Potassium	**<79.3**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:25	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:25	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**<0.50**	ug/L	1.0	0.50	1	05/27/18 07:59	05/31/18 13:14	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		05/24/18 09:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**330**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		05/30/18 09:14	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		05/30/18 09:14	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		05/30/18 09:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Sample: S-UMW-1D **Lab ID: 60270634001** Collected: 05/16/18 10:15 Received: 05/17/18 04:25 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	**133**	ug/L	5.0	1.5	1	05/18/18 11:35	05/18/18 20:07	7440-39-3	
Boron	**320**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:07	7440-42-8	
Calcium	**70500**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:07	7440-70-2	
Iron	**613**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:07	7439-89-6	
Lithium	**11.6**	ug/L	10.0	4.6	1	05/18/18 11:35	05/18/18 20:07	7439-93-2	
Magnesium	**21800**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:07	7439-95-4	
Manganese	**122**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:07	7439-96-5	
Molybdenum	**25.7**	ug/L	20.0	0.90	1	05/18/18 11:35	05/18/18 20:07	7439-98-7	
Potassium	**4980**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:07	7440-09-7	
Sodium	**12200**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:07	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Arsenic	**1.5**	ug/L	1.0	0.50	1	05/25/18 15:23	05/27/18 21:48	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**208**	mg/L	20.0	4.9	1		05/23/18 12:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**360**	mg/L	5.0	5.0	1		05/22/18 17:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.2**	mg/L	2.0	0.92	2		05/20/18 10:43	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.063	1		05/19/18 15:33	16984-48-8	
Sulfate	**78.7**	mg/L	5.0	1.2	5		05/20/18 11:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526186 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

METHOD BLANK: 2154784 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	05/18/18 18:56	
Boron	ug/L	<12.5	100	12.5	05/18/18 18:56	
Calcium	ug/L	<53.5	200	53.5	05/18/18 18:56	
Iron	ug/L	<6.1	50.0	6.1	05/18/18 18:56	
Lithium	ug/L	<4.6	10.0	4.6	05/18/18 18:56	
Magnesium	ug/L	<14.0	50.0	14.0	05/18/18 18:56	
Manganese	ug/L	<0.73	5.0	0.73	05/18/18 18:56	
Molybdenum	ug/L	<0.90	20.0	0.90	05/18/18 18:56	
Potassium	ug/L	<79.3	500	79.3	05/18/18 18:56	
Sodium	ug/L	<157	500	157	05/18/18 18:56	

LABORATORY CONTROL SAMPLE: 2154785

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	992	99	85-115	
Boron	ug/L	1000	946	95	85-115	
Calcium	ug/L	10000	9650	97	85-115	
Iron	ug/L	10000	9740	97	85-115	
Lithium	ug/L	1000	994	99	85-115	
Magnesium	ug/L	10000	9590	96	85-115	
Manganese	ug/L	1000	973	97	85-115	
Molybdenum	ug/L	1000	990	99	85-115	
Potassium	ug/L	10000	9820	98	85-115	
Sodium	ug/L	10000	9780	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154786 2154787

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	54.3	1000	1000	1060	1050	101	99	70-130	2	20	
Boron	ug/L	15600	1000	1000	17000	16400	141	83	70-130	3	20	M1
Calcium	ug/L	147000	10000	10000	160000	154000	128	73	70-130	4	20	
Iron	ug/L	73.5	10000	10000	9930	9810	99	97	70-130	1	20	
Lithium	ug/L	12.5	1000	1000	1060	1050	105	104	70-130	2	20	
Magnesium	ug/L	5670	10000	10000	15100	14700	94	91	70-130	2	20	
Manganese	ug/L	159	1000	1000	1130	1110	97	95	70-130	2	20	
Molybdenum	ug/L	1530	1000	1000	2540	2450	100	92	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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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154786 2154787

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Potassium	ug/L	21300	10000	10000	32100	31000	109	98	70-130	3	20	
Sodium	ug/L	48200	10000	10000	59500	57300	113	91	70-130	4	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154788 2154789

Parameter	Units	60270507006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	274	1000	1000	1280	1300	101	103	70-130	2	20	
Boron	ug/L	116	1000	1000	1110	1120	99	100	70-130	1	20	
Calcium	ug/L	127000	10000	10000	133000	136000	64	87	70-130	2	20	M1
Iron	ug/L	51.7	10000	10000	9800	9930	97	99	70-130	1	20	
Lithium	ug/L	39.7	1000	1000	1090	1100	105	107	70-130	1	20	
Magnesium	ug/L	41900	10000	10000	50400	51300	84	94	70-130	2	20	
Manganese	ug/L	176	1000	1000	1130	1140	96	97	70-130	1	20	
Molybdenum	ug/L	<0.90	1000	1000	1020	1030	102	103	70-130	1	20	
Potassium	ug/L	7140	10000	10000	17000	17200	98	100	70-130	1	20	
Sodium	ug/L	15200	10000	10000	25100	25600	99	104	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 SEC SCPA
Pace Project No.: 60270506

QC Batch: 526371
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60270634001

METHOD BLANK: 2155642 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	05/18/18 19:56	
Boron	ug/L	<12.5	100	12.5	05/18/18 19:56	
Calcium	ug/L	<53.5	200	53.5	05/18/18 19:56	
Iron	ug/L	<6.1	50.0	6.1	05/18/18 19:56	
Lithium	ug/L	<4.6	10.0	4.6	05/18/18 19:56	
Magnesium	ug/L	<14.0	50.0	14.0	05/18/18 19:56	
Manganese	ug/L	<0.73	5.0	0.73	05/18/18 19:56	
Molybdenum	ug/L	<0.90	20.0	0.90	05/18/18 19:56	
Potassium	ug/L	<79.3	500	79.3	05/18/18 19:56	
Sodium	ug/L	<157	500	157	05/18/18 19:56	

LABORATORY CONTROL SAMPLE: 2155643

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Boron	ug/L	1000	997	100	85-115	
Calcium	ug/L	10000	9890	99	85-115	
Iron	ug/L	10000	9970	100	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Magnesium	ug/L	10000	9980	100	85-115	
Manganese	ug/L	1000	999	100	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	9900	99	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2155644 2155645

Parameter	Units	60270635001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L		1000	1000	1150	1160	98	99	70-130	1	20	
Boron	ug/L	459	1000	1000	1410	1410	95	95	70-130	0	20	
Calcium	ug/L	89700	10000	10000	92200	91300	25	16	70-130	1	20	M1
Iron	ug/L	11.8J	10000	10000	9690	9690	97	97	70-130	0	20	
Lithium	ug/L		1000	1000	1050	1050	103	104	70-130	0	20	
Magnesium	ug/L	25100	10000	10000	32000	31700	69	66	70-130	1	20	M1
Manganese	ug/L	162	1000	1000	1110	1110	95	95	70-130	0	20	
Molybdenum	ug/L		1000	1000	1060	1060	101	101	70-130	0	20	
Potassium	ug/L	7730	10000	10000	16900	16900	92	92	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2155644 2155645

Parameter	Units	60270635001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sodium	ug/L	15800	10000	10000	24500	24500	88	88	70-130	0	20	

MATRIX SPIKE SAMPLE: 2155646

Parameter	Units	60270635008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L		1000	1090	100	70-130	
Boron	ug/L	1450	1000	2360	91	70-130	
Calcium	ug/L	188000	10000	188000	0	70-130	M1
Iron	ug/L	14.3J	10000	9520	95	70-130	
Lithium	ug/L		1000	1100	106	70-130	
Magnesium	ug/L	55200	10000	62000	68	70-130	M1
Manganese	ug/L	836	1000	1740	91	70-130	
Molybdenum	ug/L		1000	1040	102	70-130	
Potassium	ug/L	5440	10000	15200	98	70-130	
Sodium	ug/L	52100	10000	59900	78	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 450283 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60270634001

METHOD BLANK: 2439788 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.50	1.0	0.50	05/27/18 21:11	

LABORATORY CONTROL SAMPLE: 2439789

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	50	51.0	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2439790 2439792

Parameter	Units	60270178017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.1	50	50	55.0	57.7	110	115	70-130	5	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2439793 2439794

Parameter	Units	60270178021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	1.9	50	50	57.9	56.4	109	106	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 450516 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

METHOD BLANK: 2441053 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	<0.50	1.0	0.50	05/29/18 17:36	

LABORATORY CONTROL SAMPLE: 2441054

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	50	49.4	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2441055 2441056

Parameter	Units	35393915002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.50U	50	50	48.0	48.3	96	97	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2441057 2441058

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.4	50	50	57.0	55.0	109	105	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526731 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270634001

METHOD BLANK: 2157504 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	05/23/18 11:50	

LABORATORY CONTROL SAMPLE: 2157505

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

SAMPLE DUPLICATE: 2157506

Parameter	Units	60270036001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	1480	1360	8	10	

SAMPLE DUPLICATE: 2157507

Parameter	Units	60270635001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	195	199	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526735 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506005, 60270506006, 60270506007, 60270506008

METHOD BLANK: 2157540 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506005, 60270506006, 60270506007, 60270506008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	05/23/18 17:53	

LABORATORY CONTROL SAMPLE: 2157541

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	514	103	90-110	

SAMPLE DUPLICATE: 2157542

Parameter	Units	60270506001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	80.8	79.7	1	10	

SAMPLE DUPLICATE: 2157543

Parameter	Units	60270506005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	287	297	3	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 527077 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270506004, 60270506009

METHOD BLANK: 2158919 Matrix: Water
Associated Lab Samples: 60270506004, 60270506009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	05/24/18 08:43	

LABORATORY CONTROL SAMPLE: 2158920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	501	100	90-110	

SAMPLE DUPLICATE: 2158921

Parameter	Units	60270507006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	487	465	5	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526312 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

METHOD BLANK: 2155406 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/19/18 12:28	

LABORATORY CONTROL SAMPLE: 2155407

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

SAMPLE DUPLICATE: 2155408

Parameter	Units	60270506001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	800	897	11	10	D6

SAMPLE DUPLICATE: 2155409

Parameter	Units	60270510004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	277	<5.0		10	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526720 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270634001

METHOD BLANK: 2157172 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/22/18 17:54	

LABORATORY CONTROL SAMPLE: 2157173

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

SAMPLE DUPLICATE: 2157174

Parameter	Units	60270797004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1060	1050	1	10	

SAMPLE DUPLICATE: 2157175

Parameter	Units	60270635001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	441	430	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526468 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270634001

METHOD BLANK: 2156224 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.063	0.20	0.063	05/19/18 15:03	

LABORATORY CONTROL SAMPLE: 2156225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.4	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2156226 2156227

Parameter	Units	60270634001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.33	2.5	2.5	2.9	2.8	101	101	80-120	0	15	

MATRIX SPIKE SAMPLE: 2156228

Parameter	Units	60270635001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.31	2.5	2.9	102	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 526489 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270634001

METHOD BLANK: 2156661 Matrix: Water
Associated Lab Samples: 60270634001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/20/18 09:00	
Sulfate	mg/L	<0.24	1.0	0.24	05/20/18 09:00	

LABORATORY CONTROL SAMPLE: 2156662

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Sulfate	mg/L	5	5.2	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2156663 2156664

Parameter	Units	60270634001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.2	10	10	32.5	32.9	103	107	80-120	1	15	
Sulfate	mg/L	78.7	25	25	104	104	99	100	80-120	0	15	E

MATRIX SPIKE SAMPLE: 2156665

Parameter	Units	60270635001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	22.1	10	32.7	106	80-120	
Sulfate	mg/L	119	50	173	107	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 527490 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008

METHOD BLANK: 2160723 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/26/18 10:21	
Fluoride	mg/L	<0.063	0.20	0.063	05/26/18 10:21	
Sulfate	mg/L	<0.24	1.0	0.24	05/26/18 10:21	

LABORATORY CONTROL SAMPLE: 2160724

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	2.6	104	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2160725 2160726

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.63	2.5	2.5	3.2	3.2	103	104	90-110	1	15	

MATRIX SPIKE SAMPLE: 2160727

Parameter	Units	60270507006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.37	2.5	3.1	108	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

QC Batch: 527546 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

METHOD BLANK: 2161064 Matrix: Water
Associated Lab Samples: 60270506001, 60270506002, 60270506003, 60270506004, 60270506005, 60270506006, 60270506007, 60270506008, 60270506009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/30/18 08:44	
Fluoride	mg/L	<0.063	0.20	0.063	05/30/18 08:44	
Sulfate	mg/L	<0.24	1.0	0.24	05/30/18 08:44	

LABORATORY CONTROL SAMPLE: 2161065

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2161066 2161067

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.6	250	250	271	273	93	93	90-110	1	15	
Sulfate	mg/L	495	250	250	709	727	85	93	90-110	2	15	M1

MATRIX SPIKE SAMPLE: 2161068

Parameter	Units	60270507006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	18.9	10	29.6	107	90-110	
Sulfate	mg/L	55.8	25	78.3	90	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

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.

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
PASI-O	Pace Analytical Services - Ormond Beach

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC SCPA
Pace Project No.: 60270506

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270506001	**S-UMW-2D**	EPA 200.7	526186	EPA 200.7	526232
60270506002	**S-UMW-3D**	EPA 200.7	526186	EPA 200.7	526232
60270506003	**S-UMW-4D**	EPA 200.7	526186	EPA 200.7	526232
60270506004	**S-UMW-5D**	EPA 200.7	526186	EPA 200.7	526232
60270506005	**S-UMW-6D**	EPA 200.7	526186	EPA 200.7	526232
60270506006	**S-BMW-1D**	EPA 200.7	526186	EPA 200.7	526232
60270506007	**S-BMW-3D**	EPA 200.7	526186	EPA 200.7	526232
60270506008	**S-UMW-DUP-1**	EPA 200.7	526186	EPA 200.7	526232
60270506009	**S-UMW-FB-1**	EPA 200.7	526186	EPA 200.7	526232
60270634001	**S-UMW-1D**	EPA 200.7	526371	EPA 200.7	526393
60270506001	**S-UMW-2D**	EPA 200.8	450516	EPA 200.8	450555
60270506002	**S-UMW-3D**	EPA 200.8	450516	EPA 200.8	450555
60270506003	**S-UMW-4D**	EPA 200.8	450516	EPA 200.8	450555
60270506004	**S-UMW-5D**	EPA 200.8	450516	EPA 200.8	450555
60270506005	**S-UMW-6D**	EPA 200.8	450516	EPA 200.8	450555
60270506006	**S-BMW-1D**	EPA 200.8	450516	EPA 200.8	450555
60270506007	**S-BMW-3D**	EPA 200.8	450516	EPA 200.8	450555
60270506008	**S-UMW-DUP-1**	EPA 200.8	450516	EPA 200.8	450555
60270506009	**S-UMW-FB-1**	EPA 200.8	450516	EPA 200.8	450555
60270634001	**S-UMW-1D**	EPA 200.8	450283	EPA 200.8	450410
60270506001	**S-UMW-2D**	SM 2320B	526735		
60270506002	**S-UMW-3D**	SM 2320B	526735		
60270506003	**S-UMW-4D**	SM 2320B	526735		
60270506004	**S-UMW-5D**	SM 2320B	527077		
60270506005	**S-UMW-6D**	SM 2320B	526735		
60270506006	**S-BMW-1D**	SM 2320B	526735		
60270506007	**S-BMW-3D**	SM 2320B	526735		
60270506008	**S-UMW-DUP-1**	SM 2320B	526735		
60270506009	**S-UMW-FB-1**	SM 2320B	527077		
60270634001	**S-UMW-1D**	SM 2320B	526731		
60270506001	**S-UMW-2D**	SM 2540C	526312		
60270506002	**S-UMW-3D**	SM 2540C	526312		
60270506003	**S-UMW-4D**	SM 2540C	526312		
60270506004	**S-UMW-5D**	SM 2540C	526312		
60270506005	**S-UMW-6D**	SM 2540C	526312		
60270506006	**S-BMW-1D**	SM 2540C	526312		
60270506007	**S-BMW-3D**	SM 2540C	526312		
60270506008	**S-UMW-DUP-1**	SM 2540C	526312		
60270506009	**S-UMW-FB-1**	SM 2540C	526312		
60270634001	**S-UMW-1D**	SM 2540C	526720		
60270506001	**S-UMW-2D**	EPA 300.0	527490		
60270506001	**S-UMW-2D**	EPA 300.0	527546		

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 SEC SCPA
Pace Project No.: 60270506

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270506002	**S-UMW-3D**	EPA 300.0	527490		
60270506002	**S-UMW-3D**	EPA 300.0	527546		
60270506003	**S-UMW-4D**	EPA 300.0	527490		
60270506003	**S-UMW-4D**	EPA 300.0	527546		
60270506004	**S-UMW-5D**	EPA 300.0	527490		
60270506004	**S-UMW-5D**	EPA 300.0	527546		
60270506005	**S-UMW-6D**	EPA 300.0	527490		
60270506005	**S-UMW-6D**	EPA 300.0	527546		
60270506006	**S-BMW-1D**	EPA 300.0	527490		
60270506006	**S-BMW-1D**	EPA 300.0	527546		
60270506007	**S-BMW-3D**	EPA 300.0	527490		
60270506007	**S-BMW-3D**	EPA 300.0	527546		
60270506008	**S-UMW-DUP-1**	EPA 300.0	527490		
60270506008	**S-UMW-DUP-1**	EPA 300.0	527546		
60270506009	**S-UMW-FB-1**	EPA 300.0	527546		
60270634001	**S-UMW-1D**	EPA 300.0	526468		
60270634001	**S-UMW-1D**	EPA 300.0	526489		

Pace Analytical www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60270506

60270506

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: 301 Type of Ice: (Wet) Blue (None)

Cooler Temperature (°C): As-read 3.0 17.2 11.4 Corr. Factor +1.0 Corrected 4.0 18.2 12.4

Date and initials of person examining contents: JLS 5/16

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	Radium coolers not on ice
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) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No / ☐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: 5/17/18

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:	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
	Ryan Feldmann
Purchase Order No.:	
Project Name:	Ameren SEC SCPA
Project Number:	153-1406.0003E

Section C Invoice Information:

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

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)

Pace Project No./ Lab I.D.: 6027050

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*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
1	~~S-UMW-1D~~	WT	G																					
2	S-UMW-2D	WT	G			5/14/18	1535		12	3		9						✓	✓	✓	✓		(3)BP2U (3)BP3N (6)BP1N	001
3	S-UMW-3D	↓	↓			↓	1435		3	1		3						↓	↓	↓	↓		BP2U BP3N5 (?)BP1N	002
4	S-UMW-4D	↓	↓				1330		↓	↓		↓						↓	↓	↓	↓		↓	003
5	S-UMW-5D	↓	↓			5/15/18	1040		↓	↓		↓						↓	↓	↓	↓		↓	004
6	S-UMW-6D	↓	↓			5/14/18	1530		↓	↓		↓						↓	↓	↓	↓		↓	005
7	S-BMW-1D	↓	↓			↓	~~1625~~ DP		↓	↓		↓						↓	↓	↓	↓		↓	006
8	S-BMW-3D	↓	↓			↓	0945		↓	↓		↓						↓	↓	↓	↓		↓	007
9	S-UMW-DUP-1	↓	↓				—		↓	↓		↓						↓	↓	↓	↓		↓	008
10	S-UMW-FB-1	↓	↓			5/15/18	1045		↓	↓		↓						↓	↓	↓	↓		↓	009
11																								
12																								

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, Mg, K, Na, Fe, Mn, Ba, Li, Mo	[signature] / Golder	5/15/18	1740	[signature]	5/16	0920	4.0	Y	Y	Y
EPA 200.8: As; Hold Radiums, Do not run unless Jeff Ingram gives go ahead.							18.2	N	Y	Y
							17.4	N	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/15/18

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60270634

60270634

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-298 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 0.3 **Corr. Factor** +1.1 **Corrected** 1.4

Date and initials of person examining contents: 05/17/18

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	
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	

JLS

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Check 5/18/18

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:	820 South Main Street, Suite 100	Copy To:	Jeffrey Ingram	Company Name:	
	St Charles, MO 63301		Ryan Feldmann	Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren SEC SCPA	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003E	Pace Profile #:	9285, line 3

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*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60270634
1	S-UMW-1D	WT	G			5/16/18	1015		2	1		1						Y	✓	✓	✓	✓		BP3N BP2U 2BP1N 061
2	S-UMW-2D																							
3	S-UMW-3D																							
4	S-UMW-4D																							
5	S-UMW-5D																							
6	S-UMW-6D																							
7	S-BMW-1D																							
8	S-BMW-3D																							
9	S-UMW-DUP-1																							
10	S-UMW-FB-1																							
11																								
12																								

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, Mg, Mn, K, Na, Fe, Ba, Li, MO; EPA 200.8: As Please hold radium samples and do not run w/out okay from Jeff Ingram	Golder	5/16/18	1315		5/16/18	1315				
	Golder	5/16/18	1700	Pace	5/17	0425	1.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 5/16/2018

MEMORANDUM

DATE 8/16/18 **Project No.** 1531406

TO Project File
Golder Associates

CC

FROM Samantha DiCenso **EMAIL samantha_dicenso@golder.com**

DATA VALIDATION SUMMARY, AMEREN GROUNDWATER – DATA PACKAGE 60270506

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

- Reported results with high levels of non-target analytes or other matrix interference were analyzed at dilution and qualified as a diluted result (D).
- When a compound was detected in a blank (i.e. method, field, equipment blank), and the sample results were greater than the PQL but less than 10x the blank result, the sample results were recorded as an estimated value (J).
- When a field duplicate RPD or a lab duplicate RPD was not met, associated samples were qualified as estimated values (J).
- When analytes exceeded the recovery criteria for the MS/MSD of a sample, the sample result was qualified as an estimated value (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 Groundwater
Reviewer: S. DiCenso

Project Manager: J. Ingram
Project Number: 1531406
Validation Date: 8/16/18

Laboratory: Pace Analytical
SDG #: 60270506
Analytical Method (type and no.): Metals 200.7, 200.8, Alkalinity 2320B, TDS 2540, Anions 300.0
Matrix: ☐ Air ☐ Soil/Sed. ☑ Water ☐ Waste ☐ _____
Sample Names
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-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?	☑	☐	☐	5/14/18 & 5/16/18
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, cond, turb, temp, DO, ORP, flow, 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?	☑	☐	☐	See notes
g) Were any matrix problems noted?	☑	☐	☐	See notes

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)?	☑	☐	☐	S-UMW-DUP-1 : S-UMW-3D
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)?	☐	☑	☐	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:

Dilutions: Chloride
S-UMW-2D [x 2]
S-UMW-4D [x 2]
S-UMW-5D [x 2]
S-UMW-1D [x 2]

Sulfate
S-UMW-2D [x 50]
S-UMW-3D [x 100]
S-UMW-4D [x 50]
S-UMW-6D [x 5]
S-BMW-1D [x 2]
S-BMW-3D [x 2]
S-UMW-DUP-1 [x 100]
S-UMW-1D [x 5]

Blanks: S-UMW-FB-1 (AKA S-SCPA-FB-1): S-UMW-5
FB detections: Boron 85.7 J ug/L, Molybdenum 1.1 J ug/L, TDS 330 mg/L

Duplicates: RPD > 20% for Arsenic between sample & DUP and for TDS between sample & DUP
RPD > 10% between sample and lab dup for TDS

MS/MSD: Boron above QC limits for S-UMW-2D MS
Sulfate above QC limits for S-UMW-2D MS

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-UMW-2D	Chloride	22.6	D	Analyzed at a dilution
S-UMW-3D	sulfate	931	D	"
S-UMW-4D	Chloride	25.0	D	"
"	sulfate	531	D	"
S-UMW-5D	chloride	25.8	D	"
S-UMW-6D	sulfate	64.6	D	"
S-BMW-1D	sulfate	35.3	D	"
S-BMW-3D	sulfate	26.9	D	"
S-UMW-DUP-1	sulfate	971	D	"
S-UMW-1D	Chloride	22.2	D	"
"	sulfate	78.7	D	"
S-UMW-2D	sulfate	495	JD	Analyzed at a dilution; MS/MSD outside QC limits
"	Boron	15600	J	MS/MSD outside QC limits
"	TDS	800	J	RPD outside limits for sample and dup
S-UMW-3D	Arsenic	1.8	J	"
"	TDS	1660	J	"
S-UMW-DUP-1	Arsenic	2.3	J	"
"	TDS	583	J	"
S-UMW-5D	TDS	400	J	Detected in blank

Signature: Samantha Riley Date: 8/16/18

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

July 16, 2018

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

RE: Project: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on July 07, 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: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Certification Number: 10090
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
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: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60274321001	**S-UMW-1D**	Water	07/05/18 09:40	07/07/18 03:10

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

SAMPLE ANALYTE COUNT

Project: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60274321001	**S-UMW-1D**	EPA 200.7	TDS	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Sample: S-UMW-1D **Lab ID: 60274321001** Collected: 07/05/18 09:40 Received: 07/07/18 03:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**306**	ug/L	100	12.5	1	07/09/18 14:45	07/16/18 13:49	7440-42-8	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

QC Batch: 533483 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60274321001

METHOD BLANK: 2184967 Matrix: Water
Associated Lab Samples: 60274321001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<12.5	100	12.5	07/16/18 13:19	

LABORATORY CONTROL SAMPLE: 2184968

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	967	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2184969 2184970

Parameter	Units	60274308001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	1400	1000	1000	2300	2330	90	93	70-130	1	20	

MATRIX SPIKE SAMPLE: 2184971

Parameter	Units	60274291001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	ND	1000	1030	97	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
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QUALIFIERS

Project: SCPA AMEREN MO CCR MONITORING
Pace Project No.: 60274321

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 AMEREN MO CCR MONITORING
Pace Project No.: 60274321

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60274321001	**S-UMW-1D**	EPA 200.7	533483	EPA 200.7	533524

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60274321

60274321

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-297 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** -0.5 **Corr. Factor** +0.9 **Corrected** 0.4

Date and initials of person examining contents: HE 7/7

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):	7/7/18 ☑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 7/9/18 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, Ryan Feldman
Purchase Order No.:	
Project Name:	SCPA Ameren MO UCR Monitoring
Project Number	1531406.0003

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Boron	Calcium	Chloride	Fluoride	Sulfate	TDS			Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				DATE	TIME	DATE	TIME												N	N	N	N	N	N				
1	S-UMW-1D	WT	G			07/5/18	0940		2		1							✓						BP2U			BP3N 001
2		WT	G							(ES)																		
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			
	[signature] Golder	7/6/18	1615	[signature] PACE	7/6/18	1615				
	[signature] PACE	7/6/18	1700	[signature] Fed Ex Ground	7/7/18	03:10	0.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 07/06/18

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 August 20, 2018 **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 – AMEREN GROUNDWATER – DATA PACKAGE 60274321

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

- No data qualification was required.

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 - GW-SCPA - VS2
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 8/20/18

Laboratory: Pace Analytical
Analytical Method (type and no.): EPA 2007 (Metals)

SDG #: 60274321

Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ _____

Sample Names: S-MW-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?	☒	☐	☐	7/5/18
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, Flow, 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@
	☒ TR	☑	☐	FB-1@
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒ TR	☑	☐	
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: ____________________ Date: 8/20/18

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

January 24, 2018

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

RE: Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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, 12/28/18: Sample list trimmed.
REV-1A, 1/24/19: Project name revised.

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
Pace Project No.: 60286569

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: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286569001	**S-BMW-1D**	Water	11/12/18 14:30	11/13/18 11:58
60286569002	**S-BMW-3D**	Water	11/12/18 12:30	11/13/18 11:58
60286569003	**S-UMW-2D**	Water	11/13/18 15:00	11/14/18 03:40
60286569004	**S-UMW-3D**	Water	11/13/18 14:05	11/14/18 03:40
60286569005	**S-UMW-4D**	Water	11/13/18 13:15	11/14/18 03:40
60286569006	**S-UMW-5D**	Water	11/13/18 15:50	11/14/18 03:40
60286569009	**S-UMW-FB-1**	Water	11/13/18 15:46	11/14/18 03:40
60287011001	**S-UMW-1D**	Water	11/14/18 11:35	11/15/18 10:00
60287011002	**S-UMW-6D**	Water	11/14/18 10:45	11/15/18 10:00
60287011003	**S-UMW-DUP-1**	Water	11/14/18 10:45	11/15/18 10:00

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286569001	**S-BMW-1D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60286569002	**S-BMW-3D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60286569003	**S-UMW-2D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60286569004	**S-UMW-3D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60286569005	**S-UMW-4D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K

Pace Analytical Services, LLC
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(913)599-5665

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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
60286569006	**S-UMW-5D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60286569009	**S-UMW-FB-1**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	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
60287011001	**S-UMW-1D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	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	LDB	1	PASI-K
60287011002	**S-UMW-6D**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	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	LDB	1	PASI-K
60287011003	**S-UMW-DUP-1**	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JDH	6	PASI-K

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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	ZMH	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

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Sample: S-BMW-1D **Lab ID: 60286569001** Collected: 11/12/18 14:30 Received: 11/13/18 11:58 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	**297**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:53	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 20:53	7440-41-7	
Boron	**140**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 20:53	7440-42-8	
Calcium	**128000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 20:53	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 20:53	7440-48-4	
Iron	**9790**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 20:53	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 20:53	7439-92-1	
Lithium	**16.2**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:53	7439-93-2	
Magnesium	**25900**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 20:53	7439-95-4	
Manganese	**1090**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 20:53	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:53	7439-98-7	
Potassium	**2540**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 20:53	7440-09-7	
Sodium	**6560**	ug/L	500	157	1	11/28/18 15:52	11/28/18 20:53	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	11/28/18 15:52	11/28/18 17:31	7440-36-0	
Arsenic	**0.20J**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:31	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:31	7440-43-9	
Chromium	**0.29J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:31	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:31	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:31	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**399**	mg/L	20.0	4.9	1		11/20/18 12:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**474**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**9.6**	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.15J**	mg/L	0.20	0.012	1		11/17/18 10:34		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.5**	mg/L	1.0	0.29	1		11/27/18 23:20	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.19	1		11/27/18 23:20	16984-48-8	
Sulfate	**13.3**	mg/L	5.0	1.2	5		11/27/18 23:36	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.35**	mg/L	0.10	0.050	1		11/15/18 11:50	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
Pace Project No.: 60286569

Sample: S-BMW-3D **Lab ID: 60286569002** Collected: 11/12/18 12:30 Received: 11/13/18 11:58 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	**645**	ug/L	5.0	1.5	1	11/28/18 15:52	11/28/18 20:55	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 15:52	11/28/18 20:55	7440-41-7	
Boron	**47.3J**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 20:55	7440-42-8	
Calcium	**108000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 20:55	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 15:52	11/28/18 20:55	7440-48-4	
Iron	**7630**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 20:55	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 15:52	11/28/18 20:55	7439-92-1	
Lithium	**25.4**	ug/L	10.0	4.6	1	11/28/18 15:52	11/28/18 20:55	7439-93-2	
Magnesium	**23600**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 20:55	7439-95-4	
Manganese	**459**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 20:55	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 15:52	11/28/18 20:55	7439-98-7	
Potassium	**3640**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 20:55	7440-09-7	
Sodium	**6500**	ug/L	500	157	1	11/28/18 15:52	11/28/18 20:55	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	11/28/18 15:52	11/28/18 17:33	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/28/18 15:52	11/28/18 17:33	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/28/18 15:52	11/28/18 17:33	7440-43-9	
Chromium	**0.33J**	ug/L	1.0	0.078	1	11/28/18 15:52	11/28/18 17:33	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/28/18 15:52	11/28/18 17:33	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/28/18 15:52	11/28/18 17:33	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**350**	mg/L	20.0	4.9	1		11/20/18 12:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**410**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**7.6**	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.080J**	mg/L	0.20	0.012	1		11/17/18 10:35		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.4**	mg/L	1.0	0.29	1		11/27/18 23:53	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.19	1		11/27/18 23:53	16984-48-8	
Sulfate	**27.5**	mg/L	2.0	0.48	2		11/28/18 23:32	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.37**	mg/L	0.10	0.050	1		11/15/18 11:51	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
Pace Project No.: 60286569

Sample: S-UMW-2D **Lab ID: 60286569003** Collected: 11/13/18 15:00 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	**65.7**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:24	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:24	7440-41-7	
Boron	**18400**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:24	7440-42-8	
Calcium	**175000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:24	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:24	7440-48-4	
Iron	**256**	ug/L	50.0	6.1	1	11/28/18 19:00	11/30/18 14:00	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:24	7439-92-1	
Lithium	**23.4**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:24	7439-93-2	
Magnesium	**5710**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:24	7439-95-4	
Manganese	**183**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:24	7439-96-5	
Molybdenum	**1540**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:24	7439-98-7	
Potassium	**23900**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:24	7440-09-7	
Sodium	**50000**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:24	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 17:17	7440-36-0	
Arsenic	**2.8**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 17:17	7440-38-2	
Cadmium	**0.29J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 17:17	7440-43-9	
Chromium	**0.17J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 17:17	7440-47-3	B
Selenium	**0.11J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 17:17	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 17:17	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**116**	mg/L	20.0	4.9	1		11/20/18 18:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**895**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.26**	mg/L	0.050	0.012	1		12/03/18 14:18	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 10:35		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.0**	mg/L	5.0	1.4	5		12/01/18 20:48	16887-00-6	
Fluoride	**0.46**	mg/L	0.20	0.19	1		12/01/18 20:32	16984-48-8	
Sulfate	**522**	mg/L	50.0	12.0	50		12/01/18 21:36	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.087J**	mg/L	0.10	0.050	1		11/15/18 13:07	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
Pace Project No.: 60286569

Sample: S-UMW-3D **Lab ID: 60286569004** Collected: 11/13/18 14:05 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	**75.0**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:26	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:26	7440-41-7	
Boron	**31900**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:26	7440-42-8	
Calcium	**248000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:26	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:26	7440-48-4	
Iron	**620**	ug/L	50.0	6.1	1	11/28/18 19:00	11/30/18 14:03	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:26	7439-92-1	
Lithium	**11.7**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:26	7439-93-2	
Magnesium	**7210**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:26	7439-95-4	
Manganese	**399**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:26	7439-96-5	
Molybdenum	**4000**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:26	7439-98-7	
Potassium	**20400**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:26	7440-09-7	
Sodium	**106000**	ug/L	500	157	1	11/28/18 19:00	11/29/18 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	11/29/18 11:07	11/29/18 16:26	7440-36-0	
Arsenic	**0.82J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:26	7440-38-2	
Cadmium	**1.0**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:26	7440-43-9	
Chromium	**0.24J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:26	7440-47-3	B
Selenium	**0.20J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:26	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:26	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**56.7**	mg/L	20.0	4.9	1		11/20/18 18:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1410**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.62**	mg/L	0.050	0.012	1		12/03/18 14:19	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 10:36		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.8**	mg/L	1.0	0.29	1		12/01/18 21:52	16887-00-6	
Fluoride	**0.96**	mg/L	0.20	0.19	1		12/01/18 21:52	16984-48-8	
Sulfate	**994**	mg/L	100	24.0	100		12/01/18 22:24	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.093J**	mg/L	0.10	0.050	1		11/15/18 13:08	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 SPCA
Pace Project No.: 60286569

Sample: S-UMW-4D **Lab ID: 60286569005** 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	**56.9**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:28	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:28	7440-41-7	
Boron	**16800**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:28	7440-42-8	
Calcium	**153000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:28	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:28	7440-48-4	
Iron	**6280**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:28	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:28	7439-92-1	
Lithium	**38.3**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:28	7439-93-2	
Magnesium	**21600**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:28	7439-95-4	
Manganese	**1460**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:28	7439-96-5	
Molybdenum	**3900**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:28	7439-98-7	
Potassium	**13100**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:28	7440-09-7	
Sodium	**59900**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:28	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 16:27	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:27	7440-38-2	
Cadmium	**0.94**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:27	7440-43-9	
Chromium	**0.14J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:27	7440-47-3	B
Selenium	**0.12J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:27	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:27	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**201**	mg/L	20.0	4.9	1		11/20/18 18:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1000**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**6.1**	mg/L	0.050	0.012	1		12/03/18 14:20	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.16J**	mg/L	0.20	0.012	1		11/17/18 10:36		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**23.8**	mg/L	2.0	0.58	2		12/02/18 08:48	16887-00-6	
Fluoride	**0.49**	mg/L	0.40	0.38	2		12/02/18 08:48	16984-48-8	
Sulfate	**459**	mg/L	50.0	12.0	50		12/02/18 09:04	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.26**	mg/L	0.10	0.050	1		11/20/18 18:17	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
Pace Project No.: 60286569

Sample: S-UMW-5D **Lab ID: 60286569006** Collected: 11/13/18 15:50 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	**265**	ug/L	5.0	1.5	1	11/28/18 19:00	11/29/18 16:30	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:30	7440-41-7	
Boron	**5530**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:30	7440-42-8	
Calcium	**72700**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:30	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:30	7440-48-4	
Iron	**3400**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:30	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:30	7439-92-1	
Lithium	**22.9**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:30	7439-93-2	
Magnesium	**16700**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:30	7439-95-4	
Manganese	**444**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:30	7439-96-5	
Molybdenum	**181**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:30	7439-98-7	
Potassium	**9260**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:30	7440-09-7	
Sodium	**18700**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:30	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 16:29	7440-36-0	
Arsenic	**0.40J**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:29	7440-38-2	
Cadmium	**0.054J**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:29	7440-43-9	
Chromium	**0.19J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:29	7440-47-3	B
Selenium	**0.12J**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:29	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:29	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**264**	mg/L	20.0	4.9	1		11/20/18 18:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**375**	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 14:21	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.28**	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	**24.9**	mg/L	2.0	0.58	2		12/02/18 09:36	16887-00-6	
Fluoride	**0.49**	mg/L	0.20	0.19	1		12/02/18 09:20	16984-48-8	
Sulfate	**12.0**	mg/L	1.0	0.24	1		12/02/18 09:20	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.24**	mg/L	0.10	0.050	1		11/20/18 18:18	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 SPCA
Pace Project No.: 60286569

Sample: S-UMW-FB-1 **Lab ID: 60286569009** Collected: 11/13/18 15:46 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 16:43	7440-39-3	
Beryllium	**0.20J**	ug/L	1.0	0.16	1	11/28/18 19:00	11/29/18 16:43	7440-41-7	B
Boron	**25.0J**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:43	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:43	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/28/18 19:00	11/29/18 16:43	7440-48-4	
Iron	**10.4J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:43	7439-89-6	B
Lead	**<3.0**	ug/L	10.0	3.0	1	11/28/18 19:00	11/29/18 16:43	7439-92-1	
Lithium	**<4.6**	ug/L	10.0	4.6	1	11/28/18 19:00	11/29/18 16:43	7439-93-2	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:43	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:43	7439-96-5	
Molybdenum	**<0.90**	ug/L	20.0	0.90	1	11/28/18 19:00	11/29/18 16:43	7439-98-7	
Potassium	**132J**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:43	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:43	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 16:33	7440-36-0	
Arsenic	**<0.065**	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:33	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:33	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:33	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:33	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:33	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/20/18 18:49		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**<0.012**	mg/L	0.050	0.012	1		12/03/18 14:24	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 10:39		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		12/02/18 12:00	16887-00-6	M1
Fluoride	**<0.19**	mg/L	0.20	0.19	1		12/02/18 12:00	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		12/02/18 12:00	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/20/18 18:29	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
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ANALYTICAL RESULTS

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Sample: S-UMW-1D **Lab ID: 60287011001** Collected: 11/14/18 11:35 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	**134**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:15	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/30/18 10:47	11/30/18 22:15	7440-41-7	
Boron	**163**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:15	7440-42-8	
Calcium	**75300**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:15	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/30/18 10:47	11/30/18 22:15	7440-48-4	
Iron	**843**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:15	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/30/18 10:47	11/30/18 22:15	7439-92-1	
Lithium	**15.7**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:15	7439-93-2	
Magnesium	**21300**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:15	7439-95-4	
Manganese	**114**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:15	7439-96-5	
Molybdenum	**24.0**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:15	7439-98-7	
Potassium	**5490**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:15	7440-09-7	
Sodium	**15200**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:15	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	11/30/18 14:29	11/30/18 17:45	7440-36-0	
Arsenic	**1.4**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:45	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 17:45	7440-43-9	
Chromium	**0.10J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 17:45	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 17:45	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 17:45	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**204**	mg/L	20.0	4.9	1		11/26/18 09:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**348**	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	**0.84**	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	**<0.012**	mg/L	0.20	0.012	1		11/17/18 11:05		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.8**	mg/L	5.0	1.4	5		12/01/18 15:59	16887-00-6	
Fluoride	**0.19J**	mg/L	0.20	0.19	1		12/01/18 15:27	16984-48-8	
Sulfate	**63.4**	mg/L	5.0	1.2	5		12/01/18 15:59	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.18**	mg/L	0.10	0.050	1		11/24/18 12:46	7723-14-0	M1

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Sample: S-UMW-6D **Lab ID: 60287011002** 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	**182**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:26	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	11/30/18 10:47	11/30/18 22:26	7440-41-7	
Boron	**589**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:26	7440-42-8	
Calcium	**123000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:26	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/30/18 10:47	11/30/18 22:26	7440-48-4	
Iron	**8850**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:26	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/30/18 10:47	11/30/18 22:26	7439-92-1	
Lithium	**20.3**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:26	7439-93-2	
Magnesium	**28600**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:26	7439-95-4	
Manganese	**716**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:26	7439-96-5	
Molybdenum	**52.8**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:26	7439-98-7	
Potassium	**5530**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:26	7440-09-7	
Sodium	**11800**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:26	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	11/30/18 14:29	11/30/18 17:51	7440-36-0	
Arsenic	**0.29J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:51	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 17:51	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 17:51	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 17:51	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 17:51	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**386**	mg/L	20.0	4.9	1		11/26/18 10:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**464**	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	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.14J**	mg/L	0.20	0.012	1		11/17/18 11:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.6**	mg/L	1.0	0.29	1		12/08/18 15:18	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.19	1		12/08/18 15:18	16984-48-8	
Sulfate	**53.4**	mg/L	5.0	1.2	5		12/08/18 15:57	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.45**	mg/L	0.10	0.050	1		11/24/18 12:48	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
Pace Project No.: 60286569

Sample: S-UMW-DUP-1 **Lab ID: 60287011003** 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	**177**	ug/L	5.0	1.5	1	11/30/18 10:47	11/30/18 22:28	7440-39-3	
Beryllium	**0.17J**	ug/L	1.0	0.16	1	11/30/18 10:47	11/30/18 22:28	7440-41-7	B
Boron	**575**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:28	7440-42-8	
Calcium	**120000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:28	7440-70-2	
Cobalt	**<0.87**	ug/L	5.0	0.87	1	11/30/18 10:47	11/30/18 22:28	7440-48-4	
Iron	**8590**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:28	7439-89-6	
Lead	**<3.0**	ug/L	10.0	3.0	1	11/30/18 10:47	11/30/18 22:28	7439-92-1	
Lithium	**15.0**	ug/L	10.0	4.6	1	11/30/18 10:47	11/30/18 22:28	7439-93-2	
Magnesium	**27800**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:28	7439-95-4	
Manganese	**702**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:28	7439-96-5	
Molybdenum	**50.8**	ug/L	20.0	0.90	1	11/30/18 10:47	11/30/18 22:28	7439-98-7	
Potassium	**5240**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:28	7440-09-7	
Sodium	**11600**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:28	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	11/30/18 14:29	11/30/18 17:53	7440-36-0	
Arsenic	**0.28J**	ug/L	1.0	0.065	1	11/30/18 14:29	11/30/18 17:53	7440-38-2	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 17:53	7440-43-9	
Chromium	**0.20J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 17:53	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 17:53	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 17:53	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**389**	mg/L	20.0	4.9	1		11/26/18 10:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**458**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**8.4**	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	**0.23**	mg/L	0.20	0.012	1		11/17/18 11:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.7**	mg/L	1.0	0.29	1		12/08/18 16:39	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.19	1		12/08/18 16:39	16984-48-8	
Sulfate	**64.9**	mg/L	50.0	12.0	50		12/08/18 16:54	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.44**	mg/L	0.10	0.050	1		11/24/18 12:49	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 557225 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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 SPCA
Pace Project No.: 60286569

QC Batch: 557358 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2286636 Matrix: Water
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

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
Pace Project No.: 60286569

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
Pace Project No.: 60286569

QC Batch: 557642 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2287717 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.5	5.0	1.5	11/30/18 21:51	
Beryllium	ug/L	0.35J	1.0	0.16	11/30/18 21:51	
Boron	ug/L	<12.5	100	12.5	11/30/18 21:51	
Calcium	ug/L	<53.5	200	53.5	11/30/18 21:51	
Cobalt	ug/L	<0.87	5.0	0.87	11/30/18 21:51	
Iron	ug/L	16.0J	50.0	6.1	11/30/18 21:51	
Lead	ug/L	<3.0	10.0	3.0	11/30/18 21:51	
Lithium	ug/L	<4.6	10.0	4.6	11/30/18 21:51	
Magnesium	ug/L	<14.0	50.0	14.0	11/30/18 21:51	
Manganese	ug/L	2.4J	5.0	0.73	11/30/18 21:51	
Molybdenum	ug/L	<0.90	20.0	0.90	11/30/18 21:51	
Potassium	ug/L	141J	500	79.3	11/30/18 21:51	
Sodium	ug/L	<157	500	157	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	
Beryllium	ug/L	1000	1020	102	85-115	
Boron	ug/L	1000	917	92	85-115	
Calcium	ug/L	10000	10500	105	85-115	
Cobalt	ug/L	1000	1040	104	85-115	
Iron	ug/L	10000	10500	105	85-115	
Lead	ug/L	1000	984	98	85-115	
Lithium	ug/L	1000	1080	108	85-115	
Magnesium	ug/L	10000	9850	99	85-115	
Manganese	ug/L	1000	905	91	85-115	
Molybdenum	ug/L	1000	1090	109	85-115	
Potassium	ug/L	10000	10700	107	85-115	
Sodium	ug/L	10000	10900	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	
Beryllium	ug/L	<0.16	1000	1000	1020	975	102	97	70-130	5	20	
Boron	ug/L	425	1000	1000	1390	1340	97	92	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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
Calcium	ug/L	129000	10000	10000	144000	138000	157	95	70-130	4	20	M1
Cobalt	ug/L	2.3J	1000	1000	1010	972	101	97	70-130	4	20	
Iron	ug/L	7.3J	10000	10000	10300	9830	103	98	70-130	5	20	
Lead	ug/L	<3.0	1000	1000	954	919	95	92	70-130	4	20	
Lithium	ug/L	32.0	1000	1000	1090	1030	106	100	70-130	5	20	
Magnesium	ug/L	23300	10000	10000	33900	32700	106	94	70-130	4	20	
Manganese	ug/L	545	1000	1000	1450	1430	91	89	70-130	2	20	
Molybdenum	ug/L	3.2J	1000	1000	1090	1040	109	104	70-130	5	20	
Potassium	ug/L	6300	10000	10000	16900	16100	106	98	70-130	5	20	
Sodium	ug/L	40800	10000	10000	52900	50700	121	99	70-130	4	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	
Beryllium	ug/L	<0.16	1000	1000	1010	1010	101	101	70-130	0	20	
Boron	ug/L	163	1000	1000	1080	1080	92	92	70-130	0	20	
Calcium	ug/L	75300	10000	10000	83200	83400	78	81	70-130	0	20	
Cobalt	ug/L	<0.87	1000	1000	1020	1010	102	101	70-130	0	20	
Iron	ug/L	843	10000	10000	11100	11200	102	103	70-130	1	20	
Lead	ug/L	<3.0	1000	1000	963	959	96	96	70-130	0	20	
Lithium	ug/L	15.7	1000	1000	1070	1080	105	106	70-130	1	20	
Magnesium	ug/L	21300	10000	10000	30400	30300	91	90	70-130	0	20	
Manganese	ug/L	114	1000	1000	987	986	87	87	70-130	0	20	
Molybdenum	ug/L	24.0	1000	1000	1110	1110	109	108	70-130	0	20	
Potassium	ug/L	5490	10000	10000	15600	15700	101	103	70-130	1	20	
Sodium	ug/L	15200	10000	10000	25500	25600	102	103	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	
Beryllium	ug/L	<0.16	1000	1000	1020	1020	102	102	70-130	0	20	
Boron	ug/L	539	1000	1000	1460	1470	93	93	70-130	0	20	
Calcium	ug/L	79400	10000	10000	88500	89900	91	105	70-130	2	20	
Cobalt	ug/L	<0.87	1000	1000	1020	1020	102	102	70-130	0	20	
Iron	ug/L	17.2J	10000	10000	10400	10400	104	104	70-130	0	20	
Lead	ug/L	<3.0	1000	1000	962	960	96	96	70-130	0	20	
Lithium	ug/L	21.0	1000	1000	1080	1080	106	106	70-130	0	20	
Magnesium	ug/L	20100	10000	10000	29400	29600	93	95	70-130	1	20	
Manganese	ug/L	59.4	1000	1000	940	937	88	88	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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
Molybdenum	ug/L	43.6	1000	1000	1130	1140	109	110	70-130	1	20	
Potassium	ug/L	6800	10000	10000	17100	17200	103	104	70-130	1	20	
Sodium	ug/L	33400	10000	10000	43500	44000	102	106	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 557233 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2286073 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

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 SPCA
Pace Project No.: 60286569

QC Batch: 557460 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2286955 Matrix: Water
Associated Lab Samples: 60286569004, 60286569005, 60286569006, 60286569009

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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 SPCA
Pace Project No.: 60286569

QC Batch: 557461 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60286569003

METHOD BLANK: 2286967 Matrix: Water
Associated Lab Samples: 60286569003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/29/18 17:13	
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 17:13	
Cadmium	ug/L	<0.033	0.50	0.033	11/29/18 17:13	
Chromium	ug/L	0.27J	1.0	0.078	11/29/18 17:13	
Selenium	ug/L	<0.085	1.0	0.085	11/29/18 17:13	
Thallium	ug/L	<0.099	1.0	0.099	11/29/18 17:13	

LABORATORY CONTROL SAMPLE: 2286968

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	99	85-115	
Arsenic	ug/L	40	38.9	97	85-115	
Cadmium	ug/L	40	38.8	97	85-115	
Chromium	ug/L	40	39.4	98	85-115	
Selenium	ug/L	40	37.8	94	85-115	
Thallium	ug/L	40	37.2	93	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
Antimony	ug/L	1.1	40	40	40.0	40.1	97	97	70-130	0	20	
Arsenic	ug/L	0.45J	40	40	40.3	40.1	100	99	70-130	1	20	
Cadmium	ug/L	0.056J	40	40	36.6	36.8	91	92	70-130	0	20	
Chromium	ug/L	8.8	40	40	55.5	55.3	117	116	70-130	0	20	
Selenium	ug/L	<0.085	40	40	37.8	38.3	94	96	70-130	1	20	
Thallium	ug/L	0.18J	40	40	38.6	39.2	96	97	70-130	1	20	

MATRIX SPIKE SAMPLE: 2286971

Parameter	Units	60286708001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	5.6	40	45.2	99	70-130	
Arsenic	ug/L	4.3	40	47.4	108	70-130	
Cadmium	ug/L	36.1	40	74.6	96	70-130	
Chromium	ug/L	3970	40	4140	430	70-130	M1
Selenium	ug/L	ND	40	46.6	108	70-130	
Thallium	ug/L	ND	40	39.0	97	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 557644 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2287725 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/30/18 17:23	
Arsenic	ug/L	<0.065	1.0	0.065	11/30/18 17:23	
Cadmium	ug/L	<0.033	0.50	0.033	11/30/18 17:23	
Chromium	ug/L	0.086J	1.0	0.078	11/30/18 17:23	
Selenium	ug/L	<0.085	1.0	0.085	11/30/18 17:23	
Thallium	ug/L	<0.099	1.0	0.099	11/30/18 17:23	

LABORATORY CONTROL SAMPLE: 2287726

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	98	85-115	
Arsenic	ug/L	40	39.3	98	85-115	
Cadmium	ug/L	40	39.0	97	85-115	
Chromium	ug/L	40	38.9	97	85-115	
Selenium	ug/L	40	39.7	99	85-115	
Thallium	ug/L	40	37.4	94	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
Antimony	ug/L	0.17J	40	40	39.3	39.9	98	99	70-130	2	20	
Arsenic	ug/L	0.34J	40	40	40.8	41.1	101	102	70-130	1	20	
Cadmium	ug/L	0.23J	40	40	35.8	35.8	89	89	70-130	0	20	
Chromium	ug/L	0.23J	40	40	38.1	38.4	95	95	70-130	1	20	
Selenium	ug/L	2.9	40	40	41.5	41.9	96	97	70-130	1	20	
Thallium	ug/L	<0.099	40	40	34.1	34.4	85	86	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
Antimony	ug/L	<0.078	40	40	40.0	39.7	100	99	70-130	1	20	
Arsenic	ug/L	1.4	40	40	41.9	41.0	101	99	70-130	2	20	
Cadmium	ug/L	<0.033	40	40	37.7	36.6	94	92	70-130	3	20	
Chromium	ug/L	0.10J	40	40	38.8	38.4	97	96	70-130	1	20	
Selenium	ug/L	<0.085	40	40	39.7	38.5	99	96	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

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
Thallium	ug/L	<0.099	40	40	36.0	35.6	90	89	70-130	1	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
Antimony	ug/L	0.38J	40	40	40.0	40.0	99	99	70-130	0	20	
Arsenic	ug/L	2.0	40	40	43.5	42.4	104	101	70-130	3	20	
Cadmium	ug/L	0.049J	40	40	37.1	37.0	93	92	70-130	0	20	
Chromium	ug/L	0.36J	40	40	39.3	38.9	97	96	70-130	1	20	
Selenium	ug/L	3.0	40	40	42.3	42.1	98	98	70-130	1	20	
Thallium	ug/L	<0.099	40	40	35.3	35.1	88	88	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 556192 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2282069 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 556367 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2282759 Matrix: Water
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

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 SPCA
Pace Project No.: 60286569

QC Batch: 556754 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2284647 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

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 SPCA
Pace Project No.: 60286569

QC Batch: 555505 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2278841 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

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 SPCA
Pace Project No.: 60286569

QC Batch: 555738 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2280010 Matrix: Water
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

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
Pace Project No.: 60286569

QC Batch: 555805 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2280475 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

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 SPCA
Pace Project No.: 60286569

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: 60286569001, 60286569002, 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2279572 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002, 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

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
Pace Project No.: 60286569

QC Batch: 555663 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2279582 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/17/18 10:59	H6

LABORATORY CONTROL SAMPLE: 2279583

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

SAMPLE DUPLICATE: 2279584

Parameter	Units	60287003004 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

SAMPLE DUPLICATE: 2279585

Parameter	Units	60287011001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

SAMPLE DUPLICATE: 2279586

Parameter	Units	60287013001 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 SPCA
Pace Project No.: 60286569

QC Batch: 557070 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2285634 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/27/18 18:48	
Fluoride	mg/L	<0.19	0.20	0.19	11/27/18 18:48	
Sulfate	mg/L	<0.24	1.0	0.24	11/27/18 18:48	

LABORATORY CONTROL SAMPLE: 2285635

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2285636 2285637

Parameter	Units	60286803001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2990	2500	2500	5700	5570	108	103	90-110	2	15	
Fluoride	mg/L	ND	1250	1250	1230	1230	94	95	90-110	0	15	
Sulfate	mg/L	4350	2500	2500	7140	6960	112	104	90-110	3	15	M1

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 557318 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286569002

METHOD BLANK: 2286426 Matrix: Water
Associated Lab Samples: 60286569002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
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
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
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
Sulfate	mg/L	520	250	746	90	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 557819 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

METHOD BLANK: 2288548 Matrix: Water
Associated Lab Samples: 60286569003, 60286569004, 60286569005, 60286569006, 60286569009

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
Pace Project No.: 60286569

QC Batch: 557820
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287011001

METHOD BLANK: 2288554 Matrix: Water
Associated Lab Samples: 60287011001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/01/18 02:25	
Fluoride	mg/L	<0.19	0.20	0.19	12/01/18 02:25	
Sulfate	mg/L	<0.24	1.0	0.24	12/01/18 02:25	

LABORATORY CONTROL SAMPLE: 2288555

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.5	95	90-110	
Fluoride	mg/L	5	5.0	100	90-110	
Sulfate	mg/L	10	9.7	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288556 2288557

Parameter	Units	60287003004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	67.0	25	25	96.8	92.4	119	102	90-110	5	15	M1
Fluoride	mg/L	0.21	2.5	2.5	2.7	2.7	100	101	90-110	0	15	
Sulfate	mg/L	63.9	25	25	90.6	89.0	107	100	90-110	2	15	

MATRIX SPIKE SAMPLE: 2288558

Parameter	Units	60287011001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	21.8	25	46.4	98	90-110	
Fluoride	mg/L	0.19J	2.5	2.7	101	90-110	
Sulfate	mg/L	63.4	25	90.5	108	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 559055 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287011002, 60287011003

METHOD BLANK: 2294201 Matrix: Water
Associated Lab Samples: 60287011002, 60287011003

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	
Sulfate	mg/L	<0.24	1.0	0.24	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	
Sulfate	mg/L	5	5.0	100	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	
Sulfate	mg/L	752	500	1260	102	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 554984 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286569001, 60286569002

METHOD BLANK: 2276694 Matrix: Water
Associated Lab Samples: 60286569001, 60286569002

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 SPCA
Pace Project No.: 60286569

QC Batch: 555261 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286569003, 60286569004

METHOD BLANK: 2277817 Matrix: Water
Associated Lab Samples: 60286569003, 60286569004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/15/18 12:52	

LABORATORY CONTROL SAMPLE: 2277818

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

MATRIX SPIKE SAMPLE: 2277819

Parameter	Units	60286632003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	24.0	2	24.1	8	90-110	M1

SAMPLE DUPLICATE: 2277820

Parameter	Units	60286633001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	7.1	5.7	21	10	D6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 556193 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286569005, 60286569006, 60286569009

METHOD BLANK: 2282073 Matrix: Water
Associated Lab Samples: 60286569005, 60286569006, 60286569009

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

QC Batch: 556507 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60287011001, 60287011002, 60287011003

METHOD BLANK: 2283264 Matrix: Water
Associated Lab Samples: 60287011001, 60287011002, 60287011003

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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QUALIFIERS

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
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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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286569001	**S-BMW-1D**	EPA 200.7	557225	EPA 200.7	557391
60286569002	**S-BMW-3D**	EPA 200.7	557225	EPA 200.7	557391
60286569003	**S-UMW-2D**	EPA 200.7	557358	EPA 200.7	557423
60286569004	**S-UMW-3D**	EPA 200.7	557358	EPA 200.7	557423
60286569005	**S-UMW-4D**	EPA 200.7	557358	EPA 200.7	557423
60286569006	**S-UMW-5D**	EPA 200.7	557358	EPA 200.7	557423
60286569009	**S-UMW-FB-1**	EPA 200.7	557358	EPA 200.7	557423
60287011001	**S-UMW-1D**	EPA 200.7	557642	EPA 200.7	557772
60287011002	**S-UMW-6D**	EPA 200.7	557642	EPA 200.7	557772
60287011003	**S-UMW-DUP-1**	EPA 200.7	557642	EPA 200.7	557772
60286569001	**S-BMW-1D**	EPA 200.8	557233	EPA 200.8	557393
60286569002	**S-BMW-3D**	EPA 200.8	557233	EPA 200.8	557393
60286569003	**S-UMW-2D**	EPA 200.8	557461	EPA 200.8	557562
60286569004	**S-UMW-3D**	EPA 200.8	557460	EPA 200.8	557561
60286569005	**S-UMW-4D**	EPA 200.8	557460	EPA 200.8	557561
60286569006	**S-UMW-5D**	EPA 200.8	557460	EPA 200.8	557561
60286569009	**S-UMW-FB-1**	EPA 200.8	557460	EPA 200.8	557561
60287011001	**S-UMW-1D**	EPA 200.8	557644	EPA 200.8	557771
60287011002	**S-UMW-6D**	EPA 200.8	557644	EPA 200.8	557771
60287011003	**S-UMW-DUP-1**	EPA 200.8	557644	EPA 200.8	557771
60286569001	**S-BMW-1D**	SM 2320B	556192		
60286569002	**S-BMW-3D**	SM 2320B	556192		
60286569003	**S-UMW-2D**	SM 2320B	556367		
60286569004	**S-UMW-3D**	SM 2320B	556367		
60286569005	**S-UMW-4D**	SM 2320B	556367		
60286569006	**S-UMW-5D**	SM 2320B	556367		
60286569009	**S-UMW-FB-1**	SM 2320B	556367		
60287011001	**S-UMW-1D**	SM 2320B	556754		
60287011002	**S-UMW-6D**	SM 2320B	556754		
60287011003	**S-UMW-DUP-1**	SM 2320B	556754		
60286569001	**S-BMW-1D**	SM 2540C	555505		
60286569002	**S-BMW-3D**	SM 2540C	555505		
60286569003	**S-UMW-2D**	SM 2540C	555738		
60286569004	**S-UMW-3D**	SM 2540C	555738		
60286569005	**S-UMW-4D**	SM 2540C	555738		
60286569006	**S-UMW-5D**	SM 2540C	555738		
60286569009	**S-UMW-FB-1**	SM 2540C	555738		
60287011001	**S-UMW-1D**	SM 2540C	555805		
60287011002	**S-UMW-6D**	SM 2540C	555805		
60287011003	**S-UMW-DUP-1**	SM 2540C	555805		
60286569001	**S-BMW-1D**	SM 3500-Fe B#4	558081		
60286569002	**S-BMW-3D**	SM 3500-Fe B#4	558081		

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SPCA
Pace Project No.: 60286569

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286569003	**S-UMW-2D**	SM 3500-Fe B#4	558081		
60286569004	**S-UMW-3D**	SM 3500-Fe B#4	558081		
60286569005	**S-UMW-4D**	SM 3500-Fe B#4	558081		
60286569006	**S-UMW-5D**	SM 3500-Fe B#4	558081		
60286569009	**S-UMW-FB-1**	SM 3500-Fe B#4	558081		
60287011001	**S-UMW-1D**	SM 3500-Fe B#4	558082		
60287011002	**S-UMW-6D**	SM 3500-Fe B#4	558082		
60287011003	**S-UMW-DUP-1**	SM 3500-Fe B#4	558082		
60286569001	**S-BMW-1D**	SM 3500-Fe B#4	555661		
60286569002	**S-BMW-3D**	SM 3500-Fe B#4	555661		
60286569003	**S-UMW-2D**	SM 3500-Fe B#4	555661		
60286569004	**S-UMW-3D**	SM 3500-Fe B#4	555661		
60286569005	**S-UMW-4D**	SM 3500-Fe B#4	555661		
60286569006	**S-UMW-5D**	SM 3500-Fe B#4	555661		
60286569009	**S-UMW-FB-1**	SM 3500-Fe B#4	555661		
60287011001	**S-UMW-1D**	SM 3500-Fe B#4	555663		
60287011002	**S-UMW-6D**	SM 3500-Fe B#4	555663		
60287011003	**S-UMW-DUP-1**	SM 3500-Fe B#4	555663		
60286569001	**S-BMW-1D**	EPA 300.0	557070		
60286569002	**S-BMW-3D**	EPA 300.0	557070		
60286569002	**S-BMW-3D**	EPA 300.0	557318		
60286569003	**S-UMW-2D**	EPA 300.0	557819		
60286569004	**S-UMW-3D**	EPA 300.0	557819		
60286569005	**S-UMW-4D**	EPA 300.0	557819		
60286569006	**S-UMW-5D**	EPA 300.0	557819		
60286569009	**S-UMW-FB-1**	EPA 300.0	557819		
60287011001	**S-UMW-1D**	EPA 300.0	557820		
60287011002	**S-UMW-6D**	EPA 300.0	559055		
60287011003	**S-UMW-DUP-1**	EPA 300.0	559055		
60286569001	**S-BMW-1D**	EPA 365.4	554984		
60286569002	**S-BMW-3D**	EPA 365.4	554984		
60286569003	**S-UMW-2D**	EPA 365.4	555261		
60286569004	**S-UMW-3D**	EPA 365.4	555261		
60286569005	**S-UMW-4D**	EPA 365.4	556193		
60286569006	**S-UMW-5D**	EPA 365.4	556193		
60286569009	**S-UMW-FB-1**	EPA 365.4	556193		
60287011001	**S-UMW-1D**	EPA 365.4	556507		
60287011002	**S-UMW-6D**	EPA 365.4	556507		
60287011003	**S-UMW-DUP-1**	EPA 365.4	556507		

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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

JLS

Date and initials of person examining contents: JB 11/13

Cooler Temperature (°C): **As-read** 4.0 3.6 **Corr. Factor** +0.0 **Corrected** 4.0 3.6

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: _____

Project Manager Review: Jann Church Date: 11/13/18

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:	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

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*	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.
1	S-UMW-1D	WT	G																								
2	S-UMW-2D	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																								
7	S-BMW-1D	WT	G			11/12/18	1430		4	2	1	1						✓		✓	✓	✓	✓				(2) BP1U BP3S BP3N
8	S-BMW-3D	WT	G		1230	11/12/18	~~1230~~ 1230		4	3	1	1						✓		✓	✓	✓	✓				
9	S-AM-1S	WT	G																								
10	S-AM-1D	WT	G																								
11	S-UMW-DUP-1	WT	G																								
12	S-UMW-FB-1	WT	G																								

001
002

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
*EPA 200.7: Fe, Mg, Mn, K, Na	Golder	11/12/18	17:15		11/13/18	0847
**EPA 200.7: Be, Co, Pb **EPA 200.8: Sb, Cd, Cr, Se, Tl						

SAMPLE CONDITIONS			
4.0 / 3.6	Y / Y	Y / 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

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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
Project Number:	153-1406.0003E (COC 12)

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		
1	S-UMW-1D	WT	G																				
2	S-UMW-2D	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																				
7	S-BMW-1D	WT	G			11/12/18	1430		4	2	1		1						✓	✓	✓		
8	S-BMW-3D	WT	G			11/12/18	1230		4	2	1		1						✓	✓	✓		
9	S-AM-1S	WT	G																				
10	S-AM-1D	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, Ba, Li, Mo *EPA 200.8: As	Golder	11/12/18	17:15		11/13/18	0747	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):

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# : 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

JLS

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	Fecal
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 (circled) | 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): Metals* N, Chloride/Fluoride/Sulfate N, TDS 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*	Chloride/Fluoride/Sulfate	TDS		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60286569
1	S-UMW-1D	WT	G																				
2	S-UMW-2D	WT	G			11/13/18	1500		4	2	1	1						✓	✓	✓	(2)BP1U BP3S BP3N		001
3	S-UMW-3D	WT	G				1405																002
4	S-UMW-4D	WT	G				1315																003
5	S-UMW-5D	WT	G				1550																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						✓	✓	✓		(2)BP1N	005
10	S-AM-1D	WT	G				1110		6	2	1	3											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	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: As	[signature] / Golder	11/13/18	1715	[signature]	11/14/18	0740	3.8	Y	Y	Y
							3.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bri 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	Golder	11/13/18	1715				
**EPA 200.7: Be, Co, Pb **EPA 200.8: Sb, Cd, Cr, Se, Tl							

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:	Brian Works	DATE Signed (MM/DD/YY): 11/13/18				
SIGNATURE of SAMPLER:						

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60287011

60287011

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** 2.6 4.0 **Corr. Factor** +0.0 **Corrected** 2.6 4.0

Date and initials of person examining contents: JB 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? (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: Jamie Church 11/16/18 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:		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 #13)	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	Y/N	Analysis Test: 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.
Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS																		N	N	N	N	N	N	N	N						6028701
1	S-UMW-1D	WT	G			11/14/18	1135		4	2	1	1						✓	✓		✓	✓	✓	✓	(4)[illegible] (2)[illegible] (2)[illegible]					
2	S-UWL-MS-1 ~~S-UMW-2D~~ (UMW-10)	WT	G																											MS (collected UMW-1D)
3	S-UWL-MSD-1 ~~S-UMW-3D~~ (UMW-10)	WT	G																											MSD (collected UMW-1D)
4	S-UMW-4D	WT	G																											
5	S-UMW-5D	WT	G																											
6	S-UMW-6D	WT	G			11/14/18	1045		4	2	1	1						✓	✓		✓	✓	✓	✓	(2)[illegible]					
7	S-BMW-1D	WT	G																											
8	S-BMW-3D	WT	G																											
9	S-AM-1S	WT	G																											
10	S-AM-1D	WT	G																											
11	S-UMW-DUP-1	WT	G			11/14/18	—		4	2	1	1						✓	✓		✓	✓	✓	✓	(2)[illegible]					
12	S-UMW-FB-1	WT	G																											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Fe, Mg, Mn, K, Na	[signature] / Golder	11/14/18	1750	[signature]	11/15	1010	3.6	Y	Y	Y
**EPA 200.7: Be, Co, Pb **EPA 200.8: Sb, Cd, Cr, Se, Tl							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

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

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:	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
Project Number:	153-1406.0003E (COC 12)

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	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N		L0287011
1	S-UMW-1D	WT	G			11/14/18	1135		4	2	1	1							✓	✓	✓		
2	~~S-UW2-MS-1 S-UMW-2D~~ (UMW-1D)	WT	G			"	"		1	1	1	1							1	1	1		MS Collected UMW-1D
3	~~S-UW2-MSD-1 S-UMW-3D~~ (UMW-1D)	WT	G			"	"		1	1	1	1							1	1	1		MSD Collected UMW-1D
4	S-UMW-4D	WT	G																				
5	S-UMW-5D	WT	G																				
6	S-UMW-6D	WT	G			11/14/18	1045		4	2	1	1							✓	✓	✓		
7	S-BMW-1D	WT	G																				
8	S-BMW-3D	WT	G																				
9	S-AM-1S	WT	G																				
10	S-AM-1D	WT	G																				
11	S-UMW-DUP-1	WT	G			11/14/18	—		4	2	1	1							✓	✓	✓		
12	S-UMW-FB-1	WT	G																				

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	11/14/18	1750			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 11/14/18

SAMPLE CONDITIONS			
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 60286569

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). 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 - CCR
Reviewer: T Goodwin

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

Laboratory: Pace Analytical
SDG #: 60286569
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-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-FB-1, S-UMW-DUP-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?	☒	☐	☐	11/12-11/14/18
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^{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
b) Were analytes detected in the field blank(s)?	☑	☐	☐	FB-1: Be(0.26), B(25.0), Fe(10.4), K(132), Cr(0.18),
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@ UMW-6D
	☑	☐	☐	FB-1@ UMW-5D •
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	DUP-1: Be(200), Li(30), Cr(58.1), Fe^{TV}(49)
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☑	☐	TDS [1001-003] (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?	☐	☑	☐	Cr
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☑	☐	Cr
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

MB
[9001-02] Be(0.48), Fe(8.6), K(179), Cr(0.19)
[9003-06+09] Be(0.36), Fe(16.7), Cr(0.14)/Cr(0.27) for [03],
[1001-003] Be(0.35), Fe(16.0), Mn(2.4), K(141), Cr(0.086)

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-UMW-1D	TDS	348	J	Sample Duplicate (SD) exceeded limit; Result > MDL
⊥	Chromium (Cr)	1.0	U	Detected in Method Blank (MB); MDL < Result < PQL
S-UMW-6D	Cr	1.0	U	⊥ ⊥
⊥	Lithium (Li)	20.3	J	RPD exceeded limit; Result > MDL
S-UMW-DUP-1	Li	15.0	J	⊥ ⊥
⊥	Beryllium (Be)	1.0	U	MB; MDL < Result < PQL
⊥	Cr	1.0	U	⊥ ⊥
S-BMW-1D	⊥	1.0	U	⊥ ⊥
S-BMW-3D	⊥	1.0	U	⊥ ⊥
S-UMW-2D	⊥	1.0	U	⊥ ⊥
S-UMW-3D	⊥	1.0	U	⊥ ⊥
S-UMW-4D	⊥	1.0	U	⊥ ⊥
S-UMW-5D	⊥	1.0	U	⊥ ⊥
S-UMW-FB-1	⊥	1.0	U	⊥ ⊥
⊥	Be	1.0	U	⊥ ⊥
⊥	Iron (Fe)	5.0	U	⊥ ⊥

Signature: Tommy J. Woodward Date: 1/8/19

APPENDIX C

Assessment Monitoring Statistical Evaluation

TECHNICAL MEMORANDUM

DATE October 11, 2018 **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

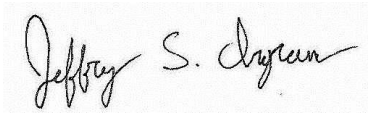
This Technical Memorandum provides the results of the Assessment Monitoring Statistical Evaluation for the SCPA Surface Impoundment at the Sioux Energy Center located in St. Charles County Missouri. Included in this memorandum is a brief summary of constituents that are present at a Statistically Significant Level (SSL), an updated 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**).

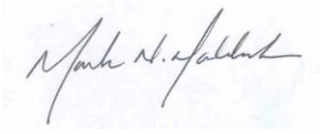
SSLs were calculated using the methods and procedures outlined in the Groundwater Monitoring Plan's (GMP) Statistical Analysis Plan (SAP). No outliers were removed prior to calculation of the confidence intervals. A summary of SSLs at corresponding well(s) is as follows:

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

Enclosures:
Table 1 – SCPA Groundwater Protection Standards
Appendix A – Sanitas Confidence Interval Statistical Output

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021 T: +1 314 984-8800 F: +1 314 984-8770

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

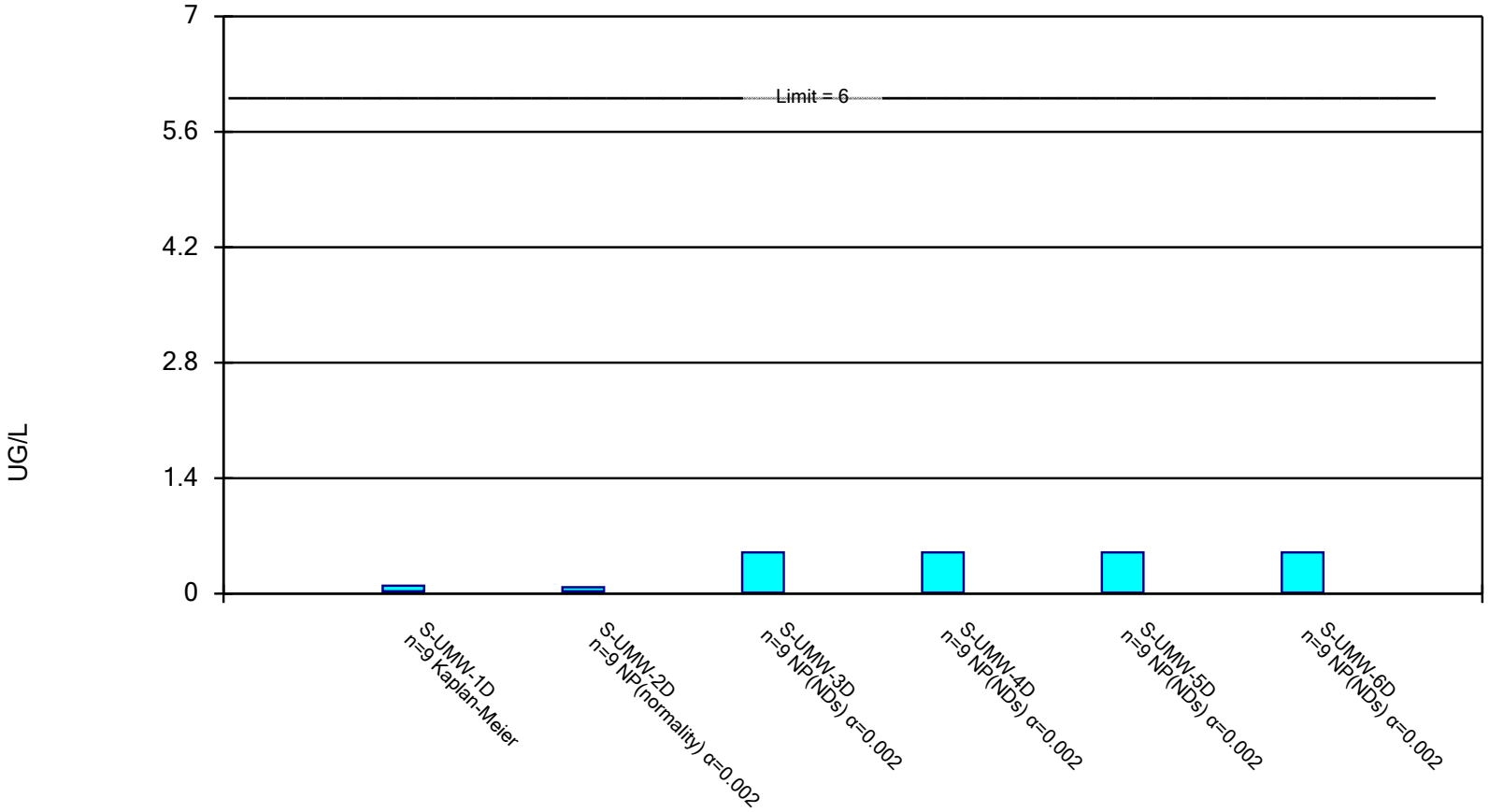
1. µg/L - micrograms per liter
2. mg/L - milligrams per liter
3. pCi/L - picocuries per liter
4. MCL - Maximum Contaminant Level. MCLs from United States Environmental Protection Agency (USEPA) 2012 Edition of the Drinking Water Standards and Health Advisories. Spring 2012. http://water.epa.gov/drink/contaminants/index.cfm.
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 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 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric Confidence Interval

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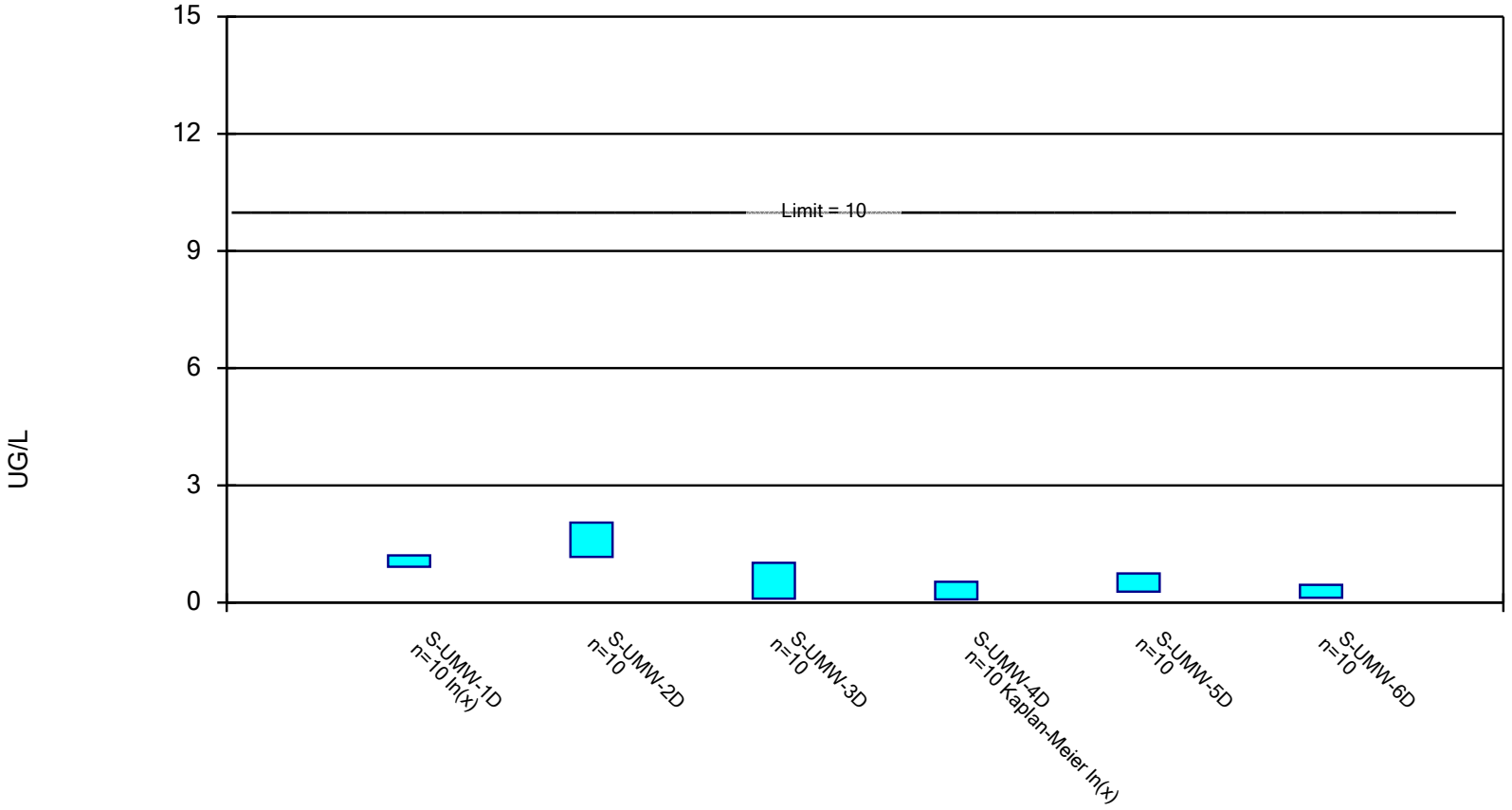

Constituent: ARSENIC, TOTAL Analysis Run 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric Confidence Interval

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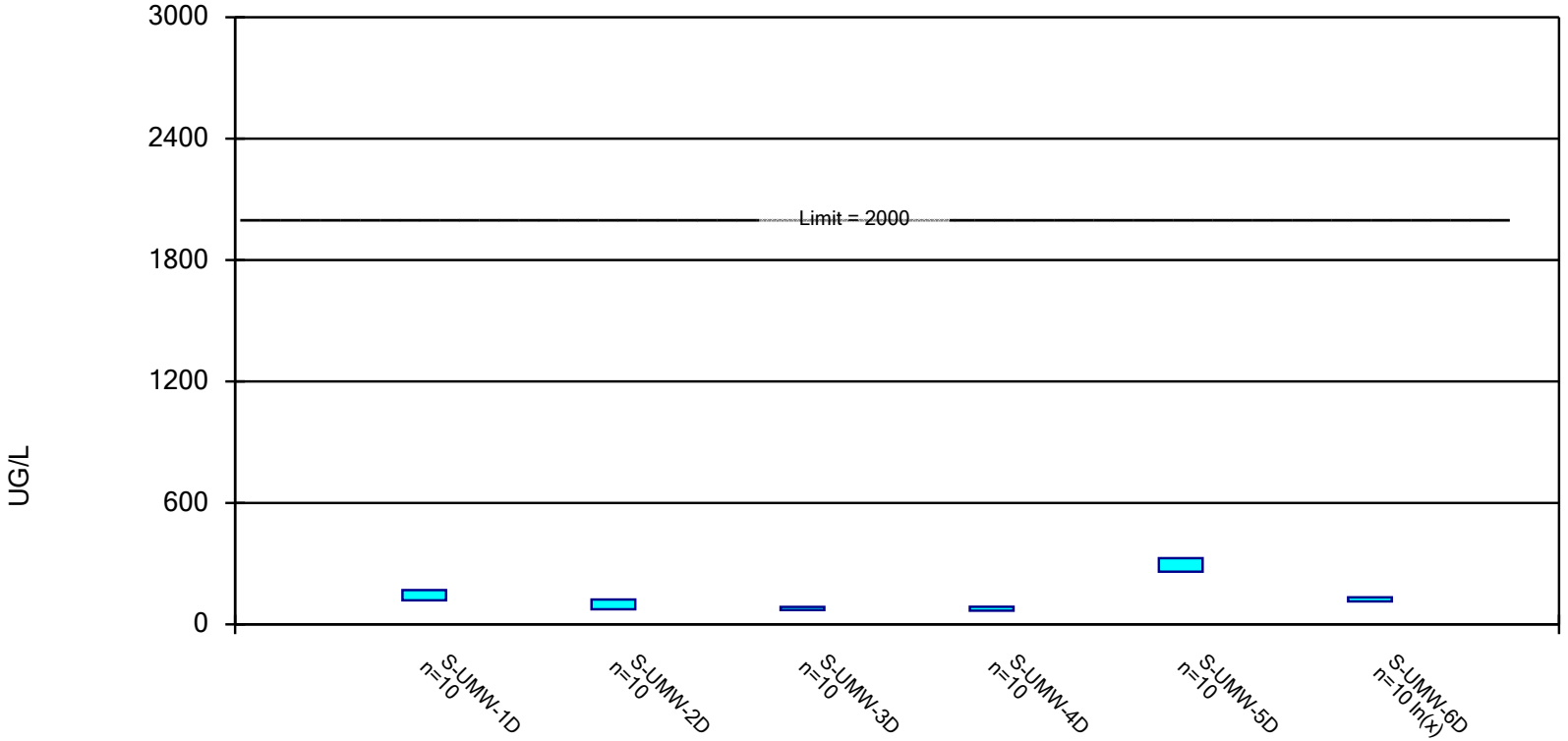
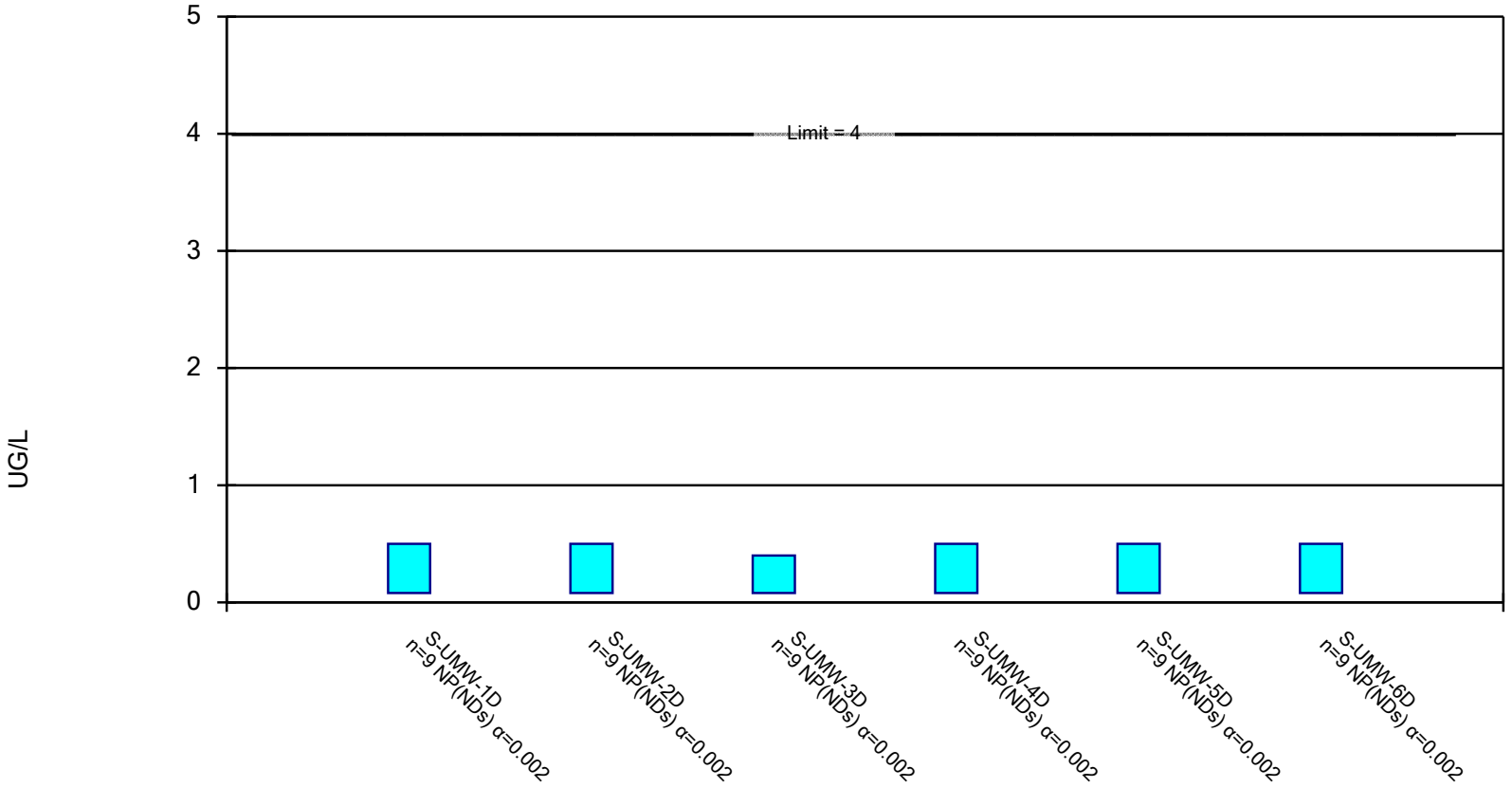


Constituent: BARIUM, TOTAL Analysis Run 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

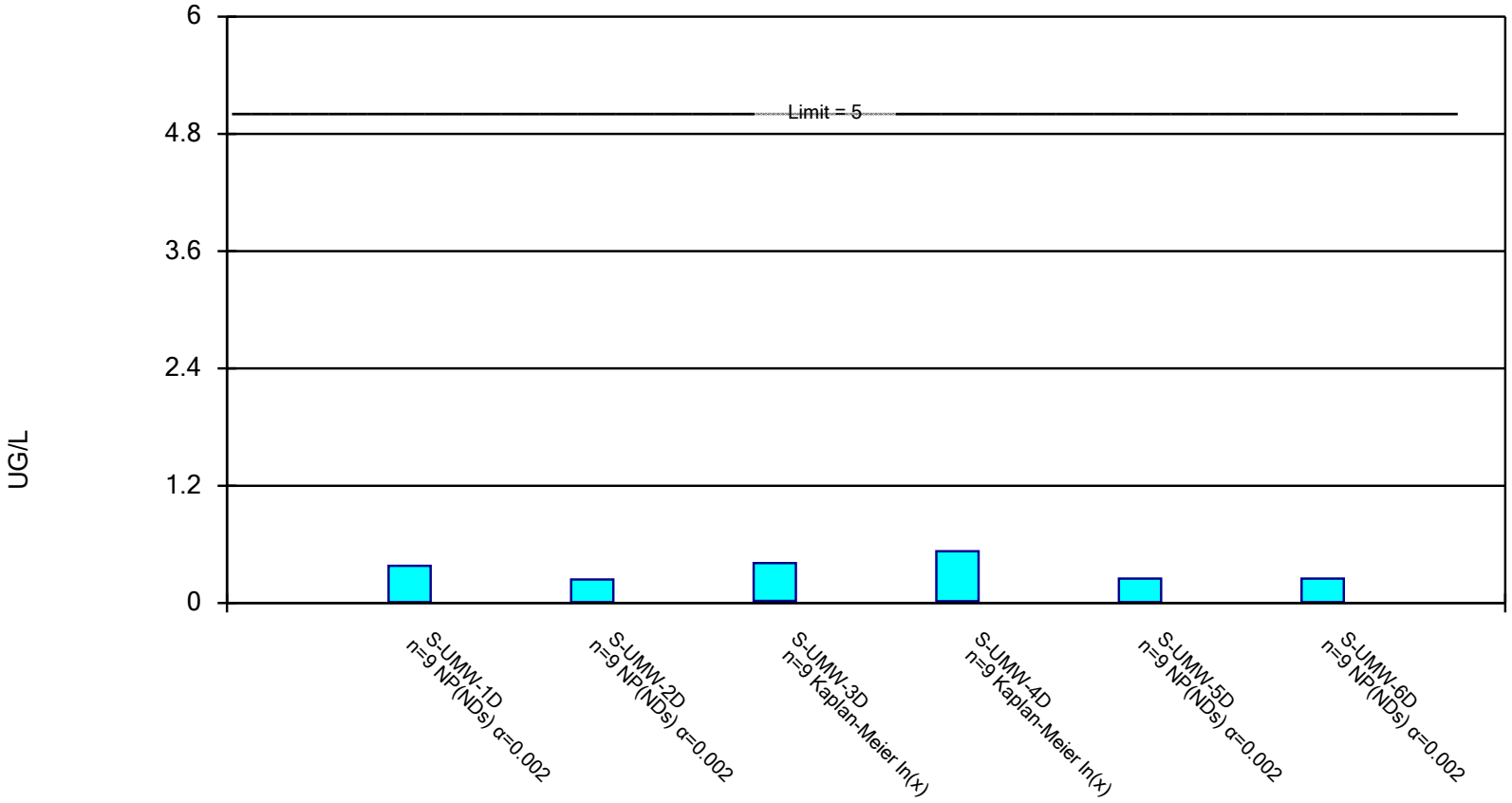


Constituent: BERYLLIUM, TOTAL Analysis Run 10/5/2018 3:04 PM

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: CADMIUM, TOTAL Analysis Run 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

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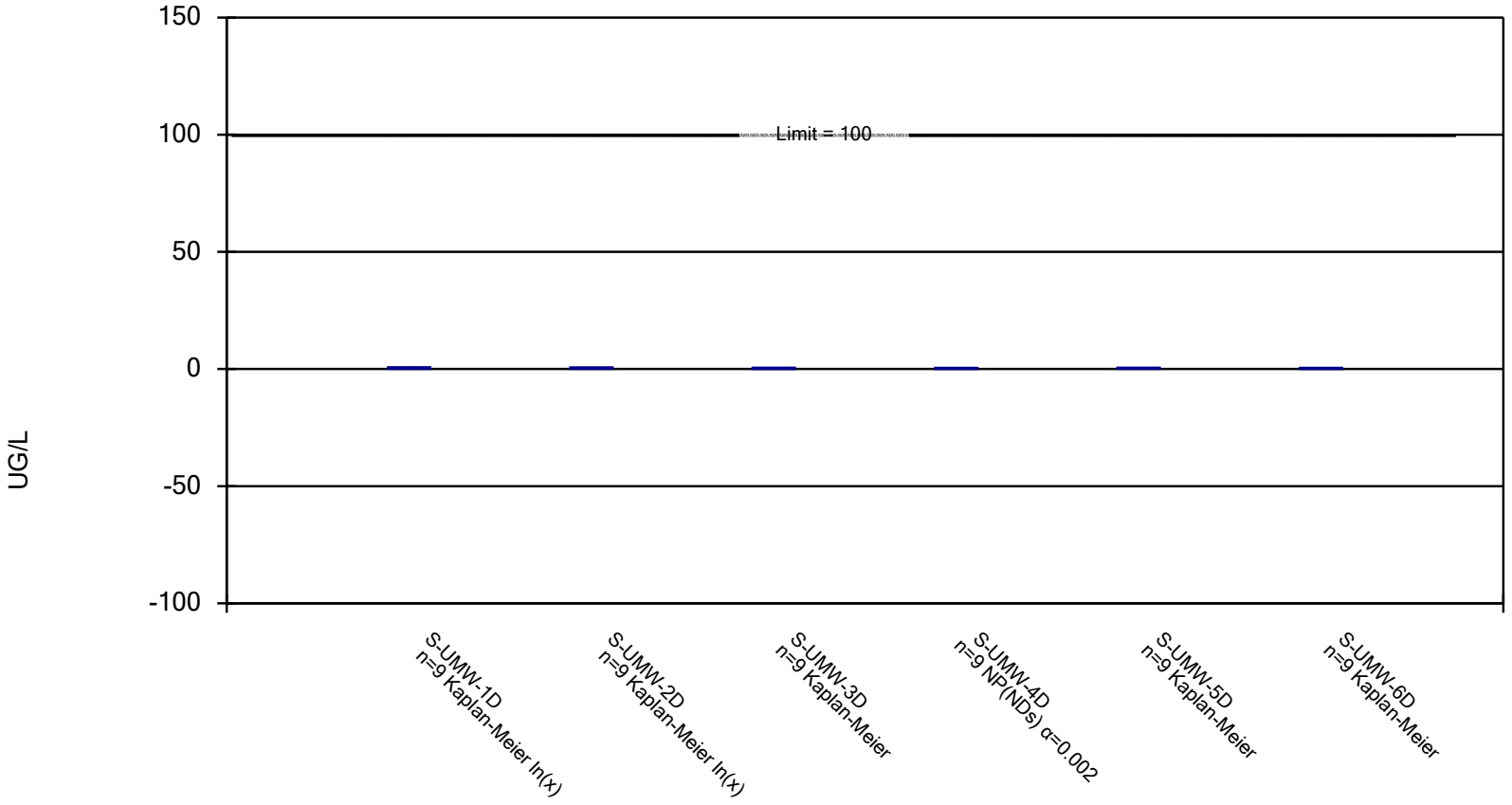
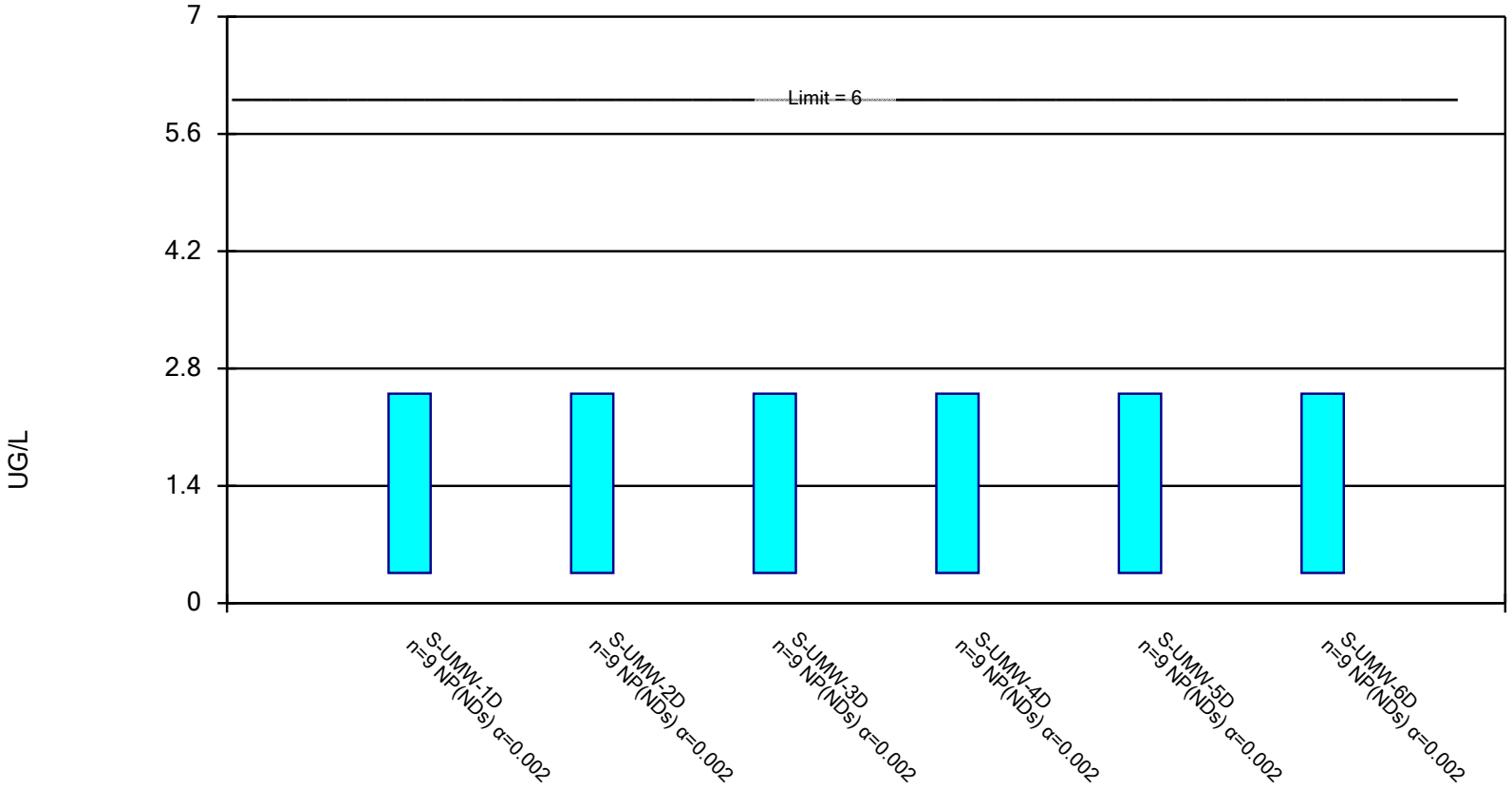


Constituent: CHROMIUM, TOTAL Analysis Run 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

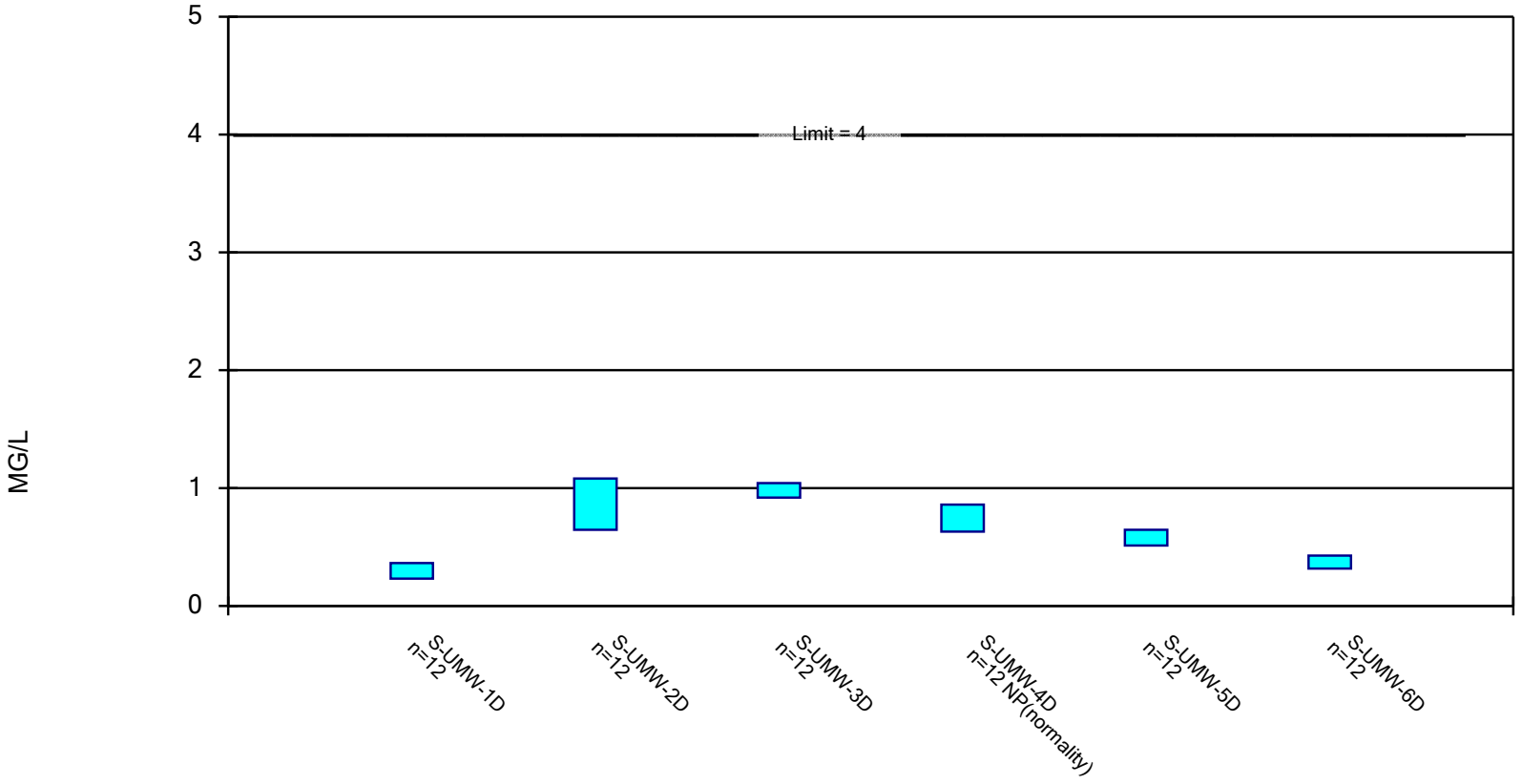


Constituent: COBALT, TOTAL Analysis Run 10/5/2018 3:04 PM

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.

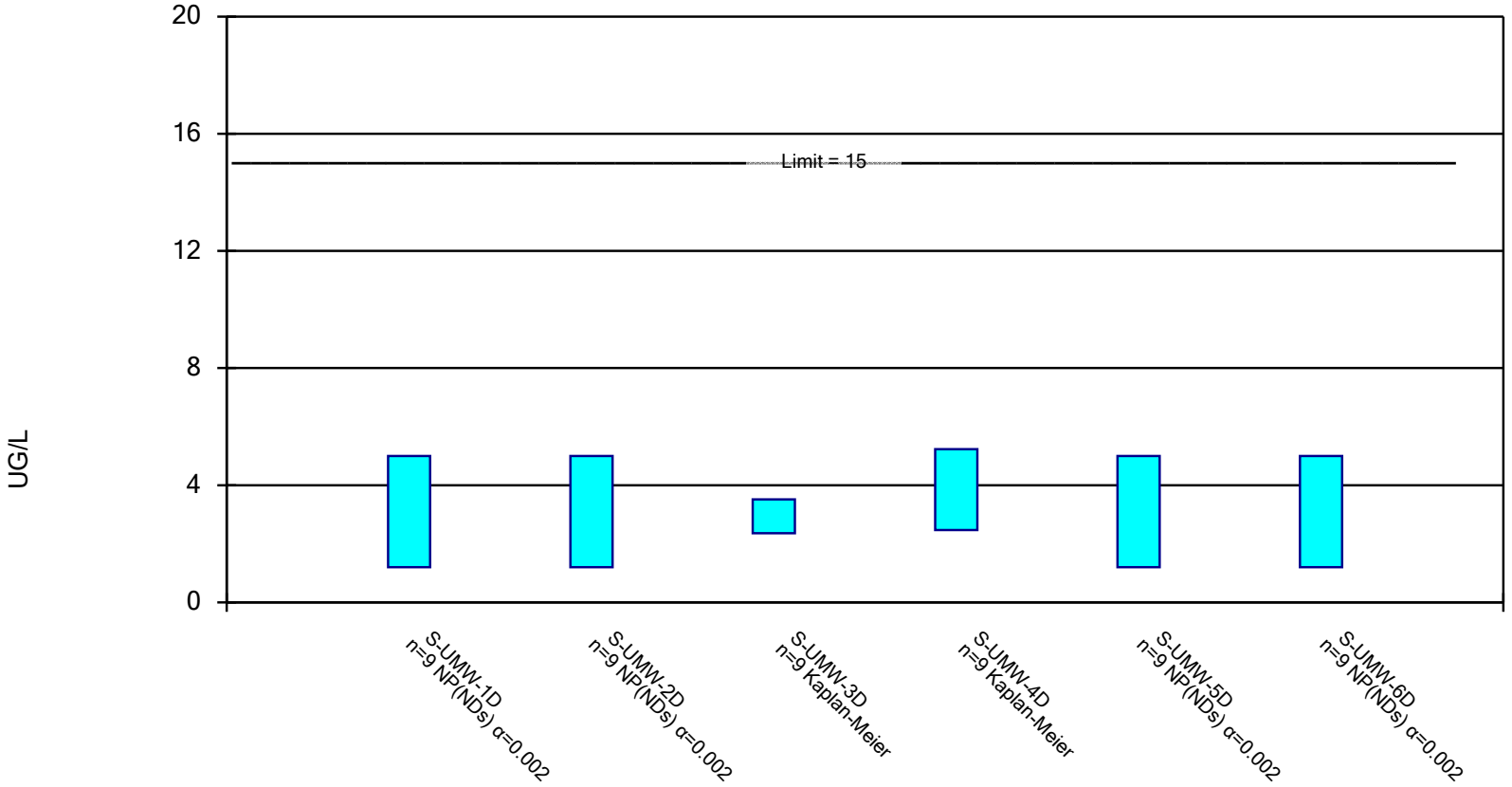


Constituent: FLUORIDE, TOTAL Analysis Run 10/5/2018 3:04 PM

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.

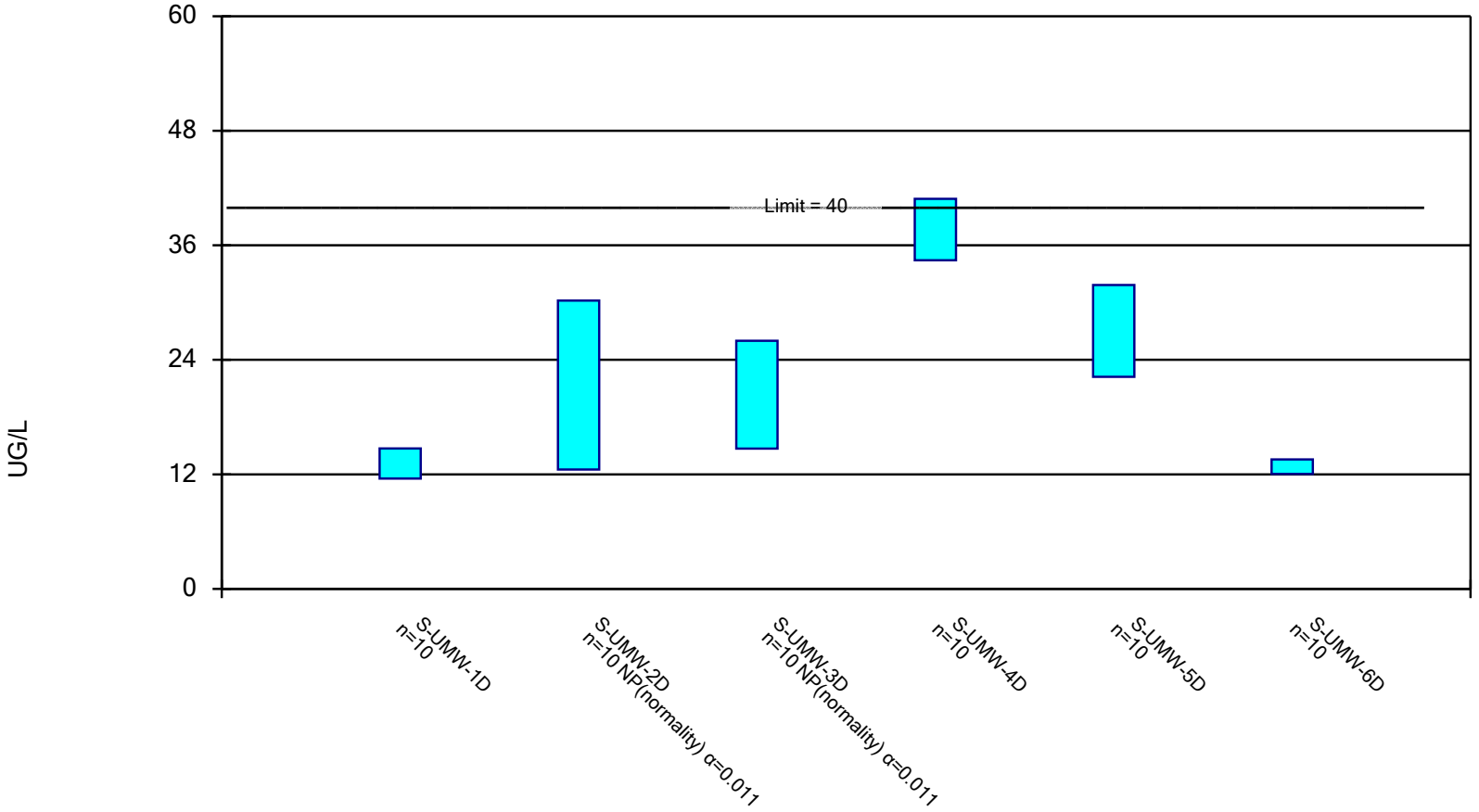


Constituent: LEAD, TOTAL Analysis Run 10/5/2018 3:04 PM

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.

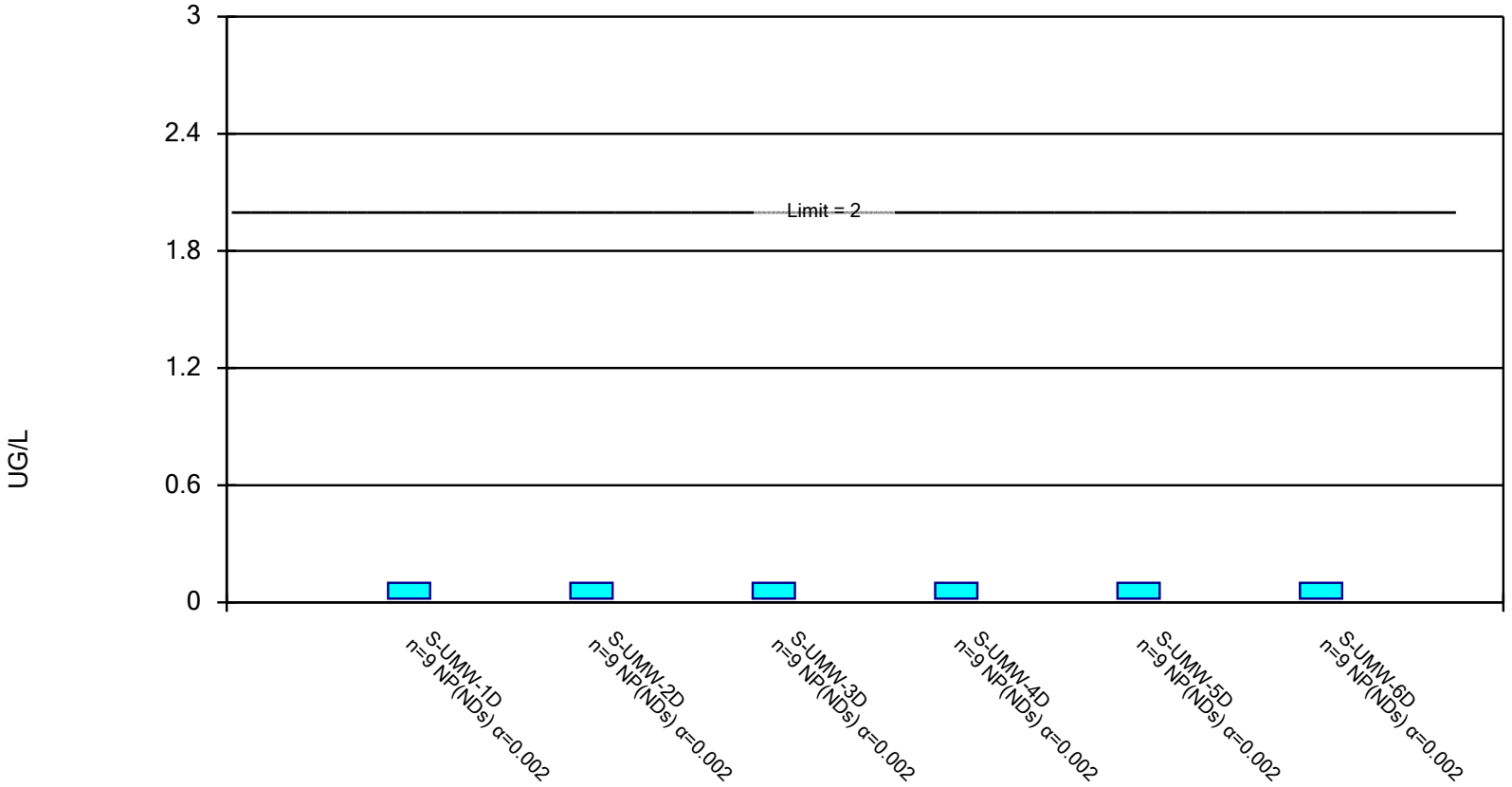


Constituent: LITHIUM, TOTAL Analysis Run 10/5/2018 3:04 PM

Sioux E.C. Client: Ameren Data: SEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: MERCURY, TOTAL Analysis Run 10/5/2018 3:05 PM

Sioux E.C. Client: Ameren Data: SEC Data

Parametric and Non-Parametric (NP) Confidence Interval

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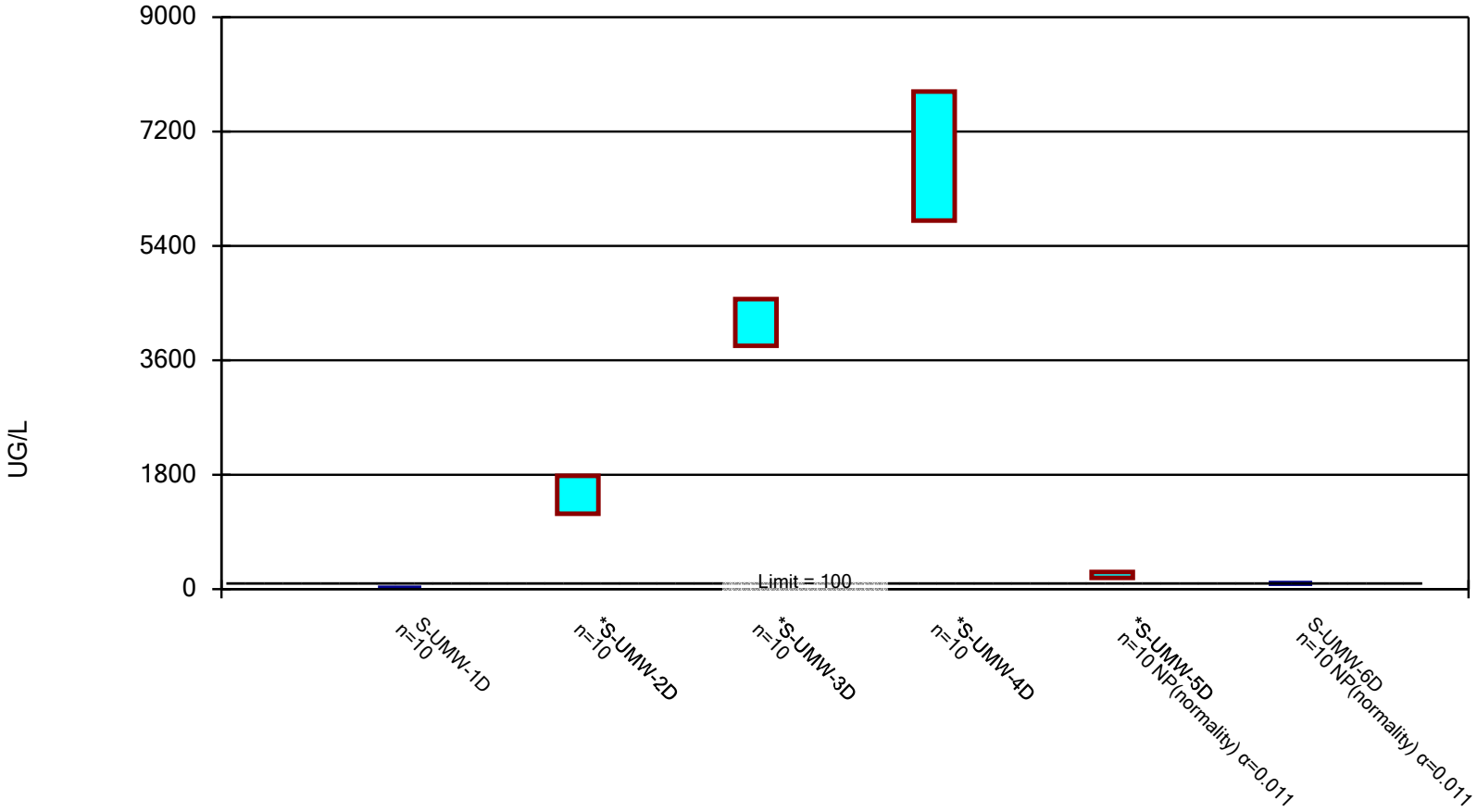
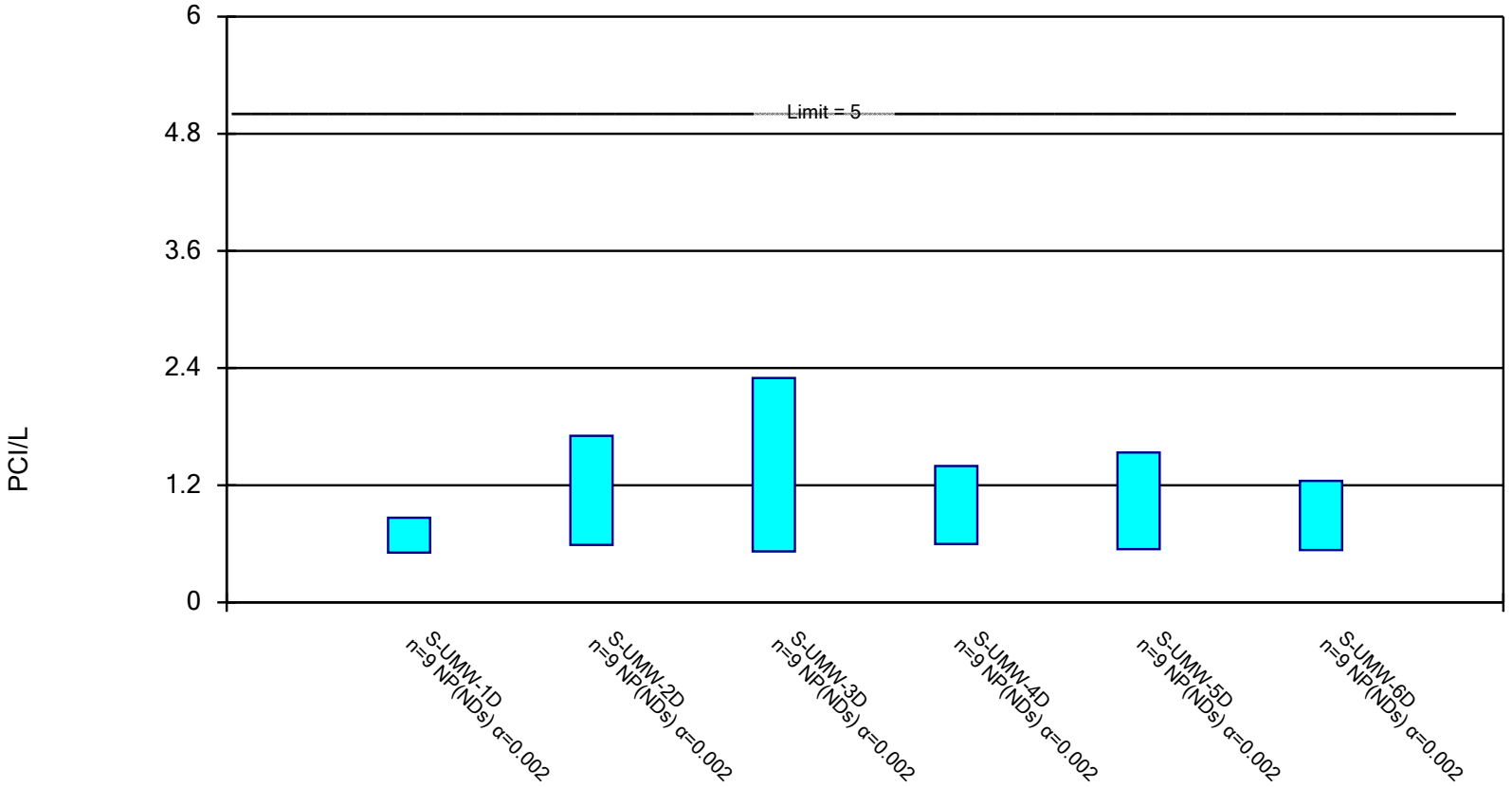


Constituent: MOLYBDENUM, TOTAL Analysis Run 10/5/2018 3:05 PM

Sioux E.C. Client: Ameren Data: SEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

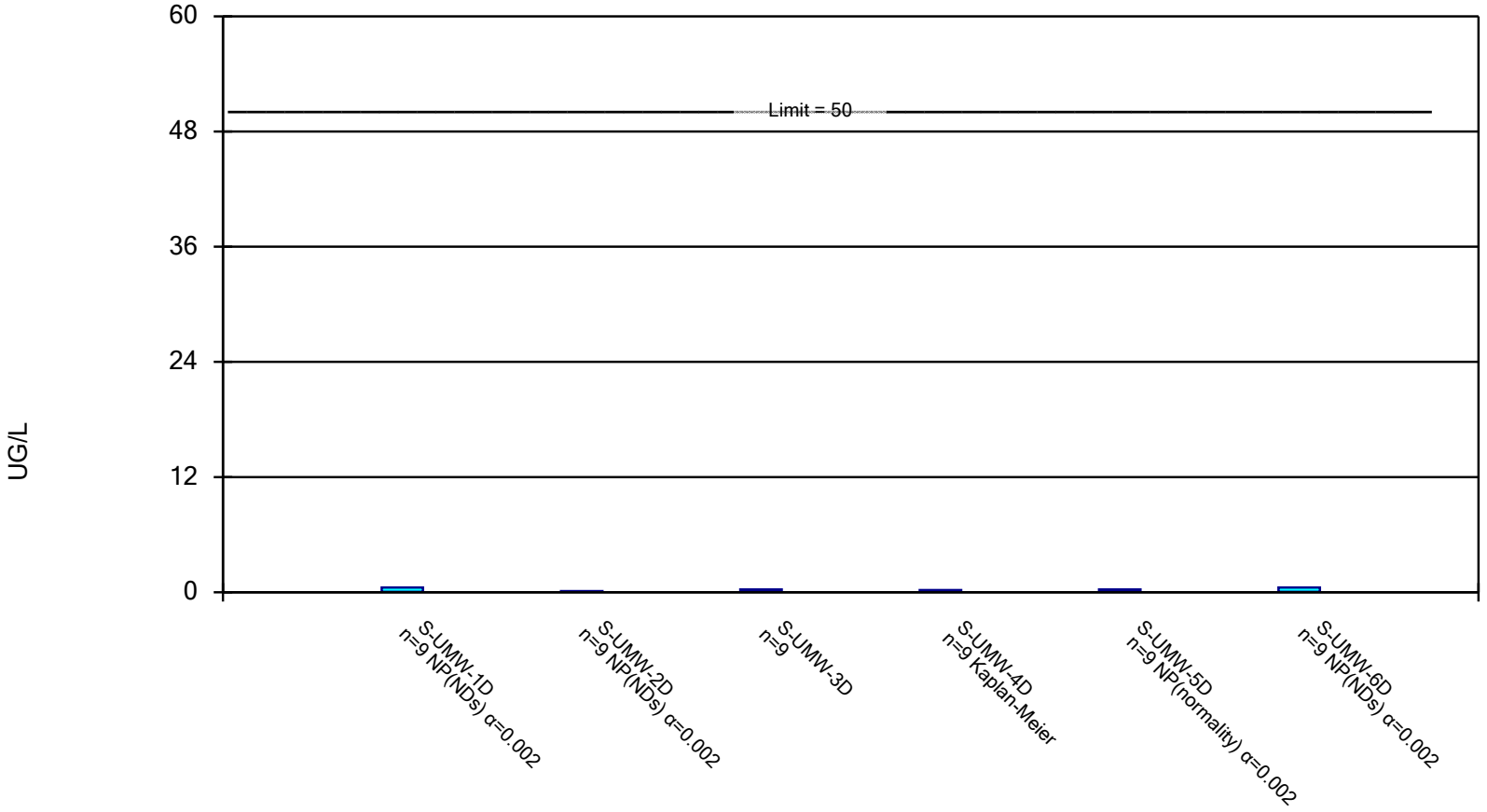


Constituent: RADIUM [226 + 228] Analysis Run 10/5/2018 3:05 PM

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.

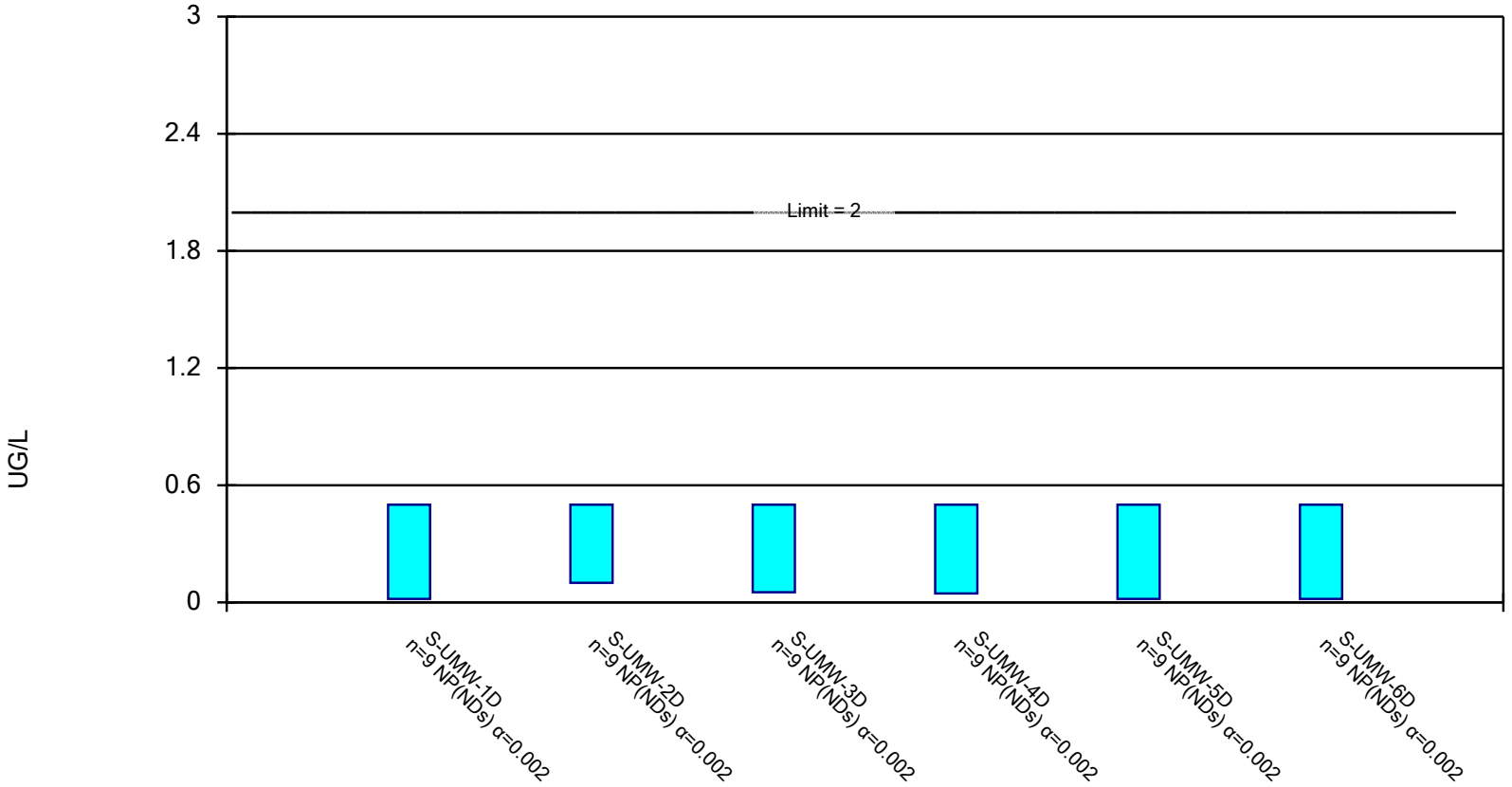


Constituent: SELENIUM, TOTAL Analysis Run 10/5/2018 3:05 PM

Sioux E.C. Client: Ameren Data: SEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: THALLIUM, TOTAL Analysis Run 10/5/2018 3:05 PM

Sioux E.C. Client: Ameren Data: SEC Data

Confidence Interval

Sioux E.C. Client: Ameren Data: SEC Data Printed 10/5/2018, 3:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
ANTIMONY, TOTAL (UG/L)	S-UMW-1D	0.09589	0.02796	6	No	9	33.33	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	S-UMW-2D	0.077	0.029	6	No	9	44.44	No	0.002	NP (normality)
ANTIMONY, TOTAL (UG/L)	S-UMW-3D	0.5	0.013	6	No	9	66.67	No	0.002	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-4D	0.5	0.013	6	No	9	88.89	No	0.002	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-5D	0.5	0.013	6	No	9	100	No	0.002	NP (NDs)
ANTIMONY, TOTAL (UG/L)	S-UMW-6D	0.5	0.013	6	No	9	100	No	0.002	NP (NDs)
ARSENIC, TOTAL (UG/L)	S-UMW-1D	1.207	0.9169	10	No	10	0	ln(x)	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-2D	2.047	1.167	10	No	10	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-3D	1.016	0.1008	10	No	10	10	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-4D	0.5307	0.08011	10	No	10	30	ln(x)	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-5D	0.7443	0.2789	10	No	10	10	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	S-UMW-6D	0.4541	0.1251	10	No	10	10	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-1D	168.9	118.9	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-2D	122.3	74.69	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-3D	86.21	70.83	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-4D	86.91	67.25	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-5D	327.3	260.1	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	S-UMW-6D	133.7	113.5	2000	No	10	0	ln(x)	0.01	Param.
BERYLLIUM, TOTAL (UG/L)	S-UMW-1D	0.5	0.08	4	No	9	100	No	0.002	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-2D	0.5	0.08	4	No	9	100	No	0.002	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-3D	0.4	0.08	4	No	9	88.89	No	0.002	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-4D	0.5	0.08	4	No	9	100	No	0.002	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-5D	0.5	0.08	4	No	9	100	No	0.002	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	S-UMW-6D	0.5	0.08	4	No	9	100	No	0.002	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-1D	0.38	0.009	5	No	9	88.89	No	0.002	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-2D	0.24	0.009	5	No	9	66.67	No	0.002	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-3D	0.4084	0.02088	5	No	9	44.44	ln(x)	0.01	Param.
CADMIUM, TOTAL (UG/L)	S-UMW-4D	0.53	0.0185	5	No	9	44.44	ln(x)	0.01	Param.
CADMIUM, TOTAL (UG/L)	S-UMW-5D	0.25	0.009	5	No	9	77.78	No	0.002	NP (NDs)
CADMIUM, TOTAL (UG/L)	S-UMW-6D	0.25	0.009	5	No	9	77.78	No	0.002	NP (NDs)
CHROMIUM, TOTAL (UG/L)	S-UMW-1D	0.7208	0.09275	100	No	9	33.33	ln(x)	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-2D	0.6392	0.0757	100	No	9	33.33	ln(x)	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-3D	0.5267	0.03832	100	No	9	44.44	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-4D	0.48	0.027	100	No	9	55.56	No	0.002	NP (NDs)
CHROMIUM, TOTAL (UG/L)	S-UMW-5D	0.5281	0.07994	100	No	9	44.44	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	S-UMW-6D	0.487	-0.007852	100	No	9	44.44	No	0.01	Param.
COBALT, TOTAL (UG/L)	S-UMW-1D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-2D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-3D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-4D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-5D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
COBALT, TOTAL (UG/L)	S-UMW-6D	2.5	0.36	6	No	9	100	No	0.002	NP (NDs)
FLUORIDE, TOTAL (MG/L)	S-UMW-1D	0.363	0.232	4	No	12	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-2D	1.081	0.6454	4	No	12	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-3D	1.043	0.919	4	No	12	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-4D	0.86	0.63	4	No	12	0	No	0.01	NP (normality)
FLUORIDE, TOTAL (MG/L)	S-UMW-5D	0.6454	0.5129	4	No	12	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	S-UMW-6D	0.4275	0.3175	4	No	12	0	No	0.01	Param.
LEAD, TOTAL (UG/L)	S-UMW-1D	5	1.2	15	No	9	88.89	No	0.002	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-2D	5	1.2	15	No	9	77.78	No	0.002	NP (NDs)

Confidence Interval

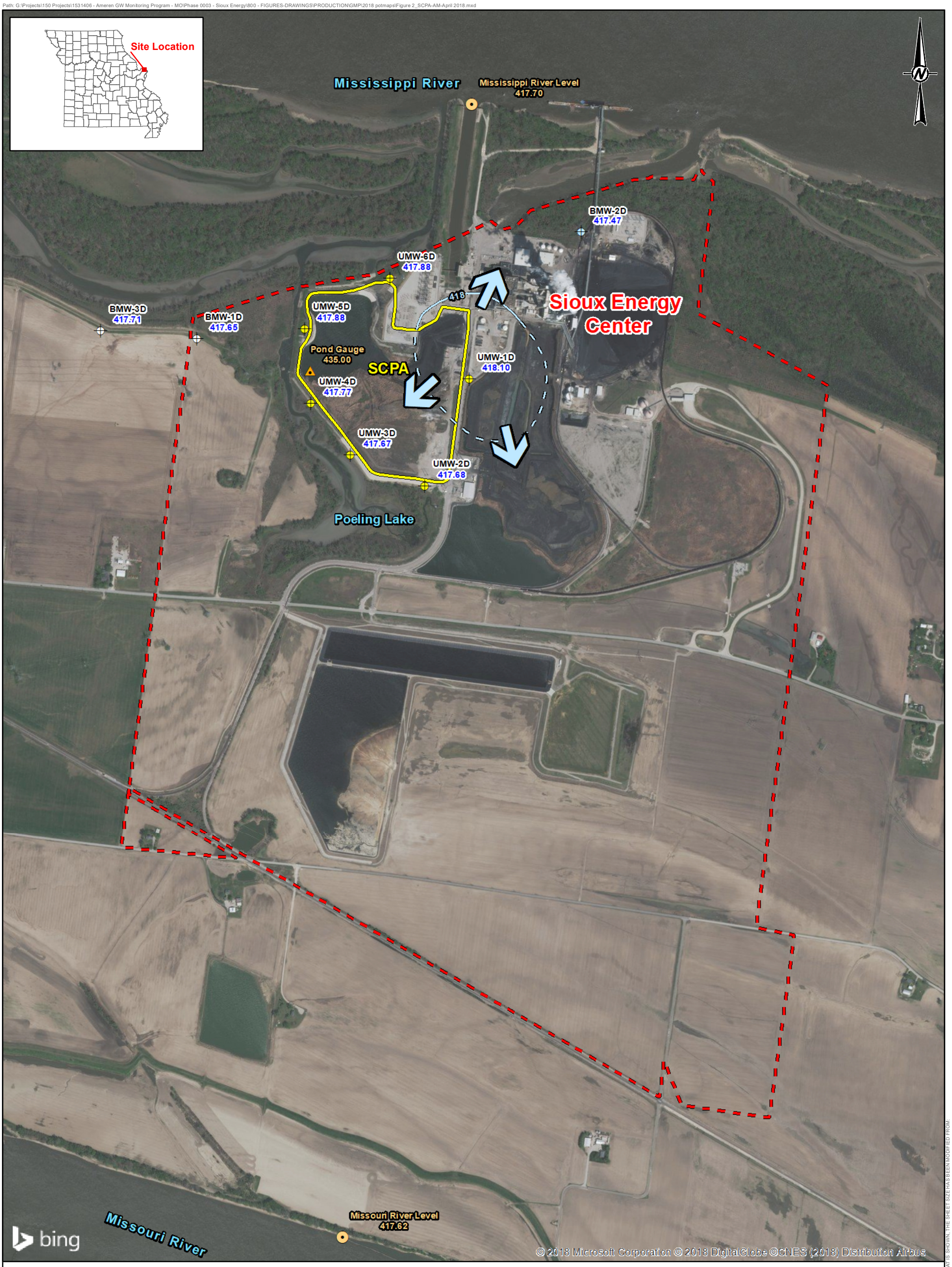
Sioux E.C. Client: Ameren Data: SEC Data Printed 10/5/2018, 3:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
LEAD, TOTAL (UG/L)	S-UMW-3D	3.517	2.358	15	No	9	44.44	No	0.01	Param.
LEAD, TOTAL (UG/L)	S-UMW-4D	5.231	2.469	15	No	9	44.44	No	0.01	Param.
LEAD, TOTAL (UG/L)	S-UMW-5D	5	1.2	15	No	9	66.67	No	0.002	NP (NDs)
LEAD, TOTAL (UG/L)	S-UMW-6D	5	1.2	15	No	9	88.89	No	0.002	NP (NDs)
LITHIUM, TOTAL (UG/L)	S-UMW-1D	14.71	11.55	40	No	10	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-2D	30.2	12.5	40	No	10	0	No	0.011	NP (normality)
LITHIUM, TOTAL (UG/L)	S-UMW-3D	26	14.7	40	No	10	0	No	0.011	NP (normality)
LITHIUM, TOTAL (UG/L)	S-UMW-4D	40.87	34.43	40	No	10	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-5D	31.84	22.22	40	No	10	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	S-UMW-6D	13.57	12.03	40	No	10	0	No	0.01	Param.
MERCURY, TOTAL (UG/L)	S-UMW-1D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-2D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-3D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-4D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-5D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MERCURY, TOTAL (UG/L)	S-UMW-6D	0.1	0.0195	2	No	9	100	No	0.002	NP (NDs)
MOLYBDENUM, TOTAL (UG/L)	S-UMW-1D	38.49	28.75	100	No	10	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-2D**	**1784**	**1186**	**100**	**Yes**	**10**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-3D**	**4563**	**3829**	**100**	**Yes**	**10**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-4D**	**7829**	**5799**	**100**	**Yes**	**10**	**0**	**No**	**0.01**	**Param.**
MOLYBDENUM, TOTAL (UG/L)	**S-UMW-5D**	**271**	**177**	**100**	**Yes**	**10**	**0**	**No**	**0.011**	**NP (normality)**
MOLYBDENUM, TOTAL (UG/L)	S-UMW-6D	114	67.8	100	No	10	0	No	0.011	NP (normality)
RADIUM [226 + 228] (PCI/L)	S-UMW-1D	0.8665	0.51	5	No	9	100	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-2D	1.706	0.589	5	No	9	88.89	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-3D	2.298	0.521	5	No	9	77.78	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-4D	1.396	0.5985	5	No	9	88.89	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-5D	1.535	0.545	5	No	9	66.67	No	0.002	NP (NDs)
RADIUM [226 + 228] (PCI/L)	S-UMW-6D	1.244	0.535	5	No	9	88.89	No	0.002	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-1D	0.5	0.043	50	No	9	100	No	0.002	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-2D	0.12	0.043	50	No	9	77.78	No	0.002	NP (NDs)
SELENIUM, TOTAL (UG/L)	S-UMW-3D	0.2841	0.1403	50	No	9	11.11	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	S-UMW-4D	0.2351	0.1337	50	No	9	22.22	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	S-UMW-5D	0.29	0.09	50	No	9	22.22	No	0.002	NP (normality)
SELENIUM, TOTAL (UG/L)	S-UMW-6D	0.5	0.043	50	No	9	100	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-1D	0.5	0.018	2	No	9	88.89	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-2D	0.5	0.1	2	No	9	77.78	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-3D	0.5	0.052	2	No	9	77.78	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-4D	0.5	0.046	2	No	9	77.78	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-5D	0.5	0.018	2	No	9	88.89	No	0.002	NP (NDs)
THALLIUM, TOTAL (UG/L)	S-UMW-6D	0.5	0.018	2	No	9	100	No	0.002	NP (NDs)

APPENDIX D

Potentiometric Surface Maps

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\GMP\2018 potmaps\Figure 2_SCPA-AM-April 2018.mxd



LEGEND

- Sioux Energy Center Property Boundary
- SCPA - Bottom Ash Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Groundwater Elevation Piezometer
- Background Monitoring Well
- SCPA Bottom Ash Surface Impoundment Monitoring Well
- SCPA Bottom Ash Surface Impoundment Gauge
- River Gauge Location
- Groundwater Flow Direction

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER MONITORING WELLS SURVEYED BY ZAHNER AND ASSOCIATES, INC. ON JANUARY 14 AND DECEMBER 8, 2016.
3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
4.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
5.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 450 900 1,800 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
SCPA POTENTIOMETRIC SURFACE MAP - APRIL 5, 2018

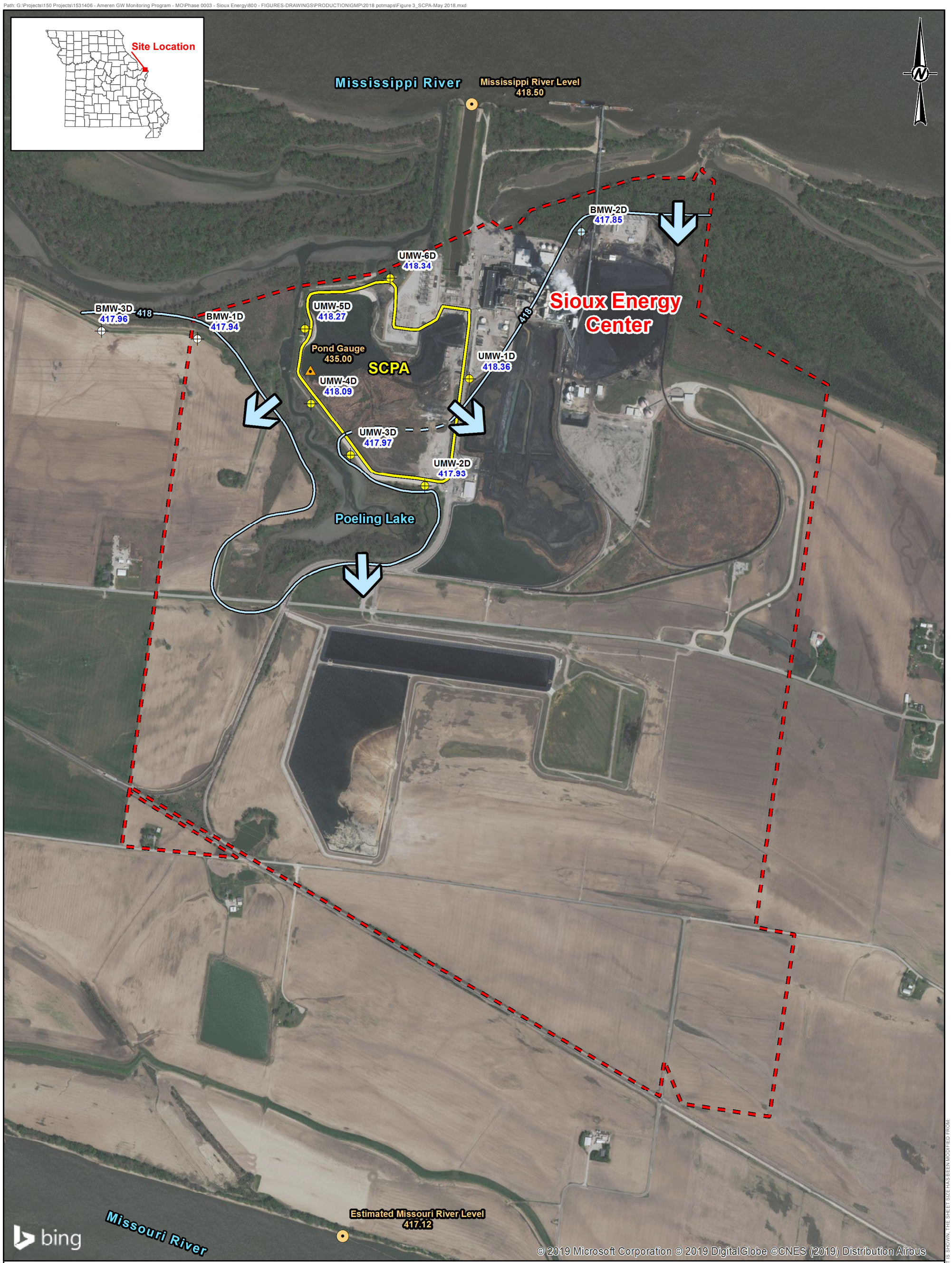
CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-21
PREPARED	EFT
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **C1**

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

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\GMP\2018 potmaps\Figure 3_SCPA-May 2018.mxd



LEGEND

- Sioux Energy Center Property Boundary
- SCPA - Bottom Ash Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Groundwater Elevation Piezometer
- Background Monitoring Well
- SCPA Bottom Ash Surface Impoundment Monitoring Well
- SCPA Bottom Ash Surface Impoundment Gauge
- River Gauge Location
- Groundwater Flow Direction

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
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3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
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6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
SCPA POTENTIOMETRIC SURFACE MAP - MAY 14, 2018

CONSULTANT
GOLDER

YYYY-MM-DD	2018-06-28
PREPARED	EFT
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE C2

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

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\GMP\2018 potmaps\Figure 4_SCPA-DM-Nov 2018.mxd

LEGEND

- Sioux Energy Center Property Boundary
- SCPA - Bottom Ash Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Groundwater Elevation Piezometer
- Background Monitoring Well
- SCPA Bottom Ash Surface Impoundment Monitoring Well
- SCPA Bottom Ash Surface Impoundment Gauge
- River Gauge Location
- Groundwater Flow Direction

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER MONITORING WELLS SURVEYED BY ZAHNER AND ASSOCIATES, INC. ON JANUARY 14 AND DECEMBER 8, 2016.
3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
4.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
5.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
SCPA POTENTIOMETRIC SURFACE MAP - NOVEMBER 12, 2018

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-20
PREPARED	EFT
DESIGN	JSI
REVIEW	JAP
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE C3

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

golder.com