2018 Annual Groundwater Monitoring and Corrective Action Report

SCPB 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

Project No. 153-1406

January 31, 2019

Distribution:

1 Electronic Copy - Ameren Missouri
1 Electronic Copy - Golder Associates

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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 SCPB Coal Combustion Residuals (CCR) Surface Impoundment at the Sioux Energy Center (SEC) is subject to the requirements of the CCR Rule. This Annual Report for the SCPB 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 SCPB. The groundwater monitoring system consists of eleven (11) monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monitoring wells were installed or decommissioned in 2018 as a part of the CCR Rule monitoring program for the SCPB. For more information on the groundwater monitoring network, see the 2017 Annual Groundwater Monitoring Report for the SCPB.

3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCPB CCR Unit in 2018. **Table 1** below provides a summary of the samples collected in 2018 including the number of groundwater samples that were collected, the date of sample collection, and the monitoring program.

Table 1 – Summary of Groundwater Sampling Dates

Sampling Event	Groundwater Monitoring Wells											Monitoring Program
	BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S	
	Date of Sample Collection											
January 2018 Verification Sampling	-	-	1/8/2018	1/9/2018	1/8/2018	1/8/2018	1/9/2018	1/9/2018	1/9/2018	1/9/2018	1/8/2018	Detection
May 2018 Detection Monitoring	5/14/2018	5/14/2018	5/16/2018	5/15/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	Detection
July 2018 Verification Sampling	-	-	-	-	7/5/2018	-	-	-	-	-	-	Detection
November 2018 Detection Monitoring	11/12/2018	11/12/2018	11/14/2018	11/16/2018	11/14/2018	11/16/2018	11/16/2018	11/14/2018	11/14/2018	11/14/2018	11/16/2018	Detection
Total Number of Samples Collected	2	2	3	3	4	3	3	3	3	3	3	NA

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.) "-" No sample collected.
4.) NA - Not applicable.

3.1 Detection Monitoring Program

A Detection Monitoring event was completed November 13-15, 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 8-9, 2018 and verified SSIs. A table summarizing the results of the statistical analysis of the November 2017 Detection Monitoring event is provided in **Table 2** and laboratory analytical data are provided in **Appendix A**.

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

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 3** and laboratory analytical data are provided in **Appendix A**. As with the November 2017 sampling event, SSIs in the monitoring well network are not caused by the SCPB CCR unit and an ASD for this is provided in **Appendix C.**

A Detection Monitoring event was completed November 12-16, 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 will be included in the 2019 annual report. A table summarizing the results of the November 2018 Detection Monitoring event is provided in **Table 4** and laboratory analytical data are provided in **Appendix A**.

3.2 Groundwater Elevation, Flow Rate and Direction

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

Groundwater elevations were used to generate potentiometric surface maps on **Figure 2** and **Figure 3**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and influenced by seasonal changes in the water level in the adjacent Mississippi and Missouri Rivers, since the alluvial aquifer is hydraulically connected to these water bodies. Groundwater in the alluvial aquifer will generally flow from the higher of the two rivers toward the lower elevation river. The SCPA Surface Impoundment and Poeling Lake also locally affect water levels and flow directions. Water flows into and out of the alluvial aquifer as a result of fluctuating river water levels that produce “bank recharge” and “bank discharge” conditions. At this

facility, groundwater can flow north and south toward the Mississippi and Missouri Rivers, depending on river levels.

Groundwater flow direction and 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, the overall net groundwater flow at the SCPB was toward the southeast but ranged from northeast to south. Horizontal gradients calculated by the program range from 0.0001 to 0.0010 feet/foot with an estimated net annual groundwater velocity of approximately 11 feet per year.

4.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

The SCPB remains in detection monitoring. Section 5.0 provides a discussion of the activities planned for 2018.

4.1 Sampling Issues

No notable sampling issues were encountered at the SCPB during 2018.

5.0 ACTIVITIES PLANNED FOR 2019

Detection 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 Monitoring data will be completed in 2019 and included in the 2019 Annual Report.

Tables

Table 2
November 2017 Detection Monitoring Results
SCPB Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS								
			BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S
November 2017 Detection Monitoring Event													
DATE	NA	NA	11/13/2017	11/13/2017	11/14/2017	11/14/2017	11/13/2017	11/13/2017	11/14/2017	11/14/2017	11/14/2017	11/14/2017	11/15/2017
pH	SU	6.369-7.556	6.95	7.08	7.43	7.12	7.17	7.16	6.98	7.00	6.93	6.79	6.94
BORON, TOTAL	µg/L	107.5	118	104	1,390	11,600	303	267	8,220	18,000	2,630	6,880	1,470
CALCIUM, TOTAL	µg/L	170,705	156,000	128,000	98,500	200,000	153,000	154,000	236,000	269,000	256,000	178,000	193,000
CHLORIDE, TOTAL	mg/L	12.34	7.7	10.5	24.4	156	29.6	3.0	29.5	3.0	14.1	52.2	89.6
FLUORIDE, TOTAL	mg/L	0.38	0.30	0.34	0.41	0.40	0.28	0.19 J	0.51	0.21	0.28	0.89	0.41
SULFATE, TOTAL	mg/L	34.49	41.4	28.2	113	268	38.2	34.6	585	792	519	463	302
TOTAL DISSOLVED SOLIDS	mg/L	565	526	446	471	958	545	544	1,180	1,500	1,140	941	997
January 2018 Verification Sampling Event													
DATE	NA	NA			1/8/2018	1/9/2018	1/8/2018	1/8/2018	1/9/2018	1/9/2018	1/9/2018	1/9/2018	1/8/2018
pH	SU	6.369-7.556											
BORON, TOTAL	µg/L	107.5			608	7,970	305	387	7,310	21,400	2,430	8,800	1,560
CALCIUM, TOTAL	µg/L	170,705				246,000			236,000	322,000	258,000	175,000	199,000
CHLORIDE, TOTAL	mg/L	12.34			17.2	259	36.4		29.1		12.7	48.8	97.2
FLUORIDE, TOTAL	mg/L	0.38			0.44	0.37			0.62			0.94	0.43
SULFATE, TOTAL	mg/L	34.49			68.8	171	41.0	51.5	556	993	525	441	318
TOTAL DISSOLVED SOLIDS	mg/L	565				1,220			1,210	1,770	1,220	932	980

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

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

Table 3
May 2018 Detection Monitoring Results
SCPB Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS								
			BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S
May 2018 Detection Monitoring Event													
DATE	NA	NA	5/14/2018	5/14/2018	5/16/2018	5/15/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018	5/16/2018
pH	SU	6.369-7.556	7.84	7.17	7.27	6.86	6.60	6.91	6.76	6.89	6.85	6.85	6.89
BORON, TOTAL	µg/L	107.5	74.0 J	65.6 J	459	5,590	272	251	13,100	20,300	2,360	9,400	1,450
CALCIUM, TOTAL	µg/L	170,705	147,000	126,000	89,700 J	253,000	171,000	126,000	260,000	256,000	214,000	161,000	188,000 J
CHLORIDE, TOTAL	mg/L	12.34	6.3	10.0	22.1	278	38.0	3.7	28.0	2.7	18.2	45.6	111
FLUORIDE, TOTAL	mg/L	0.38	0.30	0.36	0.31	0.32	0.22	0.16 J	0.30	0.17 J	0.30	0.79	0.40
SULFATE, TOTAL	mg/L	34.49	23.6	28.5	119	135	49.9	31.0	938	850	401	374	277
TOTAL DISSOLVED SOLIDS	mg/L	565	1,170	565	441	7.5 J	671	539	1,600	1,510	1,060	949	1,230
July 2018 Verification Sampling Event													
DATE	NA	NA					7/5/2018						
pH	SU	6.369-7.556					6.62						
BORON, TOTAL	µg/L	107.5											
CALCIUM, TOTAL	µg/L	170,705					147,000						
CHLORIDE, TOTAL	mg/L	12.34											
FLUORIDE, TOTAL	mg/L	0.38											
SULFATE, TOTAL	mg/L	34.49											
TOTAL DISSOLVED SOLIDS	mg/L	565					655						

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit and that had not already been verified were tested during Verification Sampling.

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

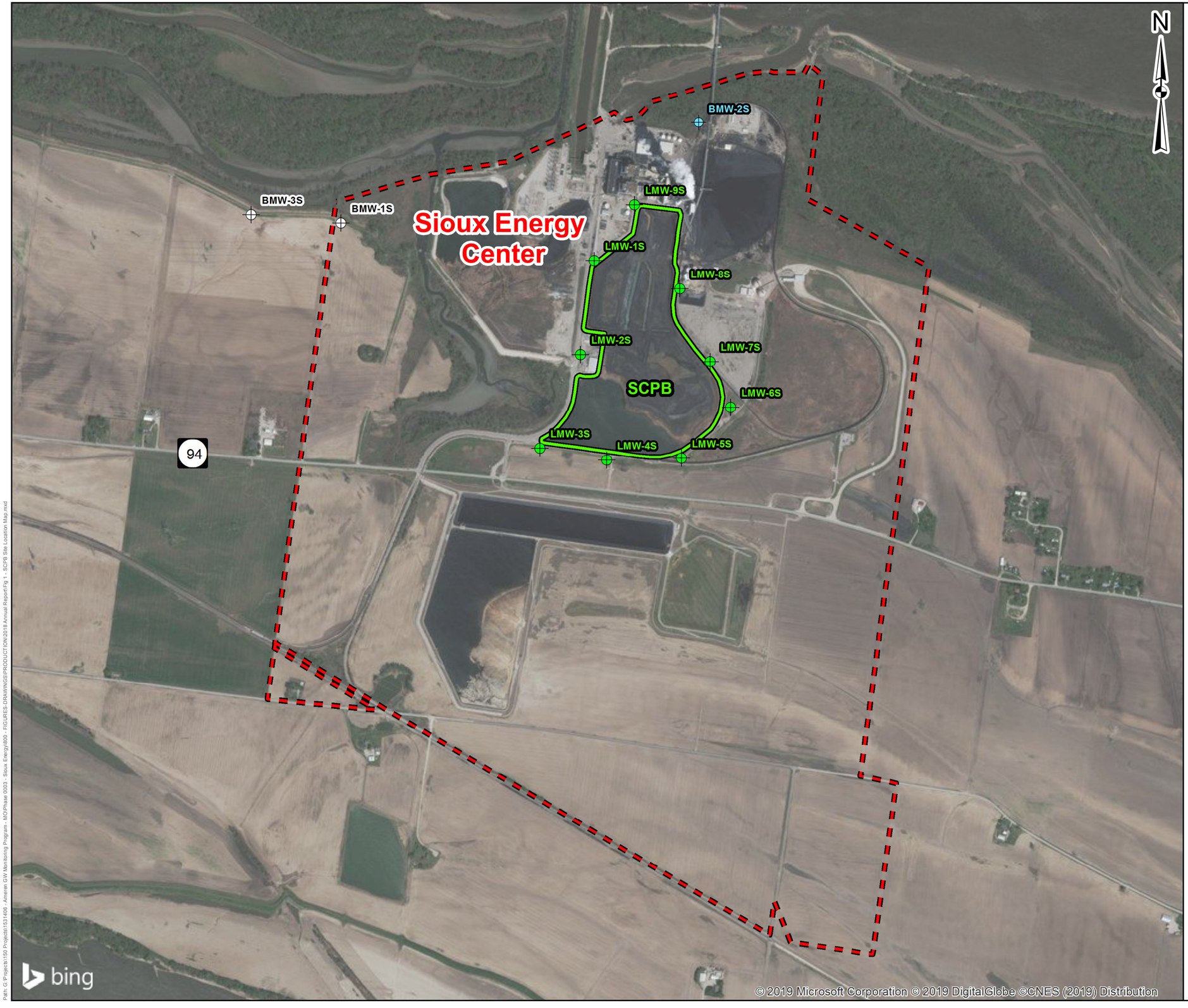
Table 4
November 2018 Detection Monitoring Results
SCPB Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS								
		BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S
November 2018 Detection Monitoring Event												
DATE	NA	11/12/2018	11/12/2018	11/14/2018	11/16/2018	11/16/2018	11/14/2018	11/16/2018	11/14/2018	11/14/2018	11/14/2018	11/16/2018
pH	SU	7.46	7.49	7.40	6.95	6.75	6.06	6.74	6.81	6.84	6.93	6.82
BORON, TOTAL	µg/L	72.9 J	61.5 J	539	8,530	298	1,020	13,400	10,400	2,740	8,500	1,760
CALCIUM, TOTAL	µg/L	157,000	124,000	79,400	197,000	188,000	179,000	280,000	199,000	221,000	177,000	194,000
CHLORIDE, TOTAL	mg/L	6.7	10.1	42.6	174	51.3	2.9	27.9	2.2	11.6	38.9	278
FLUORIDE, TOTAL	mg/L	0.34	0.36	0.37	0.32	0.26	0.35	0.34	0.32	0.34	0.87	0.56
SULFATE, TOTAL	mg/L	28.8	25.6	62.2	188	54.3	50.0	912	385	396	405	163
TOTAL DISSOLVED SOLIDS	mg/L	556	436	346 J	1,040	709	814	1,530	771	1,020	925	1,020

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.

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

Figures



LEGEND

- Sioux Energy Center Property Boundary
- SCPB - Fly Ash Surface Impoundment

Sample/Measurement Locations

- Background Monitoring Well
- SCPB Fly Ash Surface Impoundment Monitoring Well
- Groundwater Elevation Piezometer

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.
3.) AMEREN MISSOURI DRAWING SX-8420-X-182001.

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	2018-01-10
PREPARED	RJF
DESIGN	JSI
REVIEW	EMS
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
0

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

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\GMP\2018 potmaps\Figure 2_SCPB-SCPC-SCL4A-May_18.mxd

LEGEND

- Sioux Energy Center Property Boundary
- SCPB - Fly Ash Surface Impoundment

Ground/Surface Water Measurement Locations

- SCL4A - UWL Cell 4A Monitoring Well
- Groundwater Elevation Piezometer
- Background Monitoring Well
- SCPB - Fly Ash Surface Impoundment Monitoring Well
- SCPC - WFGD Surface Impoundment Monitoring Well
- SCPA Pond Gauge
- River Elevation

Utility Waste Landfill (UWL)

- SCL4A - UWL Cell 4A
- SCPC - WFGD Surface Impoundment
- Water Recycle Pond
- UWL Future Perimeter Fence

Groundwater Elevation Contours

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

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GOLDER GROUNDWATER MONITORING WELLS SURVEYED BY ZAHNER AND ASSOCIATES, INC. ON JANUARY 14, APRIL 29, AND DECEMBER 8, 2016.
3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4.) GROUNDWATER MEASUREMENTS OBTAINED BY GOLDER.
5.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY USGS (UNITED STATES GEOLOGICAL SURVEY) RIVER GAUGING LOCATIONS.
6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
7.) POND GAUGE LEVEL OBTAINED ONSITE BY GOLDER.
8.) UWL BOUNDARIES, DESIGNATIONS AND STATE MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
9.) WFGD - WET FLUE GAS DESULFURIZATION..

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).
4.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
SCPB POTENTIOMETRIC SURFACE MAP - MAY 14, 2018

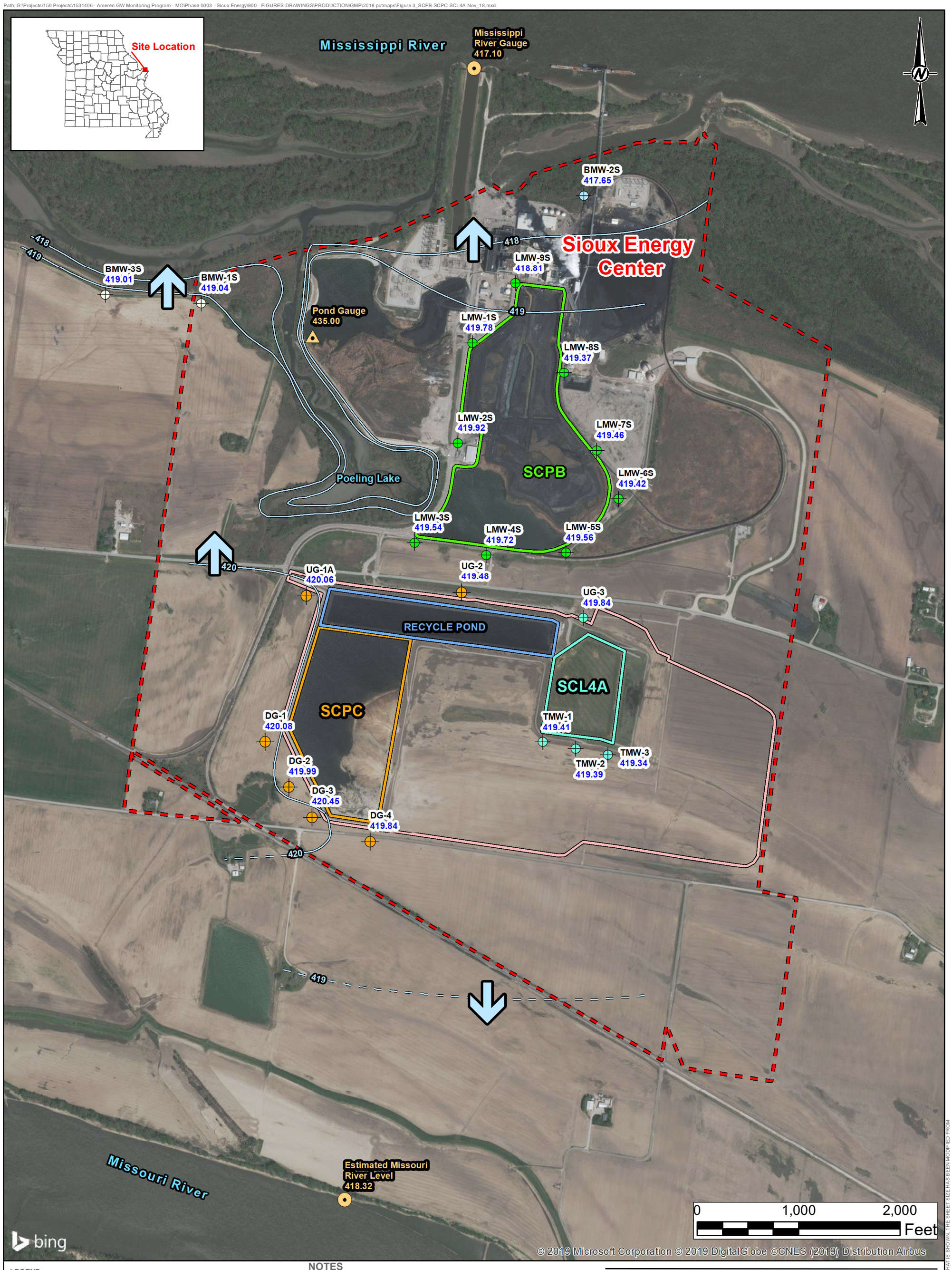
CONSULTANT
GOLDER

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

PROJECT No. 153-1406
PHASE 0003
FIGURE 2

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_SCPB-SCPC-SCL4A-Nov_18.mxd



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- Sioux Energy Center Property Boundary
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- Groundwater Elevation Piezometer
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6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
7.) POND GAUGE LEVEL OBTAINED ONSITE BY GOLDER.
8.) UWL BOUNDARIES, DESIGNATIONS AND STATE MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
9.) WFGD - WET FLUE GAS DESULFURIZATION.

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).
4.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
SCPB 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 3

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

Appendices

APPENDIX A

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-SCPB
Pace Project No.: 60261746

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-SCPB
Pace Project No.: 60261746

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-SCPB
Pace Project No.: 60261746

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60261746001	**S-LMW-1S**	Water	01/08/18 15:40	01/10/18 03:50
60261746002	**S-LMW-2S**	Water	01/09/18 12:45	01/10/18 03:50
60261746003	**S-LMW-3S**	Water	01/08/18 08:40	01/10/18 03:50
60261746004	**S-LMW-4S**	Water	01/08/18 09:35	01/10/18 03:50
60261746005	**S-LMW-5S**	Water	01/09/18 08:40	01/10/18 03:50
60261746006	**S-LMW-6S**	Water	01/09/18 09:25	01/10/18 03:50
60261746007	**S-LMW-7S**	Water	01/09/18 10:15	01/10/18 03:50
60261746008	**S-LMW-8S**	Water	01/09/18 11:10	01/10/18 03:50
60261746009	**S-LMW-9S**	Water	01/08/18 16:20	01/10/18 03:50
60261746010	**S-LMW-DUP-1**	Water	01/08/18 08:00	01/10/18 03:50
60261746011	**S-LMW-FB-1**	Water	01/09/18 12:30	01/10/18 03:50

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60261746001	**S-LMW-1S**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746002	**S-LMW-2S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746003	**S-LMW-3S**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB	2	PASI-K
60261746004	**S-LMW-4S**	EPA 200.7	SMW	1	PASI-K
		EPA 300.0	LDB	1	PASI-K
60261746005	**S-LMW-5S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746006	**S-LMW-6S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	1	PASI-K
60261746007	**S-LMW-7S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	2	PASI-K
60261746008	**S-LMW-8S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746009	**S-LMW-9S**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746010	**S-LMW-DUP-1**	EPA 200.7	SMW	2	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	LDB	3	PASI-K
60261746011	**S-LMW-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

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-1S **Lab ID: 60261746001** Collected: 01/08/18 15:40 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	**608**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:38	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17.2**	mg/L	1.0	0.50	1		01/11/18 18:38	16887-00-6	
Fluoride	**0.44**	mg/L	0.20	0.10	1		01/11/18 18:38	16984-48-8	
Sulfate	**68.8**	mg/L	5.0	2.5	5		01/11/18 18:52	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-2S **Lab ID: 60261746002** Collected: 01/09/18 12:45 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	**7970**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:41	7440-42-8	
Calcium	**246000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:41	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1220**	mg/L	5.0	5.0	1		01/11/18 09:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**259**	mg/L	20.0	10.0	20		01/11/18 19:34	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.10	1		01/11/18 19:06	16984-48-8	
Sulfate	**171**	mg/L	20.0	10.0	20		01/11/18 19:34	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-3S **Lab ID: 60261746003** Collected: 01/08/18 08:40 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	**305**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:43	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**36.4**	mg/L	5.0	2.5	5		01/11/18 19:48	16887-00-6	
Sulfate	**41.0**	mg/L	5.0	2.5	5		01/11/18 19:48	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-4S **Lab ID: 60261746004** Collected: 01/08/18 09:35 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	**387**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:45	7440-42-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**51.5**	mg/L	5.0	2.5	5		01/11/18 20:15	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-5S **Lab ID: 60261746005** Collected: 01/09/18 08:40 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	**7310**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:47	7440-42-8	
Calcium	**236000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:47	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1210**	mg/L	5.0	5.0	1		01/11/18 09:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.1**	mg/L	5.0	2.5	5		01/12/18 02:45	16887-00-6	
Fluoride	**0.62**	mg/L	0.20	0.10	1		01/11/18 20:43	16984-48-8	
Sulfate	**556**	mg/L	50.0	25.0	50		01/12/18 09:56	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-6S **Lab ID: 60261746006** Collected: 01/09/18 09:25 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	**21400**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:54	7440-42-8	
Calcium	**322000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:54	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1770**	mg/L	5.0	5.0	1		01/11/18 09:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**993**	mg/L	100	50.0	100		01/12/18 09:00	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-7S **Lab ID: 60261746007** Collected: 01/09/18 10:15 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	**2430**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:57	7440-42-8	
Calcium	**258000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:57	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1220**	mg/L	5.0	5.0	1		01/11/18 09:07		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**12.7**	mg/L	1.0	0.50	1		01/12/18 03:54	16887-00-6	
Sulfate	**525**	mg/L	50.0	25.0	50		01/12/18 10:38	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-8S **Lab ID: 60261746008** Collected: 01/09/18 11:10 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	**8800**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 13:59	7440-42-8	
Calcium	**175000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 13:59	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**932**	mg/L	5.0	5.0	1		01/11/18 09:08		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**48.8**	mg/L	5.0	2.5	5		01/12/18 04:50	16887-00-6	
Fluoride	**0.94**	mg/L	0.20	0.10	1		01/12/18 04:36	16984-48-8	
Sulfate	**441**	mg/L	50.0	25.0	50		01/12/18 10:51	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-9S **Lab ID: 60261746009** Collected: 01/08/18 16:20 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	**1560**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 14:06	7440-42-8	
Calcium	**199000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 14:06	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**980**	mg/L	5.0	5.0	1		01/11/18 09:09		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**97.2**	mg/L	5.0	2.5	5		01/12/18 06:41	16887-00-6	
Fluoride	**0.43**	mg/L	0.20	0.10	1		01/12/18 06:27	16984-48-8	
Sulfate	**318**	mg/L	20.0	10.0	20		01/12/18 06:55	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-DUP-1 **Lab ID: 60261746010** 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	**1520**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 14:11	7440-42-8	
Calcium	**198000**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 14:11	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**979**	mg/L	5.0	5.0	1		01/11/18 09:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**97.2**	mg/L	5.0	2.5	5		01/12/18 07:23	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.10	1		01/12/18 07:09	16984-48-8	
Sulfate	**314**	mg/L	20.0	10.0	20		01/12/18 07:37	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Sample: S-LMW-FB-1 **Lab ID: 60261746011** Collected: 01/09/18 12:30 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	**17.5J**	ug/L	100	3.5	1	01/10/18 15:30	01/11/18 14:13	7440-42-8	
Calcium	**43.0J**	ug/L	100	36.0	1	01/10/18 15:30	01/11/18 14:13	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5.5**	mg/L	5.0	5.0	1		01/11/18 09:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	1.0	0.50	1		01/12/18 08:46	16887-00-6	
Fluoride	**<0.10**	mg/L	0.20	0.10	1		01/12/18 08:46	16984-48-8	
Sulfate	**<0.50**	mg/L	1.0	0.50	1		01/12/18 08:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

QC Batch: 510171 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60261746001, 60261746002, 60261746003, 60261746004, 60261746005, 60261746006, 60261746007, 60261746008, 60261746009, 60261746010, 60261746011

METHOD BLANK: 2089193 Matrix: Water
Associated Lab Samples: 60261746001, 60261746002, 60261746003, 60261746004, 60261746005, 60261746006, 60261746007, 60261746008, 60261746009, 60261746010, 60261746011

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	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

QC Batch: 510170 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60261746002, 60261746005, 60261746006

METHOD BLANK: 2089188 Matrix: Water
Associated Lab Samples: 60261746002, 60261746005, 60261746006

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

QC Batch: 510179 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60261746007, 60261746008, 60261746009, 60261746010, 60261746011

METHOD BLANK: 2089215 Matrix: Water
Associated Lab Samples: 60261746007, 60261746008, 60261746009, 60261746010, 60261746011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/11/18 09:05	

LABORATORY CONTROL SAMPLE: 2089216

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1120	112	80-120	

SAMPLE DUPLICATE: 2089217

Parameter	Units	60261746008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	932	940	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

QC Batch: 510259 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60261746001, 60261746002, 60261746003, 60261746004, 60261746005, 60261746007, 60261746008, 60261746009, 60261746010

METHOD BLANK: 2089535 Matrix: Water
Associated Lab Samples: 60261746001, 60261746002, 60261746003, 60261746004, 60261746005, 60261746007, 60261746008, 60261746009, 60261746010

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

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

QC Batch: 510260 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60261746006, 60261746011

METHOD BLANK: 2089541 Matrix: Water
Associated Lab Samples: 60261746006, 60261746011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	01/12/18 08:19	
Fluoride	mg/L	<0.10	0.20	0.10	01/12/18 08:19	
Sulfate	mg/L	<0.50	1.0	0.50	01/12/18 08:19	

LABORATORY CONTROL SAMPLE: 2089542

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	103	90-110	
Fluoride	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	5	5.3	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089879 2089880

Parameter	Units	60261746006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	66.0J	500	500	546	548	96	96	80-120	0	15	
Fluoride	mg/L	<10.0	250	250	273	274	109	110	80-120	1	15	
Sulfate	mg/L	993	500	500	1590	1560	119	114	80-120	2	15	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR-SCPB
Pace Project No.: 60261746

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60261746001	**S-LMW-1S**	EPA 200.7	510171	EPA 200.7	510212
60261746002	**S-LMW-2S**	EPA 200.7	510171	EPA 200.7	510212
60261746003	**S-LMW-3S**	EPA 200.7	510171	EPA 200.7	510212
60261746004	**S-LMW-4S**	EPA 200.7	510171	EPA 200.7	510212
60261746005	**S-LMW-5S**	EPA 200.7	510171	EPA 200.7	510212
60261746006	**S-LMW-6S**	EPA 200.7	510171	EPA 200.7	510212
60261746007	**S-LMW-7S**	EPA 200.7	510171	EPA 200.7	510212
60261746008	**S-LMW-8S**	EPA 200.7	510171	EPA 200.7	510212
60261746009	**S-LMW-9S**	EPA 200.7	510171	EPA 200.7	510212
60261746010	**S-LMW-DUP-1**	EPA 200.7	510171	EPA 200.7	510212
60261746011	**S-LMW-FB-1**	EPA 200.7	510171	EPA 200.7	510212
60261746002	**S-LMW-2S**	SM 2540C	510170		
60261746005	**S-LMW-5S**	SM 2540C	510170		
60261746006	**S-LMW-6S**	SM 2540C	510170		
60261746007	**S-LMW-7S**	SM 2540C	510179		
60261746008	**S-LMW-8S**	SM 2540C	510179		
60261746009	**S-LMW-9S**	SM 2540C	510179		
60261746010	**S-LMW-DUP-1**	SM 2540C	510179		
60261746011	**S-LMW-FB-1**	SM 2540C	510179		
60261746001	**S-LMW-1S**	EPA 300.0	510259		
60261746002	**S-LMW-2S**	EPA 300.0	510259		
60261746003	**S-LMW-3S**	EPA 300.0	510259		
60261746004	**S-LMW-4S**	EPA 300.0	510259		
60261746005	**S-LMW-5S**	EPA 300.0	510259		
60261746006	**S-LMW-6S**	EPA 300.0	510260		
60261746007	**S-LMW-7S**	EPA 300.0	510259		
60261746008	**S-LMW-8S**	EPA 300.0	510259		
60261746009	**S-LMW-9S**	EPA 300.0	510259		
60261746010	**S-LMW-DUP-1**	EPA 300.0	510259		
60261746011	**S-LMW-FB-1**	EPA 300.0	510260		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60261746

60261745

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

Cooler Temperature (°C): As-read 1.9/3.20 **Corr. Factor** (CF 0.0 CF +0.2) **Corrected** 1.9/3.2-0

Date and initials of person examining contents: 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: _____

Project Manager Review: Jann Check 1/10/18 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 2

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 Jan. 12, 2018

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- SCPB
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 [X] GROUND WATER [ ] DRINKING WATER
UST [ ] RCRA [ ] OTHER

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Boron	Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60261746
1	S-LMW-1S	WT	G			1-8-18	1540		2	1		1							N		1	1	1	1			BP3N20 BPLU 001
2	S-LMW-2S	WT	G			1-9-18	1245			1		1							N	1	1	1	1	1			002
3	S-LMW-3S	WT	G			1-8-18	0840			1		1							N			1		1			003
4	S-LMW-4S	WT	G			1-8-18	0935			1		1							N					1			004
5	S-LMW-5S	WT	G			1-9-18	0840			1		1							N		1	1	1	1	1		005
6	S-LMW-6S	WT	G			1-9-18	0925			1		1							N		1			1	1		006
7	S-LMW-7S	WT	G			1-9-18	1015			1		1							N		1	1		1	1		007
8	S-LMW-8S	WT	G			1-9-18	1110			1		1							N		1	1	1	1	1		3BP3N20 3BPLU 008
9	S-LMW-9S	WT	G			1-8-18	1620			1		1							N		1	1	1	1	1		BP3N20 BPLU 009
10	S-LMW-8S-MS	WT	G			1-9-18	1110			1		1							N		1	1	1	1	1		
11	S-LMW-8S-MSD	WT	G			1-9-18	1110			1		1							N		1	1	1	1	1		
12	S-LMW-Dup-1	WT	G			1-8-18				1		1							N		1	1	1	1	1		011

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Confirm Analysis w/ Jeff Ingram	Golder	1-9-18	1400	PACE	1/9/18	1400	
	PACE	1/9/18	1700		1/10/18	0830	1.9 1-3 2-0

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 01/09/18

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.

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 2 of 2

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: Jan 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 - SCPB
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

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.
1	S-LMW-FB-1	WT	G			1-9-18	1230		2	1		1							1	1	2	2	1	1		60261746 BPW20 BPW 011
2		WT	G																							
3		WT	G																							
4		WT	G																							
5		WT	G																							
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
See Jeff Ingram for requested/confirmed analysis	Golder	1-9-18	1400	PACE	1/9/18	1400	
	PACE	1/9/18	1700		1/10/18	0350	1-9 / 1-3 / 2-0

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 01/09/18

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1-9	†	†	X
1-3			
2-0	†	†	†

*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 – SCPB – AMEREN GROUNDWATER – DATA PACKAGE 60261746

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

- Boron and calcium were outside the recovery criteria range for MS. Data was not qualified on MS/MSD data alone.
- 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 - SCPB - VS 2018 Jan
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003
Validation Date: 1/15/18

Laboratory: Pace Analytical
SDG #: 60261746
Analytical Method (type and no.): Metals 200.7; TDS 2540C; Anions 300.0
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-LMW-1S, S-LMW-2S, S-LMW-3S, S-LMW-4S, S-LMW-5S, S-LMW-6S, S-LMW-7S, S-LMW-8S, S-LMW-9S, S-LMW-DUP-1, S-LMW-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(17.5), Ca(43.0), TDS(5.5)
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ S-LMW-9S
	☒	☐	☐	FB-1@ S-LMW-2S
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?	☑	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-LMW-1S	Sulfate	68.8	D	Result had a dilution factor of 5
S-LMW-2S	Chloride	259	D	20
⊥	Sulfate	171	D	20
S-LMW-3S	Chloride	36.4	D	5
⊥	Sulfate	41.0	D	5
S-LMW-4S	Sulfate	51.5	D	5
S-LMW-5S	Chloride	29.1	D	5
⊥	Sulfate	556	D	50
S-LMW-6S	Sulfate	993	D	100
S-LMW-7S	Sulfate	525	D	50
S-LMW-8S	Sulfate	441	D	50
S-LMW-9S	Chloride	97.2	D	5
⊥	Sulfate	318	D	20
S-LMW-DUP-1	Chloride	97.2	D	5
⊥	Sulfate	314	D	20
S-LMW-FB-1	Boron (B)	17.5	J	Result detected between MDL + PQL
⊥	Calcium (Ca)	43.0	J	⊥
			Ca	

Signature: Tommy J Goodrich Date: 1/15/2018

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

June 12, 2018

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

RE: Project: AMEREN SEC SCPB
Pace Project No.: 60270635

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, 6/12/18: 200.7 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 SCPB
Pace Project No.: 60270635

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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SAMPLE SUMMARY

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60270635001	**S-LMW-1S**	Water	05/16/18 11:00	05/17/18 04:25
60270635002	**S-LMW-3S**	Water	05/16/18 07:55	05/17/18 04:25
60270635003	**S-LMW-4S**	Water	05/16/18 08:45	05/17/18 04:25
60270635004	**S-LMW-5S**	Water	05/16/18 09:10	05/17/18 04:25
60270635005	**S-LMW-6S**	Water	05/16/18 10:10	05/17/18 04:25
60270635006	**S-LMW-7S**	Water	05/16/18 10:55	05/17/18 04:25
60270635007	**S-LMW-8S**	Water	05/16/18 11:50	05/17/18 04:25
60270635008	**S-LMW-9S**	Water	05/16/18 11:55	05/17/18 04:25
60270635009	**S-LMW-DUP-1**	Water	05/16/18 08:00	05/17/18 04:25
60270635010	**S-LMW-DUP-2**	Water	05/16/18 08:00	05/17/18 04:25
60270635011	**S-LMW-FB-2**	Water	05/16/18 11:55	05/17/18 04:25
60270510001	**S-LMW-2S**	Water	05/15/18 11:50	05/16/18 03:20
60270510002	**S-BMW-1S**	Water	05/14/18 12:15	05/16/18 03:20
60270510003	**S-BMW-3S**	Water	05/14/18 10:25	05/16/18 03:20
60270510004	**S-LMW-FB-1**	Water	05/14/18 11:45	05/16/18 03:20

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60270635001	**S-LMW-1S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635002	**S-LMW-3S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635003	**S-LMW-4S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635004	**S-LMW-5S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635005	**S-LMW-6S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635006	**S-LMW-7S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635007	**S-LMW-8S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635008	**S-LMW-9S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635009	**S-LMW-DUP-1**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635010	**S-LMW-DUP-2**	EPA 200.7	TDS	7	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270635011	**S-LMW-FB-2**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270510001	**S-LMW-2S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270510002	**S-BMW-1S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270510003	**S-BMW-3S**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60270510004	**S-LMW-FB-1**	EPA 200.7	TDS	7	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-1S **Lab ID: 60270635001** Collected: 05/16/18 11:00 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								
Boron	**459**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:09	7440-42-8	
Calcium	**89700**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:09	7440-70-2	M1
Iron	**11.8J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:09	7439-89-6	
Magnesium	**25100**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:09	7439-95-4	M1
Manganese	**162**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:09	7439-96-5	
Potassium	**7730**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:09	7440-09-7	
Sodium	**15800**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:09	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**195**	mg/L	20.0	4.9	1		05/23/18 12:34		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**441**	mg/L	5.0	5.0	1		05/22/18 17:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.1**	mg/L	2.0	0.92	2		05/20/18 12:43	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.063	1		05/19/18 16:47	16984-48-8	
Sulfate	**119**	mg/L	10.0	2.4	10		05/20/18 13:13	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-3S **Lab ID: 60270635002** Collected: 05/16/18 07:55 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								
Boron	**272**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:16	7440-42-8	
Calcium	**171000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:16	7440-70-2	
Iron	**20.3J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:16	7439-89-6	
Magnesium	**34900**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:16	7439-95-4	
Manganese	**3.5J**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:16	7439-96-5	
Potassium	**4600**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:16	7440-09-7	
Sodium	**15900**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:16	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**524**	mg/L	20.0	4.9	1		05/23/18 12:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**671**	mg/L	5.0	5.0	1		05/22/18 17:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**38.0**	mg/L	5.0	2.3	5		05/20/18 13:43	16887-00-6	
Fluoride	**0.22**	mg/L	0.20	0.063	1		05/19/18 17:17	16984-48-8	
Sulfate	**49.9**	mg/L	5.0	1.2	5		05/20/18 13:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-4S **Lab ID: 60270635003** Collected: 05/16/18 08:45 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								
Boron	**251**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:18	7440-42-8	
Calcium	**126000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:18	7440-70-2	
Iron	**9.7J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:18	7439-89-6	
Magnesium	**31900**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:18	7439-95-4	
Manganese	**18.7**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:18	7439-96-5	
Potassium	**4730**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:18	7440-09-7	
Sodium	**13400**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:18	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**451**	mg/L	20.0	4.9	1		05/23/18 12:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**539**	mg/L	5.0	5.0	1		05/22/18 17:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3.7**	mg/L	1.0	0.46	1		05/19/18 17:32	16887-00-6	
Fluoride	**0.16J**	mg/L	0.20	0.063	1		05/19/18 17:32	16984-48-8	
Sulfate	**31.0**	mg/L	2.0	0.47	2		05/20/18 13:58	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-5S **Lab ID: 60270635004** Collected: 05/16/18 09:10 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								
Boron	**13100**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:20	7440-42-8	
Calcium	**260000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:20	7440-70-2	
Iron	**152**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:20	7439-89-6	
Magnesium	**53100**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:20	7439-95-4	
Manganese	**1600**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:20	7439-96-5	
Potassium	**4780**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:20	7440-09-7	
Sodium	**139000**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:20	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**363**	mg/L	20.0	4.9	1		05/23/18 13:04		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1600**	mg/L	5.0	5.0	1		05/22/18 17:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**28.0**	mg/L	2.0	0.92	2		05/20/18 14:13	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.063	1		05/19/18 17:47	16984-48-8	
Sulfate	**938**	mg/L	100	23.6	100		05/20/18 14:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-6S **Lab ID: 60270635005** Collected: 05/16/18 10:10 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								
Boron	**20300**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:23	7440-42-8	
Calcium	**256000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:23	7440-70-2	
Iron	**28.3J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:23	7439-89-6	
Magnesium	**62900**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:23	7439-95-4	
Manganese	**459**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:23	7439-96-5	
Potassium	**5220**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:23	7440-09-7	
Sodium	**93300**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:23	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**371**	mg/L	20.0	4.9	1		05/23/18 13:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1510**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.7**	mg/L	1.0	0.46	1		05/19/18 18:02	16887-00-6	
Fluoride	**0.17J**	mg/L	0.20	0.063	1		05/19/18 18:02	16984-48-8	
Sulfate	**850**	mg/L	100	23.6	100		05/20/18 14:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-7S **Lab ID: 60270635006** Collected: 05/16/18 10:55 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								
Boron	**2360**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:29	7440-42-8	
Calcium	**214000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:29	7440-70-2	
Iron	**8.7J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:29	7439-89-6	
Magnesium	**60600**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:29	7439-95-4	
Manganese	**347**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:29	7439-96-5	
Potassium	**4120**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:29	7440-09-7	
Sodium	**14400**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:29	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**413**	mg/L	20.0	4.9	1		05/23/18 13:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1060**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18.2**	mg/L	1.0	0.46	1		05/19/18 18:17	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.063	1		05/19/18 18:17	16984-48-8	
Sulfate	**401**	mg/L	50.0	11.8	50		05/20/18 15:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-8S **Lab ID: 60270635007** Collected: 05/16/18 11:50 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								
Boron	**9400**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:32	7440-42-8	
Calcium	**161000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:32	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:32	7439-89-6	
Magnesium	**38300**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:32	7439-95-4	
Manganese	**581**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:32	7439-96-5	
Potassium	**4640**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:32	7440-09-7	
Sodium	**74500**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:32	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**333**	mg/L	20.0	4.9	1		05/23/18 13:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**949**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**45.6**	mg/L	5.0	2.3	5		05/20/18 15:42	16887-00-6	
Fluoride	**0.79**	mg/L	0.20	0.063	1		05/19/18 18:32	16984-48-8	
Sulfate	**374**	mg/L	50.0	11.8	50		05/20/18 15:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-9S **Lab ID: 60270635008** Collected: 05/16/18 11:55 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								
Boron	**1450**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:34	7440-42-8	
Calcium	**188000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:34	7440-70-2	M1
Iron	**14.3J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:34	7439-89-6	
Magnesium	**55200**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:34	7439-95-4	M1
Manganese	**836**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:34	7439-96-5	
Potassium	**5440**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:34	7440-09-7	
Sodium	**52100**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:34	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**402**	mg/L	20.0	4.9	1		05/23/18 13:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1230**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**111**	mg/L	10.0	4.6	10		05/20/18 16:12	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.063	1		05/19/18 18:46	16984-48-8	
Sulfate	**277**	mg/L	20.0	4.7	20		05/20/18 16:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-DUP-1 **Lab ID: 60270635009** Collected: 05/16/18 08:00 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								
Boron	**293**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:38	7440-42-8	
Calcium	**171000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:38	7440-70-2	
Iron	**16.5J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:38	7439-89-6	
Magnesium	**34900**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:38	7439-95-4	
Manganese	**3.6J**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:38	7439-96-5	
Potassium	**4600**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:38	7440-09-7	
Sodium	**16200**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**509**	mg/L	20.0	4.9	1		05/23/18 13:32		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**704**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**37.7**	mg/L	5.0	2.3	5		05/20/18 16:42	16887-00-6	
Fluoride	**0.23**	mg/L	0.20	0.063	1		05/19/18 19:31	16984-48-8	
Sulfate	**49.7**	mg/L	5.0	1.2	5		05/20/18 16:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-DUP-2 **Lab ID: 60270635010** Collected: 05/16/18 08:00 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								
Boron	**269**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:41	7440-42-8	
Calcium	**128000**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:41	7440-70-2	
Iron	**20.7J**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:41	7439-89-6	
Magnesium	**32400**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:41	7439-95-4	
Manganese	**20.6**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:41	7439-96-5	
Potassium	**4840**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:41	7440-09-7	
Sodium	**13800**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:41	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**451**	mg/L	20.0	4.9	1		05/23/18 13:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**518**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3.7**	mg/L	1.0	0.46	1		05/19/18 19:46	16887-00-6	
Fluoride	**0.16J**	mg/L	0.20	0.063	1		05/19/18 19:46	16984-48-8	
Sulfate	**30.9**	mg/L	2.0	0.47	2		05/20/18 16:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-FB-2 **Lab ID: 60270635011** Collected: 05/16/18 11:55 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								
Boron	**<12.5**	ug/L	100	12.5	1	05/18/18 11:35	05/18/18 20:43	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	05/18/18 11:35	05/18/18 20:43	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/18/18 11:35	05/18/18 20:43	7439-89-6	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	05/18/18 11:35	05/18/18 20:43	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	05/18/18 11:35	05/18/18 20:43	7439-96-5	
Potassium	**<79.3**	ug/L	500	79.3	1	05/18/18 11:35	05/18/18 20:43	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	05/18/18 11:35	05/18/18 20:43	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		05/23/18 13:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		05/19/18 20:01	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		05/19/18 20:01	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		05/19/18 20:01	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-2S **Lab ID: 60270510001** Collected: 05/15/18 11:50 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								
Boron	**5590**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 18:03	7440-42-8	
Calcium	**253000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 18:03	7440-70-2	
Iron	**162**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 18:03	7439-89-6	
Magnesium	**52800**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 18:03	7439-95-4	
Manganese	**698**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 18:03	7439-96-5	
Potassium	**6250**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 18:03	7440-09-7	
Sodium	**53300**	ug/L	500	157	1	05/17/18 13:15	05/18/18 18:03	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**526**	mg/L	20.0	4.9	1		05/25/18 11:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**7.5**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**278**	mg/L	20.0	9.2	20		05/31/18 02:17	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.063	1		05/26/18 23:16	16984-48-8	
Sulfate	**135**	mg/L	10.0	2.4	10		05/31/18 02:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-BMW-1S **Lab ID: 60270510002** Collected: 05/14/18 12:15 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								
Boron	**74.0J**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 18:05	7440-42-8	
Calcium	**147000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 18:05	7440-70-2	
Iron	**20.8J**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 18:05	7439-89-6	
Magnesium	**28600**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 18:05	7439-95-4	
Manganese	**402**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 18:05	7439-96-5	
Potassium	**313J**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 18:05	7440-09-7	
Sodium	**4580**	ug/L	500	157	1	05/17/18 13:15	05/18/18 18:05	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**459**	mg/L	20.0	4.9	1		05/23/18 19:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1170**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.3**	mg/L	1.0	0.46	1		05/26/18 23:31	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.063	1		05/26/18 23:31	16984-48-8	
Sulfate	**23.6**	mg/L	2.0	0.47	2		05/31/18 02:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-BMW-3S **Lab ID: 60270510003** Collected: 05/14/18 10:25 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								
Boron	**65.6J**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 18:07	7440-42-8	
Calcium	**126000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 18:07	7440-70-2	
Iron	**140**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 18:07	7439-89-6	
Magnesium	**23200**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 18:07	7439-95-4	
Manganese	**344**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 18:07	7439-96-5	
Potassium	**552**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 18:07	7440-09-7	
Sodium	**4690**	ug/L	500	157	1	05/17/18 13:15	05/18/18 18:07	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**409**	mg/L	20.0	4.9	1		05/23/18 19:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**565**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**10.0**	mg/L	1.0	0.46	1		05/26/18 23:46	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.063	1		05/26/18 23:46	16984-48-8	
Sulfate	**28.5**	mg/L	2.0	0.47	2		05/31/18 02:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Sample: S-LMW-FB-1 **Lab ID: 60270510004** Collected: 05/14/18 11:45 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								
Boron	**<12.5**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 18:16	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 18:16	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 18:16	7439-89-6	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 18:16	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 18:16	7439-96-5	
Potassium	**<79.3**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 18:16	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	05/17/18 13:15	05/18/18 18:16	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		05/23/18 19:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**277**	mg/L	5.0	5.0	1		05/19/18 12:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		05/27/18 00:01	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		05/27/18 00:01	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		05/27/18 00:01	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526189 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60270510001, 60270510002, 60270510003, 60270510004

METHOD BLANK: 2154807 Matrix: Water
Associated Lab Samples: 60270510001, 60270510002, 60270510003, 60270510004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<12.5	100	12.5	05/18/18 17:34	
Calcium	ug/L	<53.5	200	53.5	05/18/18 17:34	
Iron	ug/L	<6.1	50.0	6.1	05/18/18 17:34	
Magnesium	ug/L	<14.0	50.0	14.0	05/18/18 17:34	
Manganese	ug/L	<0.73	5.0	0.73	05/18/18 17:34	
Potassium	ug/L	<79.3	500	79.3	05/18/18 17:34	
Sodium	ug/L	<157	500	157	05/18/18 17:34	

LABORATORY CONTROL SAMPLE: 2154808

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	941	94	85-115	
Calcium	ug/L	10000	9740	97	85-115	
Iron	ug/L	10000	9940	99	85-115	
Magnesium	ug/L	10000	9600	96	85-115	
Manganese	ug/L	1000	975	98	85-115	
Potassium	ug/L	10000	9860	99	85-115	
Sodium	ug/L	10000	9730	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154809 2154810

Parameter	Units	60270508004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	693	1000	1000	1620	1650	92	95	70-130	2	20	
Calcium	ug/L	130000	10000	10000	134000	136000	37	62	70-130	2	20	M1
Iron	ug/L	10J	10000	10000	9770	9840	98	98	70-130	1	20	
Magnesium	ug/L	24500	10000	10000	32300	32800	78	84	70-130	2	20	
Manganese	ug/L	745	1000	1000	1670	1720	93	98	70-130	3	20	
Potassium	ug/L	5750	10000	10000	15500	15600	97	98	70-130	1	20	
Sodium	ug/L	36000	10000	10000	44200	45100	82	91	70-130	2	20	

MATRIX SPIKE SAMPLE: 2154811

Parameter	Units	60270510003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	65.6J	1000	1020	96	70-130	
Calcium	ug/L	126000	10000	135000	83	70-130	
Iron	ug/L	140	10000	9860	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.

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

MATRIX SPIKE SAMPLE: 2154811

Parameter	Units	60270510003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Magnesium	ug/L	23200	10000	31800	86	70-130	
Manganese	ug/L	344	1000	1280	94	70-130	
Potassium	ug/L	552	10000	10500	99	70-130	
Sodium	ug/L	4690	10000	14500	98	70-130	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526371 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

METHOD BLANK: 2155642 Matrix: Water
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
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	
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	
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
Boron	ug/L	1000	997	100	85-115	
Calcium	ug/L	10000	9890	99	85-115	
Iron	ug/L	10000	9970	100	85-115	
Magnesium	ug/L	10000	9980	100	85-115	
Manganese	ug/L	1000	999	100	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
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	
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	
Potassium	ug/L	7730	10000	10000	16900	16900	92	92	70-130	0	20	
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
Boron	ug/L	1450	1000	2360	91	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

MATRIX SPIKE SAMPLE: 2155646

Parameter	Units	60270635008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	188000	10000	188000	0	70-130	M1
Iron	ug/L	14.3J	10000	9520	95	70-130	
Magnesium	ug/L	55200	10000	62000	68	70-130	M1
Manganese	ug/L	836	1000	1740	91	70-130	
Potassium	ug/L	5440	10000	15200	98	70-130	
Sodium	ug/L	52100	10000	59900	78	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526731 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

METHOD BLANK: 2157504 Matrix: Water
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

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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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526735 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270510002, 60270510003, 60270510004

METHOD BLANK: 2157540 Matrix: Water
Associated Lab Samples: 60270510002, 60270510003, 60270510004

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 SCPB
Pace Project No.: 60270635

QC Batch: 527256 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270510001

METHOD BLANK: 2159906 Matrix: Water
Associated Lab Samples: 60270510001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	05/25/18 10:30	

LABORATORY CONTROL SAMPLE: 2159907

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

SAMPLE DUPLICATE: 2159908

Parameter	Units	60270508004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	354	358	1	10	

SAMPLE DUPLICATE: 2159909

Parameter	Units	60270797004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	101	98.8	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526312 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270510002, 60270510003, 60270510004

METHOD BLANK: 2155406 Matrix: Water
Associated Lab Samples: 60270510002, 60270510003, 60270510004

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 SCPB
Pace Project No.: 60270635

QC Batch: 526317 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270510001

METHOD BLANK: 2155429 Matrix: Water
Associated Lab Samples: 60270510001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/19/18 12:29	

LABORATORY CONTROL SAMPLE: 2155430

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	943	94	80-120	

SAMPLE DUPLICATE: 2155431

Parameter	Units	60270507006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	530	554	4	10	

SAMPLE DUPLICATE: 2155432

Parameter	Units	60270508004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	481	579	18	10	D6

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 526720 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

METHOD BLANK: 2157172 Matrix: Water
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

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 SCPB
Pace Project No.: 60270635

QC Batch: 526468 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

METHOD BLANK: 2156224 Matrix: Water
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010, 60270635011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/19/18 15:03	
Fluoride	mg/L	<0.063	0.20	0.063	05/19/18 15:03	
Sulfate	mg/L	<0.24	1.0	0.24	05/19/18 15:03	

LABORATORY CONTROL SAMPLE: 2156225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	5	4.8	95	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 SCPB
Pace Project No.: 60270635

QC Batch: 526489 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010

METHOD BLANK: 2156661 Matrix: Water
Associated Lab Samples: 60270635001, 60270635002, 60270635003, 60270635004, 60270635005, 60270635006, 60270635007, 60270635008, 60270635009, 60270635010

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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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 527491 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270510001, 60270510002, 60270510003, 60270510004

METHOD BLANK: 2160728 Matrix: Water
Associated Lab Samples: 60270510001, 60270510002, 60270510003, 60270510004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/26/18 21:02	
Fluoride	mg/L	<0.063	0.20	0.063	05/26/18 21:02	
Sulfate	mg/L	<0.24	1.0	0.24	05/26/18 21:02	

LABORATORY CONTROL SAMPLE: 2160729

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2160730 2160731

Parameter	Units	60270508004 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	3.0	3.0	106	105	90-110	1	15	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

QC Batch: 527547 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270510001, 60270510002, 60270510003

METHOD BLANK: 2161069 Matrix: Water
Associated Lab Samples: 60270510001, 60270510002, 60270510003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	05/30/18 23:03	
Sulfate	mg/L	<0.24	1.0	0.24	05/30/18 23:03	

LABORATORY CONTROL SAMPLE: 2161070

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	93	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2161071 2161072

Parameter	Units	60270508004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	84.8	25	25	109	110	96	99	90-110	1	15	E
Sulfate	mg/L	45.3	25	25	68.9	69.6	94	97	90-110	1	15	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

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

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 SCPB
Pace Project No.: 60270635

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270510001	**S-LMW-2S**	EPA 200.7	526189	EPA 200.7	526234
60270510002	**S-BMW-1S**	EPA 200.7	526189	EPA 200.7	526234
60270510003	**S-BMW-3S**	EPA 200.7	526189	EPA 200.7	526234
60270510004	**S-LMW-FB-1**	EPA 200.7	526189	EPA 200.7	526234
60270635001	**S-LMW-1S**	EPA 200.7	526371	EPA 200.7	526393
60270635002	**S-LMW-3S**	EPA 200.7	526371	EPA 200.7	526393
60270635003	**S-LMW-4S**	EPA 200.7	526371	EPA 200.7	526393
60270635004	**S-LMW-5S**	EPA 200.7	526371	EPA 200.7	526393
60270635005	**S-LMW-6S**	EPA 200.7	526371	EPA 200.7	526393
60270635006	**S-LMW-7S**	EPA 200.7	526371	EPA 200.7	526393
60270635007	**S-LMW-8S**	EPA 200.7	526371	EPA 200.7	526393
60270635008	**S-LMW-9S**	EPA 200.7	526371	EPA 200.7	526393
60270635009	**S-LMW-DUP-1**	EPA 200.7	526371	EPA 200.7	526393
60270635010	**S-LMW-DUP-2**	EPA 200.7	526371	EPA 200.7	526393
60270635011	**S-LMW-FB-2**	EPA 200.7	526371	EPA 200.7	526393
60270510001	**S-LMW-2S**	SM 2320B	527256		
60270510002	**S-BMW-1S**	SM 2320B	526735		
60270510003	**S-BMW-3S**	SM 2320B	526735		
60270510004	**S-LMW-FB-1**	SM 2320B	526735		
60270635001	**S-LMW-1S**	SM 2320B	526731		
60270635002	**S-LMW-3S**	SM 2320B	526731		
60270635003	**S-LMW-4S**	SM 2320B	526731		
60270635004	**S-LMW-5S**	SM 2320B	526731		
60270635005	**S-LMW-6S**	SM 2320B	526731		
60270635006	**S-LMW-7S**	SM 2320B	526731		
60270635007	**S-LMW-8S**	SM 2320B	526731		
60270635008	**S-LMW-9S**	SM 2320B	526731		
60270635009	**S-LMW-DUP-1**	SM 2320B	526731		
60270635010	**S-LMW-DUP-2**	SM 2320B	526731		
60270635011	**S-LMW-FB-2**	SM 2320B	526731		
60270510001	**S-LMW-2S**	SM 2540C	526317		
60270510002	**S-BMW-1S**	SM 2540C	526312		
60270510003	**S-BMW-3S**	SM 2540C	526312		
60270510004	**S-LMW-FB-1**	SM 2540C	526312		
60270635001	**S-LMW-1S**	SM 2540C	526720		
60270635002	**S-LMW-3S**	SM 2540C	526720		
60270635003	**S-LMW-4S**	SM 2540C	526720		
60270635004	**S-LMW-5S**	SM 2540C	526720		
60270635005	**S-LMW-6S**	SM 2540C	526720		
60270635006	**S-LMW-7S**	SM 2540C	526720		
60270635007	**S-LMW-8S**	SM 2540C	526720		
60270635008	**S-LMW-9S**	SM 2540C	526720		
60270635009	**S-LMW-DUP-1**	SM 2540C	526720		
60270635010	**S-LMW-DUP-2**	SM 2540C	526720		
60270635011	**S-LMW-FB-2**	SM 2540C	526720		

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC SCPB
Pace Project No.: 60270635

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270510001	**S-LMW-2S**	EPA 300.0	527491		
60270510001	**S-LMW-2S**	EPA 300.0	527547		
60270510002	**S-BMW-1S**	EPA 300.0	527491		
60270510002	**S-BMW-1S**	EPA 300.0	527547		
60270510003	**S-BMW-3S**	EPA 300.0	527491		
60270510003	**S-BMW-3S**	EPA 300.0	527547		
60270510004	**S-LMW-FB-1**	EPA 300.0	527491		
60270635001	**S-LMW-1S**	EPA 300.0	526468		
60270635001	**S-LMW-1S**	EPA 300.0	526489		
60270635002	**S-LMW-3S**	EPA 300.0	526468		
60270635002	**S-LMW-3S**	EPA 300.0	526489		
60270635003	**S-LMW-4S**	EPA 300.0	526468		
60270635003	**S-LMW-4S**	EPA 300.0	526489		
60270635004	**S-LMW-5S**	EPA 300.0	526468		
60270635004	**S-LMW-5S**	EPA 300.0	526489		
60270635005	**S-LMW-6S**	EPA 300.0	526468		
60270635005	**S-LMW-6S**	EPA 300.0	526489		
60270635006	**S-LMW-7S**	EPA 300.0	526468		
60270635006	**S-LMW-7S**	EPA 300.0	526489		
60270635007	**S-LMW-8S**	EPA 300.0	526468		
60270635007	**S-LMW-8S**	EPA 300.0	526489		
60270635008	**S-LMW-9S**	EPA 300.0	526468		
60270635008	**S-LMW-9S**	EPA 300.0	526489		
60270635009	**S-LMW-DUP-1**	EPA 300.0	526468		
60270635009	**S-LMW-DUP-1**	EPA 300.0	526489		
60270635010	**S-LMW-DUP-2**	EPA 300.0	526468		
60270635010	**S-LMW-DUP-2**	EPA 300.0	526489		
60270635011	**S-LMW-FB-2**	EPA 300.0	526468		

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Sample Condition Upon Receipt

WO# : 60270635

60270635

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** 0.8 **Corr. Factor** +1.1 **Corrected** 1.9

Date and initials of person examining contents: pm 5/17/18

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? (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	JLS

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jami Check 5/18/18

Project Manager Review: _____ Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A
Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	mhaddock@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 SCPB
Project Number:	153-1406.0003F

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
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

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

Requested Analysis Filtered (Y/N)

Pace Project No./ Lab I.D.: 60270635

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-LMW-1S	WT	G			5/16/18	1100		12	3		3						✓	✓	✓	✓		3BP3N 3BP2U 001
~~2~~	~~S-LMW-2S~~																						
3	S-LMW-3S	WT	G			5/16/18	0755		2	1		1						✓	✓	✓	✓		BP3N BP2U 002
4	S-LMW-4S	[WT]	[G]			[5/16/18]	0845		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 003
5	S-LMW-5S	[WT]	[G]			[5/16/18]	0910		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 004
6	S-LMW-6S	[WT]	[G]			[5/16/18]	1010		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 005
7	S-LMW-7S	[WT]	[G]			[5/16/18]	1055		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 006
8	S-LMW-8S	[WT]	[G]			[5/16/18]	1156		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 007
9	S-LMW-9S	[WT]	[G]			[5/16/18]	1155		[2]	[1]		[1]						[✓]	[✓]	[✓]	[✓]		[BP3N BP2U] 008
~~10~~	~~S-BMW-1S~~																						
~~11~~	~~S-BMW-3S~~																						
12	S-LMW-DUP-1	WT	G			5/16/18	—											✓	✓	✓	✓		009

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, Mn, K, Na, Fe,	[signature] / Golder	5/16/18	1315	[signature]	5/16/18	1315				
	[signature] / PACE	5/16/18	1700	[signature] / PACE	5/17	0425	1.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/16/18

CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 2

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 SCPB
Project Number:	153-1406.0003F

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) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-LMW-DUP-2	WT	G			5/16/18			2	1		1							✓	✓	✓	✓		60270635 BPLU BPLU OW
2	~~S-LMW-FB-1~~																							
3	S-LMW-FB-2	WT	G			5/16/18	1155		2	1		1							✓	✓	✓	✓		↓ ↓ OW
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

Requested Analysis Filtered (Y/N)

Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca, Mg, Mn, K, Na, Fe	Golder	5/16/18	1315		5/16/18	1315	
		5/16/18	1700	BASE	5/17	0425	1.9 Y Y Y

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Ryan Feldmann				
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 5/16/18				

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Sample Condition Upon Receipt

WO# : 60270510

60270510

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

JLS

Cooler Temperature (°C): **As-read** 3.2 **Corr. Factor** +0.0 **Corrected** 4.2

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

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Chek 5/17/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 2

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 SCPB
Project Number:	153-1406.0003F

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 | DRINKING WATER

UST | RCRA | OTHER

Site Location STATE: MO

Section D — Required Client Information

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

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~S-LMW-1S~~																							
2	S-LMW-2S	WT	G			5/15/18	1150		2	1		1							✓	✓	✓			60270510 BP2N	001
3	~~S-LMW-3S~~																							
4	~~S-LMW-4S~~																							
5	~~S-LMW-5S~~																							
6	~~S-LMW-6S~~																							
7	~~S-LMW-7S~~																							
8	~~S-LMW-8S~~																							
9	~~S-LMW-9S~~																							
10	S-BMW-1S	WT	G			5/14/18	1215		2	1		1							✓	✓	✓	✓			002
11	S-BMW-3S	WT	G			5/14/18	1025		2	1		1							✓	✓	✓	✓			003
12	~~S-LMW-DUP-1~~																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Mg, Mn, K, Na, Fe	Golder	5/15/18	1740		5/16	0320	4.2	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 2 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	820 South Main Street, Suite 100	Copy To:	Jeffrey Ingram	Company Name:	
	St Charles, MO 63301		Ryan Feldmann	Address:	
Email To:	rnaddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren SEC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F	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	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~S-LMW-DUP-2~~ SCPB						1145																	
2	S-~~LMW~~-FB-1	WT	G			5/15/16	~~1150~~	RF	2	1			1					✓	✓	✓	✓			60270510 BP2N BP3N^{2-} 004
3	S-LMW-FB-2																							
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7, B, Ca, Mg, Mn, K, Na, Fe	Golder	5/15/16	1740		5/16	0320	4.2	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 5/15/16

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

MEMORANDUM

DATE 8/14/18 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY, AMEREN GROUNDWATER – DATA PACKAGE 60270635

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 Manager: J. Ingram
Project Name: Ameren Groundwater
Project Number: 1531406
Reviewer: S. DiCenso
Validation Date: 8/14/18

Laboratory: Pace Analytical
SDG #: 60270635
Analytical Method (type and no.): Metals 200.7, Alkalinity 2320B, TDS 2540, Anions 300.0
Matrix: ☐ Air ☐ Soil/Sed. ☑ Water ☐ Waste ☐
Sample Names S-LMW-1S, S-LMW-3S, S-LMW-4S, S-LMW-5S, S-LMW-6S, S-LMW-7S, S-LMW-8S, S-LMW-9S, S-LMW-DUP-1, S-LMW-DUP-2, S-LMW-FB-2, S-LMW-2S, S-BMW-1S, S-BMW-3S, S-LMW-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?	☑	☐	☐	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)?	☑	☐	☐	
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-LMW-DUP-1: S-LMW-3S S-LMW-DUP-2: S-LMW-4S
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)?	☐	☑	☐	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?	☐	☑	☐	See notes
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

Dilutions: Chloride
S-LMW-1S [x2]
S-LMW-3S [x 5]
S-LMW-5S [x 2]
S-LMW-8S [x 5]
S-LMW-9S [x10]
S-LMW-DUP-1 [x 5]
~~S-LMW-2S~~ [x20]

Sulfate
S-LMW-1S [x10]
S-LMW-3S [x 5]
S-LMW-4S [x 2]
S-LMW-5S [x100]
S-LMW-6S [x100]
S-LMW-7S [x 50]
S-LMW-8S [x 50]
S-LMW-9S [x 20]
S-LMW-DUP-1 [x 5]
S-LMW-DUP-2 [x 2]
S-LMW-2S [x10]
S-LMW-1S [x 2]
S-LMW-3S [x 2]

Blanks: S-LMW-FB-1 (AKA: S-SCPB-FB-1): S-LMW-2S
S-LMW-FB-2 (AKA: S-SCPB-FB-2): S-LMW-8S
FB detections: TDS 277 mg/L in S-LMW-FB-1 (sample <10x blank)

MS/MSD: Some MS/MSD results were unrelated
Calcium and Magnesium %Rec low for MS/MSD of S-LMW-
Calcium and Magnesium %Rec low for MS of S-LMW-9S

Duplicates: Lab dup exceedences were for unrelated samples
RPD >20% between sample and dup for:
Iron (S-LMW-3S and DUP-1)
Iron (S-LMW-4S and DUP-2)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-LMW-1S	Chloride	22.1	D	Analyzed at a dilution
"	Sulfate	119	D	"
S-LMW-3S	Chloride	38.0	D	"
"	Sulfate	49.9	D	"
S-LMW-4S	Sulfate	31.0	D	"
S-LMW-5S	Chloride	28.0	D	"
"	Sulfate	938	D	"
S-LMW-6S	Sulfate	850	D	"
S-LMW-7S	Sulfate	401	D	"
S-LMW-8S	Chloride	45.6	D	"
"	Sulfate	374	D	"
S-LMW-9S	Chloride	111	D	"
"	Sulfate	277	D	"
S-LMW-DUP-1	Chloride	37.7	D	"
"	Sulfate	49.7	D	"
S-LMW-DUP-2	Sulfate	30.9	D	"
S-LMW-2S	Chloride	278	D	"
"	Sulfate	135	D	"
S-BMW-1S	Sulfate	23.6	D	"
S-BMW-3S	Sulfate	28.5	D	"
S-LMW-1S	Calcium	89700	J	MS/MSD outside QC limits
"	Magnesium	25100	J	"
S-LMW-9S	Calcium	188000	J	"
"	Magnesium	55200	J	"
S-LMW-3S	Iron	20.3	J	RPD outside limits between sample and dup
S-LMW-4S	Iron	9.7	J	"
S-LMW-DUP-1	Iron	16.5	J	"
S-LMW-DUP-2	Iron	20.7	J	"
S-LMW-2S	TDS	7.5	J	Detected in blank

Signature: Samantha Klees 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: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

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: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

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

SAMPLE SUMMARY

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60274320001	**S-LMW-35**	Water	07/05/18 11:30	07/07/18 03:10

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SAMPLE ANALYTE COUNT

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60274320001	**S-LMW-35**	EPA 200.7	TDS	1	PASI-K
		SM 2540C	JDA	1	PASI-K

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ANALYTICAL RESULTS

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

Sample: S-LMW-35 **Lab ID: 60274320001** Collected: 07/05/18 11:30 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								
Calcium	**147000**	ug/L	200	53.5	1	07/09/18 14:45	07/16/18 13:47	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**655**	mg/L	5.0	5.0	1		07/10/18 13:07		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

QC Batch: 533483 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60274320001

METHOD BLANK: 2184967 Matrix: Water
Associated Lab Samples: 60274320001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<53.5	200	53.5	07/16/18 13:19	

LABORATORY CONTROL SAMPLE: 2184968

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9540	95	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
Calcium	ug/L	67000	10000	10000	75900	78200	89	112	70-130	3	20	

MATRIX SPIKE SAMPLE: 2184971

Parameter	Units	60274291001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	15100	10000	22800	78	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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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

QC Batch: 533628 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60274320001

METHOD BLANK: 2185372 Matrix: Water
Associated Lab Samples: 60274320001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	07/10/18 13:07	

LABORATORY CONTROL SAMPLE: 2185373

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	992	99	80-120	

SAMPLE DUPLICATE: 2185374

Parameter	Units	60274226005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	578	567	2	10	

SAMPLE DUPLICATE: 2185375

Parameter	Units	60274277002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2120	2200	3	10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

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: SCPB AMEREN MO CCR MONITORING
Pace Project No.: 60274320

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60274320001	**S-LMW-35**	EPA 200.7	533483	EPA 200.7	533524
60274320001	**S-LMW-35**	SM 2540C	533628		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60274320

60274320

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):	☐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: _____

Jami Check 7/9/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A Required Client Information:

Company:	Golder Associates
Address:	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:	SCPB Ammon MO GW 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

Valid Matrix Codes

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

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	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.
																		Y/N	N	N	N	N	N	N		
1	S-LMW-35	WT	G			07/5/18	1130		2	1		1								✓				✓		60274320
2		WT	G																							
3		WT	G																							
4		WT	G																							
5		WT	G																							
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

Pace Project No./ Lab I.D.: 60274320

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] Golder	07/6/18	1615	[signature]	7/6/18	1615				
	[signature] PACE	7/6/18	1700	[signature] Fedex carry past	7/7/18	03:10	0.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schrandt

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

*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 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 – SCPB – AMEREN GROUNDWATER – DATA PACKAGE 60274320

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- SCPB - YS2
Reviewer: T Goodwin

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

Laboratory: Pace Analytical
SDG #: 60274320
Analytical Method (type and no.): Metals (EPA 200.7), TDS (SM 2540C)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-LMW-35

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)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☑	☐	☐	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None	—	—	—	—

Signature: [signature] Date: 8/20/2018

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

January 24, 2019

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

RE: Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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

REV-1, 1/14/19: Metals 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 EC SCPB
Pace Project No.: 60286568

Kansas Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286568001	**S-BMW-1S**	Water	11/12/18 13:45	11/13/18 03:47
60286568002	**S-BMW-3S**	Water	11/12/18 11:05	11/13/18 03:47
60287013001	**S-LMW-1S**	Water	11/14/18 12:25	11/15/18 10:00
60287013002	**S-LMW-4S**	Water	11/14/18 15:25	11/15/18 10:00
60287013003	**S-LMW-6S**	Water	11/14/18 15:45	11/15/18 10:00
60287013004	**S-LMW-7S**	Water	11/14/18 13:35	11/15/18 10:00
60287013005	**S-LMW-8S**	Water	11/14/18 14:40	11/15/18 10:00
60287013006	**S-LMW-DUP-1**	Water	11/14/18 12:25	11/15/18 10:00
60287013007	**S-LMW-DUP-2**	Water	11/14/18 12:25	11/15/18 10:00
60287013008	**S-LMW-FB-1**	Water	11/14/18 15:35	11/15/18 10:00
60287013009	**S-LMW-FB-2**	Water	11/14/18 15:50	11/15/18 10:00
60287167001	**S-LMW-2S**	Water	11/16/18 14:15	11/17/18 04:30
60287167002	**S-LMW-3S**	Water	11/16/18 13:05	11/17/18 04:30
60287167003	**S-LMW-5S**	Water	11/16/18 10:20	11/17/18 04:30
60287167004	**S-LMW-9S**	Water	11/16/18 14:40	11/17/18 04:30

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286568001	**S-BMW-1S**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60286568002	**S-BMW-3S**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287013001	**S-LMW-1S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287013002	**S-LMW-4S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287013003	**S-LMW-6S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 365.4	LDB	1	PASI-K
60287013004	S-LMW-7S	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287013005	S-LMW-8S	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287013006	S-LMW-DUP-1	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	LDB	1	PASI-K
60287013007	S-LMW-DUP-2	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287013008	S-LMW-FB-1	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDF	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287013009	**S-LMW-FB-2**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287167001	**S-LMW-2S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287167002	**S-LMW-3S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287167003	**S-LMW-5S**	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
60287167004	**S-LMW-9S**	EPA 200.7	EMR	7	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	JDH	5	PASI-K
		SM 2320B	RLG	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-BMW-1S **Lab ID: 60286568001** Collected: 11/12/18 13:45 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**72.9J**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 20:48	7440-42-8	
Calcium	**157000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 20:48	7440-70-2	
Iron	**13.8J**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 20:48	7439-89-6	B
Magnesium	**29000**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 20:48	7439-95-4	
Manganese	**607**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 20:48	7439-96-5	
Potassium	**580**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 20:48	7440-09-7	B
Sodium	**5600**	ug/L	500	157	1	11/28/18 15:52	11/28/18 20:48	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**464**	mg/L	20.0	4.9	1		11/20/18 12:32		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**556**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.014J**	mg/L	0.050		1		11/29/18 16:43	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 10:33		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.7**	mg/L	1.0	0.29	1		11/27/18 22:16	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.19	1		11/27/18 22:16	16984-48-8	
Sulfate	**28.8**	mg/L	2.0	0.48	2		11/27/18 22:32	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.50**	mg/L	0.10	0.050	1		11/15/18 11:48	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-BMW-3S **Lab ID: 60286568002** Collected: 11/12/18 11:05 Received: 11/13/18 03:47 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**61.5J**	ug/L	100	12.5	1	11/28/18 15:52	11/28/18 20:50	7440-42-8	
Calcium	**124000**	ug/L	200	53.5	1	11/28/18 15:52	11/28/18 20:50	7440-70-2	
Iron	**57.5**	ug/L	50.0	6.1	1	11/28/18 15:52	11/28/18 20:50	7439-89-6	B
Magnesium	**21400**	ug/L	50.0	14.0	1	11/28/18 15:52	11/28/18 20:50	7439-95-4	
Manganese	**400**	ug/L	5.0	0.73	1	11/28/18 15:52	11/28/18 20:50	7439-96-5	
Potassium	**772**	ug/L	500	79.3	1	11/28/18 15:52	11/28/18 20:50	7440-09-7	B
Sodium	**5070**	ug/L	500	157	1	11/28/18 15:52	11/28/18 20:50	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**368**	mg/L	20.0	4.9	1		11/20/18 12:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**436**	mg/L	5.0	5.0	1		11/16/18 10:25		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.057**	mg/L	0.050		1		11/29/18 16:43	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 10:34		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**10.1**	mg/L	1.0	0.29	1		11/27/18 22:48	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	0.19	1		11/27/18 22:48	16984-48-8	
Sulfate	**25.6**	mg/L	2.0	0.48	2		11/27/18 23:04	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.23**	mg/L	0.10	0.050	1		11/15/18 11:49	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-1S **Lab ID: 60287013001** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**539**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:30	7440-42-8	
Calcium	**79400**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:30	7440-70-2	
Iron	**17.2J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:30	7439-89-6	B
Magnesium	**20100**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:30	7439-95-4	
Manganese	**59.4**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:30	7439-96-5	
Potassium	**6800**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:30	7440-09-7	
Sodium	**33400**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:30	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.38J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 17:55	7440-36-0	
Cadmium	**0.049J**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 17:55	7440-43-9	
Chromium	**0.36J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 17:55	7440-47-3	B
Selenium	**3.0**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 17:55	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 17:55	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**227**	mg/L	20.0	4.9	1		11/26/18 11:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**346**	mg/L	5.0	5.0	1		11/19/18 10:31		D6
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.017J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 11:07		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**42.6**	mg/L	10.0	2.9	10		12/08/18 02:51	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.19	1		12/08/18 01:54	16984-48-8	M1
Sulfate	**62.2**	mg/L	10.0	2.4	10		12/08/18 02:51	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.26**	mg/L	0.10	0.050	1		11/24/18 13:09	7723-14-0	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-4S **Lab ID: 60287013002** Collected: 11/14/18 15:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**1020**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:36	7440-42-8	
Calcium	**179000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:36	7440-70-2	
Iron	**21.8J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:36	7439-89-6	B
Magnesium	**36900**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:36	7439-95-4	
Manganese	**260**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:36	7439-96-5	
Potassium	**5050**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:36	7440-09-7	
Sodium	**14300**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:36	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.21J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:00	7440-36-0	
Cadmium	**0.17J**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:00	7440-43-9	
Chromium	**0.12J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:00	7440-47-3	B
Selenium	**1.0**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:00	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:00	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**540**	mg/L	20.0	4.9	1		11/26/18 11:32		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**814**	mg/L	5.0	5.0	1		11/19/18 10:31		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.022J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 11:08		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.9**	mg/L	1.0	0.29	1		12/08/18 03:19	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.19	1		12/08/18 03:19	16984-48-8	
Sulfate	**50.0**	mg/L	5.0	1.2	5		12/08/18 03:34	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:12	7723-14-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-6S **Lab ID: 60287013003** Collected: 11/14/18 15:45 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**10400**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:39	7440-42-8	
Calcium	**199000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:39	7440-70-2	
Iron	**21.0J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:39	7439-89-6	B
Magnesium	**52500**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:39	7439-95-4	
Manganese	**373**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:39	7439-96-5	
Potassium	**4650**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:39	7440-09-7	
Sodium	**44100**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:39	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.25J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:02	7440-36-0	
Cadmium	**1.5**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:02	7440-43-9	
Chromium	**0.13J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:02	7440-47-3	B
Selenium	**0.21J**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:02	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:02	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**430**	mg/L	20.0	4.9	1		11/26/18 11:47		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**771**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.021J**	mg/L	0.050		1		12/05/18 09:00	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 11:08		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.2**	mg/L	1.0	0.29	1		12/09/18 00:13	16887-00-6	B
Fluoride	**0.32**	mg/L	0.20	0.19	1		12/09/18 00:13	16984-48-8	
Sulfate	**385**	mg/L	100	24.0	100		12/09/18 00:29	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:13	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-7S **Lab ID: 60287013004** Collected: 11/14/18 13:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**2740**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:41	7440-42-8	
Calcium	**221000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:41	7440-70-2	
Iron	**15.3J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:41	7439-89-6	B
Magnesium	**60200**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:41	7439-95-4	
Manganese	**118**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:41	7439-96-5	
Potassium	**3990**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:41	7440-09-7	
Sodium	**16900**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:41	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.091J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:08	7440-36-0	
Cadmium	**0.26J**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:08	7440-43-9	
Chromium	**0.12J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:08	7440-47-3	B
Selenium	**3.5**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:08	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:08	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**391**	mg/L	20.0	4.9	1		11/26/18 11:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1020**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.015J**	mg/L	0.050		1		12/05/18 09:13	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 11:09		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.6**	mg/L	1.0	0.29	1		12/09/18 00:45	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.19	1		12/09/18 00:45	16984-48-8	
Sulfate	**396**	mg/L	50.0	12.0	50		12/09/18 01:01	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:14	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-8S **Lab ID: 60287013005** Collected: 11/14/18 14:40 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**8500**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:43	7440-42-8	
Calcium	**177000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:43	7440-70-2	
Iron	**8.6J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:43	7439-89-6	B
Magnesium	**41000**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:43	7439-95-4	
Manganese	**488**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:43	7439-96-5	
Potassium	**4880**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:43	7440-09-7	
Sodium	**77800**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:43	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.24J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:10	7440-36-0	
Cadmium	**0.71**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:10	7440-43-9	
Chromium	**0.11J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:10	7440-47-3	B
Selenium	**0.31J**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:10	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:10	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**306**	mg/L	20.0	4.9	1		11/26/18 11:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**925**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0086J**	mg/L	0.050		1		12/05/18 09:13	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 11:09		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**38.9**	mg/L	5.0	1.4	5		12/10/18 02:30	16887-00-6	
Fluoride	**0.87**	mg/L	0.20	0.19	1		12/10/18 02:14	16984-48-8	
Sulfate	**405**	mg/L	50.0	12.0	50		12/10/18 02:46	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.097J**	mg/L	0.10	0.050	1		11/24/18 13:15	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-DUP-1 **Lab ID: 60287013006** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**2730**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:50	7440-42-8	
Calcium	**224000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:50	7440-70-2	
Iron	**11.3J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:50	7439-89-6	B
Magnesium	**60600**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:50	7439-95-4	
Manganese	**139**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:50	7439-96-5	
Potassium	**4060**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:50	7440-09-7	
Sodium	**17100**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:50	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.10J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:12	7440-36-0	
Cadmium	**0.27J**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:12	7440-43-9	
Chromium	**0.14J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:12	7440-47-3	B
Selenium	**3.3**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:12	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:12	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**386**	mg/L	20.0	4.9	1		11/26/18 12:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**963**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.011J**	mg/L	0.050		1		12/05/18 09:13	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 11:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**11.8**	mg/L	1.0	0.29	1		12/10/18 03:02	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.19	1		12/10/18 03:02	16984-48-8	
Sulfate	**418**	mg/L	50.0	12.0	50		12/10/18 03:18	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 13:16	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-DUP-2 **Lab ID: 60287013007** Collected: 11/14/18 12:25 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**8550**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:52	7440-42-8	
Calcium	**180000**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:52	7440-70-2	
Iron	**6.3J**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:52	7439-89-6	B
Magnesium	**41500**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:52	7439-95-4	
Manganese	**493**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:52	7439-96-5	
Potassium	**4950**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:52	7440-09-7	
Sodium	**78400**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:52	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.23J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:13	7440-36-0	
Cadmium	**0.72**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:13	7440-43-9	
Chromium	**0.079J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:13	7440-47-3	B
Selenium	**0.38J**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:13	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:13	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**308**	mg/L	20.0	4.9	1		11/26/18 17:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**981**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0063J**	mg/L	0.050		1		12/05/18 09:13	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 11:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**39.7**	mg/L	5.0	1.4	5		12/09/18 17:28	16887-00-6	
Fluoride	**0.77**	mg/L	0.20	0.19	1		12/09/18 17:10	16984-48-8	
Sulfate	**373**	mg/L	50.0	12.0	50		12/09/18 17:45	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.082J**	mg/L	0.10	0.050	1		11/26/18 12:23	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-FB-1 **Lab ID: 60287013008** Collected: 11/14/18 15:35 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**32.1J**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:54	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:54	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:54	7439-89-6	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:54	7439-95-4	
Manganese	**4.1J**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:54	7439-96-5	B
Potassium	**194J**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:54	7440-09-7	B
Sodium	**<157**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:54	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:15	7440-36-0	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:15	7440-43-9	
Chromium	**0.12J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:15	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:15	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:15	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/26/18 17:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5.5**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0J**	mg/L	0.050		1		12/05/18 09:13	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 11:17		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		12/09/18 18:03	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		12/09/18 18:03	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		12/09/18 18:03	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 12:25	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-FB-2 **Lab ID: 60287013009** Collected: 11/14/18 15:50 Received: 11/15/18 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**17.7J**	ug/L	100	12.5	1	11/30/18 10:47	11/30/18 22:57	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	11/30/18 10:47	11/30/18 22:57	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	11/30/18 10:47	11/30/18 22:57	7439-89-6	
Magnesium	**22.6J**	ug/L	50.0	14.0	1	11/30/18 10:47	11/30/18 22:57	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	11/30/18 10:47	11/30/18 22:57	7439-96-5	
Potassium	**127J**	ug/L	500	79.3	1	11/30/18 10:47	11/30/18 22:57	7440-09-7	B
Sodium	**<157**	ug/L	500	157	1	11/30/18 10:47	11/30/18 22:57	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.078**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:17	7440-36-0	
Cadmium	**<0.033**	ug/L	0.50	0.033	1	11/30/18 14:29	11/30/18 18:17	7440-43-9	
Chromium	**0.52J**	ug/L	1.0	0.078	1	11/30/18 14:29	11/30/18 18:17	7440-47-3	B
Selenium	**<0.085**	ug/L	1.0	0.085	1	11/30/18 14:29	11/30/18 18:17	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	11/30/18 14:29	11/30/18 18:17	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/26/18 18:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**8.0**	mg/L	5.0	5.0	1		11/20/18 12:04		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0J**	mg/L	0.050		1		12/05/18 09:13	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 11:17		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		12/10/18 12:12	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		12/10/18 12:12	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		12/10/18 12:12	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 12:30	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-2S **Lab ID: 60287167001** Collected: 11/16/18 14:15 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**8530**	ug/L	100	12.5	1	12/04/18 12:45	12/05/18 13:37	7440-42-8	
Calcium	**197000**	ug/L	200	53.5	1	12/04/18 12:45	12/05/18 13:37	7440-70-2	
Iron	**158**	ug/L	50.0	6.1	1	12/04/18 12:45	12/05/18 13:37	7439-89-6	
Magnesium	**41700**	ug/L	50.0	14.0	1	12/04/18 12:45	12/05/18 13:37	7439-95-4	
Manganese	**545**	ug/L	5.0	0.73	1	12/04/18 12:45	12/05/18 13:37	7439-96-5	
Potassium	**6720**	ug/L	500	79.3	1	12/04/18 12:45	12/05/18 13:37	7440-09-7	
Sodium	**91700**	ug/L	500	157	1	12/04/18 12:45	12/05/18 13:37	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.20J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:45	7440-36-0	
Cadmium	**0.38J**	ug/L	0.50	0.033	1	12/05/18 10:24	12/05/18 15:45	7440-43-9	
Chromium	**<0.078**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:45	7440-47-3	
Selenium	**0.12J**	ug/L	1.0	0.085	1	12/05/18 10:24	12/05/18 15:45	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/05/18 10:24	12/05/18 15:45	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**428**	mg/L	20.0	4.9	1		11/29/18 12:29		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1040**	mg/L	5.0	5.0	1		11/21/18 14:50		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.16**	mg/L	0.050		1		12/06/18 16:38	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/21/18 12:13		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**174**	mg/L	20.0	5.8	20		12/08/18 18:19	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.19	1		12/08/18 18:05	16984-48-8	
Sulfate	**188**	mg/L	20.0	4.8	20		12/08/18 18:19	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 13:27	7723-14-0	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-3S **Lab ID: 60287167002** Collected: 11/16/18 13:05 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**298**	ug/L	100	12.5	1	12/04/18 12:45	12/05/18 13:39	7440-42-8	
Calcium	**188000**	ug/L	200	53.5	1	12/04/18 12:45	12/05/18 13:39	7440-70-2	
Iron	**12.7J**	ug/L	50.0	6.1	1	12/04/18 12:45	12/05/18 13:39	7439-89-6	
Magnesium	**36900**	ug/L	50.0	14.0	1	12/04/18 12:45	12/05/18 13:39	7439-95-4	
Manganese	**4.3J**	ug/L	5.0	0.73	1	12/04/18 12:45	12/05/18 13:39	7439-96-5	
Potassium	**5120**	ug/L	500	79.3	1	12/04/18 12:45	12/05/18 13:39	7440-09-7	
Sodium	**16900**	ug/L	500	157	1	12/04/18 12:45	12/05/18 13:39	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.19J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:50	7440-36-0	
Cadmium	**0.11J**	ug/L	0.50	0.033	1	12/05/18 10:24	12/05/18 15:50	7440-43-9	
Chromium	**0.30J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:50	7440-47-3	
Selenium	**2.4**	ug/L	1.0	0.085	1	12/05/18 10:24	12/05/18 15:50	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/05/18 10:24	12/05/18 15:50	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**529**	mg/L	20.0	4.9	1		11/29/18 13:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**709**	mg/L	5.0	5.0	1		11/21/18 14:50		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.013J**	mg/L	0.050		1		12/06/18 16:38	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/21/18 12:13		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**51.3**	mg/L	5.0	1.4	5		12/08/18 18:47	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	0.19	1		12/08/18 18:33	16984-48-8	
Sulfate	**54.3**	mg/L	5.0	1.2	5		12/08/18 18:47	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 13:29	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-5S **Lab ID: 60287167003** Collected: 11/16/18 10:20 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**13400**	ug/L	100	12.5	1	12/04/18 12:45	12/05/18 13:42	7440-42-8	
Calcium	**280000**	ug/L	200	53.5	1	12/04/18 12:45	12/05/18 13:42	7440-70-2	
Iron	**260**	ug/L	50.0	6.1	1	12/04/18 12:45	12/05/18 13:42	7439-89-6	
Magnesium	**54200**	ug/L	50.0	14.0	1	12/04/18 12:45	12/05/18 13:42	7439-95-4	
Manganese	**1700**	ug/L	5.0	0.73	1	12/04/18 12:45	12/05/18 13:42	7439-96-5	
Potassium	**4560**	ug/L	500	79.3	1	12/04/18 12:45	12/05/18 13:42	7440-09-7	
Sodium	**136000**	ug/L	500	157	1	12/04/18 12:45	12/05/18 13:42	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.18J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:52	7440-36-0	
Cadmium	**1.1**	ug/L	0.50	0.033	1	12/05/18 10:24	12/05/18 15:52	7440-43-9	
Chromium	**0.22J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:52	7440-47-3	
Selenium	**0.17J**	ug/L	1.0	0.085	1	12/05/18 10:24	12/05/18 15:52	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/05/18 10:24	12/05/18 15:52	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**357**	mg/L	20.0	4.9	1		11/29/18 13:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1530**	mg/L	5.0	5.0	1		11/21/18 14:50		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.26**	mg/L	0.050		1		12/06/18 16:38	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/21/18 12:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.9**	mg/L	5.0	1.4	5		12/11/18 10:30	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.19	1		12/08/18 19:31	16984-48-8	
Sulfate	**912**	mg/L	100	24.0	100		12/08/18 19:45	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 13:30	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Sample: S-LMW-9S **Lab ID: 60287167004** Collected: 11/16/18 14:40 Received: 11/17/18 04:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**1760**	ug/L	100	12.5	1	12/04/18 12:45	12/05/18 13:44	7440-42-8	
Calcium	**194000**	ug/L	200	53.5	1	12/04/18 12:45	12/05/18 13:44	7440-70-2	
Iron	**123**	ug/L	50.0	6.1	1	12/04/18 12:45	12/05/18 13:44	7439-89-6	
Magnesium	**60600**	ug/L	50.0	14.0	1	12/04/18 12:45	12/05/18 13:44	7439-95-4	
Manganese	**583**	ug/L	5.0	0.73	1	12/04/18 12:45	12/05/18 13:44	7439-96-5	
Potassium	**4720**	ug/L	500	79.3	1	12/04/18 12:45	12/05/18 13:44	7440-09-7	
Sodium	**49900**	ug/L	500	157	1	12/04/18 12:45	12/05/18 13:44	7440-23-5	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.20J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:53	7440-36-0	
Cadmium	**0.26J**	ug/L	0.50	0.033	1	12/05/18 10:24	12/05/18 15:53	7440-43-9	
Chromium	**0.17J**	ug/L	1.0	0.078	1	12/05/18 10:24	12/05/18 15:53	7440-47-3	
Selenium	**0.59J**	ug/L	1.0	0.085	1	12/05/18 10:24	12/05/18 15:53	7782-49-2	
Thallium	**<0.099**	ug/L	1.0	0.099	1	12/05/18 10:24	12/05/18 15:53	7440-28-0	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**415**	mg/L	20.0	4.9	1		11/29/18 13:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1020**	mg/L	5.0	5.0	1		11/20/18 12:07		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.12**	mg/L	0.050		1		12/06/18 16:38	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/21/18 12:14		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**278**	mg/L	50.0	14.5	50		12/08/18 20:28	16887-00-6	
Fluoride	**0.56**	mg/L	0.20	0.19	1		12/08/18 19:59	16984-48-8	
Sulfate	**163**	mg/L	50.0	12.0	50		12/08/18 20:28	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/26/18 13:32	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557225 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2286038 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
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	
Iron	ug/L	8.6J	50.0	6.1	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	
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
Boron	ug/L	1000	917	92	85-115	
Calcium	ug/L	10000	9880	99	85-115	
Iron	ug/L	10000	9860	99	85-115	
Magnesium	ug/L	10000	9400	94	85-115	
Manganese	ug/L	1000	916	92	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
Boron	ug/L	47.3J	1000	985	94	70-130	
Calcium	ug/L	108000	10000	118000	98	70-130	
Iron	ug/L	7630	10000	17500	99	70-130	
Magnesium	ug/L	23600	10000	32900	93	70-130	
Manganese	ug/L	459	1000	1360	90	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
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
Iron	ug/L	17400	10000	10000	27700	27600	103	102	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.

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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
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	
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	

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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557642 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

METHOD BLANK: 2287717 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
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	
Iron	ug/L	16.0J	50.0	6.1	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	
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
Boron	ug/L	1000	917	92	85-115	
Calcium	ug/L	10000	10500	105	85-115	
Iron	ug/L	10000	10500	105	85-115	
Magnesium	ug/L	10000	9850	99	85-115	
Manganese	ug/L	1000	905	91	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
Boron	ug/L	425	1000	1000	1390	1340	97	92	70-130	3	20	
Calcium	ug/L	129000	10000	10000	144000	138000	157	95	70-130	4	20	M1
Iron	ug/L	7.3J	10000	10000	10300	9830	103	98	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	
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	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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
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	
Iron	ug/L	843	10000	10000	11100	11200	102	103	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	
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
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	
Iron	ug/L	17.2J	10000	10000	10400	10400	104	104	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	
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 EC SCPB
Pace Project No.: 60286568

QC Batch: 558212 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2290148 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<12.5	100	12.5	12/05/18 13:33	
Calcium	ug/L	<53.5	200	53.5	12/05/18 13:33	
Iron	ug/L	<6.1	50.0	6.1	12/05/18 13:33	
Magnesium	ug/L	<14.0	50.0	14.0	12/05/18 13:33	
Manganese	ug/L	<0.73	5.0	0.73	12/05/18 13:33	
Potassium	ug/L	<79.3	500	79.3	12/05/18 13:33	
Sodium	ug/L	<157	500	157	12/05/18 13:33	

LABORATORY CONTROL SAMPLE: 2290149

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	985	98	85-115	
Calcium	ug/L	10000	10000	100	85-115	
Iron	ug/L	10000	9940	99	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Manganese	ug/L	1000	996	100	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2290150 2290151

Parameter	Units	60287289003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	640	1000	1000	1610	1640	97	100	70-130	1	20	
Calcium	ug/L	77100	10000	10000	86200	85000	91	80	70-130	1	20	
Iron	ug/L	8420	10000	10000	17900	17700	95	93	70-130	1	20	
Magnesium	ug/L	31300	10000	10000	41200	41500	98	102	70-130	1	20	
Manganese	ug/L	110	1000	1000	1110	1120	100	101	70-130	1	20	
Potassium	ug/L	3160	10000	10000	13600	13500	105	103	70-130	1	20	
Sodium	ug/L	44900	10000	10000	54600	54300	98	94	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557644 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

METHOD BLANK: 2287725 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	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	
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	
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	
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	
Thallium	ug/L	<0.099	40	40	36.0	35.6	90	89	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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	
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 EC SCPB
Pace Project No.: 60286568

QC Batch: 558318 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2290488 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	12/05/18 15:42	
Cadmium	ug/L	<0.033	0.50	0.033	12/05/18 15:42	
Chromium	ug/L	<0.078	1.0	0.078	12/05/18 15:42	
Selenium	ug/L	<0.085	1.0	0.085	12/05/18 15:42	
Thallium	ug/L	<0.099	1.0	0.099	12/05/18 15:42	

LABORATORY CONTROL SAMPLE: 2290489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.7	97	85-115	
Cadmium	ug/L	40	38.4	96	85-115	
Chromium	ug/L	40	38.8	97	85-115	
Selenium	ug/L	40	38.2	95	85-115	
Thallium	ug/L	40	37.0	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2290490 2290491

Parameter	Units	60287167001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.20J	40	40	38.1	38.3	95	95	70-130	1	20	
Cadmium	ug/L	0.38J	40	40	36.7	36.7	91	91	70-130	0	20	
Chromium	ug/L	<0.078	40	40	37.7	37.7	94	94	70-130	0	20	
Selenium	ug/L	0.12J	40	40	35.5	35.6	88	89	70-130	0	20	
Thallium	ug/L	<0.099	40	40	38.4	38.5	96	96	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556192 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2282069 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

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		545	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556754 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006

METHOD BLANK: 2284647 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/26/18 09:46	

LABORATORY CONTROL SAMPLE: 2284648

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	511	102	90-110	

SAMPLE DUPLICATE: 2284649

Parameter	Units	60287011001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	204	208	2	10	

SAMPLE DUPLICATE: 2284650

Parameter	Units	60287013001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	227	227	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556905 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287013007, 60287013008, 60287013009

METHOD BLANK: 2285092 Matrix: Water
Associated Lab Samples: 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/26/18 17:47	

LABORATORY CONTROL SAMPLE: 2285093

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	507	101	90-110	

SAMPLE DUPLICATE: 2285094

Parameter	Units	60287013008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	<4.9		10	

SAMPLE DUPLICATE: 2285095

Parameter	Units	60287037002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	1420	1440	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557384 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287167001

METHOD BLANK: 2286702 Matrix: Water
Associated Lab Samples: 60287167001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/29/18 10:30	

LABORATORY CONTROL SAMPLE: 2286703

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	502	100	90-110	

SAMPLE DUPLICATE: 2286706

Parameter	Units	60287257029 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	62.8	63.7	1	10	

SAMPLE DUPLICATE: 2286707

Parameter	Units	60287115002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	90.6	90.8	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557524 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60287167002, 60287167003, 60287167004

METHOD BLANK: 2287246 Matrix: Water
Associated Lab Samples: 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/29/18 13:19	

LABORATORY CONTROL SAMPLE: 2287247

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

SAMPLE DUPLICATE: 2287252

Parameter	Units	60287288010 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	525	543	3	10	

SAMPLE DUPLICATE: 2287253

Parameter	Units	60287289001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	403	406	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 555505 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2278841 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/16/18 10:25	

LABORATORY CONTROL SAMPLE: 2278842

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

SAMPLE DUPLICATE: 2278843

Parameter	Units	60286668009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	498	503	1	10	

SAMPLE DUPLICATE: 2278845

Parameter	Units	60286571003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1280	1290	0	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 555805 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287013001, 60287013002

METHOD BLANK: 2280475 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/19/18 10:30	

LABORATORY CONTROL SAMPLE: 2280476

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	997	100	80-120	

SAMPLE DUPLICATE: 2280477

Parameter	Units	60287003004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	575	594	3	10	

SAMPLE DUPLICATE: 2280482

Parameter	Units	60287011001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	348	273	24	10	D6

SAMPLE DUPLICATE: 2280487

Parameter	Units	60287013001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	346	294	16	10	D6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556173 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

METHOD BLANK: 2281968 Matrix: Water
Associated Lab Samples: 60287013003, 60287013004, 60287013005, 60287013006, 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/18 12:04	

LABORATORY CONTROL SAMPLE: 2281969

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	959	96	80-120	

SAMPLE DUPLICATE: 2281970

Parameter	Units	60287134001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1030	1070	4	10	

SAMPLE DUPLICATE: 2281971

Parameter	Units	60287013005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	925	951	3	10	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556175 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287167004

METHOD BLANK: 2281976 Matrix: Water
Associated Lab Samples: 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/18 12:07	

LABORATORY CONTROL SAMPLE: 2281977

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	950	95	80-120	

SAMPLE DUPLICATE: 2281978

Parameter	Units	60287171007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	859	817	5	10	

SAMPLE DUPLICATE: 2281979

Parameter	Units	60287171016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	212	211	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556380 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60287167001, 60287167002, 60287167003

METHOD BLANK: 2282802 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/21/18 14:48	

LABORATORY CONTROL SAMPLE: 2282803

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	954	95	80-120	

SAMPLE DUPLICATE: 2282804

Parameter	Units	60287115001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	264	248	6	10	

SAMPLE DUPLICATE: 2282805

Parameter	Units	60287156005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	455	464	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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: 60286568001, 60286568002

METHOD BLANK: 2279572 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

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

LABORATORY CONTROL SAMPLE: 2279573

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

SAMPLE DUPLICATE: 2279574

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

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

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: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007

METHOD BLANK: 2279582 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006, 60287013007

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 EC SCPB
Pace Project No.: 60286568

QC Batch: 555664 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60287013008, 60287013009

METHOD BLANK: 2279587 Matrix: Water
Associated Lab Samples: 60287013008, 60287013009

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

LABORATORY CONTROL SAMPLE: 2279588

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

SAMPLE DUPLICATE: 2279589

Parameter	Units	60286833001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.91	0.88	3	20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556509 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2283283 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/21/18 12:09	H6

LABORATORY CONTROL SAMPLE: 2283284

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

SAMPLE DUPLICATE: 2283286

Parameter	Units	60287289002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

SAMPLE DUPLICATE: 2283287

Parameter	Units	60287289001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.1	2.1	2	20	H6

SAMPLE DUPLICATE: 2283288

Parameter	Units	60287288010 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.4	2.5	4	20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 557070 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2285634 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 558975 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287013001, 60287013002

METHOD BLANK: 2293707 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/07/18 22:49	
Fluoride	mg/L	<0.19	0.20	0.19	12/07/18 22:49	
Sulfate	mg/L	<0.24	1.0	0.24	12/07/18 22:49	

LABORATORY CONTROL SAMPLE: 2293708

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	97	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2293709 2293710

Parameter	Units	60287773001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3000	2500	2500	5340	5320	94	93	90-110	1	15	
Fluoride	mg/L	ND	1250	1250	1250	1240	100	99	90-110	1	15	
Sulfate	mg/L	6060	2500	2500	8430	8400	95	94	90-110	0	15	

MATRIX SPIKE SAMPLE: 2293711

Parameter	Units	60287013001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	42.6	50	89.3	94	90-110	
Fluoride	mg/L	0.37	2.5	2.6	89	90-110	M1
Sulfate	mg/L	62.2	50	113	102	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559055 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2294201 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

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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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559099 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287013003, 60287013004

METHOD BLANK: 2294669 Matrix: Water
Associated Lab Samples: 60287013003, 60287013004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.34J	1.0	0.29	12/08/18 22:37	
Fluoride	mg/L	<0.19	0.20	0.19	12/08/18 22:37	
Sulfate	mg/L	<0.24	1.0	0.24	12/08/18 22:37	

LABORATORY CONTROL SAMPLE: 2294670

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	97	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2294671 2294672

Parameter	Units	60288112001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	16.2	25	25	40.2	40.1	96	96	90-110	0	15	
Fluoride	mg/L	ND	12.5	12.5	12.7	12.7	97	97	90-110	0	15	
Sulfate	mg/L	32.5	25	25	57.7	57.4	101	100	90-110	1	15	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559127 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287013005, 60287013006

METHOD BLANK: 2294915 Matrix: Water
Associated Lab Samples: 60287013005, 60287013006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.34J	1.0	0.29	12/09/18 15:07	
Fluoride	mg/L	<0.19	0.20	0.19	12/09/18 15:07	
Sulfate	mg/L	<0.24	1.0	0.24	12/09/18 15:07	

LABORATORY CONTROL SAMPLE: 2294916

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	97	90-110	
Sulfate	mg/L	5	4.8	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2294917 2294918

Parameter	Units	60287289001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.36	2.5	2.5	2.7	2.8	94	96	90-110	1	15	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559128 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287013007, 60287013008

METHOD BLANK: 2294921 Matrix: Water
Associated Lab Samples: 60287013007, 60287013008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.48J	1.0	0.29	12/09/18 15:12	
Fluoride	mg/L	<0.19	0.20	0.19	12/09/18 15:12	
Sulfate	mg/L	<0.24	1.0	0.24	12/09/18 15:12	

LABORATORY CONTROL SAMPLE: 2294922

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	4.7	93	90-110	

MATRIX SPIKE SAMPLE: 2294923

Parameter	Units	60287013008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<0.29	5	5.1	102	90-110	
Fluoride	mg/L	<0.19	2.5	2.7	107	90-110	
Sulfate	mg/L	<0.24	5	5.1	103	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559201 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287013009

METHOD BLANK: 2295155 Matrix: Water
Associated Lab Samples: 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/10/18 08:43	
Fluoride	mg/L	<0.19	0.20	0.19	12/10/18 08:43	
Sulfate	mg/L	<0.24	1.0	0.24	12/10/18 08:43	

LABORATORY CONTROL SAMPLE: 2295156

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.1	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2295157 2295158

Parameter	Units	60287044033 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.6	5	5	12.7	14.4	44	76	90-110	12	15	M1

MATRIX SPIKE SAMPLE: 2295159

Parameter	Units	60287044038 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	88.2	250	461	149	90-110	M1
Fluoride	mg/L	ND	125	123	98	90-110	
Sulfate	mg/L	29.0	250	698	267	90-110	M1

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 559270 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60287167003

METHOD BLANK: 2295317 Matrix: Water
Associated Lab Samples: 60287167003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/11/18 05:27	

LABORATORY CONTROL SAMPLE: 2295318

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 554984 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286568001, 60286568002

METHOD BLANK: 2276694 Matrix: Water
Associated Lab Samples: 60286568001, 60286568002

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		10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556507 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006

METHOD BLANK: 2283264 Matrix: Water
Associated Lab Samples: 60287013001, 60287013002, 60287013003, 60287013004, 60287013005, 60287013006

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	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556705 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60287013007, 60287013008, 60287013009

METHOD BLANK: 2284342 Matrix: Water
Associated Lab Samples: 60287013007, 60287013008, 60287013009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/26/18 12:19	

LABORATORY CONTROL SAMPLE: 2284343

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	94	90-110	

MATRIX SPIKE SAMPLE: 2284344

Parameter	Units	60287435001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.8	91	90-110	

MATRIX SPIKE SAMPLE: 2284346

Parameter	Units	60286985003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.29	2	2.0	84	90-110	M1

SAMPLE DUPLICATE: 2284345

Parameter	Units	60287013008 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	<0.050	<0.050		10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

QC Batch: 556706 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

METHOD BLANK: 2284384 Matrix: Water
Associated Lab Samples: 60287167001, 60287167002, 60287167003, 60287167004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/26/18 12:59	

LABORATORY CONTROL SAMPLE: 2284385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.8	92	90-110	

MATRIX SPIKE SAMPLE: 2284388

Parameter	Units	60287167001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.6	76	90-110	M1

MATRIX SPIKE SAMPLE: 2284608

Parameter	Units	60287371002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	3.6	2	4.8	64	90-110	M1

SAMPLE DUPLICATE: 2284387

Parameter	Units	60287412003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	9.1	9.3	2	10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568001	**S-BMW-1S**	EPA 200.7	557225	EPA 200.7	557391
60286568002	**S-BMW-3S**	EPA 200.7	557225	EPA 200.7	557391
60287013001	**S-LMW-1S**	EPA 200.7	557642	EPA 200.7	557772
60287013002	**S-LMW-4S**	EPA 200.7	557642	EPA 200.7	557772
60287013003	**S-LMW-6S**	EPA 200.7	557642	EPA 200.7	557772
60287013004	**S-LMW-7S**	EPA 200.7	557642	EPA 200.7	557772
60287013005	**S-LMW-8S**	EPA 200.7	557642	EPA 200.7	557772
60287013006	**S-LMW-DUP-1**	EPA 200.7	557642	EPA 200.7	557772
60287013007	**S-LMW-DUP-2**	EPA 200.7	557642	EPA 200.7	557772
60287013008	**S-LMW-FB-1**	EPA 200.7	557642	EPA 200.7	557772
60287013009	**S-LMW-FB-2**	EPA 200.7	557642	EPA 200.7	557772
60287167001	**S-LMW-2S**	EPA 200.7	558212	EPA 200.7	558388
60287167002	**S-LMW-3S**	EPA 200.7	558212	EPA 200.7	558388
60287167003	**S-LMW-5S**	EPA 200.7	558212	EPA 200.7	558388
60287167004	**S-LMW-9S**	EPA 200.7	558212	EPA 200.7	558388
60287013001	**S-LMW-1S**	EPA 200.8	557644	EPA 200.8	557771
60287013002	**S-LMW-4S**	EPA 200.8	557644	EPA 200.8	557771
60287013003	**S-LMW-6S**	EPA 200.8	557644	EPA 200.8	557771
60287013004	**S-LMW-7S**	EPA 200.8	557644	EPA 200.8	557771
60287013005	**S-LMW-8S**	EPA 200.8	557644	EPA 200.8	557771
60287013006	**S-LMW-DUP-1**	EPA 200.8	557644	EPA 200.8	557771
60287013007	**S-LMW-DUP-2**	EPA 200.8	557644	EPA 200.8	557771
60287013008	**S-LMW-FB-1**	EPA 200.8	557644	EPA 200.8	557771
60287013009	**S-LMW-FB-2**	EPA 200.8	557644	EPA 200.8	557771
60287167001	**S-LMW-2S**	EPA 200.8	558318	EPA 200.8	558523
60287167002	**S-LMW-3S**	EPA 200.8	558318	EPA 200.8	558523
60287167003	**S-LMW-5S**	EPA 200.8	558318	EPA 200.8	558523
60287167004	**S-LMW-9S**	EPA 200.8	558318	EPA 200.8	558523
60286568001	**S-BMW-1S**	SM 2320B	556192		
60286568002	**S-BMW-3S**	SM 2320B	556192		
60287013001	**S-LMW-1S**	SM 2320B	556754		
60287013002	**S-LMW-4S**	SM 2320B	556754		
60287013003	**S-LMW-6S**	SM 2320B	556754		
60287013004	**S-LMW-7S**	SM 2320B	556754		
60287013005	**S-LMW-8S**	SM 2320B	556754		
60287013006	**S-LMW-DUP-1**	SM 2320B	556754		
60287013007	**S-LMW-DUP-2**	SM 2320B	556905		
60287013008	**S-LMW-FB-1**	SM 2320B	556905		
60287013009	**S-LMW-FB-2**	SM 2320B	556905		
60287167001	**S-LMW-2S**	SM 2320B	557384		
60287167002	**S-LMW-3S**	SM 2320B	557524		
60287167003	**S-LMW-5S**	SM 2320B	557524		
60287167004	**S-LMW-9S**	SM 2320B	557524		
60286568001	**S-BMW-1S**	SM 2540C	555505		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568002	**S-BMW-3S**	SM 2540C	555505		
60287013001	**S-LMW-1S**	SM 2540C	555805		
60287013002	**S-LMW-4S**	SM 2540C	555805		
60287013003	**S-LMW-6S**	SM 2540C	556173		
60287013004	**S-LMW-7S**	SM 2540C	556173		
60287013005	**S-LMW-8S**	SM 2540C	556173		
60287013006	**S-LMW-DUP-1**	SM 2540C	556173		
60287013007	**S-LMW-DUP-2**	SM 2540C	556173		
60287013008	**S-LMW-FB-1**	SM 2540C	556173		
60287013009	**S-LMW-FB-2**	SM 2540C	556173		
60287167001	**S-LMW-2S**	SM 2540C	556380		
60287167002	**S-LMW-3S**	SM 2540C	556380		
60287167003	**S-LMW-5S**	SM 2540C	556380		
60287167004	**S-LMW-9S**	SM 2540C	556175		
60286568001	**S-BMW-1S**	SM 3500-Fe B#4	557638		
60286568002	**S-BMW-3S**	SM 3500-Fe B#4	557638		
60287013001	**S-LMW-1S**	SM 3500-Fe B#4	558438		
60287013002	**S-LMW-4S**	SM 3500-Fe B#4	558438		
60287013003	**S-LMW-6S**	SM 3500-Fe B#4	558438		
60287013004	**S-LMW-7S**	SM 3500-Fe B#4	558488		
60287013005	**S-LMW-8S**	SM 3500-Fe B#4	558488		
60287013006	**S-LMW-DUP-1**	SM 3500-Fe B#4	558488		
60287013007	**S-LMW-DUP-2**	SM 3500-Fe B#4	558488		
60287013008	**S-LMW-FB-1**	SM 3500-Fe B#4	558488		
60287013009	**S-LMW-FB-2**	SM 3500-Fe B#4	558488		
60287167001	**S-LMW-2S**	SM 3500-Fe B#4	558862		
60287167002	**S-LMW-3S**	SM 3500-Fe B#4	558862		
60287167003	**S-LMW-5S**	SM 3500-Fe B#4	558862		
60287167004	**S-LMW-9S**	SM 3500-Fe B#4	558862		
60286568001	**S-BMW-1S**	SM 3500-Fe B#4	555661		
60286568002	**S-BMW-3S**	SM 3500-Fe B#4	555661		
60287013001	**S-LMW-1S**	SM 3500-Fe B#4	555663		
60287013002	**S-LMW-4S**	SM 3500-Fe B#4	555663		
60287013003	**S-LMW-6S**	SM 3500-Fe B#4	555663		
60287013004	**S-LMW-7S**	SM 3500-Fe B#4	555663		
60287013005	**S-LMW-8S**	SM 3500-Fe B#4	555663		
60287013006	**S-LMW-DUP-1**	SM 3500-Fe B#4	555663		
60287013007	**S-LMW-DUP-2**	SM 3500-Fe B#4	555663		
60287013008	**S-LMW-FB-1**	SM 3500-Fe B#4	555664		
60287013009	**S-LMW-FB-2**	SM 3500-Fe B#4	555664		
60287167001	**S-LMW-2S**	SM 3500-Fe B#4	556509		
60287167002	**S-LMW-3S**	SM 3500-Fe B#4	556509		
60287167003	**S-LMW-5S**	SM 3500-Fe B#4	556509		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX EC SCPB
Pace Project No.: 60286568

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60287167004	**S-LMW-9S**	SM 3500-Fe B#4	556509		
60286568001	**S-BMW-1S**	EPA 300.0	557070		
60286568002	**S-BMW-3S**	EPA 300.0	557070		
60287013001	**S-LMW-1S**	EPA 300.0	558975		
60287013002	**S-LMW-4S**	EPA 300.0	558975		
60287013003	**S-LMW-6S**	EPA 300.0	559099		
60287013004	**S-LMW-7S**	EPA 300.0	559099		
60287013005	**S-LMW-8S**	EPA 300.0	559127		
60287013006	**S-LMW-DUP-1**	EPA 300.0	559127		
60287013007	**S-LMW-DUP-2**	EPA 300.0	559128		
60287013008	**S-LMW-FB-1**	EPA 300.0	559128		
60287013009	**S-LMW-FB-2**	EPA 300.0	559201		
60287167001	**S-LMW-2S**	EPA 300.0	559055		
60287167002	**S-LMW-3S**	EPA 300.0	559055		
60287167003	**S-LMW-5S**	EPA 300.0	559055		
60287167003	**S-LMW-5S**	EPA 300.0	559270		
60287167004	**S-LMW-9S**	EPA 300.0	559055		
60286568001	**S-BMW-1S**	EPA 365.4	554984		
60286568002	**S-BMW-3S**	EPA 365.4	554984		
60287013001	**S-LMW-1S**	EPA 365.4	556507		
60287013002	**S-LMW-4S**	EPA 365.4	556507		
60287013003	**S-LMW-6S**	EPA 365.4	556507		
60287013004	**S-LMW-7S**	EPA 365.4	556507		
60287013005	**S-LMW-8S**	EPA 365.4	556507		
60287013006	**S-LMW-DUP-1**	EPA 365.4	556507		
60287013007	**S-LMW-DUP-2**	EPA 365.4	556705		
60287013008	**S-LMW-FB-1**	EPA 365.4	556705		
60287013009	**S-LMW-FB-2**	EPA 365.4	556705		
60287167001	**S-LMW-2S**	EPA 365.4	556706		
60287167002	**S-LMW-3S**	EPA 365.4	556706		
60287167003	**S-LMW-5S**	EPA 365.4	556706		
60287167004	**S-LMW-9S**	EPA 365.4	556706		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60286568

60286568

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	FC 24
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPB
Project Number:	153-1406.0003F (COC #15)

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)

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

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N		6028656
1	S-LMW-1S	WT	G																				
2	S-LMW-2S	WT	G																				
3	S-LMW-3S	WT	G																				
4	S-LMW-4S	WT	G																				
5	S-LMW-5S	WT	G																				
6	S-LMW-6S	WT	G																				
7	S-LMW-7S	WT	G																				
8	S-LMW-8S	WT	G																				
9	S-LMW-9S	WT	G																				
10	S-BMW-1S	WT	G			11/12/18	1345		4	2	1	1							✓	✓	✓		(2) BP2A BP3S BP3 001 002
11	S-BMW-3S	WT	G			11/12/18	1105		4	2	1	1							✓	✓	✓		
12	S-LMW-DUP-1	WT	G																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca	Golder	11/12/18	17:15		11/13	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):

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPB
Project Number:	153-1406.0003L (COC #16)

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-LMW-1S	WT	G																							
2	S-LMW-2S	WT	G																							
3	S-LMW-3S	WT	G																							
4	S-LMW-4S	WT	G																							
5	S-LMW-5S	WT	G																							
6	S-LMW-6S	WT	G																							
7	S-LMW-7S	WT	G																							
8	S-LMW-8S	WT	G																							
9	S-LMW-9S	WT	G																							
10	S-BMW-1S	WT	G			11/12/18	1345		4	2	1	1							✓	✓	✓	✓	✓			
11	S-BMW-3S	WT	G			11/12/18	1105		4	2	1	1							✓	✓	✓	✓	✓			
12	S-LMW-DUP-1	WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	[signature] / Golder	11/12/18	17:15	[signature]	11/13	0747

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: | DATE Signed (MM/DD/YY):

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Sample Condition Upon Receipt

WO# : 60287013

60287013

Client Name: Golder

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

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

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

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

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

JLS

Date and initials of person examining contents: JB 11/16

Cooler Temperature (°C): **As-read** 3.6 2.8 4.0 **Corr. Factor** +0.0 **Corrected** 3.6 2.8 4.0

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	Fe2+
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Church 11/16/18

Project Manager Review: _____ Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPB
Project Number:	153-1406.0003L (COC #16)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES | (GROUND WATER) | DRINKING WATER
UST | RCRA | OTHER ______

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N): N N N N 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*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron				Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60287913
1	S-LMW-1S	WT	G			11/14/18	1225		4	2	1	1						✓	✓	✓	✓	✓	(4) BP2u	(3) DP3B	(3)	BP3N	001
2	S-LMW-2S	WT	G																								
3	S-LMW-3S	WT	G																								
4	S-LMW-4S	WT	G			11/14/18	1525		4	2	1	1						✓	✓	✓	✓	✓	(2) BP2u	BP3B		BP3N	002
5	S-LMW-5S	WT	G																								
6	S-LMW-6S	WT	G			11/14/18	1545		4	2	1	1						✓	✓	✓	✓	✓					003
7	S-LMW-7S	WT	G			〃	1335		〃	〃	〃	〃						〃	〃	〃	〃	〃					004
8	S-LMW-8S	WT	G			〃	1440		〃	〃	〃	〃						〃	〃	〃	〃	〃					005
9	S-LMW-9S	WT	G																								
10	(LMW-1S) ~~S-BMW-1S~~ S-LMW-MS-1	WT	G			11/14/18	1225		4	2	1	1						✓	✓	✓	✓	✓					MS Collected @ LMW-1S
11	(LMW-1S) ~~S-BMW-3S~~ S-LMW-MSD-1	WT	G			11/14/18	1225		〃	〃	〃	〃						〃	〃	〃	〃	〃					MSD Collected @ LMW-1S
12	S-LMW-DUP-1	WT	G			11/14/18	—		4	2	1	1						✓	✓	✓	✓	✓					006

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	[signature] / Golder	11/14/18	1750	[signature]	11/15/18	1000	3.6	Y	Y	Y
							2.8	Y	Y	Y
							4.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature]

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 2 of 2

Section A — Required Client Information:

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

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #16)

Section C — Invoice Information:

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

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron								Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N									
1	S-LMW-DUP-2	WT	G			11/14/18	—		4	2	1	1							✓	✓	✓	✓	✓	②	BP2N	BP3U	BP3N					007
2	S-LMW-FB-1	WT	G			11/14/18	1535		1	1	1	1							↓	↓	↓	↓	↓		↓							008
3	S-LMW-FB-2	WT	G			11/14/18	1550		1	1	1	1							↓	↓	↓	↓	↓									009
4		WT	G																												
5		WT	G																												
6		WT	G																												
7		WT	G																												
8		WT	G																												
9		WT	G																												
10		WT	G																												
11		WT	G																												
12		WT	G																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	[signature] / Golder	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Sommerdorf

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

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Jeffrey Ingram	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux EC SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

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*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-LMW-1S	WT	G			11/14/18	1725		4	2	1	1						✓	✓	✓			
2	S-LMW-2S	WT	G																				
3	S-LMW-3S	WT	G																				
4	S-LMW-4S	WT	G			11/14/18	1525		4	2	1	1						✓	✓	✓			
5	S-LMW-5S	WT	G																				
6	S-LMW-6S	WT	G			11/14/18	1545		4	2	1	1						✓	✓	✓			
7	S-LMW-7S	WT	G			"	1335		1	1	1	1						1	1	1			
8	S-LMW-8S	WT	G			"	1440		1	1	1	1						1	1	1			
9	S-LMW-9S	WT	G																				
10	~~S-LMW-MS-1~~ ~~S-BMW-1S~~ (LMW-15)	WT	G			11/14/18	1225		4	2	1	1						✓	✓	✓			MS Collected @ LMW-1S
11	~~S-LMW-MSD-1~~ ~~S-BMW-3S~~ (LMW-15)	WT	G			"	1225		1	1	1	1						1	1	1			MSD Collected @ LMW-1S
12	S-LMW-DUP-1	WT	G			"	—		1	1	1	1						1	1	1			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca	[signature] / Golder	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

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

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

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CHAIN-OF-CUSTODY / Analytical Request Document

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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:	153-1406.0003F (COC #15)

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-LMW-DUP-2	WT	G			11/14/18	—		4	2	1	1							✓	✓	✓		
2	S-LMW-FB-1	WT	G				1535		1	1	1	1							1	1	1		
3	S-LMW-FB-2	WT	G				1550		1	1	1	1							1	1	1		
4		WT	G																				
5		WT	G																				
6		WT	G																				
7		WT	G																				
8		WT	G																				
9		WT	G																				
10		WT	G																				
11		WT	G																				
12		WT	G																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: B, Ca	Golder /	11/14/18	1750				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schmidt

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

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

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60287167

60287167

Client Name: Golder

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

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

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

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

Thermometer Used: T-298 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 0.9 **Corr. Factor** 0.0 **Corrected** 0.9

Date and initials of person examining contents: 11/17/18 D

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jana Church 11/18/18 Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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 SCPB	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0003F (COC #15)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER

UST | RCRA | OTHER _____

Site Location STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: Metals*	Chloride/Fluoride/Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS																	Y/N	N	N	N	60487167
1	S-LMW-1S	WT	G																			
2	S-LMW-2S	WT	G			11/16/18	1415		4	2	1	1						✓	✓	✓		2BP2U, BP3S, BP3N 01
3	S-LMW-3S	WT	G			〃	1305		〃	〃	〃	〃						〃	〃	〃		02
4	S-LMW-4S	WT	G																			
5	S-LMW-5S	WT	G			11/16/18	1020		4	2	1	1						✓	✓	✓		2BP2U, BP3S, BP3N 03
6	S-LMW-6S	WT	G																			
7	S-LMW-7S	WT	G																			
8	S-LMW-8S	WT	G																			
9	S-LMW-9S	WT	G			11/16/18	1446		4	2	1	1						✓	✓	✓		2BP2U, BP3S, BP3N 04
10	S-BMW-1S	WT	G																			
11	S-BMW-3S	WT	G																			
12	S-LMW-DUP-1	WT	G																			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca	Golder	11/16/18		EBrockett / Pace	11/17/18	0430	0.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Andrew Ackins

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/16/18

MEMORANDUM

DATE January 15, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

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

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – DATA PACKAGE 60286568R1

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

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).
- When a sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL (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 - SCPB-SEC-Nov 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/14/19

Laboratory: Pace Analytical (TG)
SDG #: 60286568 (TG)
Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-BMW-1S, S-BMW-3S, S-LMW-1S, S-LMW-2S, S-LMW-3S, S-LMW-4S, S-LMW-5S, S-LMW-6S, S-LMW-7S, S-LMW-8S, S-LMW-9S, S-LMW-DUP-1, S-LMW-DUP-2, S-LMW-FB-1, S-LMW-FB-2

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/(12,14,16)/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☐	☐	☒	
b) Were hold times met for sample analysis?	☐	☒	☐	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 Section
b) Were analytes detected in the field blank(s)?	☑	☐	☐	FB-1: B(32.1), Mn(4.1), K(194), Cr(0.12), TDS(5.5)
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	FB-2: B(17.7), Mg(22.6), K(127), Cr(0.52), TDS(8.0)
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☐	☐	Dup-1@ 7S DUP-2@ 8S FB-1@ 4S (12) FB-2@ 6S
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☐	DUP-1: Fe(30), ~~Mo(200)~~, Fe^{3r}(31)
c) Were lab duplicates analyzed (note original and duplicate samples)?	☒	☐	☐	DUP-2: Fe(31), ~~Li(55)~~ (14), Cr(33), Se(20), Fe^{3r}(31)
d) Were lab dup. precision criteria met (note RPD)?	☐	☑	☐	[3001-01] TDS(16) [3001-02] (14)

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

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	☐	☑	☐	Ca, SO_4^{2-}, F^-, P
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☑	☐	Ca
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

MB:
[3001-02] Fe(8.6), K(179),
[3001-09] Fe(16.0), Mn(2.4), K(141), Cr(0.086),
[3003-08] F^-(0.34)
[3007-08] Cl^-(0.48)

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-BMW-1S	Iron (Fe)	50.0	U	Method Blank; MDL < Result < PQL
⊥	Potassium (K)	580	J	; PQL < Result < 10× MB
S-BMW-3S	Fe	57.5	J	
⊥	K	772	J	
S-LMW-1S	Fe	50.0	U	; MDL < Result < PQL
⊥	Chromium (Cr)	1.0	U	
⊥	Total Dissolved Solids (TDS)	346	J	Sample Dup exceeded limits; Result > MDL
S-LMW-4S	Fe	50.0	U	MB; MDL < Result < PQL
⊥	Cr	1.0	U	
S-LMW-6S	Fe	50.0	U	
⊥	Cr	1.0	U	
S-LMW-7S	Fe	50.0	U	
⊥	Cr	1.0	U	
⊥	Ferric Iron (Fe^{3+})	0.015	J	RPD exceeded limit; Result > MDL
S-LMW-8S	Selenium (Se)	0.31	J	
⊥	Fe^{3+}	0.0086	J	
⊥	Fe	50.0	U	MB; MDL < Result < PQL
⊥	Cr	1.0	U	
S-LMW-DUP-1	Fe	50.0	U	
⊥	Cr	1.0	U	
⊥	Fe^{3+}	0.011	J	RPD exceeded limit; Result > MDL
S-LMW-DUP-2	Se	0.38	J	
⊥	Fe^{3+}	0.0063	J	
⊥	Fe	50.0	U	MB; MDL < Result < PQL
⊥	Cr	1.0	U	
S-LMW-FB-1	Manganese (Mn)	5.0	U	
⊥	K	500	U	
⊥	Cr	1.0	U	
S-LMW-FB-2	K	500	U	
⊥	Cr	1.0	U	

Signature: Tommy J. Wood III Date: 1/15/19

APPENDIX B

Alternative Source Demonstration – November 2017 Sampling Event

SCPB Alternative Source Demonstration

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

Submitted to:

Ameren Missouri

1901 Chouteau Ave, St. Louis MO 63103

Submitted by:

Golder Associates Inc.

820 South Main Street, Suite 100 St. Charles, Missouri, USA 63301

+1 636 724-9191

Project No. 153-1406

April 13, 2018

Distribution List

1 Electronic Copy - Ameren

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FALCON Analysis

CERTIFICATION STATEMENT

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

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

GOLDER ASSOCIATES INC.

_____

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

Principal, Practice Leader

1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this *SCPB – Alternative Source Demonstration* has been prepared to document an Alternative Source Demonstration (ASD) for Statistically Significant Increases (SSI) calculated at Ameren Missouri's (Ameren) Sioux Energy Center (SEC or Facility), SCPB or fly ash surface impoundment. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that the SSI results are from a source other than the CCR Unit or from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

2.0 SITE DESCRIPTION AND BACKGROUND

The SEC is located approximately 12 miles west-northwest of the confluence of the Mississippi and Missouri Rivers in St. Charles County, Missouri. **Figure 1** depicts the site location and layout of the Facility, including the locations of the SCPB and the nearby bottom ash pond SCPA. The Facility is surrounded by agricultural fields and bounded to the north by wooded areas associated with the Mississippi River, to the south by a railroad, and to the east and west by agricultural fields.

2.1 Geological and Hydrogeological Setting

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

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

2.2 SCPB – Fly Ash Surface Impoundment

In 1994, Ameren constructed SCPB[1], a 62-acre impoundment located directly south of the plant building. The SCPB was constructed by contouring an existing lowland area previously used for stormwater management and lining the impoundment with a geomembrane. The impoundment is surrounded by earthen berms with a crest height of 441.5 (FT MSL). Pond bottom elevations also vary from approximately 419 to 431 FT MSL. Discharges from the impoundment are routed through NPDES Outfall 006 into Poeling Lake at the

[1] SCPB is sometimes referred to as "Fly Ash Pond", "Secondary Pond', and "Ash Pond 2",

southwest end of the pond. The interior slopes are lined with a 60-mil high-density polyethylene (HDPE) geomembrane and the interior bottom is lined with a 40-mil HDPE geomembrane.

The SCPB has a total storage capacity of approximately 1,550,000 cubic yards (960 acre-feet) and receives process water used to sluice fly ash as well as stormwater runoff from an approximately 27-acre area which includes the coal pile.

2.3 SCPA – Bottom Ash Surface Impoundment

[2]SCPA is 49 acre unlined containment pond constructed in 1967 as a borrow area for plant foundation and earthen berm materials used during for plant construction. The earthen berms consist of 2H:1V upstream slope and 2H:1V or 2.5H:1V downstream slopes with a crest height at approximately 442.5 FT MSL. Pond bottom elevations vary from approximately 373 to 420 FT MSL. Water in SCPA exits the pond via NPDES Outfall 002 into Poeling Lake on the west berm.

SCPA has a total storage capacity of approximately 3,400,000 cubic yards (2,100 acre-feet) and currently receives process water used to sluice bottom ash, as well as flow from the combined drained sump. Prior to the construction of SCPB in 1994, all high-volume wastes and most low-volume wastes were conveyed to SCPA. Historical records indicate that fly ash was sluiced to the southeastern portion of SCPA until 1994. Prior to 1987, bottom ash (boiler slag) and economizer ash were sluiced to the north central portion of SCPA.

2.4 CCR Rule Groundwater Monitoring

The following has been completed and placed in the facility's operating record in accordance with the CCR Rule: (1) installation of a groundwater monitoring well system; (2) a Statistical Method Certification; (3) a Groundwater Monitoring Plan (GMP) that details design, installation, development, sampling procedures, as well as statistical methods; and (4) eight baseline groundwater sampling events for all Appendix III and Appendix IV parameters of the CCR Rule.

The groundwater monitoring system for the SCPB consists of nine “downgradient” or “compliance” monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. The CCR Rule monitoring wells (LMW-1S, LMW-2S, LMW-3S, LMW-4S, LMW-5S, LMW-6S, LMW-7S, LMW-8S and LMW-9S) were installed by Golder in 2016 for groundwater monitoring purposes. Additionally, two background monitoring wells (BMW-1S and BMW-3S) are located approximately 0.5 to 1 mile to the west of the CCR Unit. These monitoring wells provide background quality data for the monitoring well network and are used to calculate statistical limits. Additional detail on the design and installation of the monitoring wells is provided in the SCPB GMP and the SCPB Annual Report.

[2] SCPA, also called “Bottom Ash Pond”, “Primary Pond”, “Ash Pond #1 facility located to the southwest of the plant building at SEC.

Between May 2016 and June 2017, eight (8) baseline groundwater sampling events were completed for the SCPB. After baseline sampling, the first Detection Monitoring event was completed in November 2017. The following Appendix III constituents were sampled during detection monitoring;

- Boron
- Calcium
- Chloride
- pH
- Sulfate
- TDS
- Fluoride

In January 2018, background results from the eight baseline sampling events were used to calculate statistical upper prediction limits (UPL). These UPL's were then compared to the Detection Monitoring results from the November 2017 samples. If results from the Detection Monitoring sampling were higher than the calculated UPL, it was considered an initial exceedance, in which case a verification sample was collected and tested in accordance with the SCPB statistical analysis plan.

3.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

Statistically Significant Increases (SSIs) were reported in a least one downgradient (compliance) monitoring well for all Appendix III parameters except pH. A summary table of the detection and verification sampling results are provided in **Table 1**. In accordance with the Statistical Plan for the SCPB, interwell statistical methods were used to evaluate the data, meaning results from compliance monitoring wells were compared with a statistical upper prediction limit (UPL) calculated for each constituent from background monitoring well data. Interwell statistical methods were selected because, while the SCPB is synthetically lined, no groundwater data were collected prior to the receipt of CCR. All nine compliance monitoring wells had at least one verified SSI from detection and verification sampling.

4.0 REVIEW OF AVAILABLE DATA AND SOURCES

Geological, geochemical, and hydrogeological data have been collected during several different historical investigations at the SEC. This section provides a brief review of the data available for this analysis.

4.1 Previous Investigations

In 1998, the Electric Power Research Institute (EPRI) completed a study of the extent and type of wastes managed at CCR facilities. In this study they completed drilling in the SCPA and SCPB CCR Units, as well as the surrounding alluvial aquifer. The report also discusses the different types of CCR and other wastes that are managed in each of the CCR units.

In 2006, as part of the permitting process for the UWL south of Highway 94, Gredell Engineering Resources, Inc. (GERI) completed a *Detailed Geologic and Hydrologic Site Investigation Report.* This report looked at the alluvial groundwater chemistry, geology and hydrogeologic characteristics of the area south of Missouri State Highway 94.

As a part of the closure design work completed by Golder, 8 piezometers were installed within the SCPB in 2016. These piezometers were used for pump testing and water level measurements. These piezometers were re-used

for this ASD and pore-water samples were collected from 3 of the 8 piezometers. Geological boring logs are provided in **Appendix A** and piezometer construction details are available in **Appendix B** and **Table 2**.

As a part of the CCR Rule, in 2016, 24 monitoring wells were installed around and exterior to the different CCR units at the SEC. As described in Section 2.4, these monitoring wells were sampled as required by the CCR Rule. Information on the construction, geology and hydrogeology of these monitoring wells is provided in the Groundwater Monitoring Plans for the SCPA, SCPB, SCPC and SCL4A prepared in October 2017. Data on the sampling results are provided in the annual reports for the SCPA, SCPB, SCPC and SCL4A prepared in January 2018.

4.2 ASD Drilling and Sampling Investigation

In addition to data from previously completed studies, additional investigation data were collected for this ASD. For this investigation, Golder subcontracted Robert Environmental Drilling, Inc. (REDI) to complete direct-push drilling, soil sampling, and installation of temporary 1-inch PVC piezometers. Geological boring logs from this investigation are available in **Appendix A**, and temporary piezometer construction details are available in **Appendix B** and **Table 2**.

After temporary piezometers were installed at each location, groundwater/pore-water samples were collected using peristaltic pumps with dedicated tubing. The samples were collected following removal of at least three well volumes of water from each piezometer as well as field parameter stabilization using the following limits:

- ± 0.2 for pH
- ± 3% for Conductivity
- ± 10% for Temperature
- Less than 20 nephelometric turbidity units (NTU) or ± 10% for Turbidity

Upon stabilization, groundwater samples were collected directly into laboratory-supplied containers and submitted for laboratory analysis. Unfiltered samples (totals) were collected directly from pump tubing discharge. Filtered samples (dissolved) were collected at select locations by attaching a 0.45 micron filter to the discharge end of the tubing. Groundwater samples were then labeled with the sample identification number, requested analysis, collection date, and sampler's initials and placed on ice in a cooler for shipment under chain of custody protocol to Pace Analytical Laboratories. Analytical results for the alluvial aquifer groundwater samples (ASD samples) are tabulated in **Table 3**. Analytical results for the pore-water samples are tabulated in **Table 4**. Data packets, as provided by the laboratory, as well as data validation memos/reports, are provided in **Appendix C**.

Full rounds of groundwater elevation measurements were collected from all temporary piezometers, CCR Rule monitoring wells, and State UWL rule monitoring wells on February 12 and March 9, 2018. Groundwater levels were obtained manually using an electronic water level indicator. A summary of the groundwater level results is provided in **Table 5** and potentiometric surface maps of the groundwater/pore-water flow are provided in **Figure 2** and **Figure 3**.

4.3 CCR Indicators

There are several different types of CCR byproducts generated by the burning of coal in coal-fired power plants. The different types of CCR typically display different geochemical signatures and indicator parameters. **Table 6**

below describes the different types of CCR and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017). These indicator parameters are key to determining if impacts are from CCR units or a source other than a CCR Unit.

Table 6: Types of CCR and Typical Indicator Parameters

Type of CCR	Description of CCR (USEPA 2018)	Key Indicators (EPRI 2011, 2012, 2017)
Fly Ash	Fine grained, powdery material composed mostly of silica made from the burning of finely ground coal in the boiler.	■ Boron ■ Molybdenum ■ Lithium ■ Sulfate ■ Bromide ■ Potassium ■ Sodium ■ Fluoride
Boiler Slag / Bottom Ash	Molten bottom ash from the slag tap and cyclone type furnaces that turns into pellets that have a smooth glassy appearance after it is cooled with water	
Flue Gas Desulfurization Material (FGD)	A material leftover from the process of reducing sulfur dioxide emissions from a coal-fired boiler that can be wet sludge consisting of calcium sulfite or calcium sulfate or a dry powered material that is a mixture of sulfites and sulfates.	■ Sulfate ■ Fluoride ■ Calcium ■ Boron ■ Bromide ■ Chloride

Notes:
1) Fly Ash, Bottom Ash and Boiler Slag typically have the same indicator parameters.
2) Definitions from USEPA website, available at https://www.epa.gov/coalash/coal-ash-basics.
3) Key indicators from EPRI 2011, 2012, and 2017, as well as Gredell and Reitz & Jens, 2014.

As described above, the SCPA has historically received Fly Ash and Boiler Slag, while the SCPB has only historically received Fly Ash. FGD type wastes at the SEC are managed at the SCPC, located south of Highway 94 (**Figure 1**).

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

While the types of waste within the SCPA and SCPB are similar, key differences exist between the contact water from the two impoundments, which produces distinctively different geochemical fingerprints In evaluating geochemical data from the site with the compliance monitoring wells around the SCPB, it can be shown that the impacts observed in the compliance wells are not from the SCPB, but are rather from the SCPA. This geochemical pattern is also supported by the following: (1) the hydrogeological and geological characteristics of the alluvial aquifer; (2) construction details of the two units; and (3) by concentrations of key CCR indicators in downgradient monitoring wells. **Table 7** below summarizes the various analyses which, taken collectively, demonstrate that SSIs detected in the monitoring well network around the SCPB are from an alternative source. The details of these comparisons are provided below in Section 5.1.

Table 7: Key and Supporting Lines of Evidence for SCPB ASD

Key Lines of Evidence	Brief Description
Piper Diagrams	Piper Diagrams are graphical representations used to distinguish differences in groundwater chemistry from various sources. The Piper diagrams prepared for this investigation reflect distinct differences between background groundwater, SCPA pore-water, and SCPB pore-water. Results from this analysis demonstrate that when the groundwater data from the compliance wells in the alluvial aquifer is plotted in comparison with the different sources (background, SCPA, and SCPB), the groundwater in the compliance wells shows mixing between background groundwater and SCPA pore-water. The Piper diagrams indicate that the SCPA is the source of impacts observed in the groundwater in the shallow SCPB compliance monitoring wells that ring the facility.
Supporting Lines of Evidence	**Brief Description**
Fingerprint Analysis of Leachate Contaminates (FALCON) analysis	A USEPA FALCON analysis compared key ion ratios between background groundwater, SCPA pore-water, and SCPB pore-water. Results from this analysis indicate that impacted monitoring wells correlate better with SCPA pore-water or background groundwater, as compared to SCPB pore-water. As a result of this FALCON analysis, SCPB monitoring wells show impacts that most resemble the SCPA source.
Stiff Diagrams	Stiff diagrams use the same data plotted in Piper Diagrams to visually display the chemistry of different waters as a shape. When plotted spatially on a map, the stiff diagrams show that the chemistry of the impacted monitoring wells are more closely related to that of the SCPA pore-water rather than that of the SCPB pore-water.
Hydrogeological Analysis	A hydrogeological analysis of groundwater flow regimes within the alluvial aquifer demonstrates that groundwater flows from the SCPA toward the SCPB and that impacted monitoring wells around the SCPB are hydraulically downgradient from the SCPA. Additionally, vertical gradients in the alluvial aquifer are variable, with no principal direction of flow. Therefore, since impacts are present in the shallow, middle, and deep alluvial aquifers and are not isolated to the shallow alluvial aquifer, the impacts are more likely from the SCPA, which is unlined and cuts through these hydrogeologic units.
Construction of the SCPB	The SCPB was constructed using a 40-mil HDPE geomembrane liner on the bottom of the pond and a 60-mil HDPE geomembrane liner on the sides of the CCR Unit. The SCPA, which has been in place since 1967 does not have a liner.

Concentrations of Key Indicators	Key chemical indicators, such as boron and sulfate, are detected at levels within the shallow alluvial aquifer that are above the levels found within the SCPB, while still below the levels found within the SCPA. If groundwater impacts to the wells surrounding the SCPB were from the SCPB, concentrations in downgradient wells would not be expected to have concentrations higher than the source.

5.1 Geochemical Evaluations

Geochemical evaluations of pore-water and alluvial aquifer data demonstrate that impacts present in the monitoring wells around the SCPB are not caused by the SCPB, but instead are caused by an alternative source, the SCPA. The following sections describe different geochemical evaluation methods which demonstrate that the SCPA and SCPB have distinct geochemical fingerprints and the concentrations in compliance monitoring wells downgradient of the SCPB match the fingerprint of the SCPA, not the SCPB.

5.1.1 Piper Diagrams

A Piper diagram is a graphical technique used to classify different groundwater chemistries. Data is plotted based on its major cation and anion concentrations, and can be used to determine if groundwater chemistry is different or changing, either spatially or over time. Additionally, Piper diagrams can be used to determine if impacts are a mixture between different sources. The following sections show the relationship between the alluvial aquifer groundwater surrounding the SCPB and SCPA compared to the background alluvial aquifer groundwater, SCPA pore-water and SCPB pore-water.

5.1.1.1 Sources – SCPA, SCPB and Background

In order to determine what sources are influencing downgradient groundwater quality around the SCPB, the different sources (SCPA and SCPB pore-water quality) and background water quality were plotted on a Piper Diagram. **Figure 4** displays where each source plots based on its major cation/anion composition. As displayed on the figure, background groundwater plots on the left side of the trilinear diagram, meaning that it has relatively low concentrations of sulfate + chloride and sodium + potassium and higher concentrations of alkalinity and calcium + magnesium. Pore-water from the SCPA plots in the top portion of the trilinear diagram indicating that it has high sulfate + chloride and high calcium + magnesium concentrations. Pore-water from the SCPB plots on the right side of the trilinear diagram which indicates it has high concentrations of sulfate + chloride and sodium + potassium.

Plotting of the downgradient groundwater data along with the sources is useful for determining the source of the downgradient impacts. If the groundwater impacts were from one source or the other, the groundwater results from the downgradient wells would be expected to plot in an area between the source and background groundwater. These “mixing” zones are shown on **Figure 4** and represent that if impacts on downgradient monitoring wells were caused by the SCPA, the results from these wells should plot somewhere between the background groundwater and the SCPA pore-water in the SCPA mixing zone, and between the background groundwater and the SCPB if the impacts were from the SCPB.

5.1.1.2 Alluvial Aquifer Groundwater Results

Figures 5 and **6** display where CCR Rule alluvial aquifer groundwater sampling results plot in comparison to the SCPA pore-water, SCPB pore-water, and background groundwater zones developed using **Figure 4**. As displayed in these figures, results from all groundwater results in the alluvial aquifer plot between unimpacted background groundwater and SCPA pore-water.

Additional analysis of these figures demonstrates that there is a close correlation between key CCR indicator parameters and where the data plots on the Piper diagram. CCR indicators such as boron, sulfate, and molybdenum in monitoring wells around the SCPA are detected at their highest concentrations south of the SCPA in monitoring wells UMW-2D, UMW-3D, and UMW-4D. This correlates with where these three monitoring wells plot on the Piper diagram, in the zone for SCPA pore-water. The correlation can also be made with monitoring wells around the SCPB, where boron concentrations are typically lowest in monitoring wells LMW-1S, LMW-3S, and LMW-4S and highest in LMW-2S, LMW-5S, LMW-6S, and LMW-8S. This correlates with the Piper diagram, where monitoring wells with lower concentrations of boron plot closer to background groundwater quality and monitoring wells with high concentrations of boron plot closer to SCPA pore-water. The strong association between concentration of key CCR indicators and where those wells plot relative to background groundwater and SCPA pore-water demonstrates impacts are caused by the SCPA, and the more closely associated the water chemistry is to that of the SCPA zone, greater values of key CCR indicators are present.

There is also no notable difference in concentration between the shallow, middle and deep zones of the alluvial aquifer. **Figure 7** displays where the ASD samples plot on a Piper diagram compared to background groundwater, as well as the SCPA and SCPB zones. These results demonstrate that there is no apparent change in groundwater chemistry between the shallow, middle and deep zones of the alluvial aquifer. This supports that impacts are not from the SCPB, because the SCPB is a lined impoundment whose base is generally above the static groundwater elevation such that impacts would likely be isolated to the shallow zone of the alluvial aquifer. The SCPA is unlined and approximately 70 feet deep, cutting through each of the aquifer zones. Thus, impacts from the SCPA would be expected in the shallow, middle and deep alluvial aquifer.

5.1.2 Stiff Diagrams

Stiff Diagrams use the same major cation/anion chemistry data as piper diagrams, but produce a visual representation of the data as a geometric shape. These visual plots can then be used spatially or temporally to compare groundwater chemistry. **Figures 8** and **9** display the spatial distribution of the stiff diagrams in the shallow and middle alluvial aquifer zones. These figures support the conclusions of the piper diagrams and demonstrate downgradient well data in the shallow and intermediate aquifers more closely resemble that of the pore-water in the SCPA and not that of the pore water in the SCPB. Additionally, it demonstrates that there are no significant vertical changes in groundwater chemistry, which is further corroboration that groundwater impacts are from the unlined SCPA and not the shallow, lined SCPB.

5.1.3 FALCON Ion Ratio Analysis

The Fingerprint Analysis of Leachate Contaminants (FALCON) method was developed by the United States Environmental Protection Agency (USEPA) in 2004 to identify the source of a contaminant. This method compiles ion ratios from multiple constituents to develop a distinctive chemical fingerprint for each source. A description of the analytes were used and the steps required to produce the results are provided in **Appendix D**.

Results from the analysis are summarized on **Table 8,** which displays the correlation between each alluvial aquifer sample with the fingerprint of the SPCA, SCPB, and background groundwater. This analysis displays that each sample in the alluvial aquifer has a stronger correlation with either the SCPA pore-water or background groundwater than it does with SCPB pore-water, adding further support to the geochemical results displayed on the Piper diagrams and reinforces that while materials deposited in both the SCPA and SCPB are somewhat similar, there is a distinct fingerprint in each and impacts in downgradient monitoring wells are representative of SCPA pore-water impacts.

5.2 Hydrogeological Analysis

Groundwater flow on site is characterized as having low hydraulic gradients and variable flow direction. Horizontal gradients are typically directly controlled by river stages of the adjacent Mississippi and Missouri Rivers. Vertical gradients are localized and are not consistent. Additionally, complex alluvial aquifer deposits such as floodplain and channel deposits can create preferential flow paths within the alluvial aquifer. The following sections discuss the hydrogeological conditions at the SEC as they relate to the alternative source evaluation.

5.2.1 Horizontal Alluvial Aquifer Groundwater Flow

Site groundwater flow conditions are directly controlled by river stages of the Mississippi and Missouri Rivers since the alluvial aquifer is hydraulically connected to these water bodies. These rivers display large seasonal changes in elevation. Under normal aquifer conditions, groundwater flow in the alluvial aquifer would be expected to have a minor flow direction component to the southeast in the direction of river flow and generally flow from the higher to the lower of the two rivers, which is typically from the Mississippi towards south towards the Missouri River (see **Figure 2**).

Additionally, because of the low horizontal hydraulic gradient and changes in river stage, these maps indicate that groundwater flow near the SCPA and SCPB can be variable, and groundwater impacts from the units can travel north, east or south depending on river stages (see **Figure 3** and Appendix C of SCPA and SCPB Annual Reports). Therefore, impacts in the downgradient monitoring wells at the SCPB are sometimes downgradient from SCPA. This supports the findings in the Piper diagrams and demonstrates impacts from the SCPA are often upgradient of the monitoring wells around the SCPB.

5.2.2 Vertical Alluvial Aquifer Gradients

A review of vertical gradients in the alluvial aquifer is provided in **Figures 10-13**. The groundwater elevations between different zones of the alluvial aquifer were compared to evaluate vertical groundwater gradients in nested monitoring well/piezometers. These data demonstrate that there is no consistent vertical gradient and that vertical gradients are typically very low. Nearly all gradients are less than 3 feet per thousand feet such that for SPCA (which is about 70 feet thick), the potentiometric head difference would only be 0.2 feet between the top of the unit.

These gradients suggest that groundwater impacts onsite should be at similar elevations to the source. The ASD piezometers display that there are boron and sulfate impacts in the shallow, middle, and deep zones of the alluvial aquifer and that concentrations are generally similar between the three different zones. This supports the geochemical models that indicate that impacts are present from the SCPA. If all impacts were from the SCPB,

impacts to the groundwater would only be expected to be present in the shallow alluvial aquifer and likely decrease with depth.

5.3 Concentrations of Detection Monitoring Parameters Compared to Pore-Water

Table 9 provides a summary of the minimum and maximum concentrations at each SCPB CCR Rule monitoring well, as well as within the shallow zone of the SCPA and SCPB. When comparing these results, there are several instances where concentrations at compliance wells are higher than concentrations found in the SCPB. If impacts at the monitoring wells around the SCPB were from the SCPB CCR Unit, downgradient concentrations would not be expected to be higher than those in the shallow source. Additionally, for each Appendix III parameter that is at a concentration above those in the SCPB, it is still below concentrations within the SCPA. This comparison supports the evidence that impacts found around the SCPB are not from the SCPB CCR Unit, but instead are from the SCPA.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCPB IMPACT

Based on the information provided above, the SSIs in the CCR Rule groundwater monitoring wells at the SCPB were not caused by impacts from the SCPB. Rather, the SSIs are caused by an alternative source, in this case, the unlined, adjacent SCPA surface impoundment. This conclusion is reached via multiple analytical and evaluations methods including Piper diagrams, FALCON fingerprinting, hydrogeologic assessments, and geochemistry analysis. The following list summarizes the demonstration results:

- As reflected on the Piper diagrams, SCPA pore-water has a distinctly different signature than the pore-water from SCPB. CCR groundwater samples in monitoring wells with SSIs plot on the Piper diagrams in a location between the SCPA pore-water zone and the background groundwater zone, indicating that well water chemistry is a mixture of unaffected groundwater and groundwater impacted by the SCPA. None of the downgradient monitoring wells plotted in the SCPB pore-water zone, or in the area that is strictly the SCPB mixing zone.
- The USEPA FALCON method was used to compare constituent fingerprints between the downgradient monitoring wells and the background groundwater, SCPB pore-water and SCPA pore-water sources. The results indicate a strong correlation between downgradient monitoring wells and the SCPA pore-water or background groundwater, as compared to SCPB pore-water. These same correlations were found at depth within the alluvial aquifer in the temporary ASD piezometers.
- Potentiometric surface mapping demonstrates that groundwater flow directions onsite are variable and can flow in multiple directions, but generally with a south and eastward flow direction, depending on the river levels in the Missouri and Mississippi Rivers. This supports the conclusion that the unlined SCPA is the source of impacts at the downgradient monitoring because impacted monitoring wells around the SCPB are frequently downgradient from the SCPA.
- The SCPB was constructed with a geomembrane liner with a bottom elevation of approximately 419 FT MSL at its lowest point. The SCPA was built in 1967 and has a bottom elevation of approximately 370 FT MSL. This, along with key CCR indicators being present in the shallow, middle and deep zones of the alluvial aquifer indicate that impacts present onsite are likely from the SCPA and not the SPCB.

- Concentrations in some of the impacted SCPB downgradient monitoring wells are at levels higher than those present in the SCPB pore-water, but lower than those present in the SCPA pore-water. If the SCPB was the source of the impact at these monitoring wells, the concentration in the downgradient monitoring wells would be expected to be lower than the SCPB source, as it would be a mixture of groundwater and source water.

In summary, groundwater chemistry, pore-water chemistry fingerprints, cell construction and hydrogeological evidence all demonstrate that impacts (SSIs) that were calculated during the first detection monitoring event were not caused by impacts from the SCPB surface impoundment and the SCPA surface impoundment to the west is the source of the SCPB SSIs.

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Tables

Table 1
Detection and Verification Sampling Results
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS								
			BMW-1S	BMW-3S	LMW-1S	LMW-2S	LMW-3S	LMW-4S	LMW-5S	LMW-6S	LMW-7S	LMW-8S	LMW-9S
November 2017 Detection Monitoring Event													
DATE	NA	NA	11/13/2017	11/13/2017	11/14/2017	11/14/2017	11/13/2017	11/13/2017	11/14/2017	11/14/2017	11/14/2017	11/14/2017	11/15/2017
pH	SU	6.369-7.556	6.95	7.08	7.43	7.12	7.17	7.16	6.98	7.00	6.93	6.79	6.94
BORON, TOTAL	µg/L	107.5	118	104	**1,390**	**11,600**	**303**	**267**	**8,220**	**18,000**	**2,630**	**6,880**	**1,470**
CALCIUM, TOTAL	µg/L	170705	156,000	128,000	98,500	**200,000**	153,000	154,000	**236,000**	**269,000**	**256,000**	**178,000**	**193,000**
CHLORIDE, TOTAL	mg/L	12.34	7.7	10.5	**24.4**	**156**	**29.6**	3.0	**29.5**	3.0	**14.1**	**52.2**	**89.6**
FLUORIDE, TOTAL	mg/L	0.38	0.30	0.34	**0.41**	**0.40**	0.28	0.19 J	**0.51**	0.21	0.28	**0.89**	**0.41**
SULFATE, TOTAL	mg/L	34.49	41.4	28.2	**113**	**268**	**38.2**	**34.6**	**585**	**792**	**519**	**463**	**302**
TOTAL DISSOLVED SOLIDS	mg/L	565	526	446	471	**958**	545	544	**1,180**	**1,500**	**1,140**	**941**	**997**
January 2018 Verification Sampling Event													
DATE	NA	NA			1/8/2018	1/9/2018	1/8/2018	1/8/2018	1/9/2018	1/9/2018	1/9/2018	1/9/2018	1/8/2018
pH	SU	6.369-7.556											
BORON, TOTAL	µg/L	107.5			608	7,970	305	387	7,310	21,400	2,430	8,800	1,560
CALCIUM, TOTAL	µg/L	170705				246,000			236,000	322,000	258,000	175,000	199,000
CHLORIDE, TOTAL	mg/L	12.34			17.2	259	36.4		29.1		12.7	48.8	97.2
FLUORIDE, TOTAL	mg/L	0.38			0.44	0.37			0.62			0.94	0.43
SULFATE, TOTAL	mg/L	34.49			68.8	171	41.0	51.5	556	993	525	441	318
TOTAL DISSOLVED SOLIDS	mg/L	565				1,220			1,210	1,770	1,220	932	980

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 (PL) calculated using Sanitas Software.
6. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.
7. Values bolded and highlighted in yellow indicate a Statistically Significant Increase (SSI).
8. Values bolded and highlighted in green indicate an initial exceedance above the PL that was below the PL during Verification Sampling.
9. Only analyte/well combinations that were detected above the PL were sampled during Verification Sampling.

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

Table 2
Piezometer Construction Details
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

	Well ID	Location		Top of Casing Elevation	Ground Surface Elevation	Top of Screen	Bottom of Screen	Base of Well	Total Depth
		Northing	Easting	Feet MSL	Feet MSL	Feet MSL	Feet MSL	Feet MSL	Feet MSL
Alternative Source Demonstration Piezometers	S-ASD-1D	1,121,611.4	879,832.9	446.27	445.5	361.3	356.5	356.2	352.5
	S-ASD- 1M	1,121,605.9	879,830.6	446.21	445.5	382.3	377.5	377.2	377.2
	S-ASD- 1S	1,121,600.2	879,828.2	446.11	445.4	412.0	407.2	406.9	387.4
	S-ASD-2D	1,120,961.8	879,336.2	446.06	445.0	362.2	357.4	357.1	347.0
	S-ASD-2M	1,120,950.9	879,335.0	445.67	445.1	384.4	379.6	379.2	377.1
	S-ASD-2S	1,120,956.5	879,335.4	445.95	445.1	412.0	407.2	406.9	406.1
	S-ASD-3D	1,120,277.4	879,289.3	446.05	445.4	352.5	347.7	347.4	347.4
	S-ASD-3M	1,120,264.0	879,287.0	446.62	445.5	384.8	380.0	379.7	372.5
	S-ASD-3S	1,120,270.4	879,287.7	446.14	445.4	412.6	407.8	407.5	407.4
	S-ASD-4D	1,119,455.3	880,633.1	444.21	443.6	351.5	346.7	346.4	345.6
	S-ASD-4M	1,119,458.7	880,637.6	444.44	443.6	381.3	376.5	376.2	375.6
	S-ASD-4S	1,119,462.6	880,641.6	444.45	443.8	411.1	406.3	406.0	405.8
	S-ASD-5D	1,120,074.0	880,846.6	442.26	441.6	351.9	347.1	346.8	346.6
	S-ASD-5M	1,120,078.6	880,842.6	442.09	441.1	382.5	377.7	377.4	376.1
	S-ASD-5S	1,120,083.2	880,838.5	442.33	441.3	412.5	407.7	407.4	383.3
	S-ASD-6D	1,120,855.1	880,303.0	444.08	443.4	359.0	354.2	353.9	347.4
	S-ASD-6M	1,120,850.3	880,303.9	443.78	443.3	380.5	375.7	375.4	375.3
	S-ASD-6S	1,120,845.1	880,305.0	443.85	443.2	410.1	405.3	405.0	375.2
SCPA Piezometers	S-SCPA-1D	1,121,222.7	878,398.8	443.94	441.9	394.0	389.3	388.9	378.9
	S-SCPA-1S	1,121,216.4	878,403.1	443.49	442.1	411.8	407.1	406.7	407.1
	S-SCPA-2	1,121,148.3	879,216.0	448.26	447.1	421.1	416.4	416.0	414.1
	S-SCPA-3D	1,120,661.1	878,671.4	447.27	446.1	381.9	377.2	376.8	373.1
	S-SCPA-3S	1,120,660.0	878,666.2	447.38	446.0	413.1	408.4	408.0	408.0
SCPB Piezometers	S-SCPB-1	1,120,031.4	879,817.3	449.32	447.0	436.1	431.4	431.0	431.0
	LB-1	1,121,164.1	879,504.3	448.70	446.0	436.0	431.2	430.8	429.0
	LB-2	1,121,124.8	879,754.6	452.60	450.3	445.4	435.6	435.2	433.9
	LB-3	1,121,114.2	880,078.4	452.50	450.1	445.3	435.5	435.1	433.6
	LB-4	1,121,107.8	880,190.2	449.30	446.8	442.1	432.3	431.9	430.3
	LB-5	1,121,339.8	880,021.6	450.90	448.5	443.2	433.4	433.0	431.6
	LB-6	1,121,112.4	880,113.7	452.90	450.1	445.3	435.5	435.1	434.1
	LB-7	1,121,110.0	880,143.0	451.80	449.0	444.2	434.4	434.0	433.0
	LB-8	1,121,108.9	880,159.0	450.70	448.0	443.0	433.2	432.8	432.0

Notes:

1.) Feet MSL - Feet above mean sea level.

2.) Horizontal Datum: State Plane Coordinates NAD83 (2000) Missouri East Zone feet.

3.) Vertical Datum: NAVD88 feet.

4.) LB Piezometers installed in 2016 for pond closure analysis.

Prepared By: MSG

Checked By: SJD

Reviewed By: MNH

Table 3
Summary of Groundwater Sampling Results
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Alluvial Aquifer Temporary Piezometers																	
		S-ASD-1D	S-ASD-1M	S-ASD-1S	S-ASD-2D	S-ASD-2M	S-ASD-2S	S-ASD-3D	S-ASD-3M	S-ASD-3S	S-ASD-4D	S-ASD-4M	S-ASD-4S	S-ASD-5D	S-ASD-5M	S-ASD-5S	S-ASD-6D	S-ASD-6M	S-ASD-6S
Appendix III Parameters																			
BORON, TOTAL	µg/L	1,150	555	588	385	451	744	4,450	7,330	8,850	4,400	2,990	717	3,990	2,400	4,960	1,980	4,110	5,100
CALCIUM, TOTAL	µg/L	107,000	110,000	108,000	103,000	120,000	228,000	128,000	124,000	217,000	126,000	189,000	189,000	85,500	174,000	181,000	107,000	120,000	213,000
CHLORIDE, TOTAL	mg/L	28.1	35.7	35.0	22.9	21.6	654	28.5	31.9	147	31.1	34.4	20.4	24.3	29.4	17.2	31.4	35.5	46.9
FLUORIDE, TOTAL	mg/L	0.30	0.42	1.0	0.33	0.35	0.25	0.59	0.55	0.39	0.29	0.50	0.60	0.23	0.25	0.45	0.31	0.35	0.82
pH	SU	7.35	7.57	7.29	7.69	7.55	7.11	7.97	7.84	6.78	7.19	7.10	6.90	8.16	7.05	7.05	7.28	7.26	7.25
SULFATE, TOTAL	mg/L	162	129	195	147	193	54.3	219	278	212	268	348	255	174	342	372	208	329	469
TOTAL DISSOLVED SOLIDS	mg/L	459	427	339	482	563	1,390	585	692	1,040	671	932	848	493	809	875	596	699	1,120
Appendix IV Parameters																			
ANTIMONY, TOTAL	µg/L	ND	0.048 J	0.26 J	ND	0.028 J	0.20 J	0.19 J	0.16 J	0.29 J	0.077 J	0.12 J	0.27 J	0.038 J	0.028 J	0.11 J	ND	ND	0.24 J
ARSENIC, TOTAL	µg/L	0.49 J	1.1	4.8	1.4	1.0	0.85 J	0.48 J	0.70 J	0.47 J	0.50 J	1.6	0.32 J	ND	0.39 J	0.59 J	0.24 J	0.78 J	0.37 J
BARIUM, TOTAL	µg/L	127	143	65.1	128	149	298	96.4	116	188	113	161	149	63.6	121	128	109	95.8	159
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.29 J	0.39 J	0.20 J	0.21 J	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	ND	0.052 J	0.27 J	ND	ND	0.27 J	0.11 J	ND	0.43 J	0.054 J	ND	0.50 J	ND	ND	0.10 J	0.018 J	ND	0.29 J
CHROMIUM, TOTAL	µg/L	0.47 J	2.2	3.5	0.55 J	0.43 J	1.2	2.4	ND	0.90 J	1.5	0.34 J	0.79 J	1.4 J	0.83 J	0.53 J	0.63 J	2.9	ND
COBALT, TOTAL	µg/L	ND	0.74 J	1.4 J	ND	ND	3.4 J	ND	ND	18.6	ND	ND	8.4	ND	ND	4.5 J	ND	ND	21.6
LEAD, TOTAL	µg/L	ND	2.6 J	3.2 J	ND	ND	3.4 J	ND	ND	ND	ND	ND	2.9 J	ND	2.6 J	ND	ND	ND	3.3 J
LITHIUM, TOTAL	µg/L	22.7	16.2	8.4 J	12.4	14.6	24.9	35.0	32.8	41.8	40.1	37.2	36.0	45.0	42.6	17.1	40.1	46.2	27.0
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.057 J	ND	ND	ND	0.058 J	0.057 J	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	131	43.3	24.8	46.3	59.9	184	814	675	532	161	30.5	3.0 J	12.9 J	10.9 J	27.7	172	551	10.8 J
SELENIUM, TOTAL	µg/L	ND	0.35 J	98.5	ND	ND	7.2	0.10 J	0.093 J	0.10 J	0.12 J	0.14 J	0.20 J	ND	ND	7.9	ND	ND	0.12 J
THALLIUM, TOTAL	µg/L	ND	ND	0.076 J	ND	ND	0.057 J	ND	ND	ND	ND	ND	0.058 J	ND	ND	ND	ND	ND	0.064 J
Additional Parameters																			
ALKALINITY	mg/L	217	230	241	249	263	262	207	215	440	228	405	469	195	303	307	203	212	456
CHEMICAL OXYGEN DEMAND	mg/L	6.7 J	11.6	71.2	7.7 J	4.6 J	8.6 J	12.3	7.8 J	5.7 J	7.7 J	14.5	ND	5.7 J	7.6 J	ND	7.3 J	7.0 J	21.7
HARDNESS	µg/L	352,000	354,000	376,000	363,000	420,000	834,000	376,000	414,000	649,000	445,000	676,000	675,000	304,000	607,000	630,000	362,000	418,000	780,000
IRON, TOTAL	µg/L	8,250	4,760	1,580	3,060	4,140	468	3,460	789	1,840	8,720	8,500	949	7,170	10,900	336	7,230	8,090	2,280
MAGNESIUM, TOTAL	µg/L	20,700	19,300	26,100	25,800	29,500	63,900	13,500	25,500	26,000	31,900	49,600	49,400	22,000	41,800	43,300	22,800	28,300	60,200
MANGANESE, TOTAL	µg/L	624	616	1,900	918	1,400	319	484	304	463	985	1,630	2,160	578	1,580	231	728	747	740
POTASSIUM, TOTAL	µg/L	5,920	12,400	6,600	5,950	10,100	13,800	14,900	15,600	13,000	5,830	7,710	5,640	5,260	5,570	4,270	7,310	6,320	7,200
SODIUM, TOTAL	µg/L	24,400	23,400	38,000	21,400	23,500	120,000	29,600	37,600	73,500	41,700	37,400	15,100	38,800	19,000	19,300	29,000	48,800	42,900
SULFIDE, TOTAL	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL ORGANIC CARBON	mg/L	1.7 J	1.3 J	17.2	2.9	2.0	ND	3.3	2.9	0.93 J	2.5	4.9	1.4	2.6	2.5	1.5	2.3	1.9	6.9

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.

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

Table 4
Summary of Pore-Water Sampling Results
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

Analyte	Units	SCPB Pore-Water Data				SCPA Pore-Water Data				
		S-LB-2	S-LB-4	S-LB-5	S-SCPB-1	S-SCPA-1D	S-SCPA-1S	S-SCPA-2	S-SCPA-3D	S-SCPA-3S
Appendix III Parameters										
BORON, TOTAL	µg/L	4,510	6,500	17,900	10,700	7,680	111,000	348 J	79,500	67,800
CALCIUM, TOTAL	µg/L	112,000	94,100	40,100	37,200	101,000	825,000	73,400	548,000	501,000
CHLORIDE, TOTAL	mg/L	25.7	38.2	30.5	51.7	25.0	26.0	20.5	27.1	23.1
FLUORIDE, TOTAL	mg/L	1.3	1.1	1.2	1.8	1.2	0.79	0.22	2.9	0.60
pH	SU	11.14	11.37	11.82	11.59	8.17	NA	6.86	8.16	8.92
SULFATE, TOTAL	mg/L	451	318	393	630	200	2,080	48.5	1,820	1,290
TOTAL DISSOLVED SOLIDS	mg/L	777	560	1,030	1,240	560	3,440	320	2,880	2,150
Appendix IV Parameters										
ANTIMONY, TOTAL	µg/L	0.56 J	0.56 J	0.59 J	0.78 J	0.31 J	1.5 J	0.23 J	1.2 J	0.33 J
ARSENIC, TOTAL	µg/L	3.6	3.2	8.9	7.1	92.1	26.1	2.0	91.2	72.0
BARIUM, TOTAL	µg/L	118	108	215	71.2	79.9	46.0	153	77.7	32.9
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	0.36 J	ND
CADMIUM, TOTAL	µg/L	0.13 J	0.082 J	0.40 J	0.51	0.44 J	9.5	0.24 J	7.4	1.6
CHROMIUM, TOTAL	µg/L	0.18 J	0.27 J	0.33 J	0.44 J	0.19 J	ND	ND	0.62 J	ND
COBALT, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND
LEAD, TOTAL	µg/L	ND	2.7 J	ND	ND	ND	ND	ND	ND	2.6 J
LITHIUM, TOTAL	µg/L	24.4	21.1	13.3	ND	28.7	22.0	16.7	170	43.4
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	789	526	2,430	3,710	2,230	56,600	26.5 J	43,500	8,070
SELENIUM, TOTAL	µg/L	11.7	7.2	29.0	25.2	0.37 J	6.6 J	0.60 J	1.6 J	1.5
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	0.10 J	0.49 J	0.56 J	1.7 J	0.29 J
Additional Parameters										
ALKALINITY	mg/L	133	115	468	326	228	549	219	185	170
CHEMICAL OXYGEN DEMAND	mg/L	ND	ND	6.6 J	10.2	10.5	73.9	ND	55.7	44.0
HARDNESS	µg/L	281,000	235,000	100,000	93,000	350,000	2,080,000	266,000	1,620,000	1,290,000
IRON, TOTAL	µg/L	ND	57.0	21.9 J	69.7	779	ND	1,350	138	34.3 J
MAGNESIUM, TOTAL	µg/L	122	108	28.4 J	38.7 J	23,900	4,880	20,000	60,200	9,600
MANGANESE, TOTAL	µg/L	ND	ND	ND	ND	97.9	ND	113	202	17.9
POTASSIUM, TOTAL	µg/L	24,900	25,200	91,000	74,900	11,800	55,200	4,350	60,300	40,100
SODIUM, TOTAL	µg/L	108,000	76,100	267,000	314,000	27,000	81,400	13,900	116,000	58,500
SULFIDE, TOTAL	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL ORGANIC CARBON	mg/L	0.83 J	0.81 J	1.7	2.7	4.7	28.2	2.2 J	23.2	19.5

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.
4) NA - Not Available.

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

Table 5
Summary of Groundwater Elevation Measurements
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

	Well ID	Location		Top of Casing	Ground Surface	Groundwater Elevation Measurements 2/12/2018		Groundwater Elevation Measurements 3/9/2018	
		Northing	Easting	Feet MSL	Feet MSL	DTW	GWE	DTW	GWE
SCPA CCR Wells	UMW-1D	1,121,321.4	879,420.0	447.16	445.4	29.37	417.79	29.95	417.21
	UMW-2D	1,120,266.7	878,981.6	433.86	431.7	17.30	416.56	17.33	416.53
	UMW-3D	1,120,570.4	878,251.1	431.67	430.1	15.03	416.64	15.18	416.49
	UMW-4D	1,121,077.9	877,859.9	423.52	421.7	6.37	417.15	6.84	416.68
	UMW-5D	1,121,815.0	877,799.1	446.66	444.8	28.75	417.91	29.72	416.94
	UMW-6D	1,122,312.0	878,639.5	447.02	444.9	28.76	418.26	30.05	416.97
	BMW-1D	1,121,713.6	876,740.9	428.28	426.0	10.95	417.33	11.68	416.60
	BMW-2D	1,122,766.5	880,522.6	438.67	436.8	20.56	418.11	22.23	416.44
	BMW-3D	1,121,798.8	875,798.3	426.41	424.2	9.19	417.22	9.85	416.56
SCPB CCR Wells	LMW-1S	1,121,320.4	879,427.2	447.10	445.4	29.19	417.91	29.83	417.27
	LMW-2S	1,120,332.8	879,283.7	447.16	445.2	30.47	416.69	30.52	416.64
	LMW-3S	1,119,348.8	878,856.4	430.17	428.4	14.81	415.36	14.49	415.68
	LMW-4S	1,119,226.6	879,561.5	429.40	427.3	14.02	415.38	13.72	415.68
	LMW-5S	1,119,250.6	880,348.6	447.36	445.5	31.81	415.55	31.58	415.78
	LMW-6S	1,119,782.0	880,867.8	446.00	444.1	29.89	416.11	29.97	416.03
	LMW-7S	1,120,261.0	880,650.0	444.26	442.2	27.74	416.52	27.92	416.34
	LMW-8S	1,121,024.3	880,328.8	446.80	444.8	29.66	417.14	30.08	416.72
	LMW-9S	1,121,905.9	879,849.3	445.57	443.7	27.74	417.83	28.69	416.88
	BMW-1S	1,121,709.2	876,755.6	427.77	426.0	10.44	417.33	11.16	416.61
	BMW-2S	1,122,772.1	880,524.1	437.86	436.1	19.79	418.07	21.41	416.45
	BMW-3S	1,121,792.9	875,809.5	426.69	424.1	9.48	417.21	10.13	416.56
Utility Waste Landfill Wells	UG-1A	1,118,825.2	877,789.8	427.74	425.2	12.65	415.09	12.04	415.70
	UG-2	1,118,859.7	879,319.5	429.27	426.5	14.50	414.77	14.05	415.22
	UG-3	1,118,608.5	880,519.4	429.71	427.1	14.44	415.27	14.04	415.67
	UG-4	1,118,616.1	881,530.7	429.75	427.1	14.23	415.52	14.02	415.73
	DG-1	1,117,388.3	877,383.5	431.81	428.9	18.29	413.52	16.94	414.87
	DG-2	1,116,940.7	877,617.7	431.75	428.9	18.69	413.06	17.05	414.70
	DG-3	1,116,644.1	877,845.2	433.84	431.0	20.96	412.88	19.18	414.66
	DG-4	1,116,403.2	878,420.7	432.75	430.1	19.98	412.77	18.14	414.61
	DG-5	1,116,330.2	878,919.2	432.03	429.3	19.20	412.83	17.44	414.59
	DG-6	1,116,257.1	879,417.1	431.44	428.7	18.53	412.91	16.89	414.55
	DG-7	1,116,184.8	879,911.5	430.93	428.1	17.91	413.02	16.41	414.52
	DG-8	1,116,113.5	880,398.2	430.39	427.4	17.39	413.00	16.01	414.38
	DG-9	1,116,162.3	880,902.0	429.25	426.5	16.01	413.24	14.81	414.44
	DG-10	1,116,074.8	881,453.2	428.31	425.5	14.86	413.45	13.81	414.50
	DG-11	1,115,984.9	882,003.6	428.27	425.7	14.79	413.48	13.83	414.44
	DG-12	1,116,385.5	882,289.8	429.66	427.0	15.85	413.81	15.06	414.60
	TMW-1	1,117,385.1	880,121.2	428.08	425.9	14.49	413.59	13.55	414.53
	TMW-2	1,117,320.7	880,442.9	428.17	425.9	14.55	413.62	13.64	414.53
	TMW-3	1,117,259.2	880,762.4	427.88	425.7	14.24	413.64	13.37	414.51
Alternative Source Demonstration Piezometers	ASD-1D	1,121,611.4	879,832.9	446.27	445.5	28.51	417.76	29.28	416.99
	ASD-1M	1,121,605.9	879,830.6	446.21	445.5	28.49	417.72	29.26	416.95
	ASD-1S	1,121,600.2	879,828.2	446.11	445.4	28.37	417.74	29.13	416.98
	ASD-2D	1,120,961.8	879,336.2	446.06	445.0	28.79	417.27	29.11	416.95
	ASD-2M	1,120,950.9	879,335.0	445.67	445.1	28.39	417.28	28.67	417.00
	ASD-2S	1,120,956.5	879,335.4	445.95	445.1	28.60	417.35	28.91	417.04
	ASD-3D	1,120,277.4	879,289.3	446.05	445.4	29.52	416.53	29.55	416.50
	ASD-3M	1,120,264.0	879,287.0	446.62	445.5	30.05	416.57	30.09	416.53
	ASD-3S	1,120,270.4	879,287.7	446.14	445.4	29.58	416.56	29.60	416.54
	ASD-4D	1,119,455.3	880,633.1	444.21	443.6	28.41	415.80	28.34	415.87
	ASD-4M	1,119,458.7	880,637.6	444.44	443.6	28.60	415.84	28.53	415.91
	ASD-4S	1,119,462.6	880,641.6	444.45	443.8	28.60	415.85	28.54	415.91
	ASD-5D	1,120,074.0	880,846.6	442.26	441.6	25.90	416.36	26.05	416.21
	ASD-5M	1,120,078.6	880,842.6	442.09	441.1	25.78	416.31	25.93	416.16
	ASD-5S	1,120,083.2	880,838.5	442.33	441.3	25.94	416.39	26.11	416.22
	ASD-6D	1,120,855.1	880,303.0	444.08	443.4	27.04	417.04	27.40	416.68
	ASD-6M	1,120,850.3	880,303.9	443.78	443.3	26.73	417.05	27.09	416.69
	ASD-6S	1,120,845.1	880,305.0	443.85	443.2	26.82	417.03	27.18	416.67
SCPA Pond Piezometers	S-SCPA-1D	1,121,222.7	878,398.8	443.94	441.9	10.93	433.01	10.57	433.37
	S-SCPA-1S	1,121,216.4	878,403.1	443.49	442.1	10.75	432.74	10.25	433.24
	S-SCPA-2	1,121,148.3	879,216.0	448.26	447.1	15.34	432.92	15.04	433.22
	S-SCPA-3D	1,120,661.1	878,671.4	447.27	446.1	21.23	426.04	20.77	426.50
	S-SCPA-3S	1,120,660.0	878,666.2	447.38	446.0	16.65	430.73	16.35	431.03
SCPB Pond Piezometers	S-SCPB-1	1,120,031.4	879,817.3	449.32	447.0	10.62	438.70	9.17	440.15
	LB-1	1,121,164.1	879,504.3	448.70	446.0	11.77	436.93	8.05	440.65
	LB-2	1,121,124.8	879,754.6	452.60	450.3	12.71	439.89	11.63	440.97
	LB-3	1,121,114.2	880,078.4	452.50	450.1	11.54	440.96	10.79	441.71
	LB-4	1,121,107.8	880,190.2	449.30	446.8	8.86	440.44	8.45	440.85
	LB-5	1,121,339.8	880,021.6	450.90	448.5	10.53	440.37	9.31	441.59
	LB-6	1,121,112.4	880,113.7	452.90	450.1	11.98	440.92	11.01	441.89
	LB-7	1,121,110.0	880,143.0	451.80	449.0	11.23	440.57	10.19	441.61
	LB-8	1,121,108.9	880,159.0	450.70	448.0	10.23	440.47	9.58	441.12
River Levels	Mississippi River	1,124,029 [1]	879,444 [1]	NA	NA	NA	419.00	NA	416.30
	Missouri River	1,112,870 [1]	878,170 [1]	NA	NA	NA	412.55	NA	415.66

Notes:

1.) Mississippi and Missouri River gauge locations are estimated.

2.) CCR - Coal Combustion Residuals

3.) River Elevation for the Mississippi River is provided by Ameren.

4.) Feet MSL - Feet above mean sea level.

5.) NA - Not applicable.

6.) Horizontal Datum: State Plane Coordinates NAD83 (2000) Missouri East Zone feet.

7.) Vertical Datum: NAVD88 feet.

8.) DTW - Depth to water measured in feet below top of casing.

9.) GWE - Groundwater elevation measured in feet above mean sea level.

10.) River Elevation for the Missouri River is calculated based on nearby USGS (United States Geological Survey) river elevation gauges.

Prepared By: RJF

Checked By: EMS/JSI

Reviewed By: MNH

Table 8
Summary of FALCON Analysis Results
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

Temporary Piezometers				CCR Rule Monitoring Wells			
	Percent Correlation				Percent Correlation		
Well ID	SCPA	SCPB	Background	Well ID	SCPA	SCPB	Background
S-ASD-1D	**95%**	84%	63%	S-LMW-1S	**94%**	84%	64%
S-ASD-1M	**89%**	77%	72%	S-LMW-2S	**83%**	76%	63%
S-ASD-1S	**87%**	81%	46%	S-LMW-3S	41%	19%	**99%**
S-ASD-2D	**94%**	82%	66%	S-LMW-4S	39%	18%	**100%**
S-ASD-2M	**96%**	85%	61%	S-LMW-5S	**99%**	93%	38%
S-ASD-2S	-4%	-1%	**20%**	S-LMW-6S	**99%**	93%	38%
S-ASD-3D	**97%**	87%	57%	S-LMW-7S	**96%**	82%	61%
S-ASD-3M	**99%**	91%	47%	S-LMW-8S	**99%**	93%	43%
S-ASD-3S	**75%**	67%	70%	S-LMW-9S	**92%**	81%	65%
S-ASD-4D	**98%**	91%	49%	S-TMW-1	47%	23%	**98%**
S-ASD-4M	**98%**	87%	56%	S-TMW-2	43%	19%	**98%**
S-ASD-4S	**93%**	77%	69%	S-TMW-3	57%	34%	**97%**
S-ASD-5D	**96%**	90%	49%	S-UG-1A	55%	36%	**91%**
S-ASD-5M	**98%**	86%	53%	S-UG-2	50%	41%	**88%**
S-ASD-5S	**99%**	87%	52%	S-UG-3	58%	42%	**93%**
S-ASD-6D	**97%**	88%	52%	S-UMW-1D	**89%**	75%	74%
S-ASD-6M	**99%**	93%	40%	S-UMW-2D	**100%**	93%	40%
S-ASD-6S	**99%**	89%	49%	S-UMW-3D	**100%**	94%	39%
				S-UMW-4D	**100%**	94%	39%
				S-UMW-5D	45%	28%	**95%**
				S-UMW-6D	**83%**	67%	82%
				S-DG-1	45%	20%	**98%**
				S-DG-2	44%	20%	**97%**
				S-DG-3	51%	27%	**97%**
				S-DG-4	41%	19%	**95%**

Notes:

1) Values display percent correlation between each sampling point and the SCPA pore-water, SCPB pore-water, and background groundwater chemistry.

2) The higher the value, the better the two correlate. The best correlation for each sampling point is bolded.

3) The darker red the cell, the better the correlation.

4) More Information on the calculation of these numbers is provided in Appendix D.

Prepared by:JSI
Checked by:RJF
Reviewed by:MNH

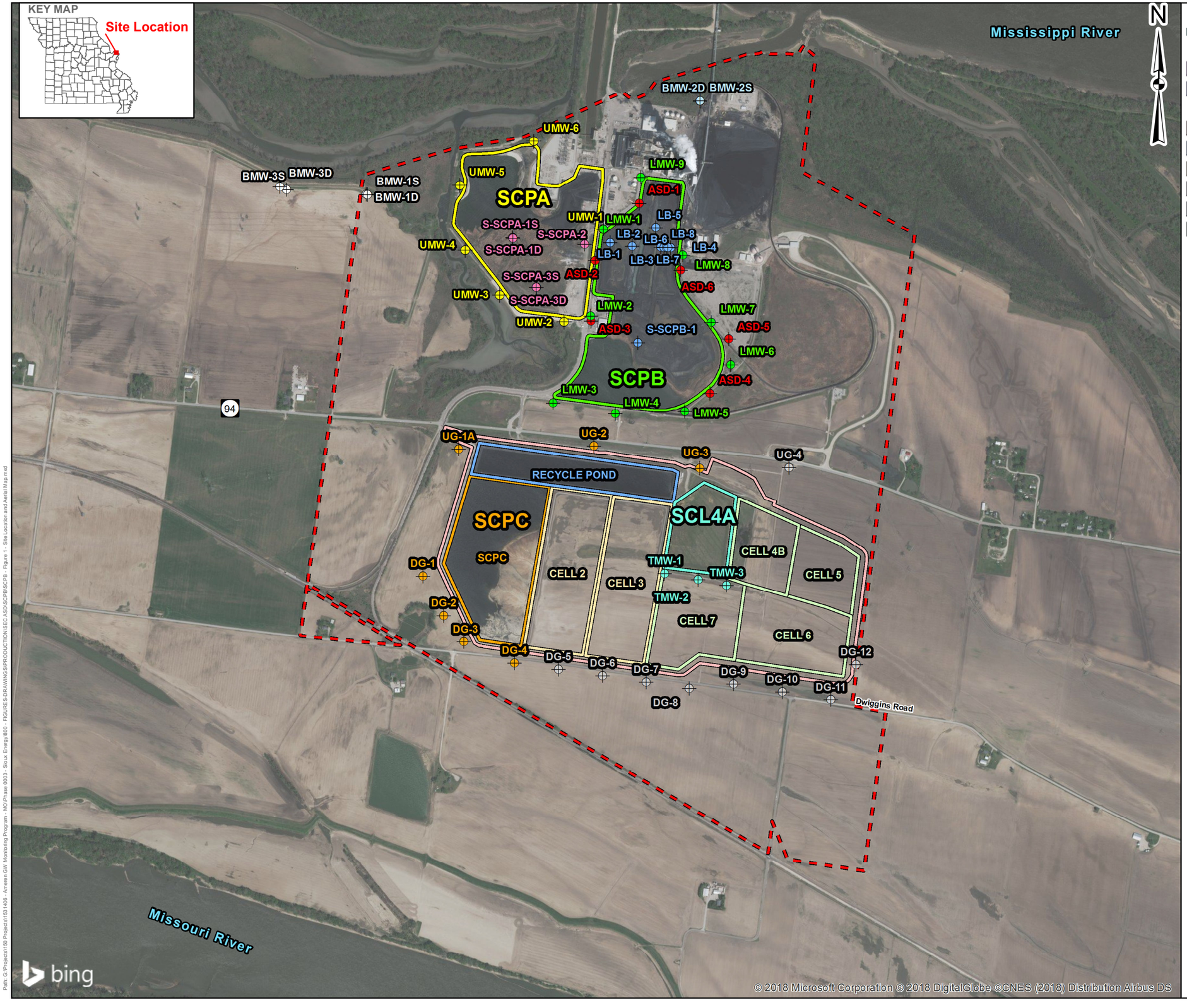
Table 9
Comparison of Shallow Zone Groundwater Concentrations to Pore-Water
SCPB Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

ID	Units	SCPA		SCPB		LMW-1S		LMW-2S		LMW-3S		LMW-4S		LMW-5S		LMW-6S		LMW-7S		LMW-8S		LMW-9S	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Appendix III Paramters																							
Boron	µg/L	348	111,000	4,510	17,900	351	1,940	7,970	13,300	230	305	71	387	7,310	14,200	13,300	**21,400**	1,430	3,320	4,810	8,800	1,070	1,560
Calcium	µg/L	73,400	825,000	37,200	112,000	67,200	**157,000**	**161,000**	**266,000**	**117,000**	**164,000**	**125,000**	**160,000**	**236,000**	**292,000**	**264,000**	**343,000**	**203,000**	**274,000**	**142,000**	**180,000**	**193,000**	**239,000**
Chloride	mg/L	20.5	27.1	25.7	51.7	17.2	**54.8**	**61.6**	**259**	18.9	36.4	2	7.7	23.5	33.7	3	6.4	12.7	24.8	36	**52.2**	**70.7**	**97.2**
Fluoride	mg/L	0.22	0.79	1.1	1.8	0.18	0.44	0.3	0.42	0.24	0.32	0.12	0.26	0.29	0.62	0.12	0.42	0.2	0.34	0.79	1	0.3	0.43
Sulfate	mg/L	48.5	2,080	318	630	49.2	431	171	371	34.1	41	22.9	55.2	556	**1,100**	**774**	**1,030**	293	525	361	463	282	328
TDS	mg/L	320	3,440	560	1,240	330	915	915	1,220	474	581	468	626	1180	**1,760**	**1,500**	**1,770**	940	1220	773	976	980	1,220

Notes
1) Min - minimum concentration recorded at the monitoring well or piezometer.
2) Max - maximum concentration recorded at the monitoring well or piezometer.
3) SCPA uses results from SCPA-1S, SCPA-2, and SCPA-3S.
4) SCPB uses results from SCPB-1, LB-2, LB-4, and LB-5.
5) Highlighted and bolded cells represent values that are higher than the max for the SCPB.
6) Data used for this table are provided in Table 4 and the SCPB Annual Report.

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

Figures



LEGEND

- Sioux Energy Center Property Boundary

Surface Impoundments

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

Utility Waste Landfill (UWL)

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

CCR Rule Monitoring Wells

- Background Monitoring Well
- SCPA - Bottom Ash Surface Impoundment Monitoring Well
- SCPB - Fly Ash Surface Impoundment Monitoring Well
- Existing UWL Monitoring Well Currently Used for CCR Monitoring
- Temporary Monitoring Well for SCL4A

Alternative Source Demonstration Piezometers

- Alternative Source Demonstration Piezometers
- SCPB Pore-Water Piezometers
- SCPA Pore-Water Piezometers

Other Piezometers and Monitoring Wells

- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring
- Groundwater Elevation Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
6.) ALTERNATIVE SOURCE DEMONSTRATION (ASD) PIEZOMETERS HAVE A SHALLOW, MIDDLE, AND DEEP PIEZOMETER AT EACH LOCATION.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

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

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AND AERIAL MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2018-03-20
PREPARED	RJF
DESIGN	JSI
REVIEW	JSI
APPROVED	MNH

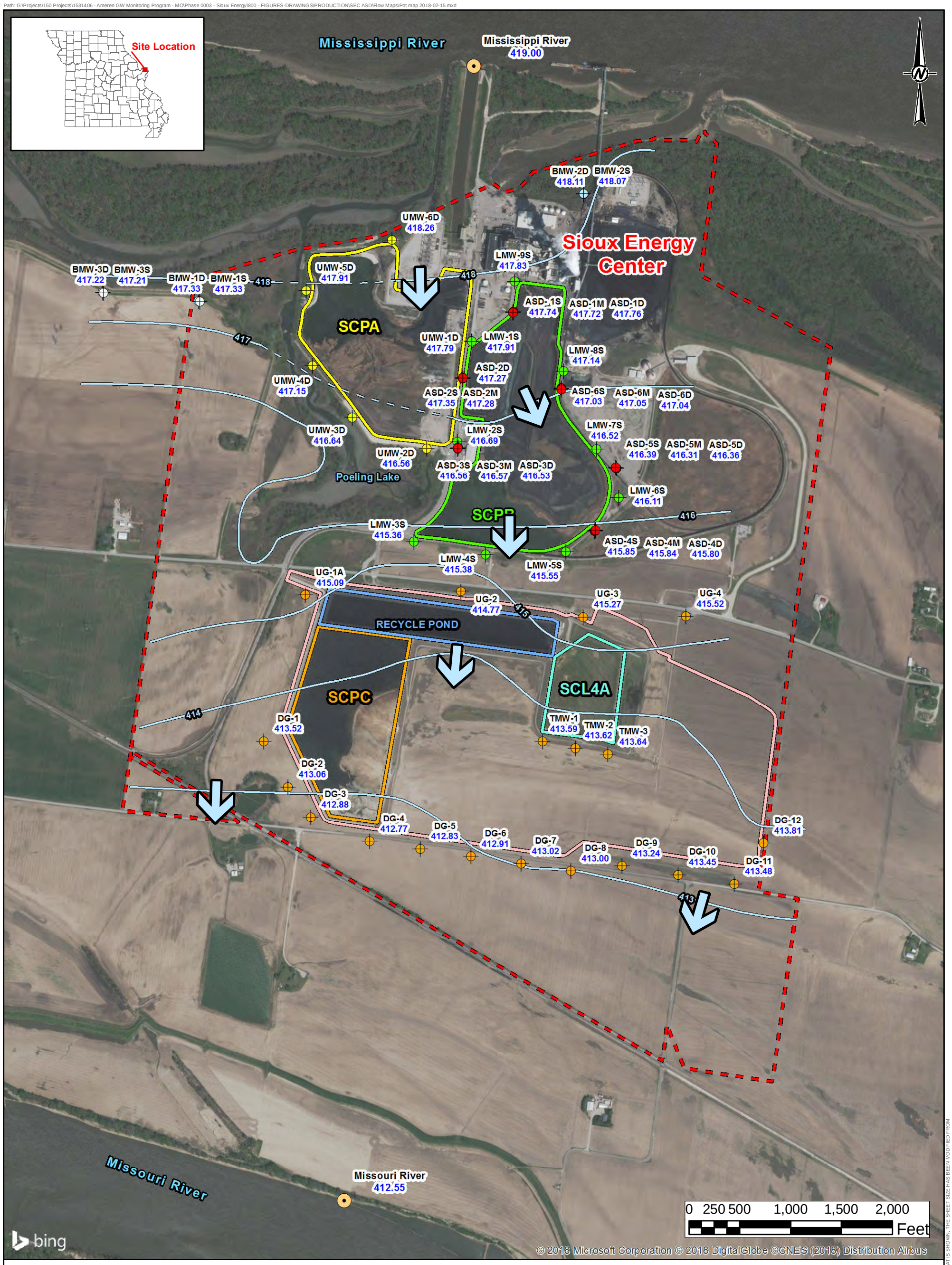
PROJECT No.
153-1406

FIGURE
1

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

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

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\Flow Maps\Pot map 2018-02-15.mxd



LEGEND

- Sioux Energy Center Property Boundary
- SCPB - Fly Ash Surface Impoundment
- SCPA - Bottom Ash Surface Impoundment
- UWL Future Perimeter Fence
- Water Recycle Pond
- SCPC - WFGD Surface Impoundment
- SCL4A - UWL Cell 4A

Groundwater Elevation Contours

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

Ground/Surface Water Measurement Locations

- SCPB - Fly Ash Surface Impoundment Monitoring Well
- SCPA - Bottom Ash Surface Impoundment Monitoring Well
- Background Monitoring Well
- Groundwater Elevation Piezometer
- Utility Waste Landfill Monitoring Well
- Alternative Source Demonstration Piezometers

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GOLDER GROUNDWATER MONITORING WELLS AND TEMPORARY PIEZOMETERS SURVEYED BY ZAHNER AND ASSOCIATES, INC.
3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4.) GROUNDWATER MEASUREMENTS OBTAINED BY GOLDER.
5.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY USGS (UNITED STATES GEOLOGICAL SURVEY) RIVER GAUGING LOCATIONS.
6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
7.) UWL BOUNDARIES, DESIGNATIONS AND STATE MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
8.) WFGD - WET FLUE GAS DESULFURIZATION.

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).
4.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
FEBRUARY 12, 2018 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

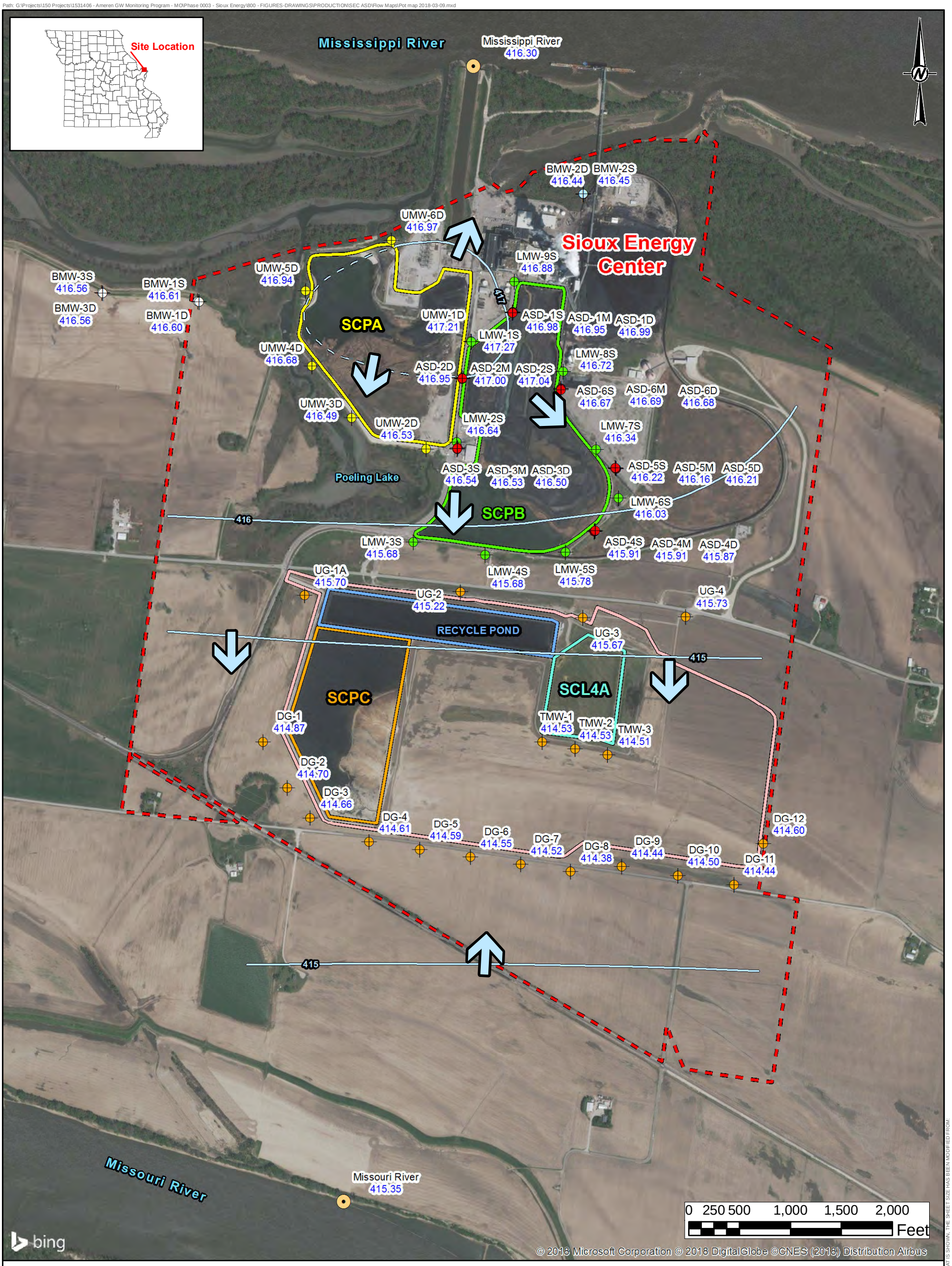
YYYY-MM-DD	2018-02-15
PREPARED	RJF
DESIGN	JSI
REVIEW	MSG
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
2

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\SEC ASD\Flow Maps\Pot map 2018-03-09.mxd



LEGEND

- Sioux Energy Center Property Boundary
- SCPB - Fly Ash Surface Impoundment
- SCPA - Bottom Ash Surface Impoundment
- UWL Future Perimeter Fence
- Water Recycle Pond
- SCPC - WFGD Surface Impoundment
- SCL4A - UWL Cell 4A

Groundwater Elevation Contours

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

Ground/Surface Water Measurement Locations

- SCPB - Fly Ash Surface Impoundment Monitoring Well
- SCPA - Bottom Ash Surface Impoundment Monitoring Well
- Background Monitoring Well
- Groundwater Elevation Piezometer
- Utility Waste Landfill Monitoring Well
- Alternative Source Demonstration Piezometers

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GOLDER GROUNDWATER MONITORING WELLS AND TEMPORARY PIEZOMETERS SURVEYED BY ZAHNER AND ASSOCIATES, INC.
3.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4.) GROUNDWATER MEASUREMENTS OBTAINED BY GOLDER.
5.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY USGS (UNITED STATES GEOLOGICAL SURVEY) RIVER GAUGING LOCATIONS.
6.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
7.) UWL BOUNDARIES, DESIGNATIONS AND STATE MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
8.) WFGD - WET FLUE GAS DESULFURIZATION.

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).
4.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
MARCH 9, 2018 POTENTIOMETRIC SURFACE MAP

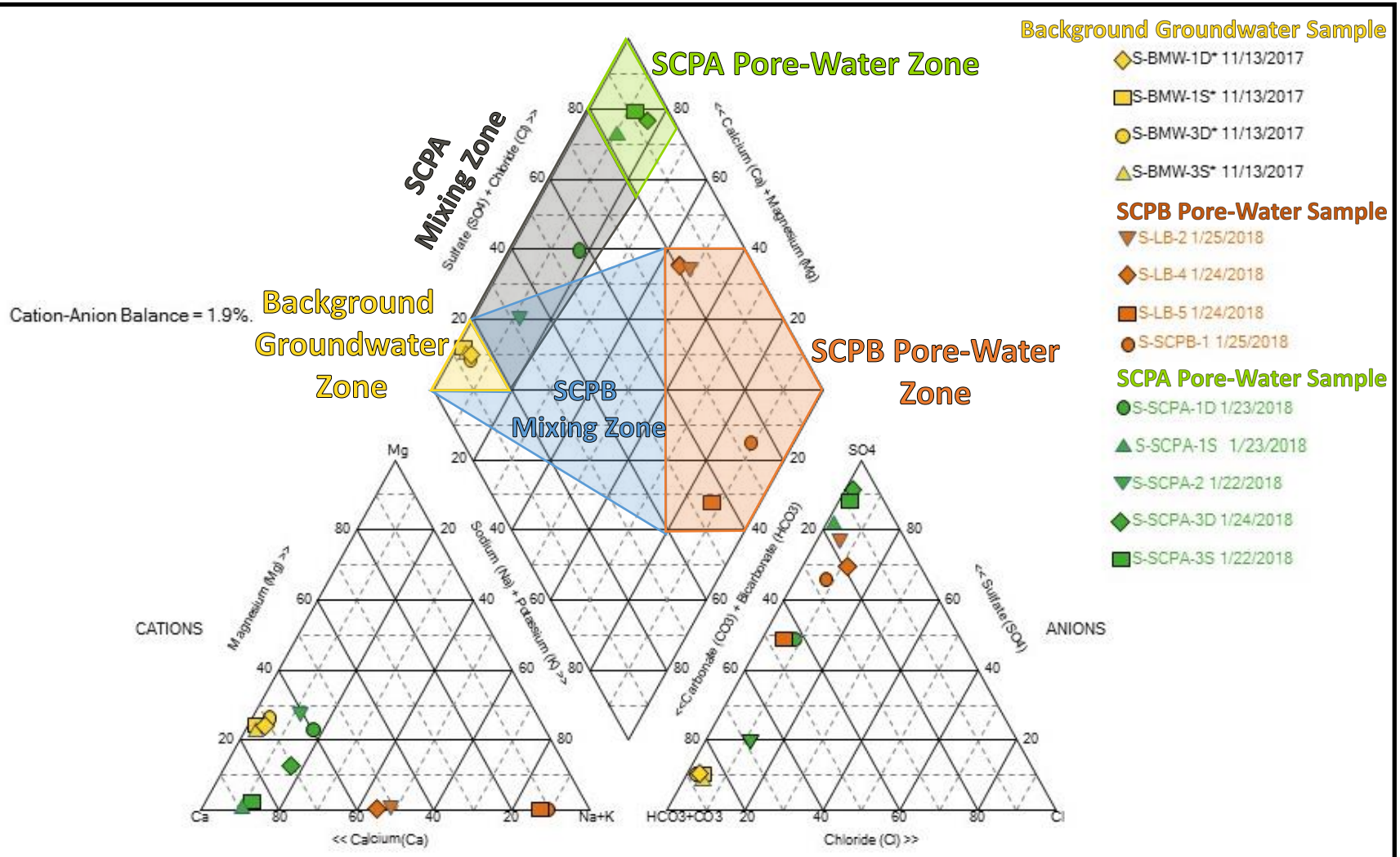
CONSULTANT
GOLDER

YYYY-MM-DD	2018-03-15
PREPARED	RJF
DESIGN	JSI
REVIEW	MSG
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
3

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

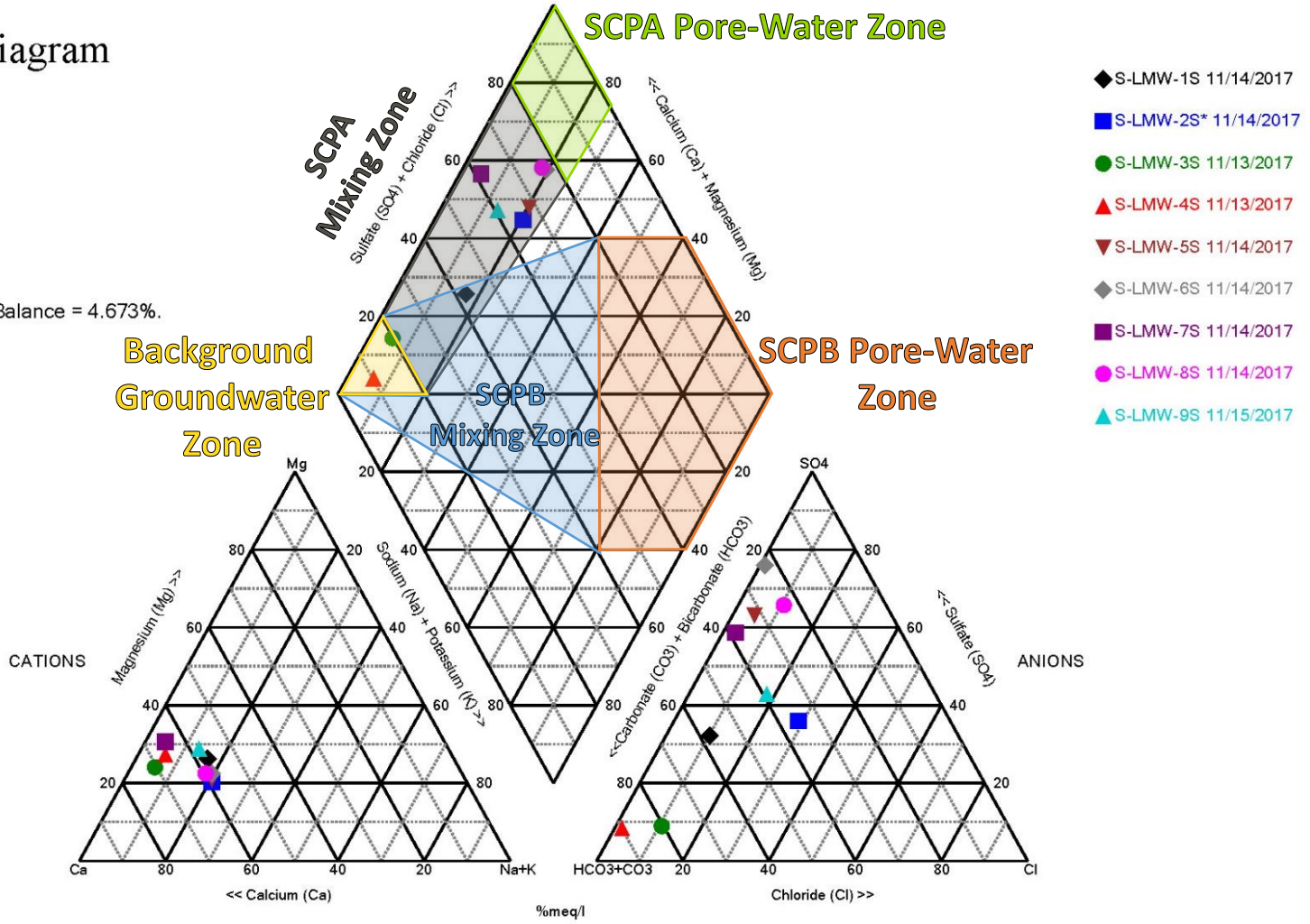


Notes:
1.) Data used to generate diagram available in Table 4 and in the SCPA and SCPB Annual Reports.
2.) Piper diagram generated using Sanitas Software.

CLIENT/PROJECT					TITLE					
AMEREN MISSOURI SIOUX ENERGY CENTER				GOLDER	BACKGROUND GROUNDWATER AND PORE-WATER PIPER DIAGRAM					
PREPARED	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	PROJECT NO.	DRAWING NO.	SUBTITLE	REV. NO.	FIGURE
JSI	EMS	MNH	3/14/2018	NA	NA	153-1406.0003	NA	NA	0	4

Piper Diagram

Cation-Anion Balance = 4.673%.



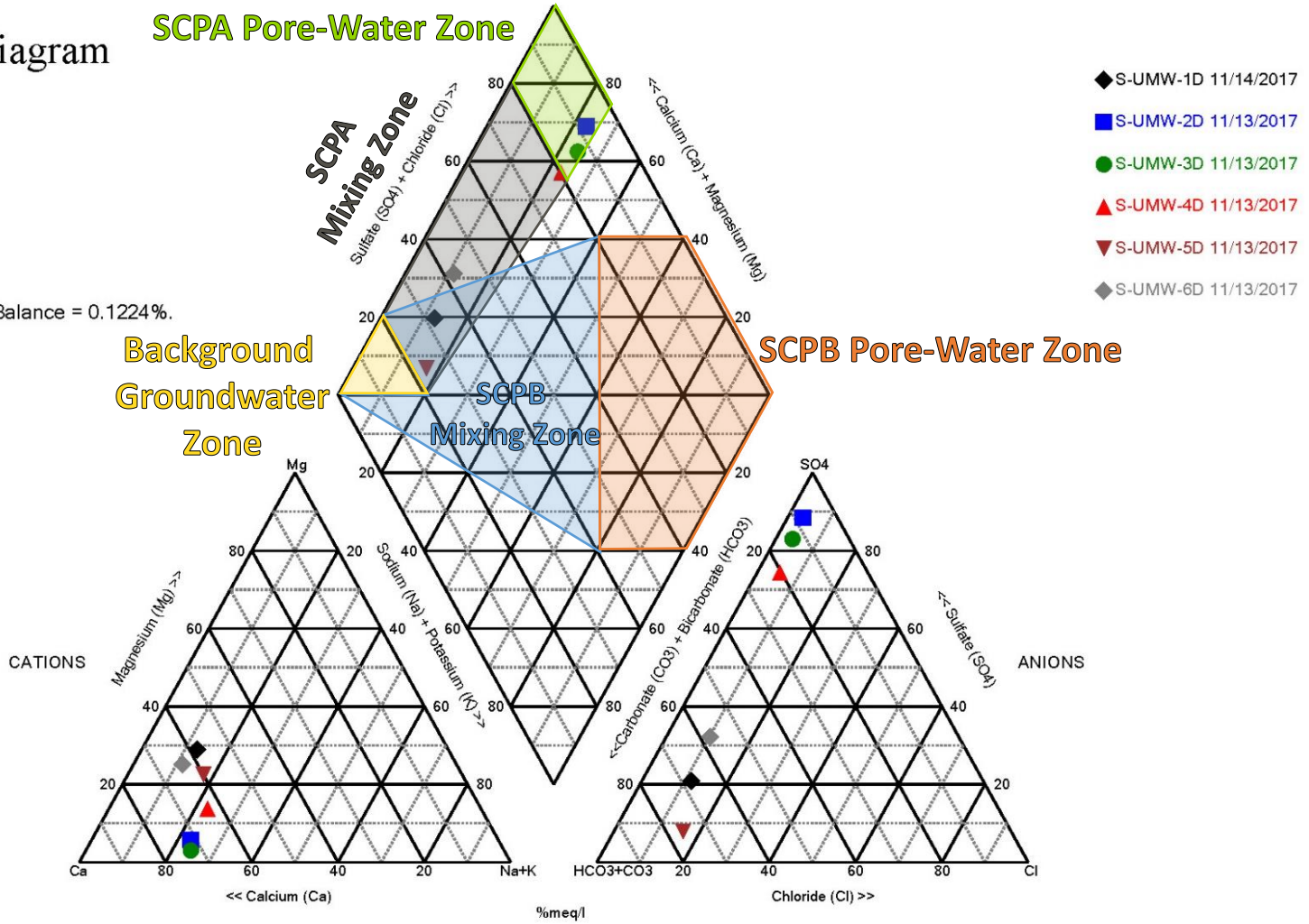
Notes:

1.) Data used to generate diagram available SCPB Annual Report.

2.) Piper diagram generated using Sanitas Software.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**				GOLDER			TITLE **SCPB PIPER DIAGRAM**			
PREPARED JSI	CHECKED EMS	REVIEWED MNH	DATE 3/14/2018	SCALE NA	FILE NO. NA	PROJECT NO. 153-1406.0003	DRAWING NO. NA	SUBTITLE NA	REV. NO. 0	FIGURE 5

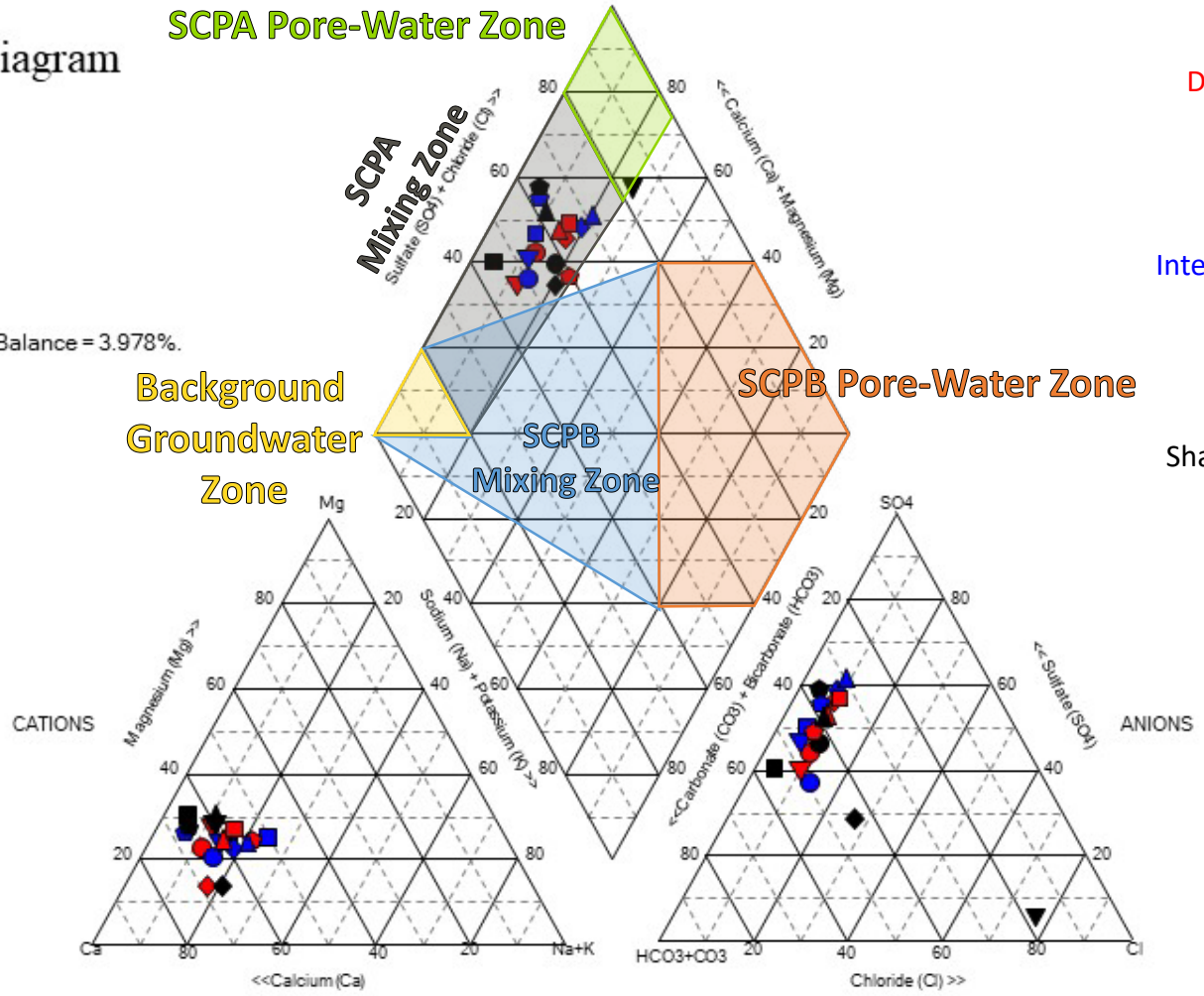
Piper Diagram



Notes:
1.) Data used to generate diagram available in SCPA Annual Report.
2.) Piper diagram generated using Sanitas Software.

CLIENT/PROJECT					TITLE					
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER	**SCPA PIPER DIAGRAM**					
PREPARED	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	PROJECT NO.	DRAWING NO.	SUBTITLE	REV. NO.	FIGURE
JSI	EMS	MNH	3/14/2018	NA	NA	153-1406.0003	NA	NA	0	6

Piper Diagram



Deep Alluvial Zone
- S-ASD-1D - 1/31/18
- S-ASD-2D - 1/30/18
- S-ASD-3D - 1/25/18
- S-ASD-4D - 2/9/18
- S-ASD-5D - 2/8/18
- S-ASD-6D - 2/5/18

Intermediate Alluvial Zone
- S-ASD-1M - 1/31/18
- S-ASD-2M - 1/30/18
- S-ASD-3M - 1/25/18
- S-ASD-4M - 2/9/18
- S-ASD- 5M - 2/8/18
- S-ASD-6M - 2/5/18

Shallow Alluvial Zone
- S-ASD-1S -1/31/18
- S-ASD-2S - 1/30/18
- S-ASD-3S - 1/25/18
- S-ASD-4S - 2/9/18
- S-ASD-5S - 2/8/18
- S-ASD-6S - 2/2/18

Notes:
1.) Data used to generate diagram available in Table 3.
2.) Piper diagram generated using Sanitas Software.

CLIENT/PROJECT					TITLE						
AMEREN MISSOURI SIOUX ENERGY CENTER				GOLDER	**ASD ALLUVIAL AQUIFER PIPER DIAGRAM**						
PREPARED	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	PROJECT NO.	DRAWING NO.	SUBTITLE	REV. NO.	FIGURE	
JSI	EMS	MNH	3/14/2018	NA	NA	153-1406.0003	NA	NA	0	7	

KEY MAP

Site Location

BMW-3S
BMW-1S
SCPA
SCPA-2
SCPA-1S
SCPA-3S
LMW-9S
ASD-1S
LMW-1S
LB-5
LB-2
LB-4
LMW-8S
ASD-2S
ASD-6S
SCPB
LMW-2S
ASD-3S
SCPB-1
LMW-7S
ASD-5S
LMW-6S
ASD-4S
LMW-3S
LMW-4S
LMW-5S
94
UG-1A
UG-2
UG-3
RECYCLE POND
SCPC
CELL 2
CELL 3
CELL 4A
CELL 4B

N

LEGEND

- Sioux Energy Center Property Boundary

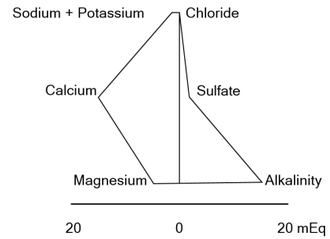
Surface Impoundments

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

Utility Waste Landfill (UWL)

- Active Dry CCR Disposal
- Active WFGD Disposal
- Active Water Recycle Pond
- Proposed Dry CCR Disposal
- Proposed WFGD Disposal
- UWL Perimeter Fence

- SCPB Pore-Water - Stiff Diagrams
- SCPA Pore-Water - Stiff Diagrams
- Shallow Alluvial Aquifer - Stiff Diagrams
- Background - Stiff Diagrams



NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
6.) STIFF DIAGRAMS CALCULATED USING SANITAS. DATA USED TO GENERATE DIAGRAMS IN TABLE 3.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

0 250 500 1,000
Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SHALLOW ALLUVIAL AQUIFER - SPATIAL DISTRIBUTION OF STIFF DIAGRAMS

CONSULTANT
GOLDER

YYYY-MM-DD	2018-03-14
PREPARED	RJF
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
8

Path: G:\Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\9800 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\SCPB\SCPB Stiff Diagrams-Shallow.mxd

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

KEY MAP

LEGEND

- Sioux Energy Center Property Boundary

Surface Impoundments

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

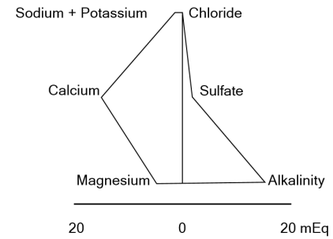
Utility Waste Landfill (UWL)

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

Middle Alluvial Aquifer - Stiff Diagrams

SCPA Pore-Water - Stiff Diagrams

Background - Stiff Diagrams



NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
6.) STIFF DIAGRAMS CALCULATED USING SANITAS. DATA USED TO GENERATE DIAGRAMS IN TABLE 3.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.

0 250 500 1,000

Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
MIDDLE ALLUVIAL AQUIFER - SPATIAL DISTRIBUTION OF STIFF DIAGRAMS

CONSULTANT
GOLDER

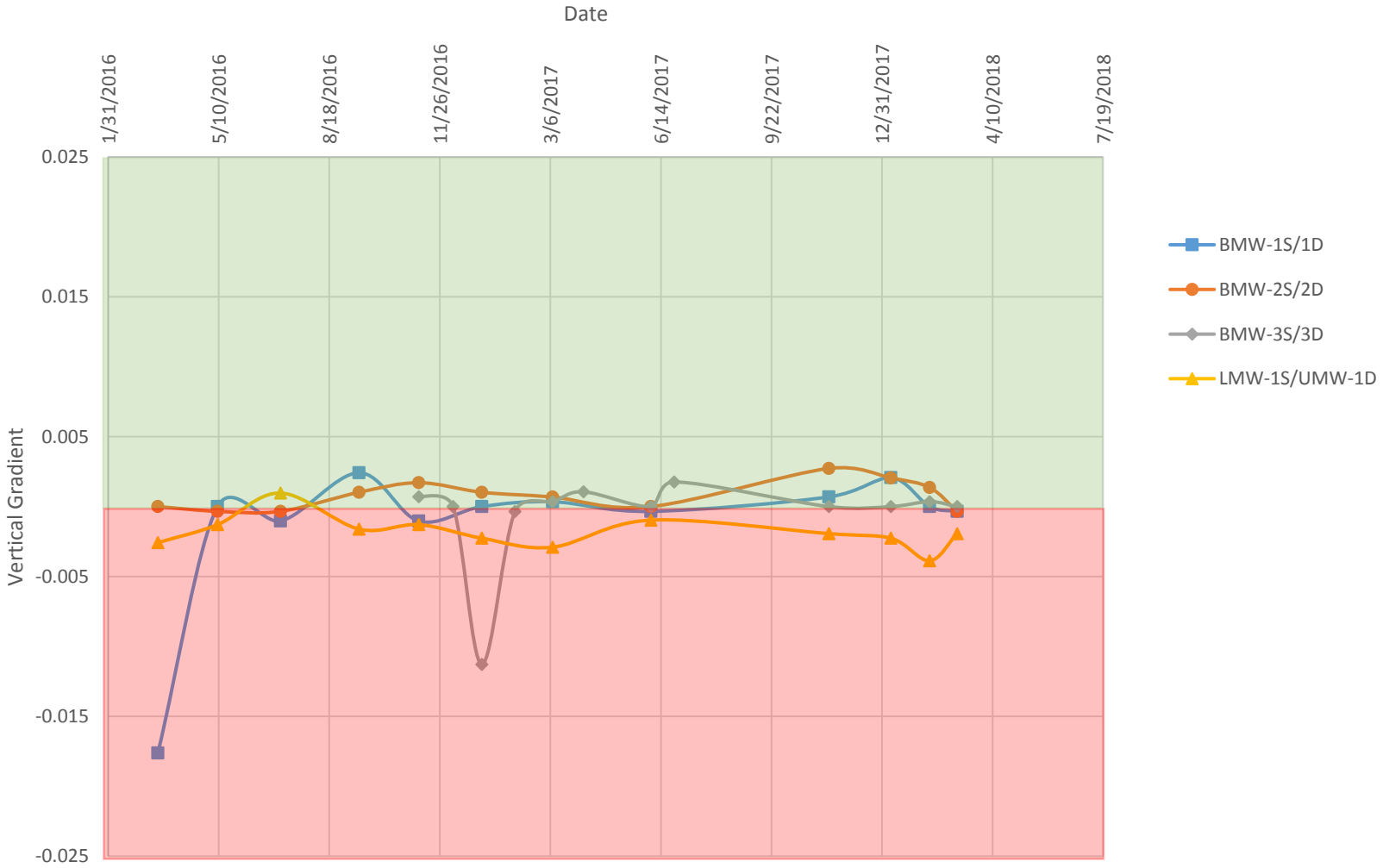
YYYY-MM-DD	2018-03-15
PREPARED	RJF
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
9

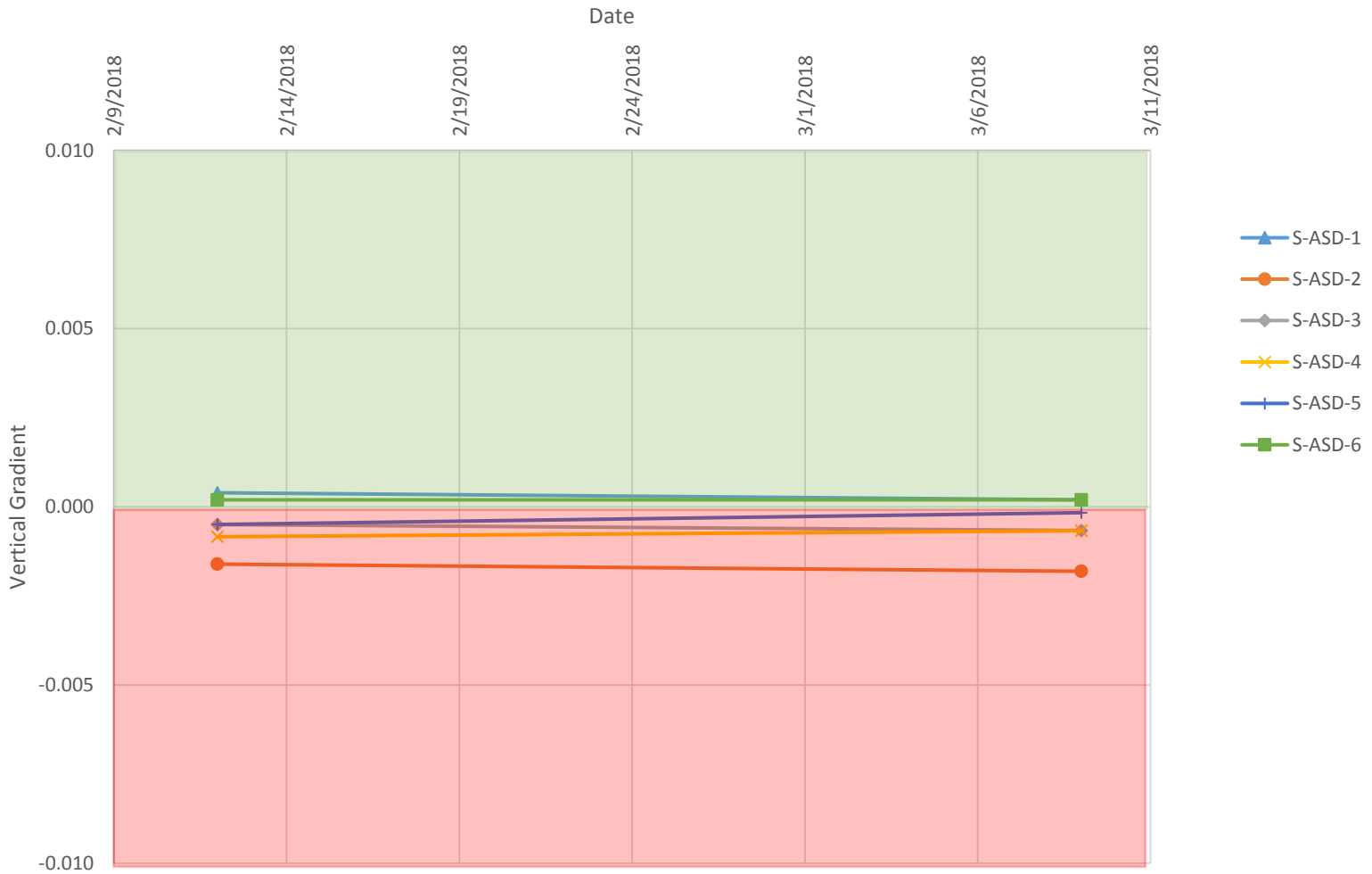
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
1 in
0

Path: G:\Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\SCPB\SCPB Stiff Diagrams - Medium.mxd



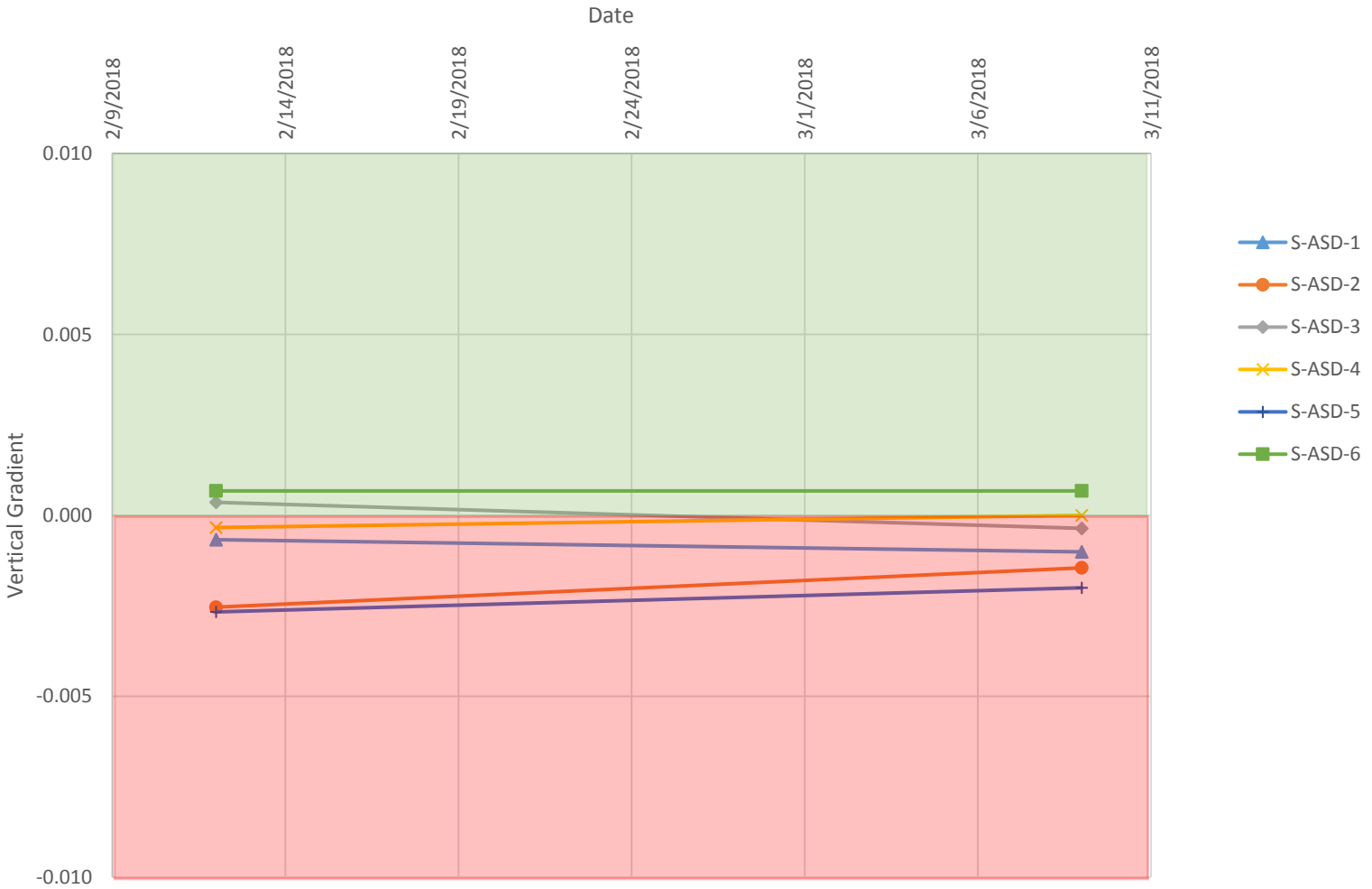
Notes:
1.) A positive gradient indicates an upward flow and is green.
2.) A negative gradient indicates a downward flow and is shaded red.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**				GOLDER			TITLE	**Vertical Gradients - CCR Monitoring Wells and Piezometers**		
PREPARED MSG	CHECKED RJF	REVIEWED MNH	DATE 3/19/2018	SCALE NA	FILE NO. NA	PROJECT NO. 153-1406.0003	DRAWING NO. NA	SUBTITLE NA	REV. NO. 0	FIGURE 10



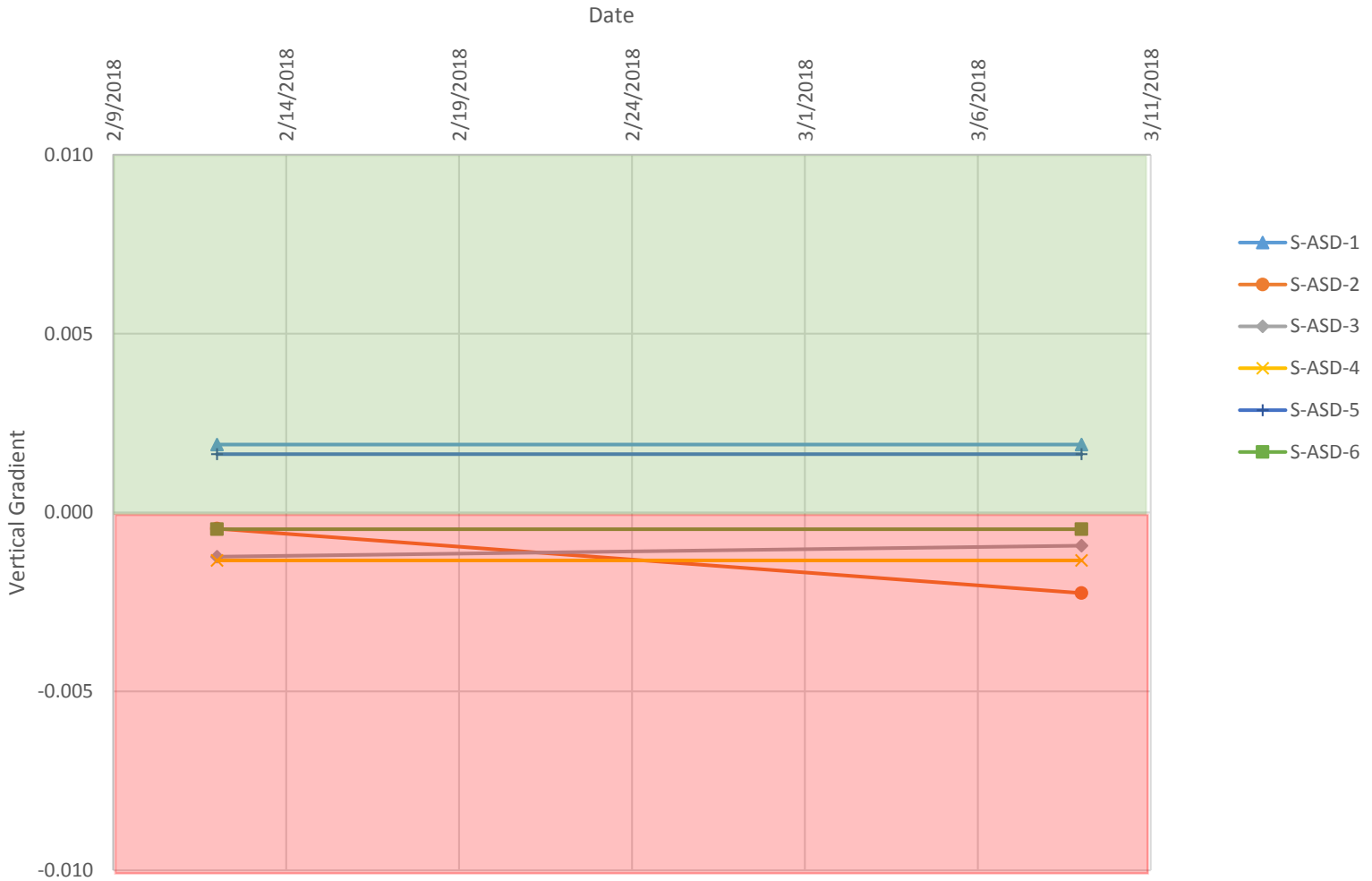
Notes:
1.) Positive gradient = Upward flow = Green shade
2.) Negative gradient = Downward flow = Red shade

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**				GOLDER			TITLE	**Vertical Gradients – ASD Piezometers – Shallow to Deep Alluvial Aquifer**		
PREPARED MSG	CHECKED RJF	REVIEWED MNH	DATE 3/19/2018	SCALE NA	FILE NO. NA	PROJECT NO. 153-1406.0003	DRAWING NO. NA	SUBTITLE NA	REV. NO. 0	FIGURE 11



Notes:
1.) Positive gradient = Upward flow = Green shade
2.) Negative gradient = Downward flow = Red shade

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**				GOLDER			TITLE	**Vertical Gradients – ASD Piezometers –Shallow to Middle Alluvial Aquifer**		
PREPARED MSG	CHECKED RJF	REVIEWED MNH	DATE 3/19/2018	SCALE NA	FILE NO. NA	PROJECT NO. 153-1406.0003	DRAWING NO. NA	SUBTITLE NA	REV. NO. 0	FIGURE 12



Notes:
1.) Positive gradient = Upward flow = Green shade
2.) Negative gradient = Downward flow = Red shade

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**				GOLDER			TITLE	**Vertical Gradients – ASD Piezometers –Middle to Deep Alluvial Aquifer**		
PREPARED MSG	CHECKED RJF	REVIEWED MNH	DATE 3/19/2018	SCALE NA	FILE NO. NA	PROJECT NO. 153-1406.0003	DRAWING NO. NA	SUBTITLE NA	REV. NO. 0	FIGURE 13

APPENDIX A

Geological Boring Logs

RECORD OF BOREHOLE ASD-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/30/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,611.37 E: 879,832.86
ELEVATION: 445.46
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac Excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		437.5	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
10	Direct Push	(8.0-10.2) (ML) CLAYEY SILT, low-plasticity fines, some fine sand, some well-graded angular gravels; dark yellowish brown (10YR 4/2); cohesive, W<PL, stiff.	ML		8.0 435.3				
		(10.2-13.0) (ML & GW) CLAYEY SILT and GRAVEL, low-plasticity fines, well graded angular gravels, some fine sand; dusky yellowish brown (10YR 2/2); cohesive, W<PL, stiff. (11.8) 3 inch pocket of fine white (N9) sub-rounded gravels.	ML & GW		10.2 433.7 11.8 432.5	1	DP	4.4 / 5.0	
15		(13.0-16.0) (ML) CLAYEY SILT, plastic fines, trace fine sand, trace angular gravels; dusky yellowish brown (10YR 2/2) with pale yellowish brown (10YR 6/2) and grayish orange (10YR 7/4) mottling; cohesive, W~PL, stiff.	ML		13.0 429.5	2	DP	3.8 / 5.0	
20		(16.0-23.0) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, dry, loose. (18.0) SAA (Same As Above), except with thin dusky yellowish brown (10YR 2/2) layers.	SP-SM		16.0 427.5 18.0	3	DP	4.4 / 5.0	
		(22.0) SAA, except dark yellowish orange (10YR 6/6) SAND.			423.5 22.0 422.5				
25		(23.0-25.0) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, moist, compact.	SP-SM		23.0 420.5	4	DP	5.0 / 5.0	
		(25.0-27.0) (ML) CLAYEY SILT, plastic fines, some fine sand; light olive gray (5Y 5/2) with moderate yellowish brown (10YR 5/4) mottling; cohesive, W~PL, firm.	ML		25.0 418.5				
30		(27.0-32.0) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4) with some dark gray (N3) mottling; non-cohesive, moist, compact. (28.0) SAA, except light olive gray (5Y 5/2) and wet.	SP-SM		27.0 417.5 28.0	5	DP	4.2 / 5.0	▽ Water Level 28.50 ft bgs 1/30/2018

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour
LOGGED: BCW
CHECKED: MSG
REVIEWED: JSI

Golder Associates

RECORD OF BOREHOLE ASD-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/30/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,611.37 E: 879,832.86

ELEVATION: 445.46
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(27.0-32.0) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4) with some dark gray (N3) mottling; non-cohesive, moist, compact. *(Continued)*	SP-SM		413.5	5	DP	4.2 / 5.0	
		(32.0-33.0) (SP-SM) SAND, fine to coarse sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense.	SP-SM		32.0 412.5				
		(33.0-58.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense.			33.0				
35						6	DP	4.6 / 5.0	
						7	DP	4.7 / 5.0	Driller encounters flowing sands. Begins to use water.
40									
		(43.0) SAA, except with some light brown (5YR 5/6) SAND.			402.5 43.0	8	DP	3.8 / 5.0	
45			SW						
		(48.0) SAA, except with trace amounts of rounded to sub-rounded cobbles.			397.5 48.0	9	DP	4.0 / 5.0	
50									
		(53.0) SAA, except light brownish gray (5YR 6/1) SAND.			392.5 53.0	10	DP	3.0 / 5.0	
55									
		(58.0-63.0) (SW) SAND, unit inferred from drilling to be sand. Heaving sands make it unable to push through.			387.5 58.0	11	DP	0.0 / 5.0	Driller can no longer collect samples due to heaving sands.
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/30/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,611.37 E: 879,832.86

ELEVATION: 445.46
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(33.0-58.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense. *(Continued)*	SW		382.5	11	DP	0.0 / 5.0	
		(63.0-68.0) (SP) SAND, fine sand, non-plastic fines; medium gray (N5); non-cohesive, wet, very dense.			63.0				Same location, different hole about 5 feet away from the first.
65			SP			12	DP	3.5 / 5.0	
					377.5				
		(68.0-93.0) (SP) SAND, unit inferred from drilling to be sand.			68.0				Driller can no longer collect samples due to heaving sands.
70						13	DP	0.0 / 5.0	
75						14	DP	0.0 / 5.0	
			SP			15	DP	0.0 / 5.0	
80									
85						16	DP	0.0 / 5.0	
						17	DP	0.0 / 5.0	
90		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/30/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,611.37 E: 879,832.86

ELEVATION: 445.46
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
90		(68.0-93.0) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP			17	DP	0.0 / 5.0	
					352.5				
		END OF BORING AT 93 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-1D, ASD-1M, ASD-1S.			93.0				
95									
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/26/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,961.77 E: 879,336.23

ELEVATION: 444.99
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac Excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		437.0	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
	Direct Push	(8.0-9.0) (ML) sandy SILT, non-plastic fines, some fine sand, with some sub-angular gravels; dark yellowish brown (10YR 4/2); non-cohesive, moist, compact.	ML		8.0 436.0				
10		(9.0-11.0) (ML) sandy SILT, non-plastic fines, some fine sand; dusky yellowish brown (10YR 2/2); non-cohesive, moist, dense.	ML		9.0 434.0	1	DP	4.1 / 5.0	
		(11.0-17.2) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, moist, compact.	SP-SM		11.0 427.8	2	DP	3.2 / 5.0	
		(17.2-19.0) (SP) silty SAND, fine sand, low-plasticity fines; moderate yellowish brown (10YR 5/4); cohesive, W~PL, stiff.	SP		17.2 426.0				
20		(19.0-28.0) (SP-SM) SAND, fine sand, non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, compact.	SP-SM		19.0 422.0	3	DP	3.5 / 5.0	
		(23.0) SAA (Same As Above), except moist.			23.0 420.4				
25		(24.6) 3 inch pocket of (ML) CLAYEY SILT, low-plasticity fines; medium gray (N5); cohesive, W~PL, soft.			24.6 417.0	4	DP	3.5 / 5.0	
		(28.0-38.0) (SP-SM) SAND, fine sand, non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, dense.	SP-SM		28.0	5	DP	3.7 / 5.0	▽ Water Level 28.16 ft bgs 1/26/2018
30		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/26/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,961.77 E: 879,336.23
ELEVATION: 444.99
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(28.0-38.0) (SP-SM) SAND, fine sand, non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, dense. *(Continued)*	SP-SM			5	DP	3.7 / 5.0	
35						6	DP	5.0 / 5.0	
					407.0				
		(38.0-41.0) (SW) SAND, fine to coarse well graded rounded sands, non-plastic fines, trace sub-rounded gravels; moderate yellowish brown (10Y 5/4); non-cohesive, wet, very dense.	SW		38.0	7	DP	4.0 / 5.0	Driller encounters flowing sands, begins to use water.
40					404.0				
		(41.0-43.0) (SP-SM) SAND, fine to medium sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, very dense.	SP-SM		41.0				
					402.0				
45		(43.0-47.5) (SW) SAND, fine to coarse well-graded sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, very dense.	SW		43.0	8	DP	5.0 / 5.0	
					397.5				
		(47.5-68.0) (SM) SILTY SAND, fine sand, non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense.	SM		47.5	9	DP	5.0 / 5.0	
50									
						10	DP	5.0 / 5.0	Run #10 - drillers encounter issues getting sample out of sampler. Push it out into a bag, say it was 5 feet of recovery.
55									
						11	DP	5.0 / 5.0	
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/26/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,961.77 E: 879,336.23
ELEVATION: 444.99
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(47.5-68.0) (SM) SILTY SAND, fine sand, non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense. *(Continued)*	SM		384.5	11	DP	5.0 / 5.0	
		(60.5) 2 inch seam of medium to coarse sand with trace amounts of sub-angular cobbles.			60.5				
65						12	DP	3.2 / 5.0	
		(66.0) 2 inch seam of medium to coarse sand with trace amounts of sub-angular cobbles.			379.0 66.0				
		(68.0-98.0) (SM) SILTY SAND, unit inferred from drilling to be sand.			377.0 68.0				Driller can no longer collect samples due to heaving sands.
70						13	DP	0.0 / 5.0	
75						14	DP	0.0 / 5.0	
			SM			15	DP	0.0 / 5.0	
80									
85						16	DP	0.0 / 5.0	
						17	DP	0.0 / 5.0	
90		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/26/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,961.77 E: 879,336.23

ELEVATION: 444.99
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
90		(68.0-98.0) (SM) SILTY SAND, unit inferred from drilling to be sand. *(Continued)*	SM			17	DP	0.0 / 5.0	
95						18	DP	0.0 / 5.0	Drillers encounter issues with equipment getting locked downhole due to flowing sands.
					347.0 / 98.0				
		END OF BORING AT 98 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-2D, ASD-2M, ASD-2S.							
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/25/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,277.42 E: 879,289.31

ELEVATION: 445.35
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac Excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		437.4	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
10	Direct Push	(8.0-13.0) (SM) SILTY SAND, fine sand, non-plastic fines; dark gray (N3); non-cohesive, moist, compact.	SM		8.0 432.4	1	DP	4.0 / 5.0	
15		(13.0-15.4) (CL) silty CLAY, low-plasticity fines, trace fine sand; dark gray (N3); cohesive, W~PL, stiff.	CL		13.0 430.0	2	DP	4.6 / 5.0	
		(15.4-18.0) (SM) sandy SILT, plastic fines, some fine sand; dark yellowish brown (10YR 4/2); cohesive, W~PL, firm.	SM		15.4 427.4				
20		(18.0-26.5) (SP-SM) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, moist, compact.	SP-SM		18.0 422.4	3	DP	3.6 / 5.0	
25		(23.0) SAA (Same As Above), except loose.			23.0 418.9	4	DP	4.1 / 5.0	
		(26.5-30.5) (SP) SAND, fine sand, non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, and compact.	SP		26.5 417.4				
30		(28.0) SAA, except dense.			28.0	5	DP	3.4 / 5.0	

Log continued on next page

▽ Water Level 29.65 ft bgs 1/26/2018

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/25/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,277.42 E: 879,289.31
ELEVATION: 445.35
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push		SP		414.9				
		(30.5-36.0) (SP) SAND, medium to coarse poorly graded rounded sand, non-plastic fines; moderate yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/2); non-cohesive, wet, dense.			30.5	5	DP	3.4 / 5.0	
			SP						Driller encounters flowing sands. Begins to use water.
35						6	DP	4.4 / 5.0	
					409.4				
		(36.0-46.5) (SP) SAND, fine to medium, non-plastic fines; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR 4/2); non-cohesive, wet, dense.			36.0				
40						7	DP	4.5 / 5.0	
			SP						
45						8	DP	5.0 / 5.0	
					398.9				
		(46.5-53.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines; medium dark gray (N4) with moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense.			46.5				
					397.4				
		(48.0) SAA, except fine to medium sand.			48.0				
50			SW			9	DP	1.6 / 5.0	
					392.4				
		(53.0-59.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines, trace amounts of sub-rounded gravel; dark gray (N3); non-cohesive, wet, very dense.			53.0				
55			SW			10	DP	1.7 / 5.0	
					387.4				
		(58.0) SAA, except no gravel.			58.0				
					386.4	11	DP	5.0 / 5.0	
		(59.0-73.0) (SP) SAND, fine sand, non-plastic fines; medium gray (N5); non-cohesive, wet, very dense.	SP		59.0				
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/25/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,277.42 E: 879,289.31
ELEVATION: 445.35
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(59.0-73.0) (SP) SAND, fine sand, non-plastic fines; medium gray (N5); non-cohesive, wet, very dense. *(Continued)*	SP			11	DP	5.0 / 5.0	
65						12	DP	5.0 / 5.0	
70						13	DP	5.0 / 5.0	
					372.4 / 73.0				
75		(73.0-93.0) (SP) SAND, unit inferred from drilling to be sand.	SP			14	DP	0.0 / 5.0	Driller can no longer collect samples due to heaving sands.
80						15	DP	0.0 / 5.0	
85						16	DP	0.0 / 5.0	
90						17	DP	0.0 / 5.0	

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/25/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,277.42 E: 879,289.31

ELEVATION: 445.35
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
90	Direct Push	(73.0-93.0) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP		352.4	17	DP	0.0 / 5.0	
		(93.0-95.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines, trace sub-angular gravels; medium dark gray (N4); non-cohesive, wet, very dense.	SW		93.0 / 350.4				Same location, different hole about 5 feet away from the first.
95		(95.0-96.5) (GW) GRAVEL, well-graded sub-angular gravel, non-plastic fines, trace fine sand; black (N1); non-cohesive, wet, very dense.	GW		95.0 / 348.9	18	DP	3.1 / 5.2	
		(96.5-98.2) (SW) SAND, fine to coarse well-graded sub-rounded sand, non-plastic fines, trace sub-angular gravels; medium dark gray (N4); non-cohesive, wet, very dense.	SW		96.5 / 347.2				
		END OF BORING AT 98.2 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-3D, ASD-3M, ASD-3S.			98.2				
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-4

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/07/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,119,455.28 E: 880,633.12

ELEVATION: 443.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		435.6	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
10	Direct Push	(8.0-13.0) (ML) SILT, non-plastic fines, some fine sub-angular gravels, trace fine sand; dusky yellowish brown (10YR 2/2); non-cohesive, moist, very dense.	ML		8.0 430.6	1	DP	5.0 / 5.0	
15		(13.0-28.0) (SP-SM) SAND, fine sand, some non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, dry, compact.	SP-SM		13.0	2	DP	3.4 / 5.0	
20		(18.0) SAA (Same As Above), except pale yellowish brown (10YR 6/2) SAND.			425.6 18.0	3	DP	3.9 / 5.0	
25		(26.0) SAA, except wet.			417.6 26.0	4	DP	3.6 / 5.0	
30		(28.0-30.6) (SP) SAND, medium to coarse sand, trace non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, compact.	SP		415.6 28.0	5	DP	2.8 / 5.0	▽ Water Level 28.13 ft bgs 2/08/2018

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-4

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 2/07/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,119,455.28 E: 880,633.12
ELEVATION: 443.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push		SP		413.0				
		(30.6-31.0) (ML) CLAYEY SILT, low-plasticity fines, trace fine sand; moderate yellowish brown (10YR 5/4) with dark yellowish orange (10YR 6/6); cohesive, W~PL, firm.	ML		30.6 412.6 31.0	5	DP	2.8 5.0	
		(31.0-33.0) (SP) SAND, fine sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, compact.	SP		411.6 32.0				
		(32.0) SAA, except medium to coarse grained SAND.			410.6 33.0				Run #6 - driller encounters flowing sands. Begins to use water to advance.
35		(33.0-41.0) (SP) SAND, medium to coarse sun-rounded sand, trace non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, compact.				6	DP	4.1 5.0	
		(37.0) SAA, except fine to medium grained SAND.	SP		406.6 37.0				
40						7	DP	4.2 5.0	
		(41.0-42.0) (SP) silty SAND, fine sand, non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, compact.	SP		402.6 41.0 401.6				
		(42.0-53.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace sub-angular gravels, trace non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, compact.			42.0 400.6				
		(43.0) SAA, except brownish gray (5YR 4/1) SAND.			43.0	8	DP	2.7 5.0	
45			SW						
		(48.0) SAA, except medium light gray (N6) SAND.			395.6 48.0	9	DP	2.6 5.0	
50									
		(52.5) SAA, except with some fine sub-angular pieces of black (N1) gravels.			391.1 52.5				
		(53.0-58.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines, trace fine sub-angular gravels; medium gray (N5) non-cohesive, wet, compact.			390.6 53.0				
55			SW			10	DP	0.6 5.0	
		(58.0-63.0) (SW) SAND, unit inferred from drilling to be sand.			385.6 58.0				Run #11 - no recovery due to soil catcher breaking.
60			SW			11	DP	0.0 5.0	

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-4

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 2/07/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,119,455.28 E: 880,633.12
ELEVATION: 443.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(58.0-63.0) (SW) SAND, unit inferred from drilling to be sand. *(Continued)*	SW		380.6	11	DP	0.0 / 5.0	
		(63.0-66.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines, trace fine sub-angular gravels; medium gray (N5) non-cohesive, wet, dense.	SW		63.0	12	DP	4.5 / 5.0	
65					377.6				
		(66.0-68.0) (SP) SAND, fine sand, trace non-plastic fines; medium gray (N5); non-cohesive, wet, dense.	SP		66.0				
					375.6				
		(68.0-98.0) (SP) SAND, unit inferred from drilling to be sand.			68.0				Driller can no longer collect samples due to heaving sands.
70						13	DP	0.0 / 5.0	
75						14	DP	0.0 / 5.0	
			SP						
80						15	DP	0.0 / 5.0	
85						16	DP	0.0 / 5.0	
						17	DP	0.0 / 5.0	
90		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-4

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/07/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,119,455.28 E: 880,633.12

ELEVATION: 443.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
90		(68.0-98.0) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP			17	DP	0.0 / 5.0	
95						18	DP	0.0 / 5.0	
					345.6 / 98.0				
		END OF BORING AT 98 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-4D, ASD-4M, ASD-4S.							
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-5

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,074.04 E: 880,846.61

ELEVATION: 441.56
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		433.6	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
	Direct Push	(8.0-8.6) (GW) GRAVEL, fine to coarse well-graded sub-angular gravel, some non-plastic fines, trace fine sand; pale yellowish brown (10YR 6/2); non-cohesive, moist, loose.	GW		8.0 / 433.0	1	DP	5.0 / 5.0	
		(8.6-9.8) (CL-ML) SILTY CLAY, low-plasticity fines, trace fine sand; dusky yellowish brown (10YR 2/2) with dark yellowish orange (10YR 6/6); cohesive, W<PL, very stiff.	CL-ML		8.6 / 431.8				
10		(9.8-12.0) (ML) CLAYEY SILT, low-plasticity fines, some fine sand; dark yellowish brown (10YR 4/2); cohesive, W<PL, stiff.	ML		9.8 / 429.6				
		(12.0-16.0) (ML) sandy SILT, non-plastic fines, fine sand; moderate yellowish brown (10YR 5/4); non-cohesive, dry, loose.	ML		12.0 / 425.6	2	DP	3.4 / 5.0	
15		(16.0-21.0) (SM) silty SAND, fine sand, non-plastic fines; moderate yellowish Bbrown (10YR 5/4); non-cohesive, dry, loose.	SM		16.0 / 423.6				
		(18.0) SAA (Same As Above), except with layers of dark yellowish brown (10YR 4/2).	SM		18.0 / 420.6	3	DP	3.6 / 5.0	
20		(21.0-23.0) (SP-SM) SAND, fine sand, some non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, dry, loose.	SP-SM		21.0 / 418.6				
		(23.0-30.2) (SP) SAND, fine sand, trace non-plastic fines; dark yellowish brown (10YR 4/2) with dusky yellowish brown (10YR 2/2); non-cohesive, wet, compact.	SP		23.0 / 413.6	4	DP	3.7 / 5.0	▽ Water Level 26.20 ft bgs 2/01/2018
25		(28.0) SAA, except no dusky yellowish brown (10YR 2/2) SAND.	SP		28.0	5	DP	5.0 / 5.0	
30		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-5

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,074.04 E: 880,846.61

ELEVATION: 441.56
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push				411.4				
		(30.2-31.0) (ML) CLAYEY SILT, plastic fines, some fine sand; light brownish gray (5YR 6/1); cohesive, W~PL, firm.	ML		30.2 410.6				
		(31.0-32.0) (SP) SAND, fine sand, non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, dense.	SP		31.0 409.6	5	DP	5.0 5.0	
		(32.0-40.0) (SW) SAND, fine to coarse well-graded sub-angular sand, trace non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense. (33.0) SAA, except with trace fine sub-rounded gravels, and very dense.	SW		32.0 408.6 33.0	6	DP	5.0 5.0	Run #6 - driller encounters flowing sands. Begins to use water to advance.
35									
						7	DP	4.2 5.0	
40					401.6				
		(40.0-42.5) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines; dark gray (N3); non-cohesive, wet, very dense.	SW		40.0 399.1				
		(42.5-48.0) (SP) SAND, fine to medium sand, trace non-plastic fines; light brownish gray (5YR 6/1); non-cohesive, wet, very dense.	SP		42.5 397.6	8	DP	4.2 5.0	
45		(44.0) SAA, except medium gray (N5) SAND.			44.0 393.6				
		(48.0-57.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines, trace fine sub-rounded gravels; medium dark gray (N4); non-cohesive, wet, very dense.	SW		48.0	9	DP	5.0 5.0	
50					388.6				
		(53.0) SAA, except with more gravels.			53.0	10	DP	5.0 5.0	
55					384.6				
		(57.0-58.0) (SP) SAND, fine sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense.	SP		57.0 383.6				
		(58.0-95.1) (SP) SAND, unit inferred from drilling to be sand.	SP		58.0	11	DP	0.0 5.0	Driller can no longer collect samples due to heaving sands.
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-5

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,074.04 E: 880,846.61

ELEVATION: 441.56
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(58.0-95.1) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP			11	DP	0.0 / 5.0	
65						12	DP	0.0 / 5.0	
70						13	DP	0.0 / 5.0	
75						14	DP	0.0 / 5.0	
80						15	DP	0.0 / 5.0	
85						16	DP	0.0 / 5.0	
90		Log continued on next page				17	DP	0.0 / 5.0	

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-5

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,074.04 E: 880,846.61

ELEVATION: 441.56
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
90	Direct Push	(58.0-95.1) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP			17	DP	0.0 / 5.0	
						18	DP	0.0 / 2.1	
95		END OF BORING AT 95.1 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-5D, ASD-5M, ASD-5S.			346.5 / 95.1				
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-6

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,855.07 E: 880,303.03
ELEVATION: 443.41
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Hydrovac	(0.0-8.0) Hydrovac Excavation. Material is (ML) SILT with fine gravels based on visual observations.	ML		435.4	0	NA	0.0 / 8.0	Hydrovac was used on the first 8 feet to ensure utility clearance.
10	Direct Push	(8.0-12.0) (ML) SILT, low-plasticity fines, some fine sand; dark yellowish brown (10YR 4/2); cohesive, W<PL, soft.	ML		8.0 / 431.4	1	DP	1.8 / 5.0	
		(12.0-13.0) (ML) sandy SILT, non-plastic fines, fine sand; moderate yellowish brown (10YR 5/4); non-cohesive, moist, loose.	ML		12.0 / 430.4				
15		(13.0-23.0) (SP) silty SAND, fine sand, non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, dry, loose.	SP		13.0	2	DP	4.2 / 5.0	
		(18.0) SAA (Same As Above), except with thin layers of moderate yellowish brown (10YR 5/4) SAND.			425.4 / 18.0	3	DP	3.9 / 5.0	
20					420.4				
25		(23.0-30.0) (SP-SM) SAND, fine sand, some non-plastic fines; dark yellowish brown (10YR 4/2); non-cohesive, wet, compact.	SP-SM		23.0	4	DP	5.0 / 5.0	
						5	DP	4.0 / 5.0	▽ Water Level 28.68 ft bgs 2/01/2018
30					413.4				

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-6

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,855.07 E: 880,303.03

ELEVATION: 443.41
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(30.0-33.0) (SP) SAND, fine to medium sand, trace non-plastic fines; dark yellowish brown (10YR 4/2) with some dusky yellowish brown (10YR 2/2); non-cohesive, wet, compact.	SP		30.0 410.4	5	DP	4.0 5.0	
35		(33.0-37.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense.	SW		33.0 406.4	6	DP	4.2 5.0	Run #6 - Driller encounters flowing sands. Begins to use water.
		(37.0-38.0) (SP) SAND, fine to medium sand, trace non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, wet, dense.	SP		37.0 405.4				
40		(38.0-43.0) (SP-SM) SAND, fine sand, some non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, dense.	SP-SM		38.0 400.4	7	DP	5.0 5.0	
45		(43.0-46.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, very dense.	SW		43.0 397.4	8	DP	4.4 5.0	
		(46.0-47.0) (SP) SAND, fine sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense.	SP		46.0 396.4				
		(47.0-51.0) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense. (48.0) SAA, except with trace amounts of fine sub-rounded gravels.	SW		47.0 395.4 48.0 392.4	9	DP	4.2 5.0	
50		(51.0-53.0) (SP) SAND, fine sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, very dense.	SP		51.0 390.4				
55		(53.0-61.2) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines; medium gray (N5); non-cohesive, wet, very dense.	SW		53.0	10	DP	3.8 5.0	
						11	DP	4.2 5.0	
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-6

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,855.07 E: 880,303.03
ELEVATION: 443.41
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(53.0-61.2) (SW) SAND, fine to coarse well-graded sub-rounded sand, trace non-plastic fines; medium gray (N5); non-cohesive, wet, very dense. *(Continued)*	SW		382.2 / 61.2	11	DP	4.2 / 5.0	
		(61.2-61.4) (ML) CLAYEY SILT, low-plasticity fines, trace fine sand; medium gray (N5); cohesive, W~PL, firm.	ML		382.0 / 61.4				
		(61.4-68.0) (SP) SAND, fine sand, trace non-plastic fines; medium gray (N5); non-cohesive, wet, very dense.			380.4 / 63.0				
65		(63.0) SAA, except medium light gray (N6) SAND.	SP			12	DP	5.0 / 5.0	
					375.4 / 68.0				
		(68.0-93.0) (SP) SAND, unit inferred from drilling to be sand.				13	DP	0.0 / 5.0	Driller can no longer collect samples due to heaving sands.
70									
						14	DP	0.0 / 5.0	
75									
			SP			15	DP	0.0 / 5.0	
80									
						16	DP	0.0 / 5.0	
85									
						17	DP	0.0 / 5.0	
90									

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE ASD-6

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 2/01/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,855.07 E: 880,303.03

ELEVATION: 443.41
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
90	Direct Push	(68.0-93.0) (SP) SAND, unit inferred from drilling to be sand. *(Continued)*	SP		350.4	17	DP	0.0 / 5.0	
		(93.0-96.0) (SP) SAND, fine to medium rounded sand, trace non-plastic fines; light brownish gray (5YR 6/1); non-cohesive, wet, very dense.	SP		93.0	18	DP	3.0 / 3.0	Same location, different hole about 5 feet from first.
95					347.4				
		END OF BORING AT 96 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG ASD-6D, ASD-6M, ASD-6S.			96.0				
100									
105									
110									
115									
120									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/19/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,222.66 E: 878,398.80

ELEVATION: 441.94
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Direct Push	(0.0-3.0) ASH (SP) silty SAND, fine to medium sand, non-plastic fines, fine angular gravels; dusky yellowish brown (10YR 2/2); non-cohesive, dry, loose.	SP		438.9	1	DP	2.3 / 3.0	
		(3.0-5.0) ASH (ML) SILT, non-plastic fines, trace fine sand; dark yellowish brown (10YR 4/2); non-cohesive, wet, very loose.	ML		3.0 436.9				
5		(5.0-6.0) ASH (SP) SAND, fine to medium sand, non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, moist, loose.	SP		5.0 435.9	2	DP	3.5 / 5.0	
		(6.0-16.0) ASH (ML) SILT, non-plastic fines, trace fine sand; dark yellowish brown (10YR 4/2); non-cohesive, wet, very loose.	ML		6.0	3	DP	5.0 / 5.0	▽ Water Level 11.00 ft bgs 1/19/2018
10									
15						4	DP	4.5 / 5.0	
		(16.0-18.0) ASH (SP) SAND, fine to medium sand, non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, moist, loose.	SP		425.9 16.0 423.9				
		(18.0-41.5) ASH (ML) SILT, non-plastic fines, trace fine sand; dark yellowish brown (10YR 4/2), thinly laminated; non-cohesive, wet, loose.	ML		18.0	5	DP	4.4 / 5.0	
20									
25						6	DP	5.0 / 5.0	
		(28.0) SAA (Same As Above), except compact.			413.9 28.0	7	DP	5.0 / 5.0	
30		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: J. Breeding

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/19/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,222.66 E: 878,398.80
ELEVATION: 441.94
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(18.0-41.5) ASH (ML) SILT, non-plastic fines, trace fine sand; dark yellowish brown (10YR 4/2), thinly laminated; non-cohesive, wet, loose. *(Continued)*	ML			7	DP	5.0 / 5.0	
35						8	DP	5.0 / 5.0	
40						9	DP	5.0 / 5.0	
					400.4				
		(41.5-42.0) ASH (ML) clayey SILT, low-plasticity fines, trace fine sand; grayish black (N2); cohesive, W~PL, soft.	ML		41.5 399.9 42.0				
45		(42.0-48.0) ASH (ML) SILT, low-plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); cohesive, W~PL, firm. (43.0) SAA, except dusky yellowish brown (10YR 2/2) ASH.	ML		398.9 43.0	10	DP	5.0 / 5.0	
					393.9				
50		(48.0-53.0) ASH (ML) SILT, non-plastic fines, trace fine sand; dark yellowish brown (10YR 4/2); non-cohesive, wet, loose.	ML		48.0	11	DP	5.0 / 5.0	
					388.9				
55		(53.0-57.4) ASH (SP) SAND, fine to coarse sand, non-plastic fines; black (N1); non-cohesive, wet, dense.	SP		53.0	12	DP	5.0 / 5.0	Run #12 -Target depth not reached, drop off shoe in hole - can no longer groundwater sample this hole. Drilling terminated. Continue in hole 5 feet away from first.
					384.5				
		(57.4-60.5) ASH (ML) SILT, non-plastic fines, trace fine sand; dusky yellowish brown (10YR 2/2); non-cohesive, moist, soft.	ML		57.4	13	DP	5.0 / 5.0	
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: J. Breeding

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/19/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,222.66 E: 878,398.80

ELEVATION: 441.94
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60			ML		381.4				
	Direct Push	(60.5-63.0) (CL) SILTY CLAY, plastic fines, trace fine sand; medium dark gray (N4); cohesive, W~PL, stiff.	CL		60.5	13	DP	5.0 / 5.0	Native Soil encountered- drilling complete.
					378.9				
		END OF BORING AT 63 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG SCPA-1D, SCPA-1S.			63.0				
65									
70									
75									
80									
85									
90									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: J. Breeding

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/18/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,148.32 E: 879,215.97
ELEVATION: 447.06
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	Direct Push	(0.0-0.9) FILL (SP & GW) SAND and GRAVEL, fine to coarse poorly graded angular gravel, fine to coarse poorly graded angular sand, non-plastic fines; moderate yellowish brown (10YR 5/4); non-cohesive, dry, very stiff.	SP & GW		446.2 0.9	1	DP	3.6 3.0	Top portion was very hard. Compacted from heavy equipment.
		(0.9-2.8) ASH (SP) silty SAND, fine to medium poorly graded angular sand, non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, dry, stiff.	SP		444.3 2.8				
		(2.8-3.0) ASH (SP) SAND, fine sand, non-plastic fines, trace angular gravels; dark yellowish brown (10YR 4/2); non-cohesive, dry, loose.	SP		444.1 3.0				
		(3.0-4.0) ASH (SP) SAND, fine sand, trace angular gravels; dusky yellowish brown (10YR 2/2) to olive gray (5Y 3/2); non-cohesive, dry, loose.			443.1 4.0				
5		(4.0-8.0) ASH (ML) sandy SILT, low-plasticity fines, fine sand; dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4), thinly laminated; cohesive, W<PL, stiff.	ML		439.1	2	DP	4.4 5.0	
		(8.0-13.0) ASH (ML) SILT, low-plasticity fines, trace fine sand; brownish gray (5YR 4/1); cohesive, W~PL, very soft.	ML		8.0 434.1	3	DP	5.0 5.0	Some sluff at top of run, ~0.9 ft.
10		(13.0-14.6) FILL (SP) SAND, fine to medium sand, low-plasticity fines; brownish black (5YR 2/1); non-cohesive, moist, loose.	SP		13.0 432.5	4	DP	4.1 5.0	
		(14.6-15.8) FILL (ML) SILT, low-plasticity fines, trace fine sand; brownish gray (5YR 4/1); cohesive, W<PL, very soft.	ML		14.6 431.3				▽ Water Level 15.39 ft bgs 1/18/2018
15		(15.8-18.0) FILL (SP) SAND, fine to medium sand, low plasticity fines; brownish black (5YR 2/1); non-cohesive, moist, loose.	SP		15.8 429.1				
		(18.0-32.1) FILL (SW) SAND, fine to coarse well-graded sub-angular sand, trace non-plastic fines; brownish black (5YR 2/1); non-cohesive, wet, stiff.	SW		18.0	5	DP	4.3 5.0	Run #5, driller notes 2ft of flowing sands sluffed into bottom of run.
20						6	DP	5.0 5.0	Run #6 - 3ft of sluff, driller pumps water down hole to remove sluff/fall in.
25		(28.0) SAA (Same As Above), except black (N1) ASH.			419.1 28.0	7	DP	3.7 5.0	
30		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:JSI/BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-2

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/18/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,121,148.32 E: 879,215.97

ELEVATION: 447.06
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(18.0-32.1) FILL (SW) SAND, fine to coarse well-graded sub-angular sand, trace non-plastic fines; brownish black (5YR 2/1); non-cohesive, wet, stiff. *(Continued)*	SW		415.0	7	DP	3.7 / 5.0	
		(32.1-33.0) (SP) SAND, fine sand, trace non-plastic fines; light brownish gray (5YR 6/1); non-cohesive, wet, stiff.	SP		32.1 414.1				Native Soil encountered- drilling complete.
		END OF BORING AT 33 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG SCPA-2.			33.0				
35									
40									
45									
50									
55									
60									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:JSI/BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 3/27/18

RECORD OF BOREHOLE SCPA-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/18/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,661.08 E: 878,671.41

ELEVATION: 446.10
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	Direct Push	(0.0-1.5) ASH (ML) SILT, low-plasticity fines, trace fine sand; dusky yellowish brown (10YR 2/2); non-cohesive, dry, compact.	ML		444.6	1	DP	3.4 / 3.0	
		(1.5-3.0) ASH (ML) sandy SILT, non-plastic fines, some fine to medium sand; dark yellowish brown (10YR 4/2); non-cohesive, dry, compact.	ML		1.5 443.1				
		(3.0-4.0) ASH (ML) SILT, non-plastic fines, trace fine sand; moderate yellowish brown (10YR 5/4); non-cohesive, dry, compact.	ML		3.0 442.1	2	DP	5.0 / 5.0	
		(4.0-5.0) ASH (SP) SAND, fine to medium poorly graded sand, some non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, dry, compact.	SP		4.0 441.1				
5		(5.0-18.0) ASH (ML) SILT, low-plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); cohesive, W<PL, stiff.	ML		5.0	3	DP	3.5 / 5.0	
10									
		(13.0) SAA (Same As Above), except some fine ASH.			433.1 13.0	4	DP	5.0 / 5.0	
15									
		(18.0-19.4) ASH (SP) SAND, fine to medium sand, trace non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, wet, compact.	SP		428.1 18.0 426.7	5	DP	5.0 / 5.0	
20		(19.4-23.0) ASH (ML) SILT, low-plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); cohesive, W<PL, soft.	ML		19.4 423.1				
		(23.0-25.0) ASH (SP) SAND, fine to medium sand, trace non-plastic fines; brownish black (5YR 2/1); non-cohesive, wet, compact.	SP		23.0 421.1	6	DP	5.0 / 5.0	
25		(25.0-47.5) ASH (ML) SILT, low-plasticity fines, some fine sand; dusky yellowish brown (10YR 2/2); cohesive, W<PL, soft.	ML		25.0				
		(28.0) SAA, except trace amounts of fine ASH.			418.1 28.0	7	DP	5.0 / 5.0	
30		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center
DRILLING METHOD: Direct Push
DRILLING DATE: 1/18/2018
DRILL RIG: Geoprobe (8040DT)
DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,661.08 E: 878,671.41
ELEVATION: 446.10
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
30	Direct Push	(25.0-47.5) ASH (ML) SILT, low-plasticity fines, some fine sand; dusky yellowish brown (10YR 2/2); cohesive, W<PL, soft. *(Continued)*	ML			7	DP	5.0 / 5.0	
35						8	DP	5.0 / 5.0	▽ Water Level 34.40 ft bgs 1/18/2018
40						9	DP	5.0 / 5.0	
		(43.0) SAA, except laminated.			403.1 / 43.0	10	DP	5.0 / 5.0	
45		(47.5-53.0) ASH (SP) SAND, medium to coarse sand, trace non-plastic fines; brownish black (5YR 2/1); non-cohesive, wet, very loose.	SP		398.6 / 47.5	11	DP	0.0 / 5.0	Run #11 - No Recovery. Driller says sample was too wet and fell out of the bottom of the sampler.
50		(53.0-55.4) ASH (ML) SILT, low-plasticity fines, trace fine sand; dusky yellowish brown (10YR 2/2); cohesive, W>PL, very soft.	ML		393.1 / 53.0	12	DP	5.0 / 5.0	
55		(55.4-57.0) ASH (SW) SAND, medium to coarse well-graded sub-angular sand, brownish black (5YR 2/1); non-cohesive, wet, very loose.	SW		390.7 / 55.4				
		(57.0-58.0) ASH (ML) SILT, low-plasticity fines, trace medium sand; dusky yellowish brown (10YR 2/2); cohesive, W>PL, very soft.	ML		389.1 / 57.0				
		(58.0-70.5) ASH (ML) SILT, non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, wet, very loose.	ML		388.1 / 58.0	13	DP	1.0 / 5.0	
60		Log continued on next page							

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPA-3

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/18/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,661.08 E: 878,671.41

ELEVATION: 446.10
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
60	Direct Push	(58.0-70.5) ASH (ML) SILT, non-plastic fines; dusky yellowish brown (10YR 2/2); non-cohesive, wet, very loose. *(Continued)*	ML		383.1 / 63.0	13	DP	1.0 / 5.0	
65		(63.0) SAA, except with trace amounts of fine ASH, (SP) SAND.				14	DP	2.1 / 5.0	
70					375.6 / 70.5	15	DP	5.0 / 5.0	Native soil encountered - drilling complete.
		(70.5-73.0) (SP) SAND, fine sand, trace non-plastic fines; light olive gray (5Y 5/2); non-cohesive, wet, dense.	SP		373.1 / 73.0				
		END OF BORING AT 73 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG SCPA-3D, SCPA-3S.							
75									
80									
85									
90									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

RECORD OF BOREHOLE SCPB-1

SHEET 1 of 1

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0003K
LOCATION: Sioux Energy Center

DRILLING METHOD: Direct Push
DRILLING DATE: 1/25/2018
DRILL RIG: Geoprobe (8040DT)

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 1,120,031.43 E: 879,817.26

ELEVATION: 446.96
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	Direct Push	(0.0-10.5) FILL (ML) SILT, low plasticity fines, trace fine sand; Dusky Yellowish Brown (10YR 2/2), FLY ASH; cohesive, W<PL, stiff.	ML			1	DP	3.1 / 3.0	
5		(5.8) 0.25 feet of (SP) SAND, fine to medium sand, non-plastic fines; Black (N1); non-cohesive, moist, loose.			441.2 / 5.8	2	DP	4.3 / 5.0	
		(7.3) SAA (Same As Above), except non-cohesive, wet, and very loose.			439.7 / 7.3				
10		(10.5-13.0) FILL (ML) sandy SILT, low-plasticity fines, fine sand; Dark Yellowish Brown (10YR 4/2) with Black (N1), Fly Ash; non-cohesive, wet, very loose.	ML		436.5 / 10.5	3	DP	5.0 / 5.0	▽ Water Level 10.82 ft bgs 1/25/2018
		(13.0-16.1) FILL (ML) SILT, low-plasticity fines, trace fine sand; Dark Yellowish Brown (10YR 4/2), FLY ASH; non-cohesive, wet, very loose.	ML		434.0 / 13.0	4	DP	3.1 / 3.1	
15		END OF BORING AT 16.1 FT BELOW GROUND SURFACE. FOR WELL DETAILS, SEE WELL CONSTRUCTION LOG SCPB-1.			430.9 / 16.1				
20									
25									
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Roberts Environmental Drilling, Inc.
DRILLER: P. Seymour

LOGGED:BCW
CHECKED:MSG
REVIEWED:JSI

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 3/27/18

RECORD OF BOREHOLE LB-1

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center
DRILLING METHOD: HSA
DRILLING DATE: 03/7/2016
DRILL RIG: HSA
DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,121,135.55 E: 879,554.76
ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0-2.6) FILL (ML), SILT, non-plastic fines; olive black (5Y 2/1), trace fine sand, trace iron solution (red grains), FLY ASH; non-cohesive, moist, very loose	ML		443.4	1	SPT	2.0 / 2.0	
		(2.6-4.0) SAA (same as above), trace fine to medium, poorly graded sand black (N1), CHAR ASH; pockets, 1/4" diameter, subangular, glass-like; non-cohesive, moist, very loose	ML		2.6 442.0	2	SPT	2.1 / 2.0	
		(4.0-4.5) SAA, non-cohesive, wet, very loose	ML		4.0 441.5				
5		(4.5-6.0) FILL (SP), SAND, fine to medium grained, poorly graded, trace non-plastic fines, black (N1), subangular, glass-like, CHAR ASH; non-cohesive, wet, very loose	SP		4.5 440.0	3	SPT	0.8 / 2.0	
		(6.0-7.0) SAA, trace organics (roots)	SP		6.0 439.0	4	SPT	2.1 / 2.0	▽ Water Level 7.5 ft bgs
		(7.0-12.5) FILL (ML), SILT, low plasticity, olive gray (5Y 3/2); FLY ASH; non-cohesive, wet, very loose	ML		7.0	5	SH	1.8 / 2.5	(8.0-10.5) TP1 (Shelby) Sampled
10									(10.5-12.5) Vane Shear Attempt at Vane Shear. Torque wrench maxed out (200 in-lb) with no movement. Need higher capacity wrench. SPT for 12-14 ft will be low due to VS test attempt
		(12.5-13.3) FILL (ML), SILT, trace fine sand, olive gray (5Y 3/2), FLY ASH; non-cohesive, wet, very loose	ML		433.5 12.5 432.7	6	SPT	2.0 / 2.0	
		(13.3-14.5) FILL (ML), SILT, trace fine to medium sand, olive gray (5Y 4/1), FLY ASH; non-cohesive, wet, very loose	ML		13.3 431.5				
15		(14.5-17.0) FILL (SM), SILTY SAND, fine to medium grained, poorly graded, rounded, CHAR ASH; non-plastic fines; dark yellowish brown (10YR 4/2) & medium gray (N5), FLY ASH; non-cohesive, moist, dense	SM		14.5	7	SH	1.4 / 2.5	(14.5-17.0) TP2 (Shelby) Sampled
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: JRS/JCW
REVIEWED: PJJ

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-2

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center
DRILLING METHOD: HSA
DRILLING DATE: 3/7/2016
DRILL RIG: HSA
DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,121,114.08 E: 879,718.99
ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0-2.0) FILL (SM), SILTY SAND, fine to medium grained, poorly graded, non-plastic fines, black (N1), trace olive gray pockets (5Y 3/2), FLY ASH; non-cohesive, moist, dense	SM		444.0 / 2.0	1	SPT	2.1 / 2.0	
		(2.0-4.4) SAA (same as above), with trace dark yellowish brown pockets (10 YR 4/2); compact	SM			2	SPT	2.0 / 2.0	
					441.6 / 4.4				
5		(4.4-6.4) No recovery, FILL, (SP), SAND, fine to medium grained sand, poorly graded, black (N1), subangular, CHAR ASH; non-cohesive, wet, loose	SP			3	SPT	1.4 / 2.0	(4.4-6.4) No Recovery, likely CHAR ASH, evidence in tube
					439.6 / 6.4				
		(6.4-10.5) FILL (ML), Sandy SILT, non-plastic fines, some fine to medium grained sand, rounded, olive black (5Y 2/1), non-cohesive, wet, very loose	ML			4	SPT	1.6 / 2.0	
						5	SH	1.9 / 2.5	▽ Water Level 8.2 ft bgs (8.0-10.5) TP3 Shelby Tube Sample
10					435.5 / 10.5				
		(10.5-12.5) FILL (ML), SILT, non-plastic fines, olive gray (5Y 4/1), FLY ASH; some poorly graded, fine to medium grained sand, poorly graded, black (N1) (2"-4" seams), subangular, CHAR ASH; non-cohesive, wet, very loose	SP			6	SPT	2.1 / 2.0	
					433.5 / 12.5				
		(12.5-17.0) FILL (ML), SILT, non-plastic fines, olive black (5Y 2/1), FLY ASH; non-cohesive, wet, very loose	SP			7	SPT	2.1 / 2.0	(13.5-14.5) Stratification of olive black (5Y 2/1) and black (N1) layers (layers of interlaid fly ash and char ash)
15						8	SH	1.7 / 2.5	(14.5-17.0) TP4 Shelby Tube Sample Attempted tremie pressure locating of liner. Depth appeared to be at 16.4 ft. Driller lost return and encountered a highly resistive layer.
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-3

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center
DRILLING METHOD: HSA
DRILLING DATE: 3/7/2016
DRILL RIG: HSA
DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,121,089.81 E: 880,095.49
ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0-2.0) FILL (ML) SILT, non-plastic fines, some fine to medium grained sand, olive black (5Y 2/1), FLY ASH; non-cohesive, moist, very loose	ML		444.0	1	SPT	2.1 / 2.0	
		(2.0-5.6) FILL, (SP-ML), SAND AND SILT, fine to medium grained, poorly graded, subangular, black (N1), CHAR ASH non-plastic fines, olive black (5Y 2/1), FLY ASH; ; non-cohesive, moist, very loose	SP-SM		2.0	2	SPT	0.0 / 2.0	(2.0-5.6) No Recovery, trace evidence in tube
5					440.4	3	SPT	0.4 / 2.0	
		(5.6-7.8) FILL (ML), SILT, non-plastic fines, some fine to medium grained sand, olive black (5Y 2/1), FLY ASH; non-cohesive, wet, very loose	ML		5.6 / 438.2	4	SPT	2.0 / 2.0	
		(7.8-10.9) FILL (SP), SAND, fine to medium grained, poorly graded, black (N1), non-plastic fines, CHAR ASH, subangular; non-cohesive, wet, very loose	SP		7.8 / 435.1	5	SPT	0.6 / 2.0	▽ Water Level 8.6 ft bgs (8.6-10.9) No Recovery, likely SAA
10		(10.9-12.0) FILL (ML), SILT, non-plastic fines, some fine sands, olive black (5Y 2/1), FLY ASH; non-cohesive, wet, very loose	ML		10.9 / 434.0	6	SPT	1.1 / 2.0	
		(12.0-12.5) FILL (SP), SAND, fine to medium grained, poorly graded, non-plastic fines, black (N1), FLY ASH; non-cohesive, wet, very loose	SP		12.0 / 433.5	7	SPT	2.0 / 2.0	Material has some plastic qualities.
		(12.5-16.5) FILL (ML), SILT, non-plastic and plastic fines, trace fine sands, dark yellowish brown (10YR 4/2), FLY ASH; non-cohesive, wet, very loose.	ML		12.5	8	SH	1.6 / 2.5	(14.0-16.5) TP5 Shelby tube sampled
15									
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-4

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center

DRILLING METHOD: HSA
DRILLING DATE: 3/11/2016
DRILL RIG: HSA

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,121,091.05 E: 880,157.80

ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0-2.9) FILL (SP), SAND, fine-grained, poorly graded, easily crushed, black (N1), CHAR ASH; trace non-plastic fines, dark yellowish brown silt pockets (10YR 4/2) (1/4" dia), FLY ASH; non-cohesive, moist, dense	SP		443.1	1	SPT	2.0 / 2.0	
		(2.9-3.2) FILL (ML), SILT, non-plastic fines, dark yellowish brown (10YR 4/2), FLY ASH; non-cohesive, moist, dense	ML		2.9 / 442.8	2	SPT	2.0 / 2.0	
		(3.2-4.0) SAA with some fine-grained, poorly graded, sand, black (N1), non-cohesive, moist, dense	ML		3.2 / 442.0				
		(4.0-6.0) SAA with trace medium grained sand, poorly graded, medium gray (N5), non-cohesive, moist, dense	ML		4.0 / 440.0	3	SPT	2.0 / 2.0	▽ Water Level 5.4 ft bgs
		(6.0-8.0) FILL (ML), SILT, non-plastic fines, olive black (5Y 2/1), FLY ASH; with 1" seam FILL, (SP), SAND, medium-grained, poorly graded, black (N1), subangular, CHAR ASH; non-cohesive, wet, compact	ML		6.0 / 438.0	4	SPT	2.1 / 2.0	
		(8.0-10.9) FILL (SP), SAND, poorly graded, medium grained, black (N1), CHAR ASH; non-cohesive, wet, very loose. Loss of some recovery	SP		8.0 / 435.1	5	SH	1.5 / 2.5	(8.0-10.5) TP6 Shelby Tube Sampled
		(10.9-14.5) FILL (ML), SILT, non-plastic fines, olive black (5Y 2/1), FLY ASH; non-cohesive, wet, very loose	ML		10.9 / 431.5	6	SPT	1.9 / 2.0	(12.5-14.5) Attempted Vane shear (no soil data)
		(14.5-15.7) FILL (ML), SILT, non-plastic fines, olive black (5Y 2/1) with trace sand, medium grained, poorly graded, black (N1), FLY ASH; non-cohesive, moist, compact	ML		14.5 / 430.3	7	SPT	2.0 / 2.0	
		(15.7-16.5) FILL (ML), SILT, non-plastic fines, olive gray (5Y 4/1), with trace sands, medium grained, poorly graded, black (N1), FLY ASH; non-cohesive, moist, compact	ML		15.7				
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-5

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center
DRILLING METHOD: HSA
DRILLING DATE: 3/11/2016
DRILL RIG: HSA
DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,121,363.14 E: 880,016.33
ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0-2.0) FILL (ML), SILT, non-plastic fines, some fine-grained, poorly graded sand, olive black (5Y 2/1), FLY ASH; non-cohesive, moist, compact	ML		444.0	1	SPT	2.0 / 2.0	
		(2.0-4.0) SAA with silt pockets, dark yellowish brown (10YR 4/2) (1/4"-1/2" dia), FLY ASH; non-cohesive, moist, loose	ML		2.0 442.0	2	SPT	1.4 / 2.0	
		(4.0-6.0) FILL (ML), SILT, non-plastic fines, some fine grained, poorly graded sand, dusky yellowish brown (10YR 2/2), FLY ASH; non-cohesive, moist, loose	ML		4.0 440.0	3	SPT	1.3 / 2.0	
5		(6.0-10.5) FILL (SM), SILTY SAND, fine to medium grained, poorly graded, grayish black (N2), CHAR ASH; non-plastic fines, moderate yellowish brown silt seams (10YR 5/4) (1/8" to 1/4" thick), FLY ASH; non-cohesive, wet, very loose	SM		6.0	4	SPT	1.7 / 2.0	
						5	SH	1.5 / 2.5	▽ Water Level 8.1 ft bgs (8.0-10.5) TP7 Shelby Tube Sampled. Material appears to be SAA. Lack of recovery may indicate CHAR ASH layer (medium grained, poorly graded sand, black (N1))
10					435.5				
		(10.5-10.9) FILL (SP), SAND, medium grained, poorly graded sand, black (N1), subangular, CHAR ASH; non-cohesive, wet, very loose	SP		10.5 435.1	6	SPT	2.1 / 2.0	
		(10.4-16.6) FILL, ML, SILT, non-plastic fines, dark yellowish brown (10YR 4/2), trace fine-grained sand, black (N1), FLY ASH; non-cohesive, wet, very loose	ML		10.9	7	SH	2.1 / 2.5	(12.5-15.0) TP8 Shelby Tube Sampled, SAA
15						8	SPT	2.1 / 2.0	
		(16.6-16.9) FILL, SP-SM, Sandy Silt, non-plastic and plastic fines, moderate yellowish brown (10YR 5/4) with fine and medium grained sand, poorly graded, black (N1), FLY ASH; non-cohesive, wet, very loose	SP-SM		429.4 16.6				
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-6

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center

DRILLING METHOD: HSA
DRILLING DATE: 4/4/2016
DRILL RIG: HSA

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: N/A E: N/A

ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA	(0.0 - 2.0) Fill (ML), sandy SILT, with non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded, sand, black (N1) ; FLY ASH; very loose, moist, non-cohesive	ML		444.0	1	SPT	1 / 2.0	
		(2.0-10.0) No Recovery, likely SAA with very loose, wet, non-cohesive			2.0	2	SPT	0 / 2.0	
5			ML			3	SPT	1.1 / 2.0	
						4	SPT	1.2 / 2.0	
					436.0				(2.0-4.0) Vane Shear, likely SAA Peak = 48 lb Residual = 18 lb ▽ Water Level 9.4 ft bgs
10		(10.0-12.0) FILL, SP, SAND, fine to medium grained, poorly graded sand, black (N1), CHAR ASH; non-cohesive, wet, very loose	SP		10.0 434.0	5	SPT	0.1 / 2.0	
		(12.0-16.0) Fill (ML), sandy SILT, with non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded sand, black (N1), FLY ASH; very loose, moist, non-cohesive	ML		12.0				(12.0-14.0) Vane Shear Peak = 52 lb Residual = 28 lb likely Fill (ML), sandy SILT, with non-plastic fines, olive black (5Y 2/1); fine to medium grained sand, black (N1); very loose, wet, non-cohesive
15						6	SPT	1.8 / 2.0	
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-7

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center

DRILLING METHOD: HSA
DRILLING DATE: 4/4/2016
DRILL RIG: HSA

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: N/A E: N/A

ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA 4/4/2016 and 6.25" HSA 4/5/2016	(0.0-7.2) Fill (ML), sandy SILT, non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded sand, black (N1) ; FLY ASH; very loose, wet, non-cohesive	ML			1	SPT	1.9 / 2.0	
						2	SPT	2.1 / 2.0	
5						3	SPT	2 / 2.0	
						4	SPT	1.2 / 2.0	
		(7.2-8.9) Fill (SP), SAND, fine to medium grained, poorly graded, black (N1); CHAR ASH; very loose, wet, non-cohesive	SP		438.8 / 7.2				▽ Water Level 8.6 ft bgs
		(8.9-14.0) Fill (ML), sandy SILT, with non-plastic fines, greenish black (5GY 2/1); fine to medium grained sand, black (N1); FLY ASH; very loose, wet, non-cohesive			437.1 / 8.9	5	SPT	2.1 / 2.0	
10			ML						(10.0-12.0) Vane Shear, likely SAA Peak = 40 lb Residual = 30 lb
						6	SPT	2.1 / 2.0	
		(14.0-16.0) Fill (ML), SILT, with non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded sand, black (N1), FLY ASH; very loose, wet, non-cohesive.			432.0 / 14.0				
15			ML			7	SPT	0.6 / 2.0	
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

RECORD OF BOREHOLE LB-8

SHEET 1 of 1

PROJECT: Ameren MO - Partial Pond Closure
PROJECT NUMBER: 154-7197.0002
LOCATION: Sioux Energy Center
DRILLING METHOD: HSA
DRILLING DATE: 4/4/2016
DRILL RIG: HSA
DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: N/A E: N/A
ELEVATION: 446
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	4.25" HSA 4/4/2016 and 6.25" HSA 4/5/2016	(0.0 - 4.0) Fill (ML), sandy SILT, non-plastic fines, grayish black (N2); fine to medium grained, poorly graded sand, black (N1), FLY ASH; compact, moist, non-cohesive	ML			1	SPT	2 / 2.0	
						2	SPT	2 / 2.0	
					442.0 / 4.0				
		(4.0-7.6) SAA, very loose, wet, non-cohesive				3	SPT	2.1 / 2.0	
5			ML			4	SPT	1.6 / 2.0	
					438.4 / 7.6				▽ Water Level 7.6 ft bgs
		(7.6-8.4) Fill (SP), SAND, fine to medium grained, poorly graded, black (N1); CHAR ASH; very loose, wet, non-cohesive	SP		437.6 / 8.4				
		(8.4-9.0) Fill (ML), sandy SILT, non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded sand, black (N1) ; FLY ASH; very loose, wet, non-cohesive	ML		437.0 / 9.0	5	SPT	1.9 / 2.0	
		(9.0-9.4) Fill (SP), SAND, fine to medium grained, poorly graded, black (N1); CHAR ASH; very loose, wet, non-cohesive	SP		436.6 / 9.4				
10		(9.4-16.0) Fill (ML), sandy SILT, with non-plastic fines, olive black (5Y 2/1); fine to medium grained, poorly graded sand, black (N1) ; FLY ASH; very loose, wet, non-cohesive							10.0-12.0) Vane Shear, likely SAA Peak = 30 lb Residual = 20 lb
			ML			6	SPT	2.2 / 2.0	
						7	SPT	2.1 / 2.0	
15									
20									

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Bulldog
DRILLER: C. Dutton

LOGGED: MSG
CHECKED: PJJ
REVIEWED: KB

Golder Associates

GOLDER STL RECORD OF BOREHOLE MWD SEC LOGS.GPJ GLDR_CO.GDT 4/11/16

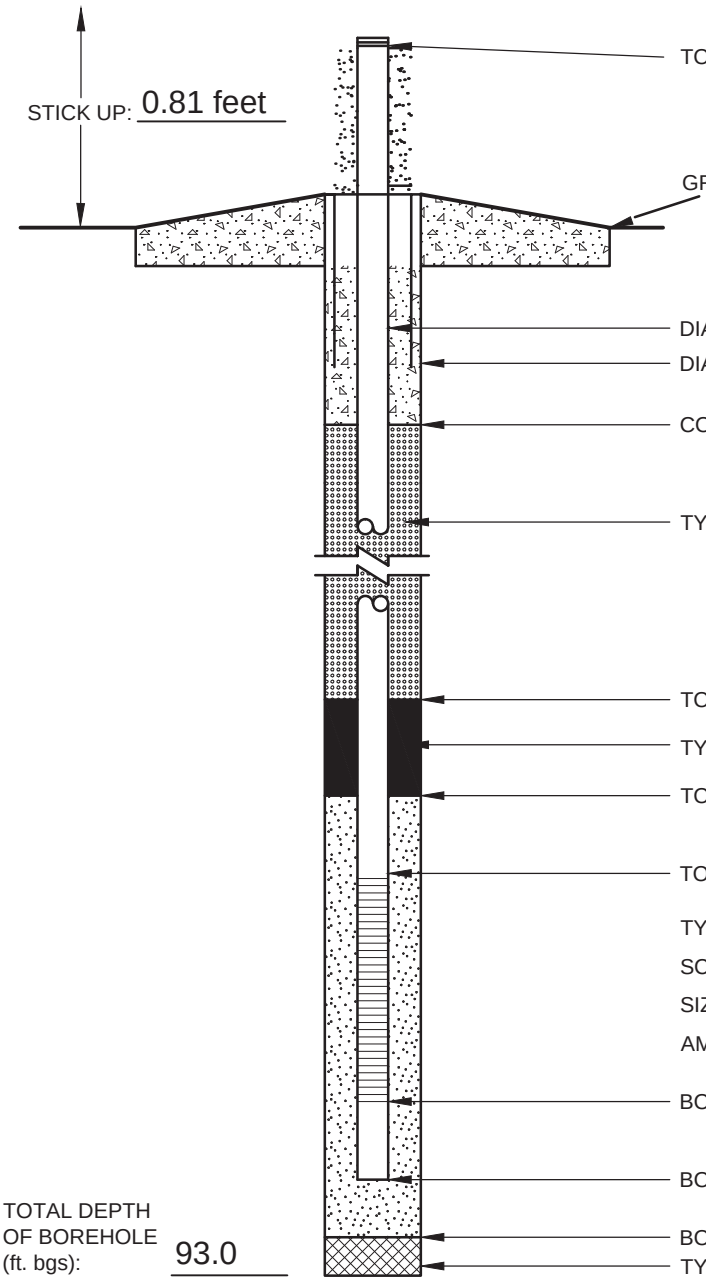
APPENDIX B

Temporary Piezometer Construction Logs

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-1D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.46
GEOLOGIST: B. Works	NORTHING: 1121611.373	EASTING: 879832.858
DRILLER: J. Breeding	STATIC WATER LEVEL: 28.68 FT BTOC	COMPLETION DATE: 1/30/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 446.27

GROUND SURFACE ELEVATION: 445.46

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 18.5

TOP OF SCREEN DEPTH (ft. bgs): 84.2

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 89.0

BOTTOM OF WELL DEPTH (ft. bgs): 89.3

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~20 gallons of water used during drilling/installation. Total depth of temporary piezometer is 90.10 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

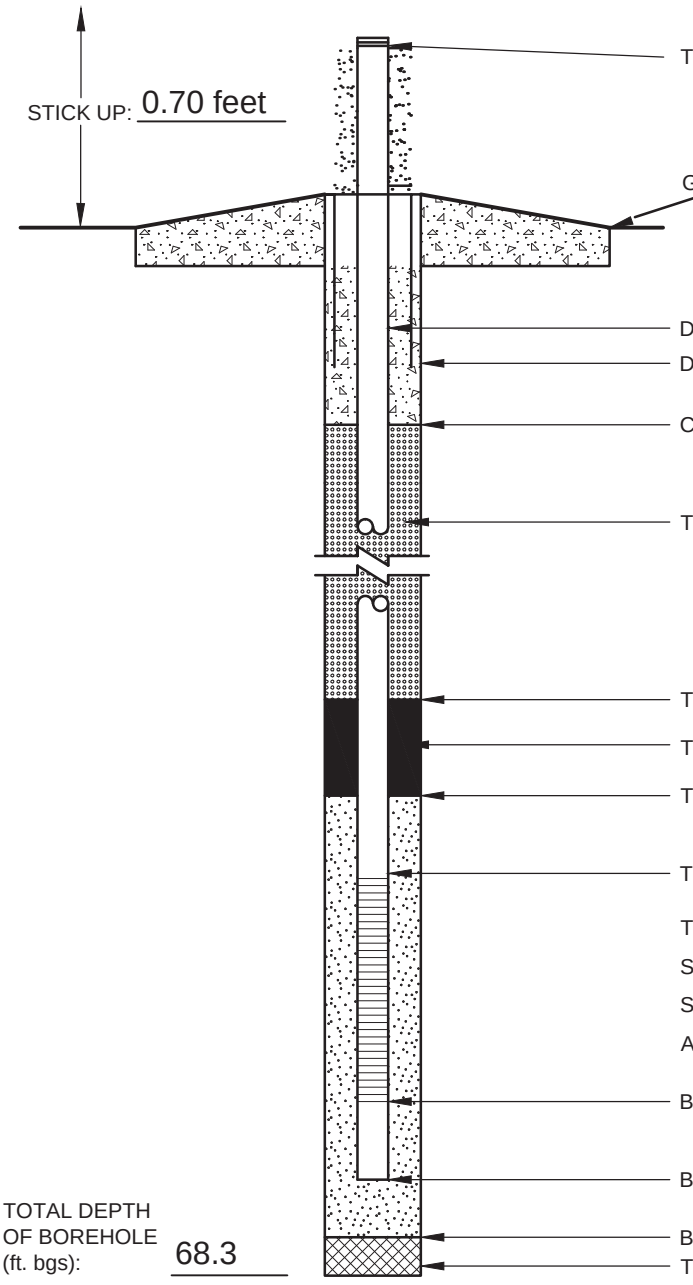
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-1M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.51
GEOLOGIST: B. Works	NORTHING: 1121605.911	EASTING: 879830.578
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.50 FT BTOC	COMPLETION DATE: 1/30/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 446.21

GROUND SURFACE ELEVATION: 445.51

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 29.5

TOP OF SCREEN DEPTH (ft. bgs): 63.2

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 68.0

BOTTOM OF WELL DEPTH (ft. bgs): 68.3

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~20 gallons of water used during drilling/installation. Total depth of temporary piezometer is 69.00 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

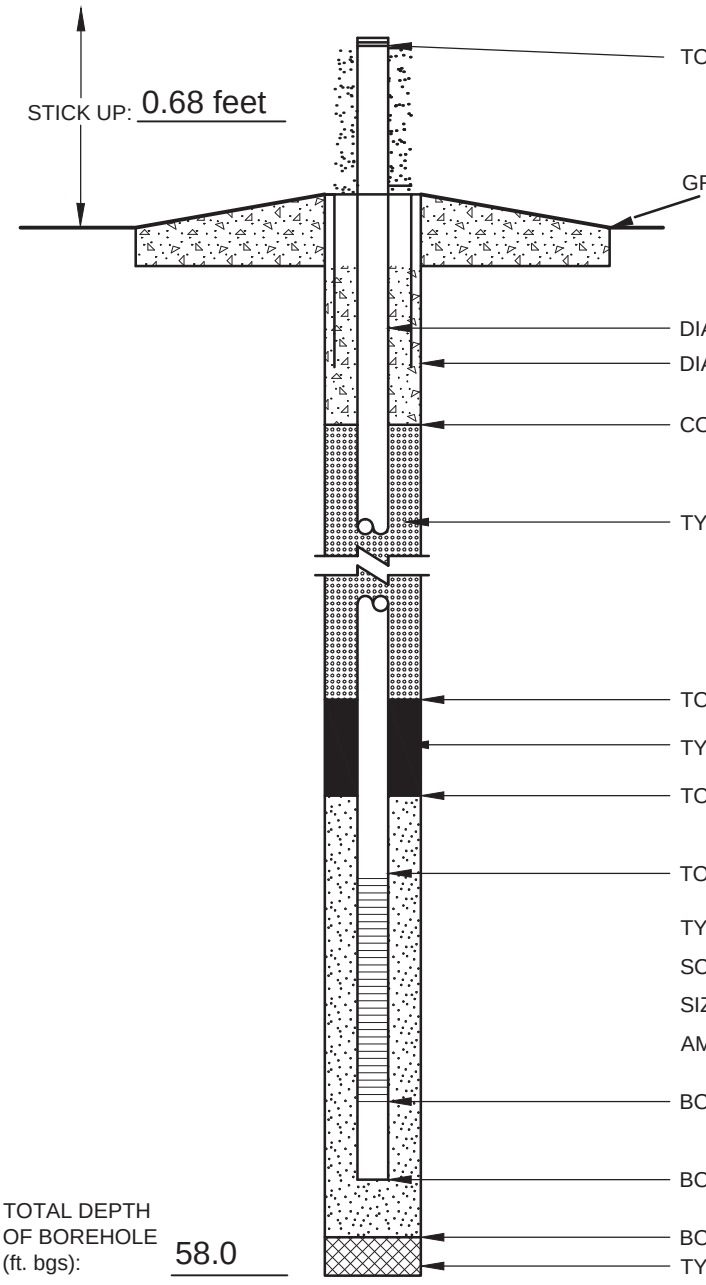
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-1S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.43
GEOLOGIST: B. Works	NORTHING: 1121600.206	EASTING: 879828.243
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.22 FT BTOC	COMPLETION DATE: 1/30/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.68 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 58.0

TOP OF CASING ELEVATION: 446.11

GROUND SURFACE ELEVATION: 445.43

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 31.0

TOP OF SCREEN DEPTH (ft. bgs): 33.4

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 38.2

BOTTOM OF WELL DEPTH (ft. bgs): 38.5

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~40 gallons of water used during drilling/installation. Total depth of temporary piezometer is 39.20 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

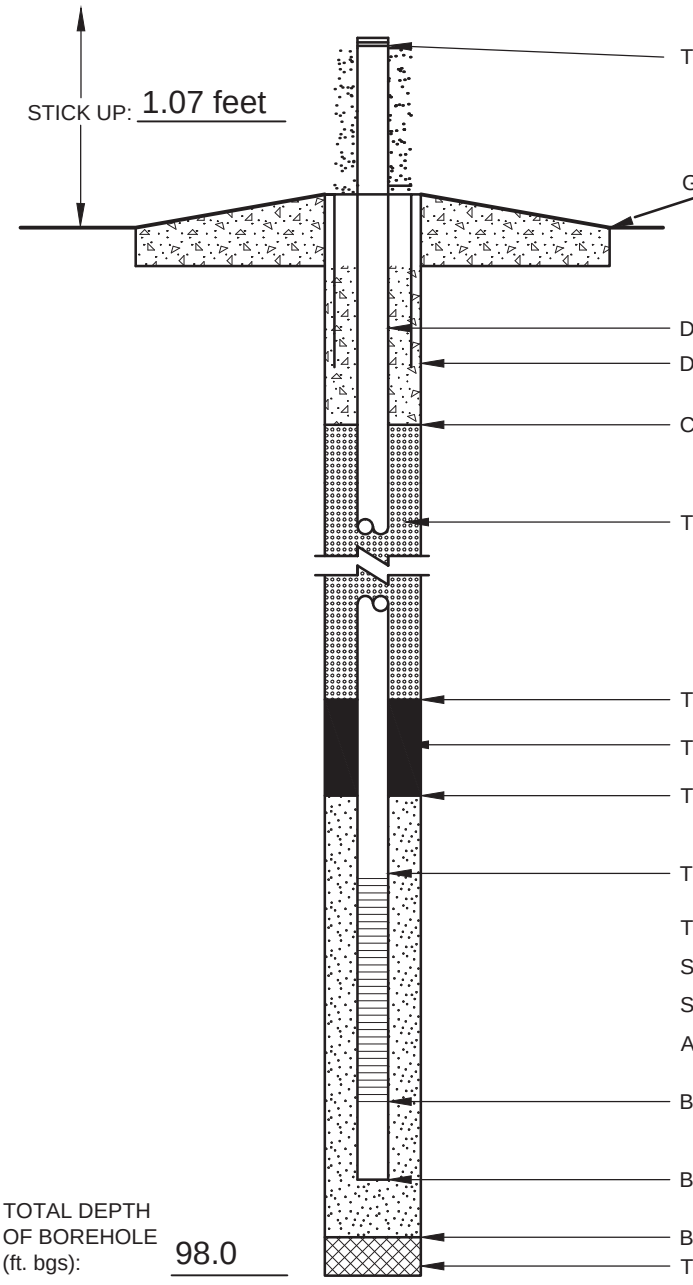
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-2D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 444.99
GEOLOGIST: B. Works	NORTHING: 1120961.773	EASTING: 879336.232
DRILLER: J. Breeding	STATIC WATER LEVEL: 29.10 FT BTOC	COMPLETION DATE: 1/29/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 1.07 feet

TOP OF CASING ELEVATION: 446.06

GROUND SURFACE ELEVATION: 444.99

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 25.5

TOP OF SCREEN DEPTH (ft. bgs): 82.7

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 87.5

BOTTOM OF WELL DEPTH (ft. bgs): 87.8

TOTAL DEPTH OF BOREHOLE (ft. bgs): 98.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~40 gallons of water used during drilling/installation. Total depth of temporary piezometer is 88.90 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

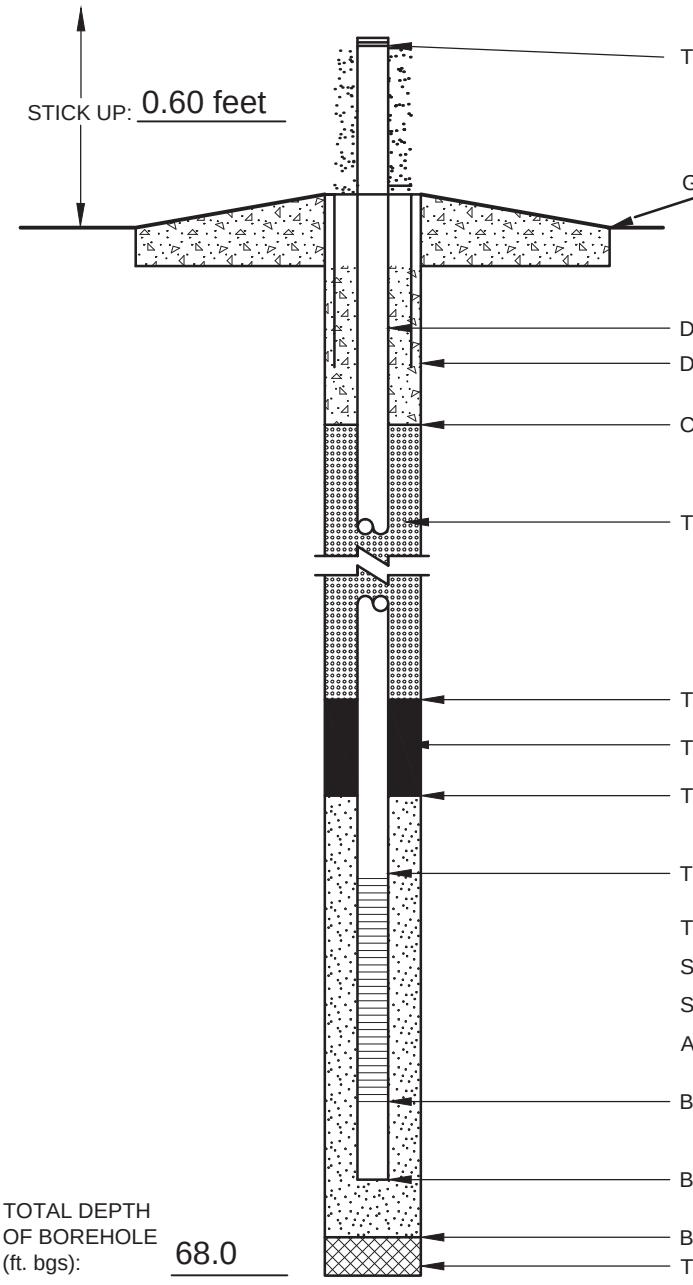
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-2M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.07
GEOLOGIST: B. Works	NORTHING: 1120950.882	EASTING: 879335.046
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.16 FT BTOC	COMPLETION DATE: 1/26/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.60 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 68.0

TOP OF CASING ELEVATION: 445.67

GROUND SURFACE ELEVATION: 445.07

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch Chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.0

TOP OF SCREEN DEPTH (ft. bgs): 60.9

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 65.7

BOTTOM OF WELL DEPTH (ft. bgs): 66.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~60 gallons of water used during drilling/installation. Total depth of temporary piezometer is 66.55 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

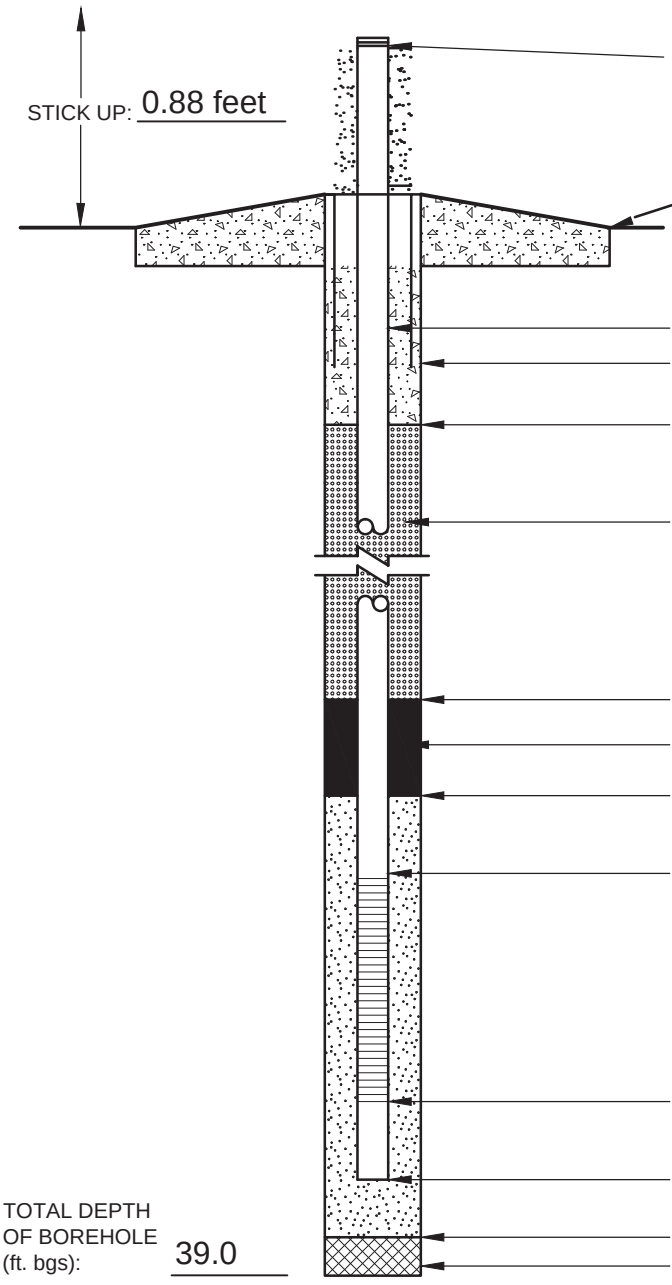
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-2S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.07
GEOLOGIST: B. Works	NORTHING: 1120956.523	EASTING: 879335.447
DRILLER: P. Seymour/J.Breeding	STATIC WATER LEVEL: 28.55 FT BTOC	COMPLETION DATE: 1/29/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.88 feet

TOP OF CASING ELEVATION: 445.95

GROUND SURFACE ELEVATION: 445.07

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 27.5

TOP OF SCREEN DEPTH (ft. bgs): 33.1

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 37.9

BOTTOM OF WELL DEPTH (ft. bgs): 38.2

TOTAL DEPTH OF BOREHOLE (ft. bgs): 39.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: No water used during drilling/installation. Total depth of temporary piezometer is 39.10 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

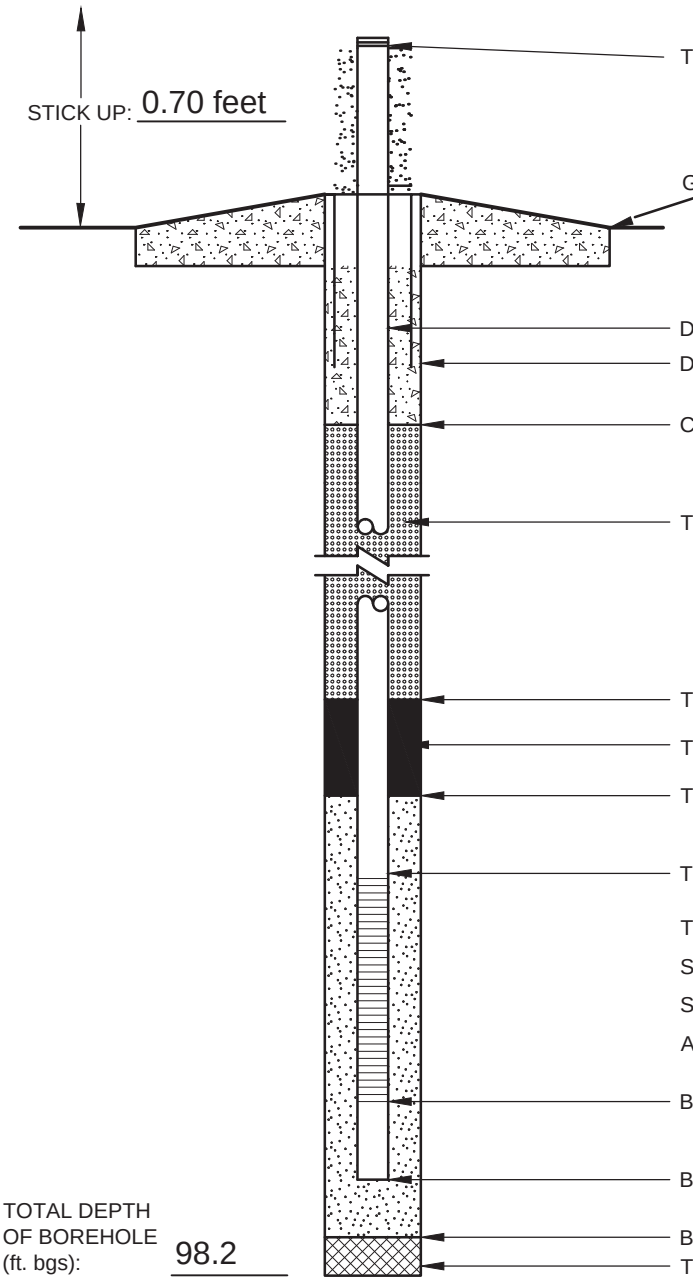
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-3D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.35
GEOLOGIST: B. Works	NORTHING: 1120277.424	EASTING: 879289.307
DRILLER: P. Seymour	STATIC WATER LEVEL: 29.65 FT BTOC	COMPLETION DATE: 1/26/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.70 feet

TOP OF CASING ELEVATION: 446.05

GROUND SURFACE ELEVATION: 445.35

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 32.0

TOP OF SCREEN DEPTH (ft. bgs): 93.1

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 97.9

BOTTOM OF WELL DEPTH (ft. bgs): 98.2

TOTAL DEPTH OF BOREHOLE (ft. bgs): 98.2

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~40 gallons of water used during drilling/installation. Total depth of temporary piezometer is 98.90 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

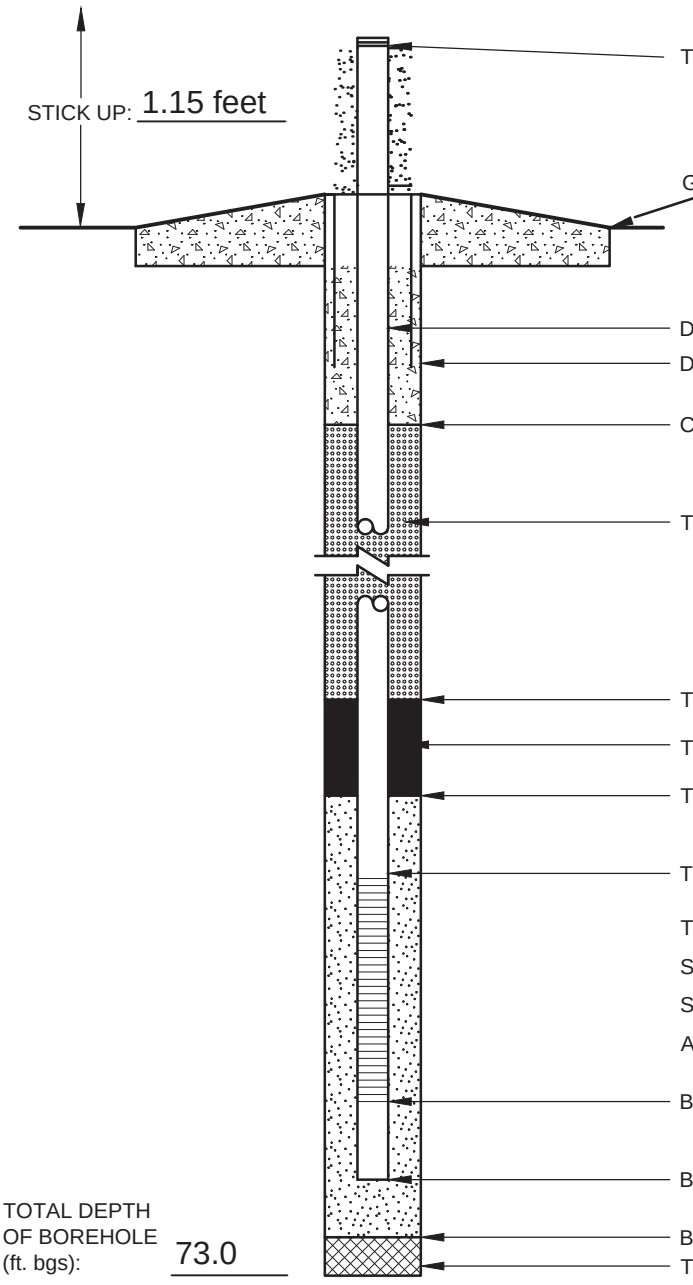
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-3M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.47
GEOLOGIST: B. Works	NORTHING: 1120263.994	EASTING: 879286.950
DRILLER: P. Seymour	STATIC WATER LEVEL: 29.80 FT BTOC	COMPLETION DATE: 1/25/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 1.15 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 73.0

TOP OF CASING ELEVATION: 446.62

GROUND SURFACE ELEVATION: 445.47

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 29.0

TOP OF SCREEN DEPTH (ft. bgs): 61.0

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 65.8

BOTTOM OF WELL DEPTH (ft. bgs): 66.1

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~70 gallons of water used during drilling/installation. Total depth of temporary piezometer is 67.25 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

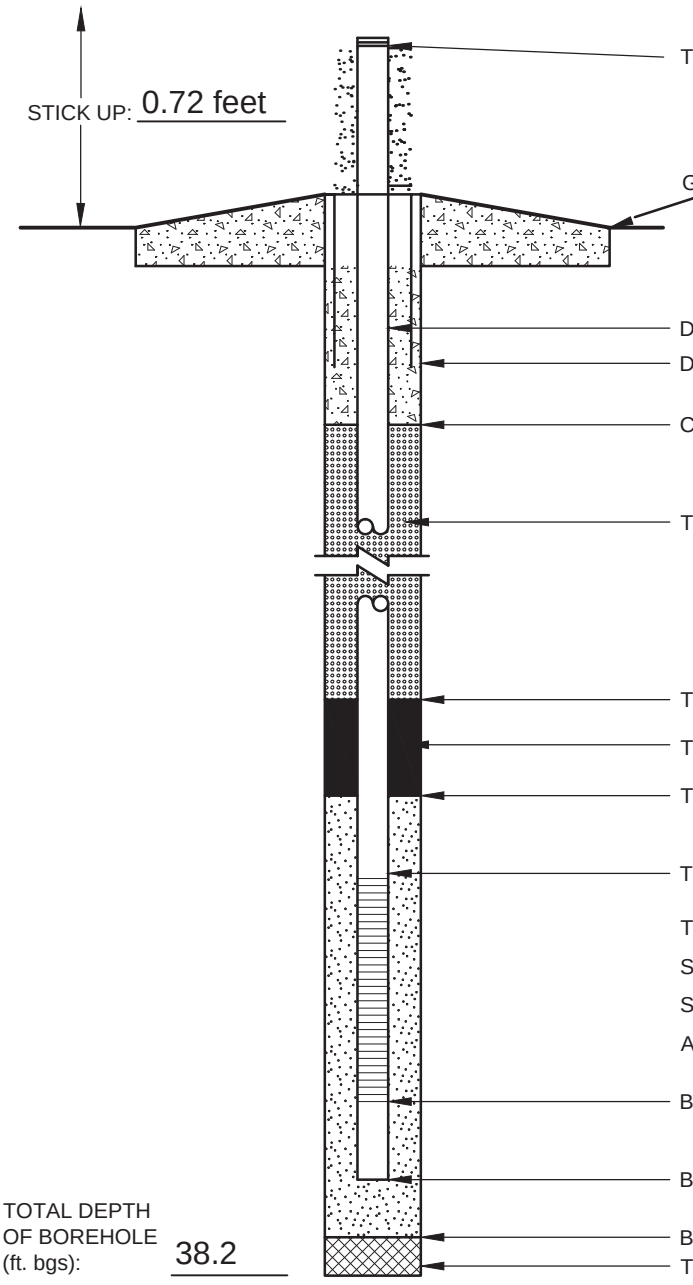
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-3S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 445.42
GEOLOGIST: B. Works	NORTHING: 1120270.405	EASTING: 879287.733
DRILLER: P. Seymour	STATIC WATER LEVEL: 29.85 FT BTOC	COMPLETION DATE: 1/25/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.72 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 38.2

TOP OF CASING ELEVATION: 446.14

GROUND SURFACE ELEVATION: 445.42

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.0

TOP OF SCREEN DEPTH (ft. bgs): 33.1

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 37.9

BOTTOM OF WELL DEPTH (ft. bgs): 38.2

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~5 gallons of water used during drilling/installation. Total depth of temporary piezometer is 38.90 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

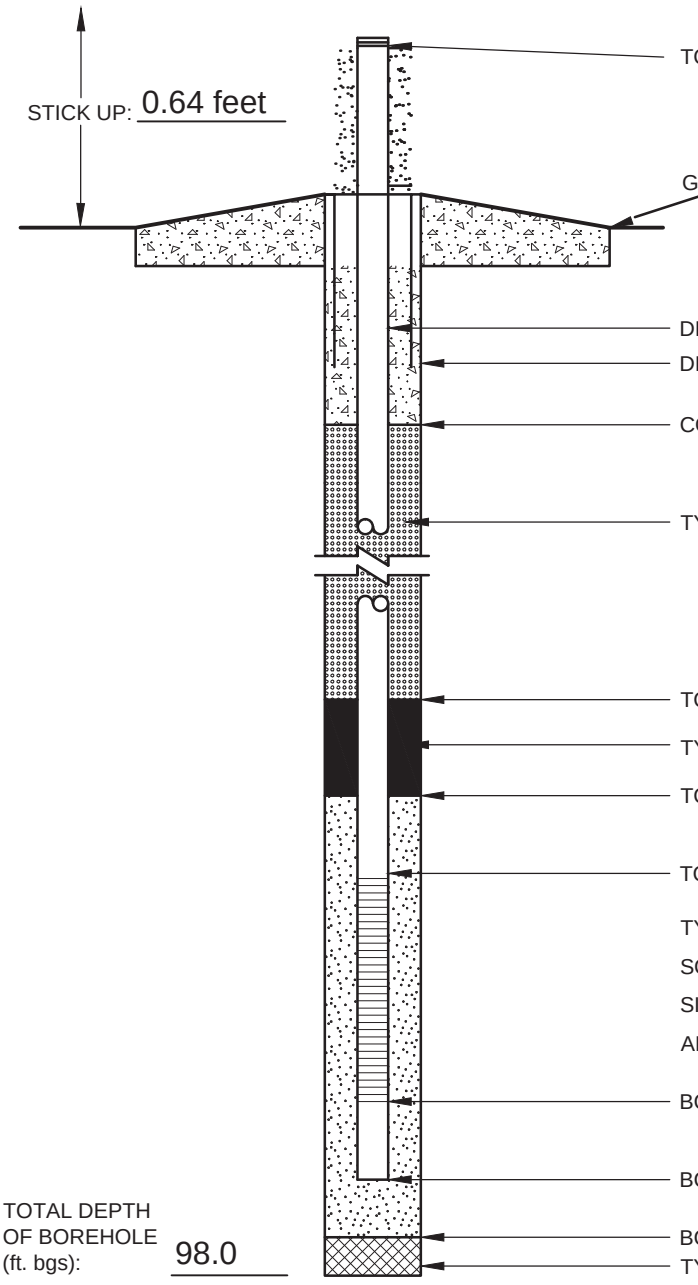
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-4D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.57
GEOLOGIST: B. Works	NORTHING: 1119455.276	EASTING: 880633.115
DRILLER: P. Seymour	STATIC WATER LEVEL: 30.80 FT BTOC	COMPLETION DATE: 2/08/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.64 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 98.0

TOP OF CASING ELEVATION: 444.21

GROUND SURFACE ELEVATION: 443.57

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.4

TOP OF SCREEN DEPTH (ft. bgs): 92.2

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 97.0

BOTTOM OF WELL DEPTH (ft. bgs): 97.3

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~40 gal of water used during drilling/installation. Total depth of temporary piezometer is 97.90 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

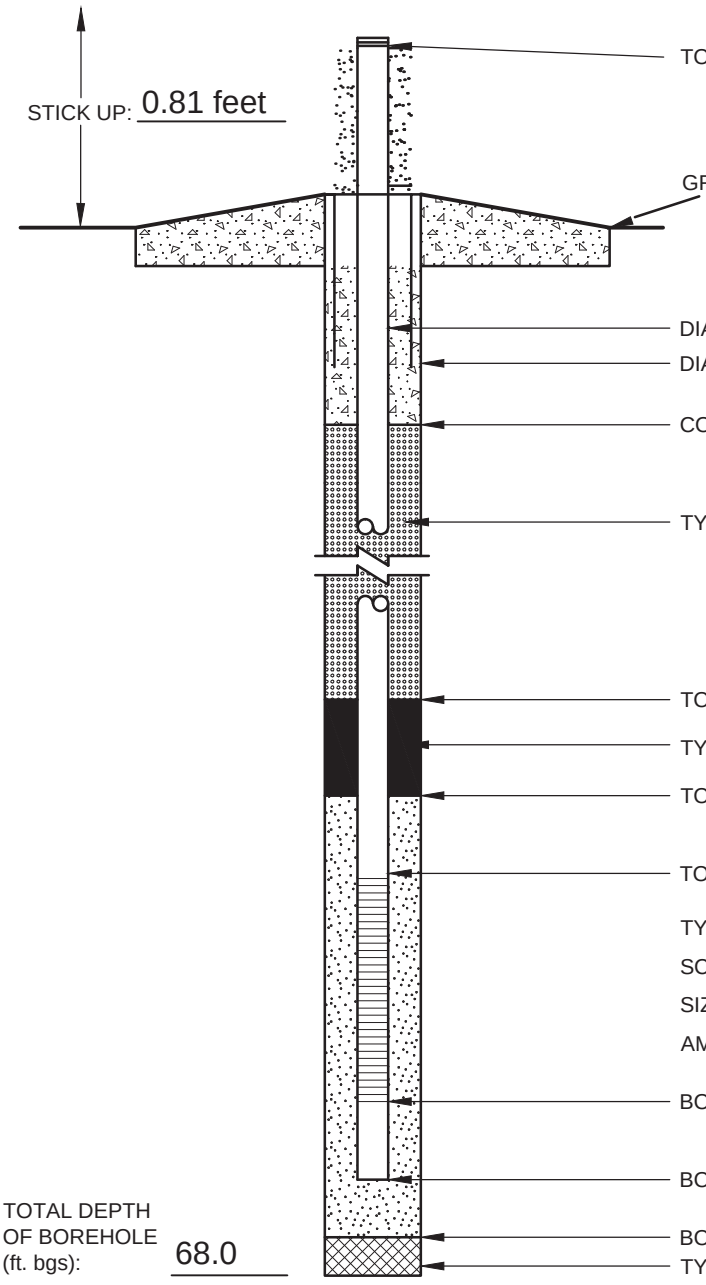
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-4M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.63
GEOLOGIST: B. Works	NORTHING: 1119458.731	EASTING: 880637.624
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.13 FT BTOC	COMPLETION DATE: 2/08/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.81 feet

TOP OF CASING ELEVATION: 444.44

GROUND SURFACE ELEVATION: 443.63

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.2

TOP OF SCREEN DEPTH (ft. bgs): 62.3

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 67.1

BOTTOM OF WELL DEPTH (ft. bgs): 67.4

TOTAL DEPTH OF BOREHOLE (ft. bgs): 68.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~35 gal of water used during drilling/installation. Total depth of temporary piezometer is 68.20 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

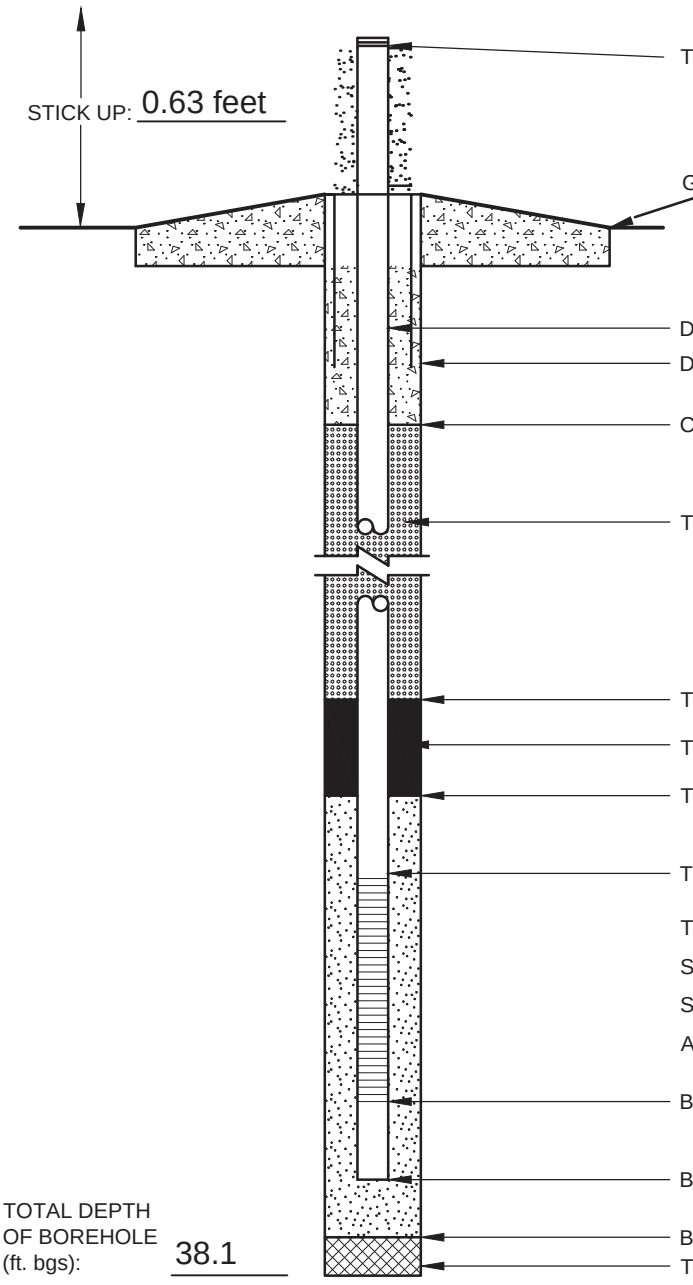
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-4S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.82
GEOLOGIST: B. Works	NORTHING: 1119462.620	EASTING: 880641.640
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.59 FT BTOC	COMPLETION DATE: 2/08/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.63 feet

TOP OF CASING ELEVATION: 444.45

GROUND SURFACE ELEVATION: 443.82

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.0

TOP OF SCREEN DEPTH (ft. bgs): 33.0

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 37.8

BOTTOM OF WELL DEPTH (ft. bgs): 38.1

TOTAL DEPTH OF BOREHOLE (ft. bgs): 38.1

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: No water used during drilling/installation. Total depth of temporary piezometer is 38.75 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

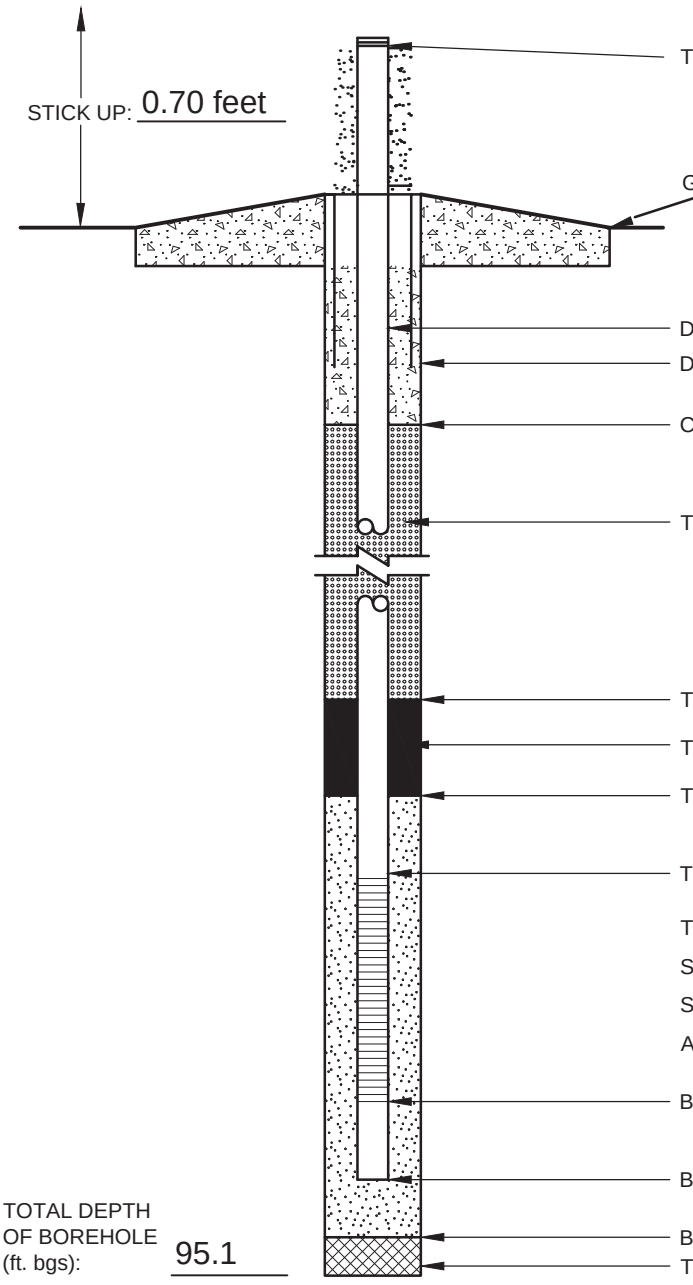
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-5D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 441.56
GEOLOGIST: B. Works	NORTHING: 1120074.041	EASTING: 880846.605
DRILLER: P. Seymour	STATIC WATER LEVEL: 27.26 FT BTOC	COMPLETION DATE: 2/07/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.70 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 95.1

TOP OF CASING ELEVATION: 442.26

GROUND SURFACE ELEVATION: 441.56

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.5

TOP OF SCREEN DEPTH (ft. bgs): 90.0

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 94.8

BOTTOM OF WELL DEPTH (ft. bgs): 95.1

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~30 gal of water used during drilling/installation. Total depth of temporary piezometer is 95.80 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

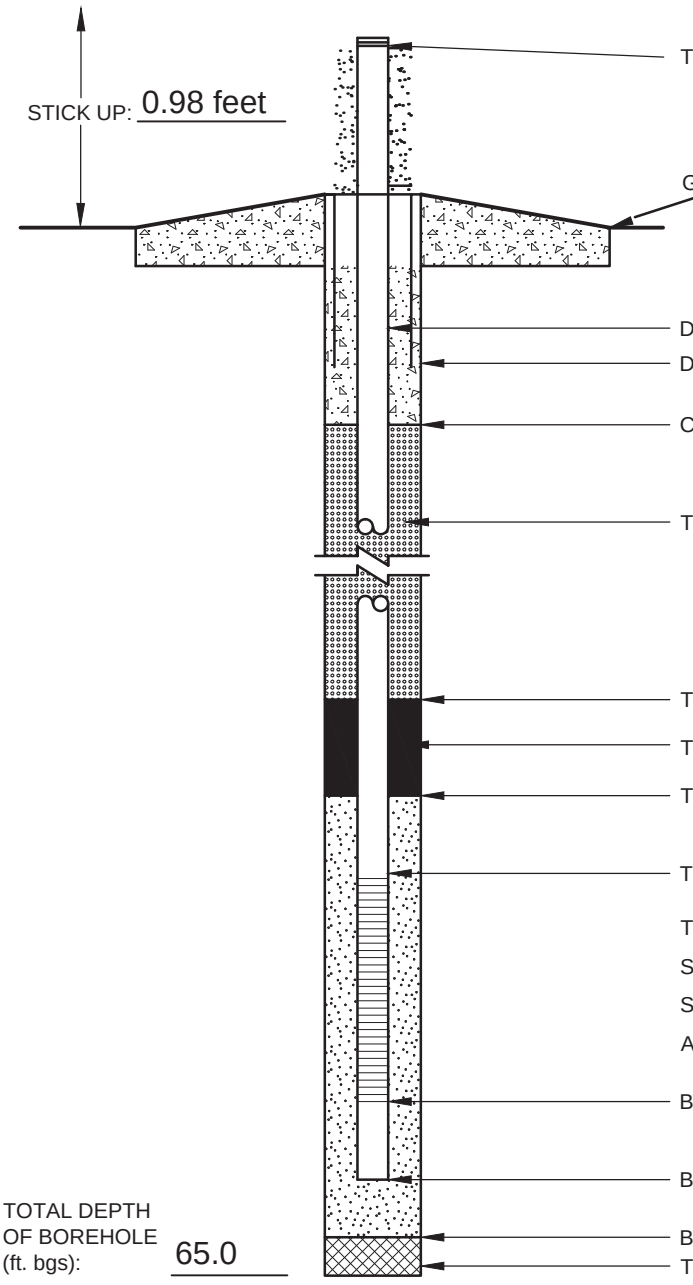
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-5M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 441.11
GEOLOGIST: B. Works	NORTHING: 1120078.576	EASTING: 880842.595
DRILLER: P. Seymour	STATIC WATER LEVEL: 26.55 FT BTOC	COMPLETION DATE: 2/07/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.98 feet

TOP OF CASING ELEVATION: 442.09

GROUND SURFACE ELEVATION: 441.11

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 27.0

TOP OF SCREEN DEPTH (ft. bgs): 58.4

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 63.2

BOTTOM OF WELL DEPTH (ft. bgs): 63.5

TOTAL DEPTH OF BOREHOLE (ft. bgs): 65.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~20 gal of water used during drilling/installation. Total depth of temporary piezometer is 64.50 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

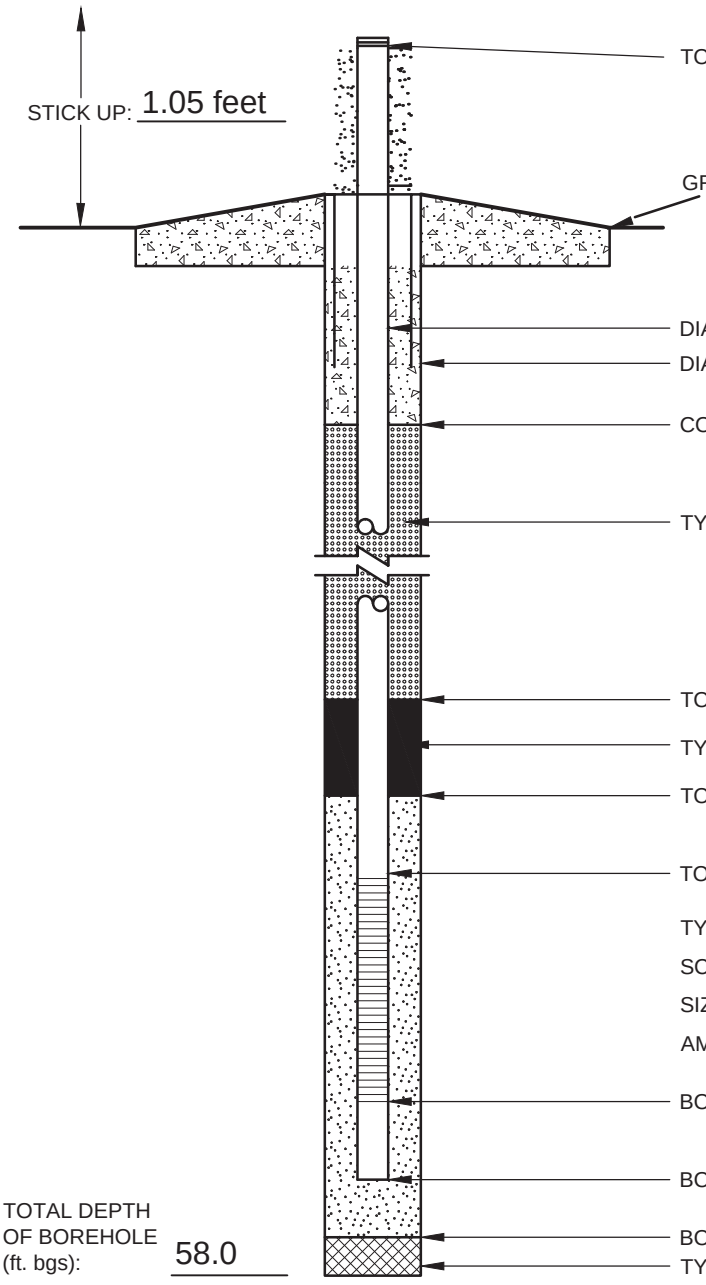
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-5S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 441.28
GEOLOGIST: B. Works	NORTHING: 1120083.242	EASTING: 880838.546
DRILLER: P. Seymour	STATIC WATER LEVEL: 26.20 FT BTOC	COMPLETION DATE: 2/01/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 1.05 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 58.0

TOP OF CASING ELEVATION: 442.33

GROUND SURFACE ELEVATION: 441.28

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 25.0

TOP OF SCREEN DEPTH (ft. bgs): 28.8

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 33.6

BOTTOM OF WELL DEPTH (ft. bgs): 33.9

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~10 gal of water used during drilling/installation. Total depth of temporary piezometer is 34.90 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

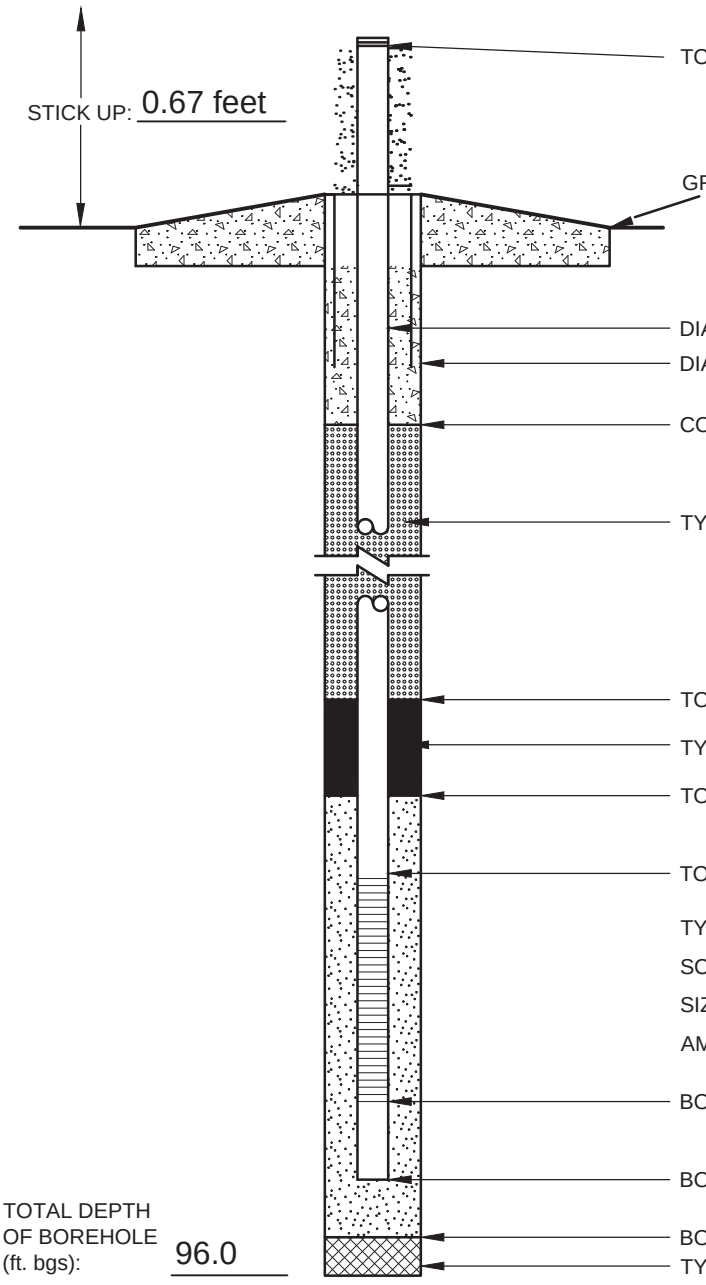
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-6D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.41
GEOLOGIST: B. Works	NORTHING: 1120855.073	EASTING: 880303.029
DRILLER: P. Seymour	STATIC WATER LEVEL: 28.68 FT BTOC	COMPLETION DATE: 2/01/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.67 feet

TOP OF CASING ELEVATION: 444.08

GROUND SURFACE ELEVATION: 443.41

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 27.5

TOP OF SCREEN DEPTH (ft. bgs): 84.5

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 89.3

BOTTOM OF WELL DEPTH (ft. bgs): 89.6

TOTAL DEPTH OF BOREHOLE (ft. bgs): 96.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~20 gallons of water used during drilling/installation. Total depth of temporary piezometer is 90.30 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

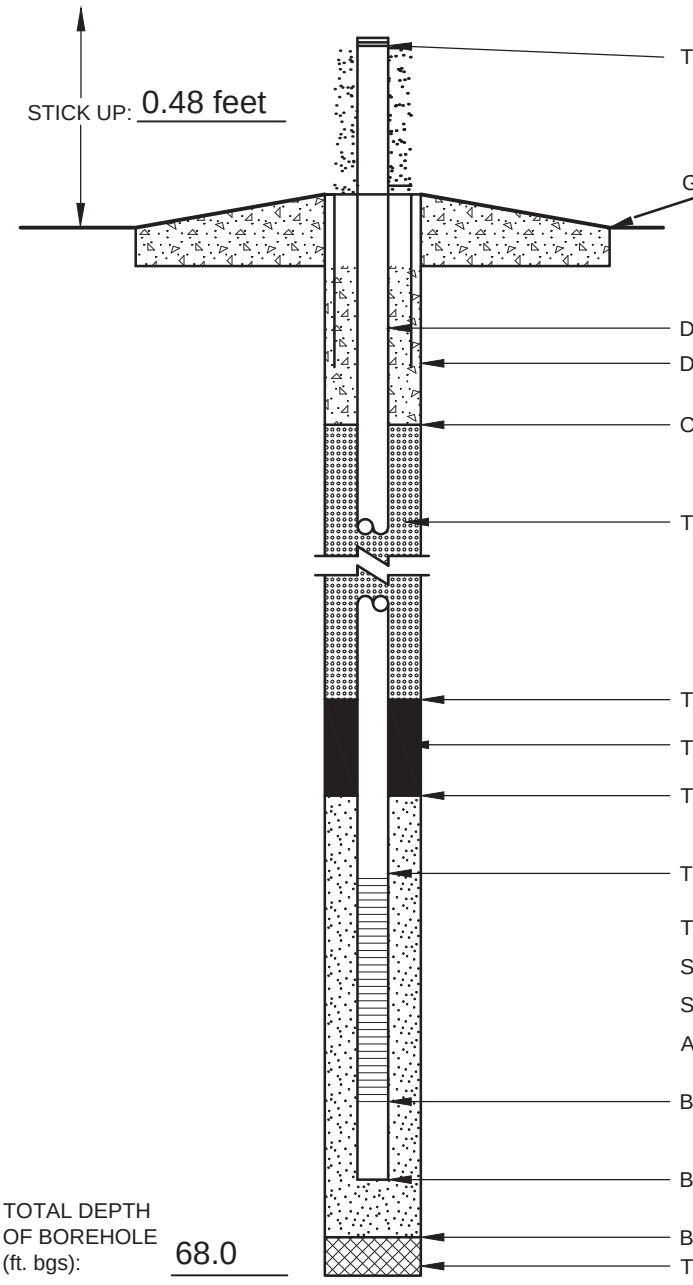
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-6M

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.30
GEOLOGIST: B. Works	NORTHING: 1120850.336	EASTING: 880303.912
DRILLER: P. Seymour	STATIC WATER LEVEL: 27.35 FT BTOC	COMPLETION DATE: 1/31/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.48 feet

TOP OF CASING ELEVATION: 443.78

GROUND SURFACE ELEVATION: 443.30

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 23.0

TOP OF SCREEN DEPTH (ft. bgs): 62.8

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 67.6

BOTTOM OF WELL DEPTH (ft. bgs): 67.9

TOTAL DEPTH OF BOREHOLE (ft. bgs): 68.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~10 gallons of water used during drilling/installation. Total depth of temporary piezometer is 68.40 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

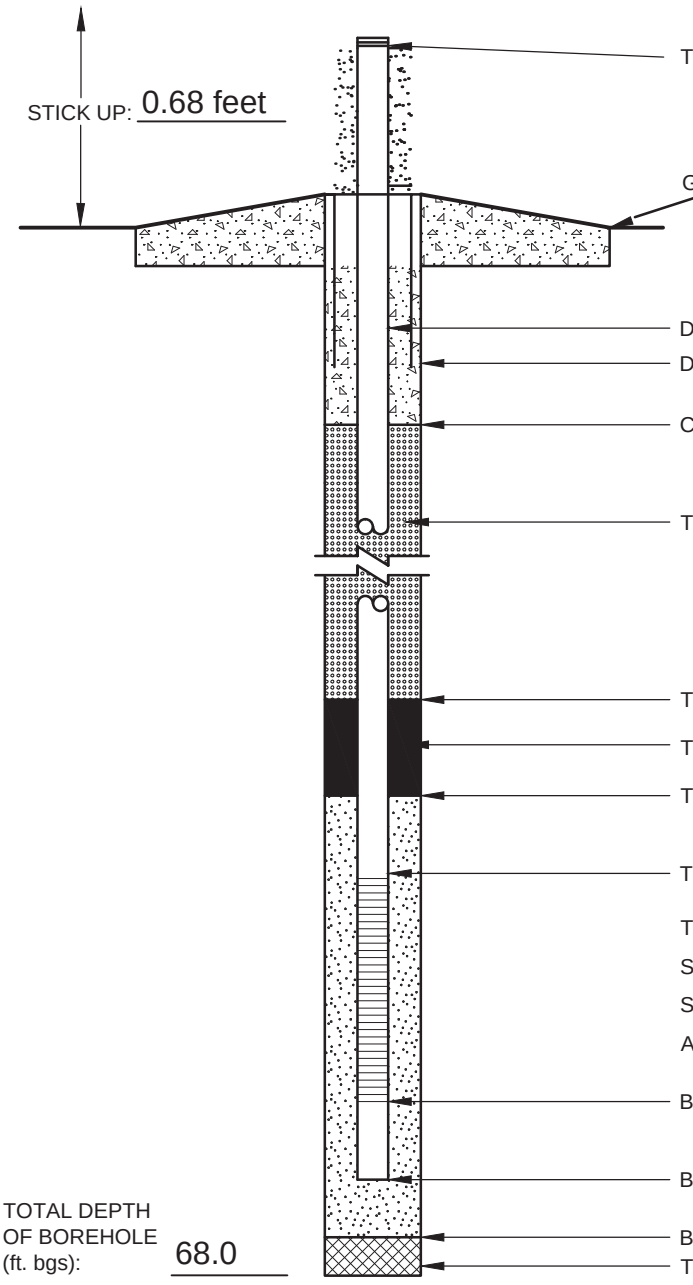
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-ASD-6S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 443.17
GEOLOGIST: B. Works	NORTHING: 1120845.069	EASTING: 880305.017
DRILLER: P. Seymour	STATIC WATER LEVEL: 26.40 FT BTOC	COMPLETION DATE: 1/31/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 0.68 feet

TOP OF CASING ELEVATION: 443.85

GROUND SURFACE ELEVATION: 443.17

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 16.2

TOP OF SCREEN DEPTH (ft. bgs): 33.2

TYPE OF SCREEN: Sch. 40 - 1 - inch x 5 - foot

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: Natural Formation Collapse

AMOUNT OF SAND: Natural Formation Collapse

BOTTOM OF SCREEN DEPTH (ft. bgs): 38.0

BOTTOM OF WELL DEPTH (ft. bgs): 38.3

TOTAL DEPTH OF BOREHOLE (ft. bgs): 68.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~45 gallons of water used during drilling/installation. Total depth of temporary piezometer is 38.95 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

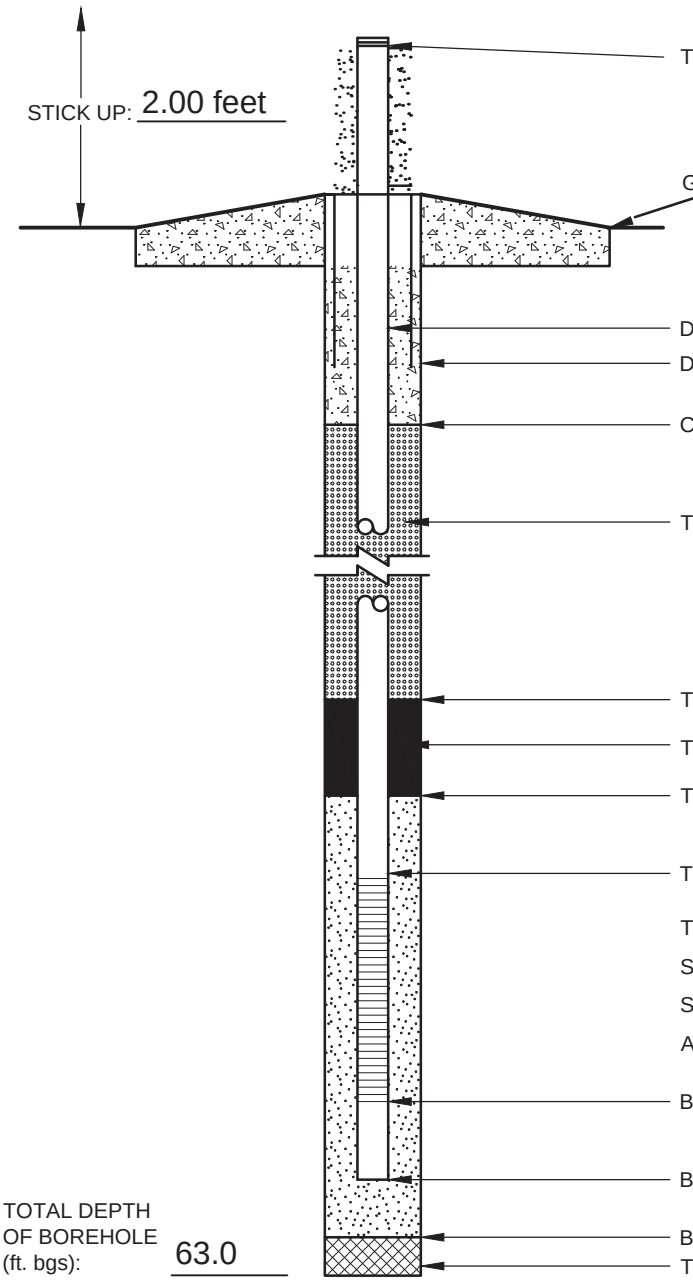
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPA-1D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 441.94
GEOLOGIST: B. Works	NORTHING: 1121222.661	EASTING: 878398.803
DRILLER: J. Breeding	STATIC WATER LEVEL: 11.00 FT BTOC	COMPLETION DATE: 1/19/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 443.94

GROUND SURFACE ELEVATION: 441.94

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 14.5

TOP OF SCREEN DEPTH (ft. bgs): 48.2

TYPE OF SCREEN: 2 - foot x 1 - inch x 5 - inch Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 52.9

BOTTOM OF WELL DEPTH (ft. bgs): 53.3

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~50 gallons of water used during drilling/installation. Total depth of temporary piezometer is 55.26 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

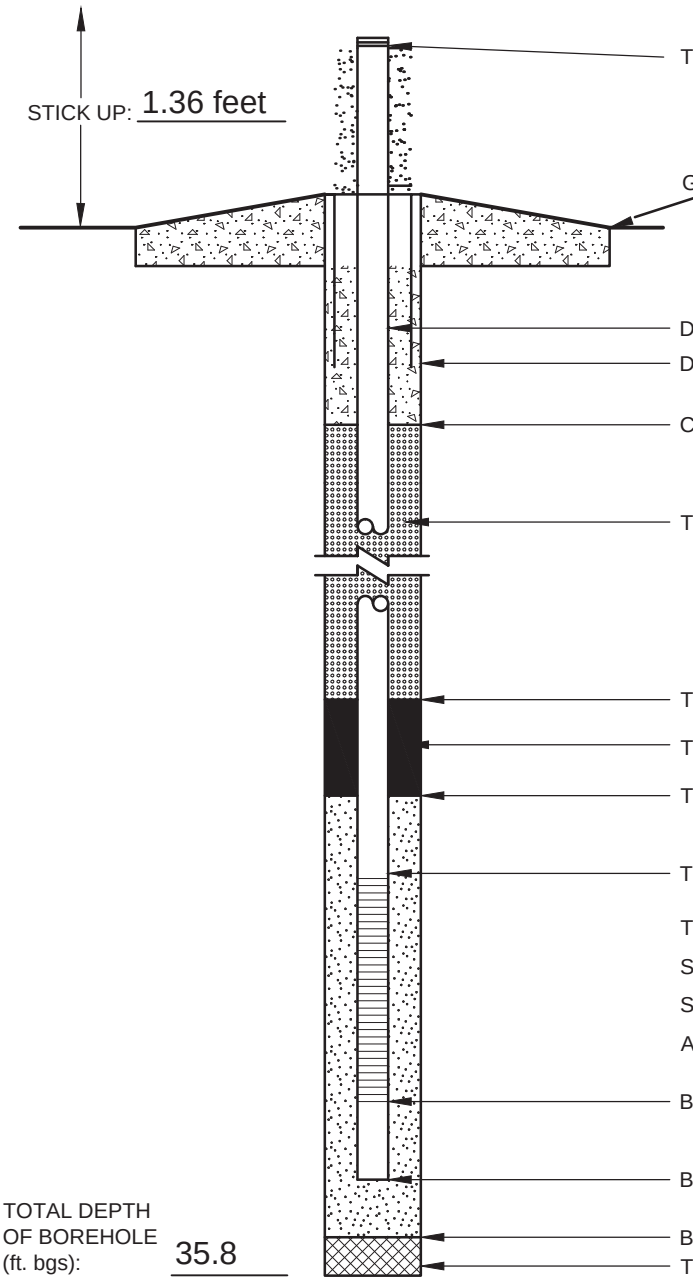
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPA-1S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 441.94
GEOLOGIST: B. Works	NORTHING: 1121216.435	EASTING: 878403.084
DRILLER: P. Seymour	STATIC WATER LEVEL: 22.15FT BTOC	COMPLETION DATE: 1/22/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 1.36 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 35.8

TOP OF CASING ELEVATION: 443.49

GROUND SURFACE ELEVATION: 442.13

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 14.0

TOP OF SCREEN DEPTH (ft. bgs): 30.7

TYPE OF SCREEN: 2 - foot x 1 - inch x 5 - inch Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 35.4

BOTTOM OF WELL DEPTH (ft. bgs): 35.8

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: No water used during drilling/installation. Total depth of temporary piezometer is 37.15 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

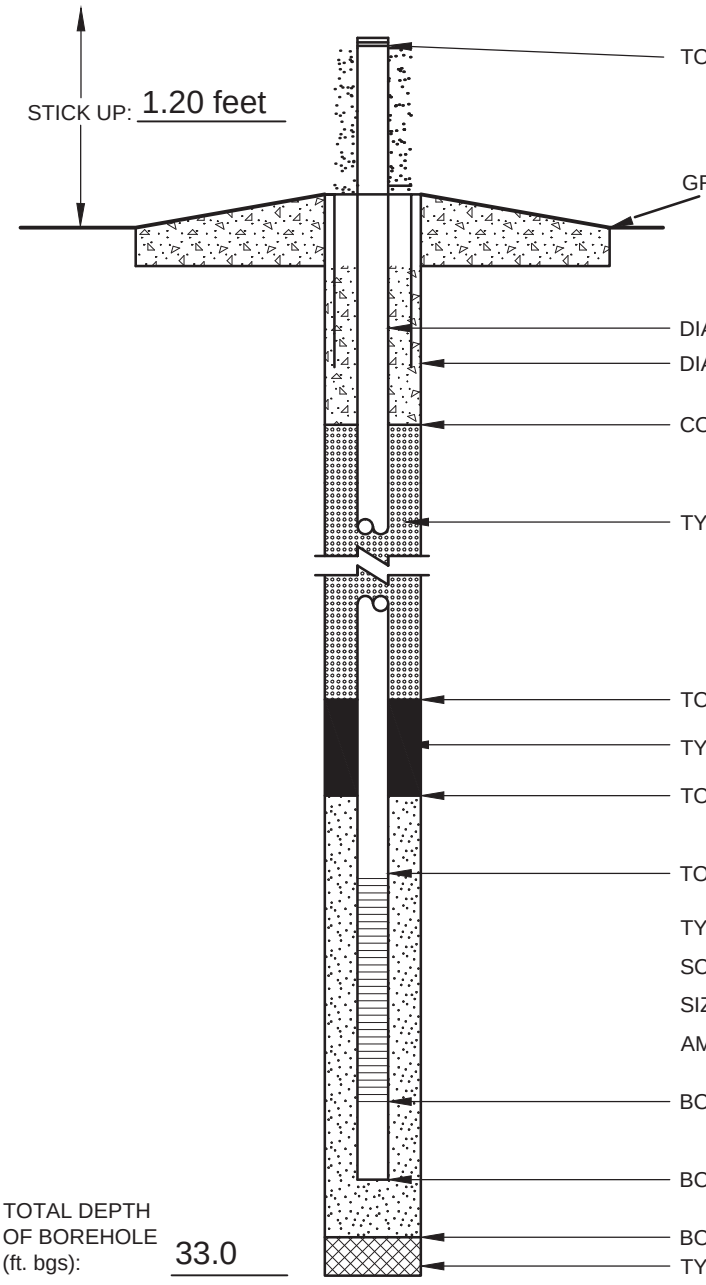
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPA-2

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 447.06
GEOLOGIST: B. Works	NORTHING: 1121148.319	EASTING: 879215.974
DRILLER: P. Seymour	STATIC WATER LEVEL: 15.39 FT BTOC	COMPLETION DATE: 1/18/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 448.26

GROUND SURFACE ELEVATION: 447.06

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 14.0

TOP OF SCREEN DEPTH (ft. bgs): 25.9

TYPE OF SCREEN: 2 - inch x 1 - inch x 5 - foot Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 30.6

BOTTOM OF WELL DEPTH (ft. bgs): 31.0

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: ~5 gallons of water used during drilling/installation. Total depth of temporary piezometer is 32.21 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

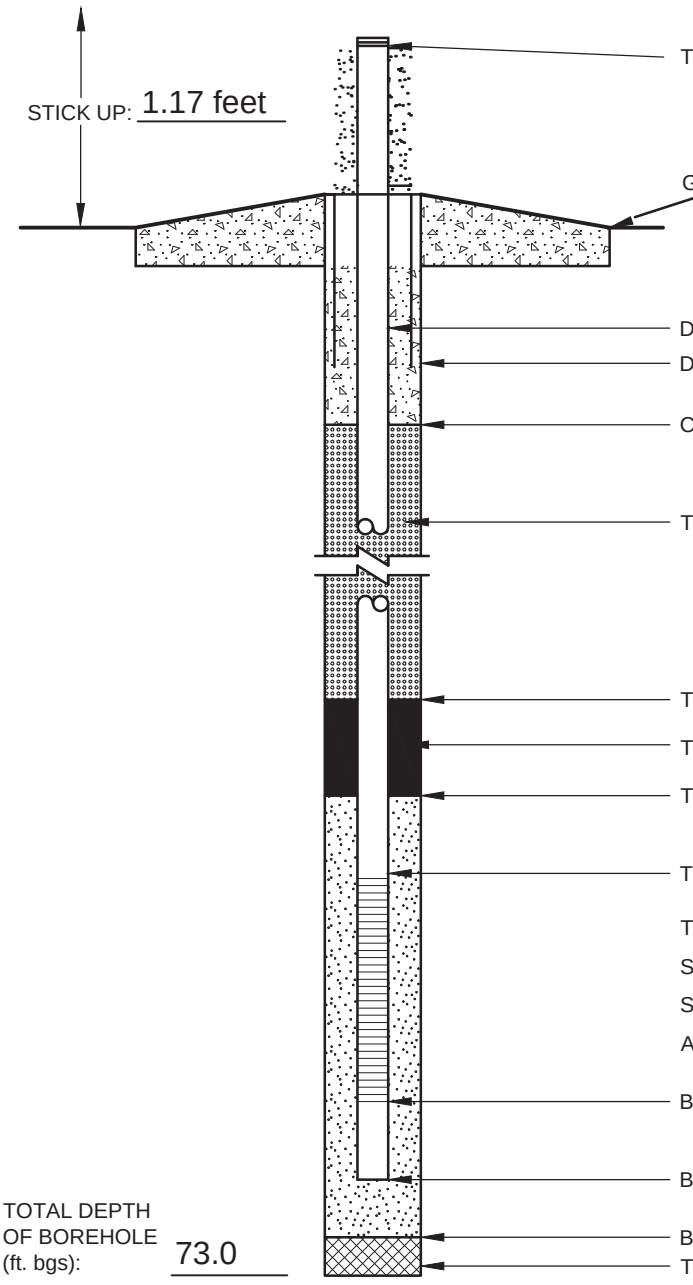
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPA-3D

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 446.04
GEOLOGIST: B. Works	NORTHING: 1120661.082	EASTING: 878671.407
DRILLER: P. Seymour	STATIC WATER LEVEL: 34.40 FT BTOC	COMPLETION DATE: 1/18/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 447.27

GROUND SURFACE ELEVATION: 446.10

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 28.0

TOP OF SCREEN DEPTH (ft. bgs): 64.3

TYPE OF SCREEN: 2 - inch x 1 - inch x 5 - foot Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 69.0

BOTTOM OF WELL DEPTH (ft. bgs): 69.4

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: No water used during drilling/ ~10 gallons of water used during installation. Total depth of temporary piezometer is 70.55 feet below top of casing. NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

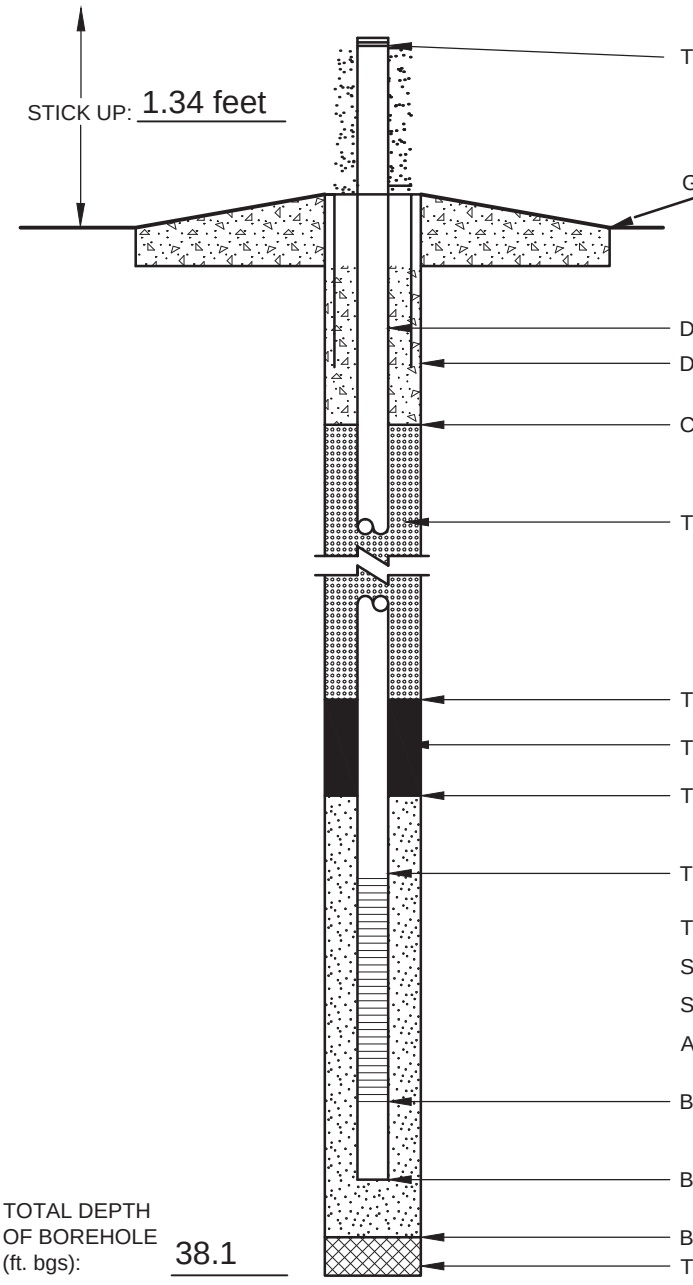
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPA-3S

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 446.04
GEOLOGIST: B. Works	NORTHING: 1120660.006	EASTING: 878666.153
DRILLER: P. Seymour	STATIC WATER LEVEL: 34.35 FT BTOC	COMPLETION DATE: 1/18/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



STICK UP: 1.34 feet

TOTAL DEPTH OF BOREHOLE (ft. bgs): 38.1

TOP OF CASING ELEVATION: 447.38

GROUND SURFACE ELEVATION: 446.04

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 15.0

TOP OF SCREEN DEPTH (ft. bgs): 33.0

TYPE OF SCREEN: 2 - inch x 1 - inch x 5 - foot Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 37.7

BOTTOM OF WELL DEPTH (ft. bgs): 38.1

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: Natural Cave In

ADDITIONAL NOTES: No water used during drilling/installation. Total depth of temporary piezometer is 39.44 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

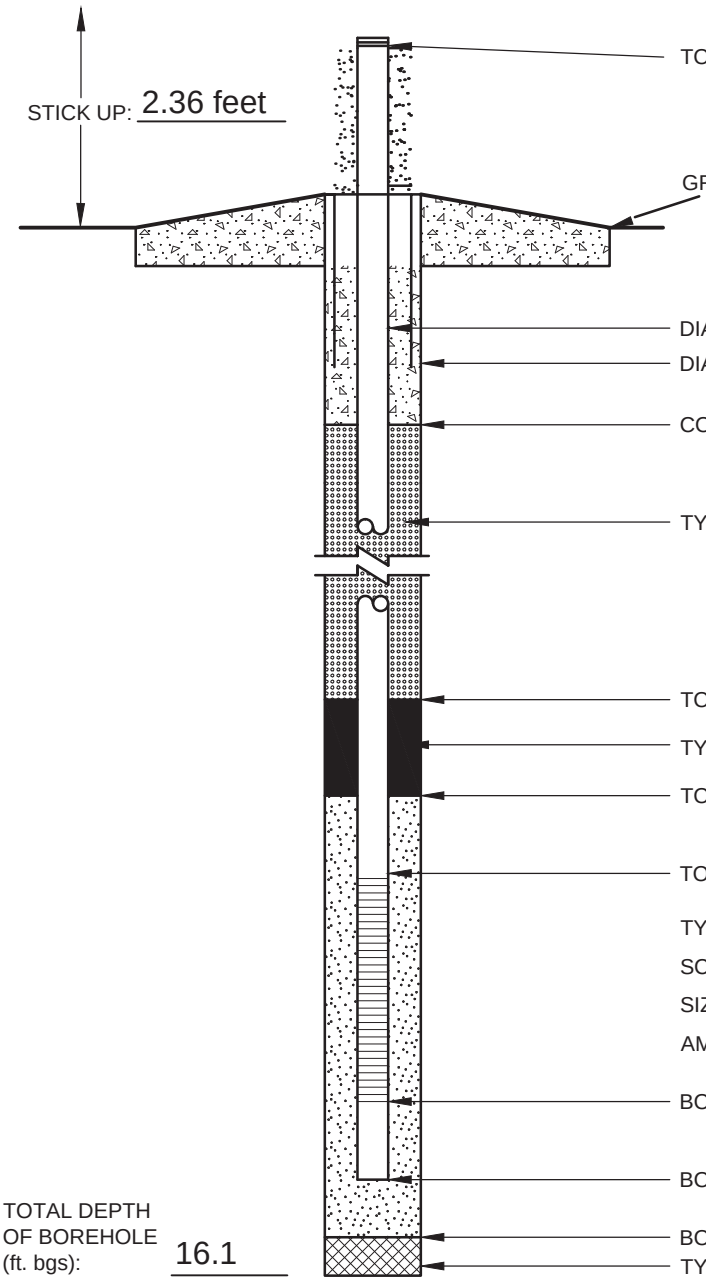
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

TEMPORARY MONITORING WELL CONSTRUCTION LOG

S-SCPB-1

PROJECT NAME: Ameren - MO - ASD		PROJECT NUMBER: 153-1406
SITE NAME: Sioux Energy Center		LOCATION: West Alton, MO
CLIENT: Ameren		SURFACE ELEVATION: 446.96
GEOLOGIST: B. Works	NORTHING: 1120031.431	EASTING: 879817.262
DRILLER: P. Seymour	STATIC WATER LEVEL: 10.82 FT BTOC	COMPLETION DATE: 1/25/2018
DRILLING COMPANY: Roberts Environmental Drilling		DRILLING METHODS: Direct Push



TOP OF CASING ELEVATION: 449.32

GROUND SURFACE ELEVATION: 446.96

DIAMETER OF RISER PIPE (in.): 1.0

DIAMETER OF BOREHOLE (in.): 3.5

CONCRETE SEAL DEPTH (ft. bgs): NA

TYPE AND AMOUNT OF ANNULAR SEAL: NA

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 0.0

TYPE OF BENTONITE SEAL: 3/8 - inch chips

TOP OF CAVE IN DEPTH (ft. bgs): 8.5

TOP OF SCREEN DEPTH (ft. bgs): 11.0

TYPE OF SCREEN: 2 - inch x 1 - inch x 5 - foot Field Pack

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 10/20

AMOUNT OF SAND: Pre-Packed

BOTTOM OF SCREEN DEPTH (ft. bgs): 15.7

BOTTOM OF WELL DEPTH (ft. bgs): 16.1

BOTTOM OF FILTER PACK (ft. bgs): NA

TYPE AND AMOUNT OF BACKFILL: 10/20 sand (1/2 bag)

ADDITIONAL NOTES: No water used during drilling/installation. Total depth of temporary piezometer is 18.42 feet below top of casing.

NA - Not Applicable, BTOC - Below Top of Casing, BGS - Below Ground Surface, Horizontal Datum - NAD83 (Missouri East Zone), Vertical Datum - NAVD88.

CHECKED BY: M. Gore

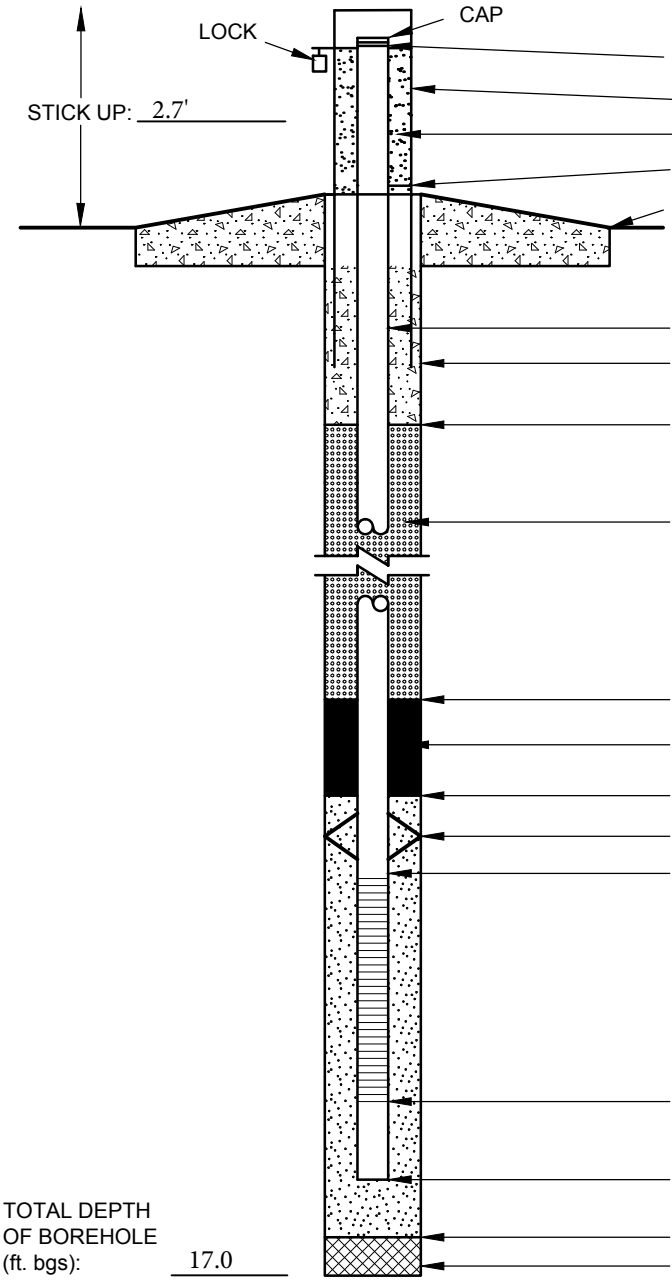
DATE CHECKED: 3/6/2018

PREPARED BY: B. Works

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-1

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond		PROJECT NUMBER: 154-7197	
SITE NAME: Sioux Energy Center (SEC)		LOCATION: St. Charles County, MO (LB-1)	
CLIENT: Ameren MO		SURFACE ELEVATION: 446.0	
GEOLOGIST: Matt Gore	NORTHING: 38.9124388	EASTING: -090.2916060	
DRILLER: Chad Dutton	STATIC WATER LEVEL: 442.4 ft msl	COMPLETION DATE: 3/7/2016	
DRILLING COMPANY: Bulldog Drilling		DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 448.7 ft msl

PROTECTIVE CASING (yes / no): 4" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 446.0 ft msl

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 8.25

CONCRETE SEAL DEPTH (ft. bgs): 2.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

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

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 7.99

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 9.99

TYPE OF SCREEN: 2" x 4.8 ' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #1 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 4 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.79

BOTTOM OF WELL DEPTH (ft. bgs): 15.19

TOTAL DEPTH OF BOREHOLE (ft. bgs): 17.0

BOTTOM OF FILTER PACK (ft. bgs): 15.19

TYPE AND AMOUNT OF BACKFILL: Natural Cave In- 1.81 ft

ADDITIONAL NOTES: Total depth: 17.89 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

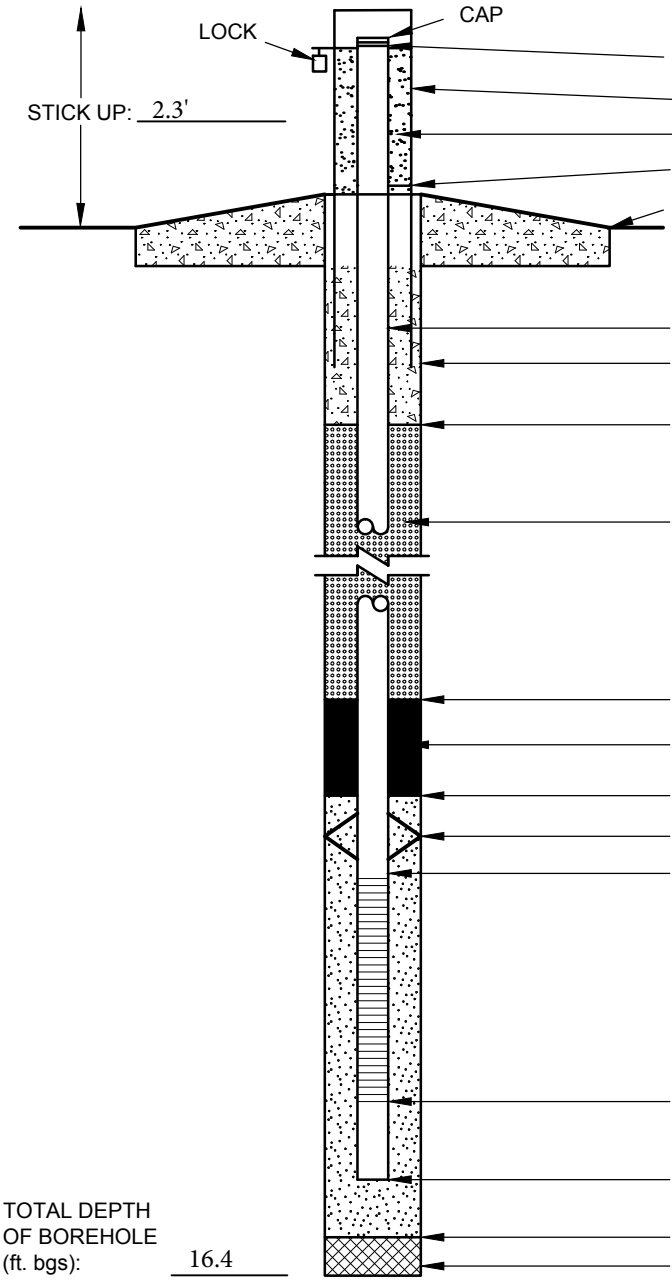
CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG LB-2

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond		PROJECT NUMBER: 154-7197	
SITE NAME: Sioux Energy Center (SEC)		LOCATION: St. Charles County, MO (LB-2)	
CLIENT: Ameren MO		SURFACE ELEVATION: 450.3	
GEOLOGIST: Matt Gore	NORTHING: 38.9124372	EASTING: -090.2907263	
DRILLER: Chad Dutton	STATIC WATER LEVEL: 441.8 ft msl	COMPLETION DATE: 3/8/2016	
DRILLING COMPANY: Bulldog Drilling		DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 452.6 ft msl
PROTECTIVE CASING (yes / no): 4" Steel Protop
PEA GRAVEL OR SAND
WEEP HOLE
GROUND SURFACE ELEVATION: 450.3 ft msl
DIAMETER OF RISER PIPE (in.): 2.0
DIAMETER OF BOREHOLE (in.): 8.25
CONCRETE SEAL DEPTH (ft. bgs): 1.5
TYPE AND AMOUNT OF ANNULAR SEAL: N/A
TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5
TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)
TOP OF SAND PACK DEPTH (ft. bgs): 2.9
CENTRALIZER (yes / no) - TYPE: No
TOP OF SCREEN DEPTH (ft. bgs): 4.9
TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC
SCREEN SLOT SIZE (in.): 0.010 Standard
SIZE OF SAND PACK: #1 Sand (Unimin Filtertec (50 lb bgs))
AMOUNT OF SAND: 6 Bags
BOTTOM OF SCREEN DEPTH (ft. bgs): 14.7
BOTTOM OF WELL DEPTH (ft. bgs): 15.1
BOTTOM OF FILTER PACK (ft. bgs): 15.1
TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 1.3 ft

ADDITIONAL NOTES: Total depth: 17.4 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

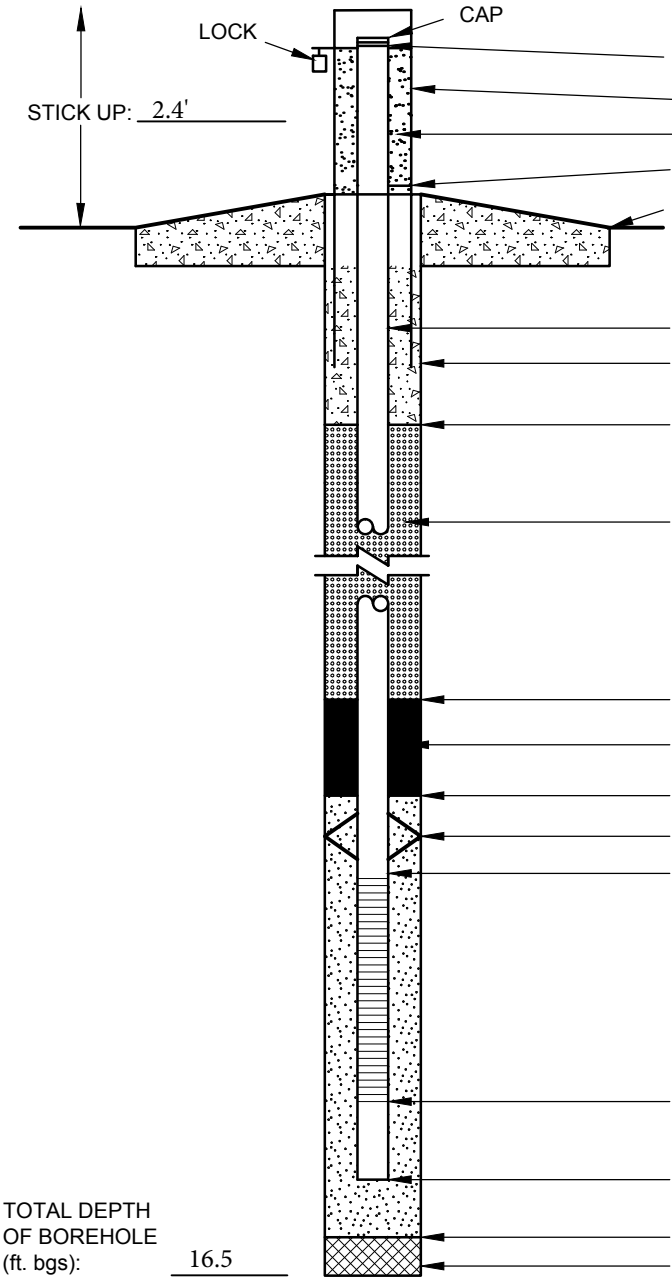
CHECKED BY: J. Ingram
DATE CHECKED: 4/26/2016
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-3

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-3)
CLIENT: Ameren MO	SURFACE ELEVATION: 450.1

GEOLOGIST: Matt Gore	NORTHING: 38.9122981	EASTING: -090.2895888
DRILLER: Chad Dutton	STATIC WATER LEVEL: 441.0 ft msl	COMPLETION DATE: 3/8/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 452.5 ft msl

PROTECTIVE CASING (yes / no): 4" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 450.1 ft msl

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 8.25

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 2.8

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 4.8

TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #1 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 6 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.6

BOTTOM OF WELL DEPTH (ft. bgs): 15.0

TOTAL DEPTH OF BOREHOLE (ft. bgs): 16.5

BOTTOM OF FILTER PACK (ft. bgs): 15.0

TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 1.5 ft

ADDITIONAL NOTES: Total depth: 17.4 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

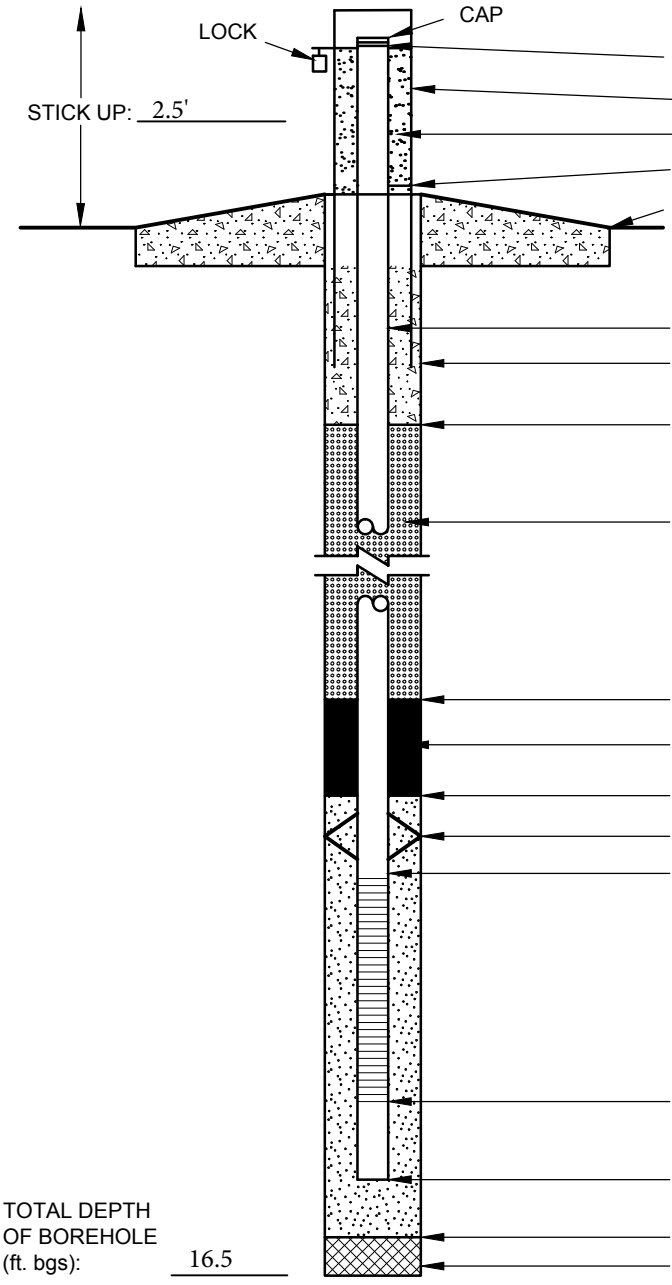
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-4

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-4)
CLIENT: Ameren MO	SURFACE ELEVATION: 446.8 ft msl

GEOLOGIST: Matt Gore	NORTHING: 38.9122799	EASTING: -090.2891960
DRILLER: Chad Dutton	STATIC WATER LEVEL: 440.9 ft msl	COMPLETION DATE: 3/11/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 449.3 ft msl

PROTECTIVE CASING (yes / no): 4" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 446.8 ft msl

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 8.25

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 2.7

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 4.7

TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #1 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 6 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.5

BOTTOM OF WELL DEPTH (ft. bgs): 14.9

BOTTOM OF FILTER PACK (ft. bgs): 14.9

TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 1.6 feet

ADDITIONAL NOTES: Total depth: 17.4 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

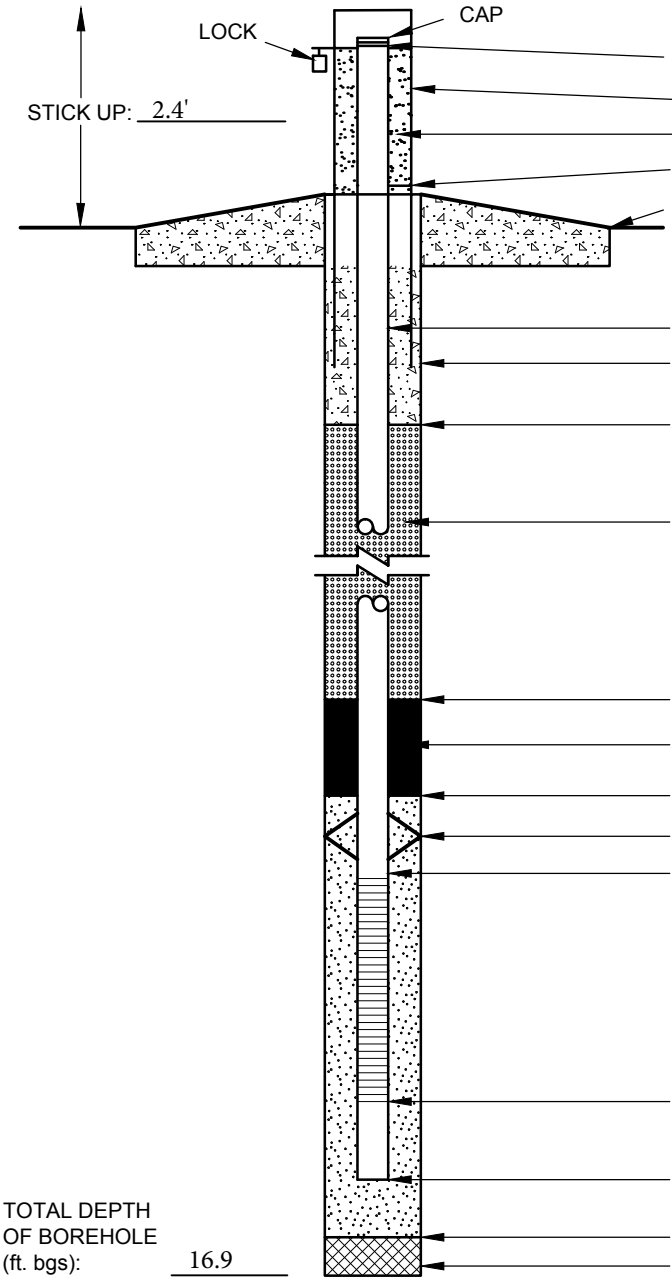
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-5

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-5)
CLIENT: Ameren MO	SURFACE ELEVATION: 448.5 ft msl

GEOLOGIST: Matt Gore	NORTHING: 38.9129178	EASTING: 090.2897866
DRILLER: Chad Dutton	STATIC WATER LEVEL: 440.5 ft msl	COMPLETION DATE: 3/11/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 450.9 ft msl

PROTECTIVE CASING (yes / no): 4" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 448.5 ft msl

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 8.25

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 3.3

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 5.3

TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #1 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 6 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 15.1

BOTTOM OF WELL DEPTH (ft. bgs): 15.5

BOTTOM OF FILTER PACK (ft. bgs): 15.5

TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 1.4 ft

ADDITIONAL NOTES: Total depth: 17.9 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

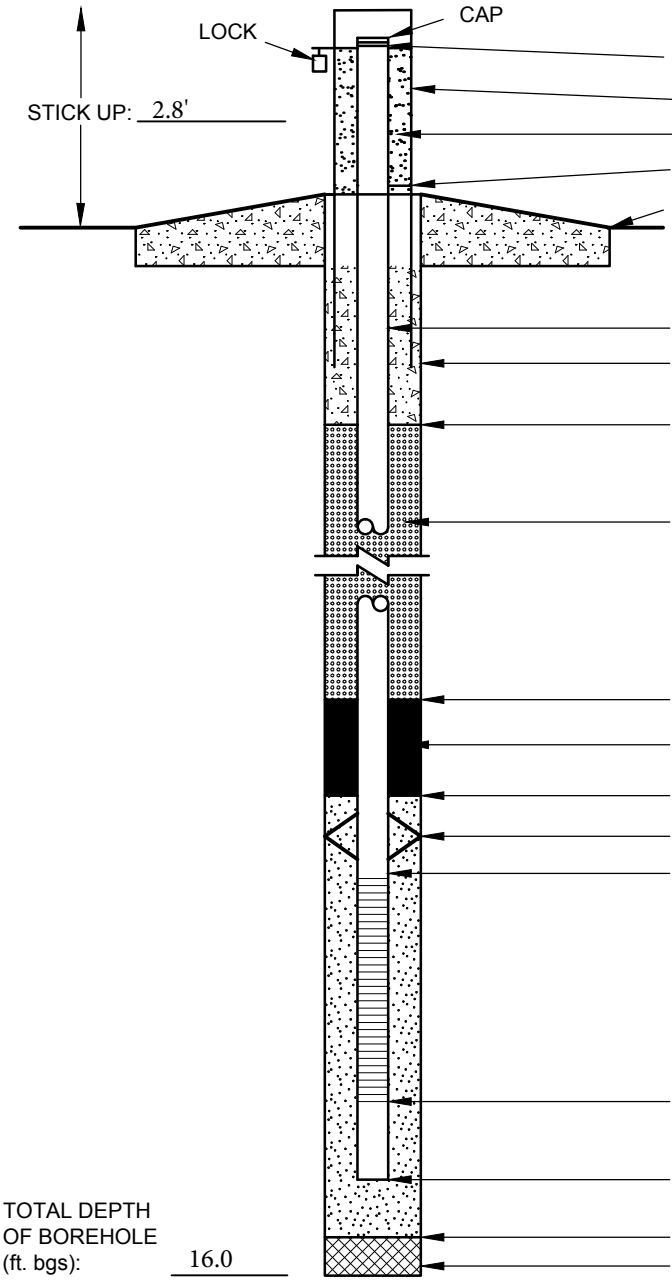
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-6

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-6)
CLIENT: Ameren MO	SURFACE ELEVATION: 450.1 ft msl

GEOLOGIST: Matt Gore	NORTHING: 38.9122929	EASTING: -090.2894649
DRILLER: Chad Dutton	STATIC WATER LEVEL: 440.9 ft msl	COMPLETION DATE: 4/4/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25" HSA	



TOP OF CASING ELEVATION: 452.9 ft msl

PROTECTIVE CASING (yes / no): 4" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 450.1 ft msl

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 8.25

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 2.8

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 4.8

TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #00 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 6 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.6

BOTTOM OF WELL DEPTH (ft. bgs): 15.0

BOTTOM OF FILTER PACK (ft. bgs): 15.0

TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 1 ft

ADDITIONAL NOTES: Total depth: 17.8 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

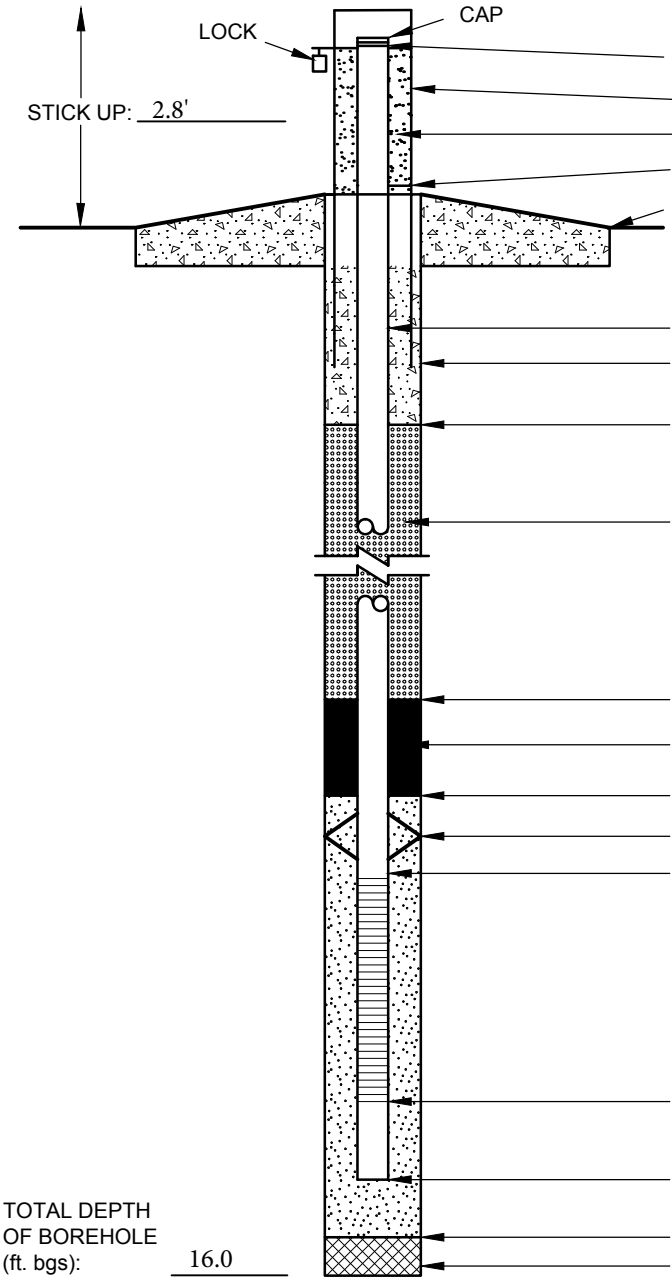
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-7

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-7)
CLIENT: Ameren MO	SURFACE ELEVATION: 449.0 ft msl

GEOLOGIST: Matt Gore	NORTHING: 38.9122862	EASTING: 090.2893619
DRILLER: Chad Dutton	STATIC WATER LEVEL: 440.4 ft msl	COMPLETION DATE: 4/4/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25"/6.25" HSA	



TOP OF CASING ELEVATION: 451.8 ft msl

PROTECTIVE CASING (yes / no): 6" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 449.0 ft msl

DIAMETER OF RISER PIPE (in.): 4.0

DIAMETER OF BOREHOLE (in.): 9.75

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 2.8

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 4.8

TYPE OF SCREEN: 4" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #00 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 7 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.6

BOTTOM OF WELL DEPTH (ft. bgs): 15.0

BOTTOM OF FILTER PACK (ft. bgs): 15.0

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES: Total depth: 17.88 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

Appears to be some type of void in the hole. During placement of bage #5, sand did not rise in the piezometer.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

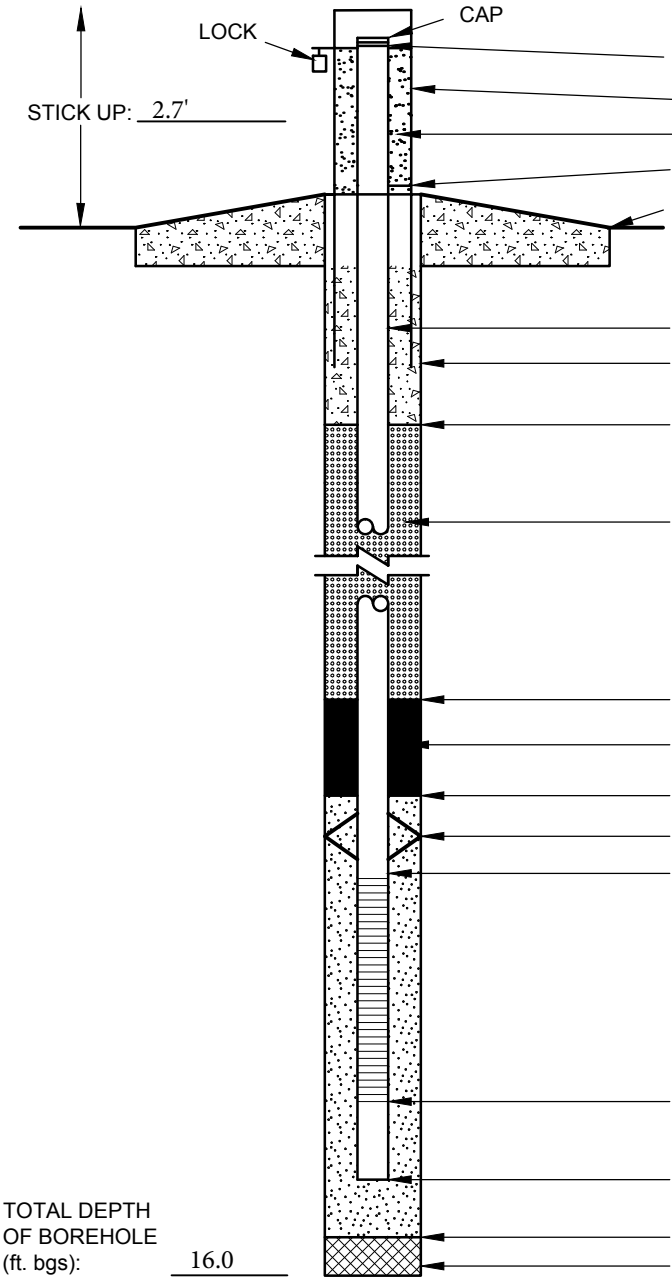
PREPARED BY: M. Gore

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG

LB-8

PROJECT NAME: SEC - Partial Closure of Fly Ash Pond	PROJECT NUMBER: 154-7197
SITE NAME: Sioux Energy Center (SEC)	LOCATION: St. Charles County, MO (LB-8)
CLIENT: Ameren MO	SURFACE ELEVATION: 448.0

GEOLOGIST: Matt Gore	NORTHING: 38.9122830	EASTING: -090.2893056
DRILLER: Chad Dutton	STATIC WATER LEVEL: 440.4 ft msl	COMPLETION DATE: 4/4/2016
DRILLING COMPANY: Bulldog Drilling	DRILLING METHODS: 4.25"/6.25" HSA	



TOP OF CASING ELEVATION: 450.7 ft msl

PROTECTIVE CASING (yes / no): 6" Steel Protop

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 448.0 ft msl

DIAMETER OF RISER PIPE (in.): 4.0

DIAMETER OF BOREHOLE (in.): 9.75

CONCRETE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 1.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" Chips (2 bgs) (Hole-Plug) (50 lb bgs)

TOP OF SAND PACK DEPTH (ft. bgs): 3.0

CENTRALIZER (yes / no) - TYPE: No

TOP OF SCREEN DEPTH (ft. bgs): 5.0

TYPE OF SCREEN: 2" x 9.8' Schedule 40 PVC

SCREEN SLOT SIZE (in.): 0.010 Standard

SIZE OF SAND PACK: #00 Sand (Unimin Filtertec (50 lb bgs))

AMOUNT OF SAND: 6 Bags

BOTTOM OF SCREEN DEPTH (ft. bgs): 14.8

BOTTOM OF WELL DEPTH (ft. bgs): 15.2

BOTTOM OF FILTER PACK (ft. bgs): 15.2

TYPE AND AMOUNT OF BACKFILL: Natural Cave In - 0.8 ft

ADDITIONAL NOTES: Total depth: 17.9 ft btor; ft bgs = feet below ground surface; ft msl = feet above mean sea level; ft btor = feet below top riser; HAS = hollow stem auger; lb bgs = pound bag. Well surveyed by Zahner & Associates, INC. on April 25, 2016; Horizontal Datum: NAD 83; Vertical Datum: NAVD 88.

CHECKED BY: J. Ingram

DATE CHECKED: 4/26/2016

PREPARED BY: M. Gore

APPENDIX C

Laboratory Data

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

February 01, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60262500

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 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
Pace Project No.: 60262500

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
Pace Project No.: 60262500

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60262500001	**S-SCPA-2**	Water	01/22/18 09:20	01/23/18 03:45
60262500002	**S-SCPA-3S**	Water	01/22/18 14:30	01/23/18 03:45
60262500003	**S-SCPA-DUP-1**	Water	01/22/18 08:00	01/23/18 03:45

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

SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60262500

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60262500001	**S-SCPA-2**	EPA 200.7	TDS	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262500002	**S-SCPA-3S**	EPA 200.7	TDS	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262500003	**S-SCPA-DUP-1**	EPA 200.7	TDS	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-2 **Lab ID: 60262500001** Collected: 01/22/18 09:20 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**37.7J**	ug/L	75.0	28.8	1	01/23/18 13:30	01/24/18 13:41	7429-90-5	
Barium	**153**	ug/L	5.0	0.91	1	01/23/18 13:30	01/24/18 13:41	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/23/18 13:30	01/24/18 13:41	7440-41-7	
Boron	**348**	ug/L	100	3.5	1	01/23/18 13:30	01/24/18 14:32	7440-42-8	
Calcium	**73400**	ug/L	100	36.0	1	01/23/18 13:30	01/24/18 13:41	7440-70-2	
Cobalt	**1.8J**	ug/L	5.0	0.73	1	01/23/18 13:30	01/24/18 13:41	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/23/18 13:30	01/24/18 13:41	7440-50-8	
Iron	**1350**	ug/L	50.0	12.4	1	01/23/18 13:30	01/24/18 13:41	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/23/18 13:30	01/24/18 13:41	7439-92-1	
Lithium	**16.7**	ug/L	10.0	2.9	1	01/23/18 13:30	01/24/18 13:41	7439-93-2	
Magnesium	**20000**	ug/L	50.0	15.4	1	01/23/18 13:30	01/24/18 13:41	7439-95-4	
Manganese	**113**	ug/L	5.0	1.8	1	01/23/18 13:30	01/24/18 13:41	7439-96-5	
Molybdenum	**26.5**	ug/L	20.0	1.3	1	01/23/18 13:30	01/24/18 13:41	7439-98-7	
Nickel	**4.4J**	ug/L	5.0	2.3	1	01/23/18 13:30	01/24/18 13:41	7440-02-0	
Potassium	**4350**	ug/L	500	52.3	1	01/23/18 13:30	01/24/18 13:41	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/23/18 13:30	01/24/18 13:41	7440-22-4	
Sodium	**13900**	ug/L	500	28.4	1	01/23/18 13:30	01/24/18 13:41	7440-23-5	
Total Hardness by 2340B	**266000**	ug/L	500		1	01/23/18 13:30	01/24/18 13:41		
Zinc	**16.8J**	ug/L	50.0	11.2	1	01/23/18 13:30	01/24/18 13:41	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**<28.8**	ug/L	75.0	28.8	1	01/24/18 10:45	01/29/18 12:24	7429-90-5	
Barium, Dissolved	**150**	ug/L	5.0	0.91	1	01/24/18 10:45	01/29/18 12:24	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/24/18 10:45	01/29/18 12:24	7440-41-7	
Boron, Dissolved	**307**	ug/L	100	3.5	1	01/24/18 10:45	01/29/18 12:24	7440-42-8	
Calcium, Dissolved	**69000**	ug/L	100	36.0	1	01/24/18 10:45	01/29/18 12:24	7440-70-2	
Cobalt, Dissolved	**1.6J**	ug/L	5.0	0.73	1	01/24/18 10:45	01/29/18 12:24	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/24/18 10:45	01/29/18 12:24	7440-50-8	
Iron, Dissolved	**1280**	ug/L	50.0	12.4	1	01/24/18 10:45	01/29/18 12:24	7439-89-6	
Lead, Dissolved	**4.0J**	ug/L	5.0	2.4	1	01/24/18 10:45	01/29/18 12:24	7439-92-1	
Lithium, Dissolved	**17.6**	ug/L	10.0	2.9	1	01/24/18 10:45	01/29/18 12:24	7439-93-2	D9
Magnesium, Dissolved	**18100**	ug/L	50.0	15.4	1	01/24/18 10:45	01/29/18 12:24	7439-95-4	
Manganese, Dissolved	**100**	ug/L	5.0	1.8	1	01/24/18 10:45	01/29/18 12:24	7439-96-5	
Molybdenum, Dissolved	**29.2**	ug/L	20.0	1.3	1	01/24/18 10:45	01/29/18 12:24	7439-98-7	
Nickel, Dissolved	**4.1J**	ug/L	5.0	2.3	1	01/24/18 10:45	01/29/18 12:24	7440-02-0	
Potassium, Dissolved	**4220**	ug/L	500	52.3	1	01/24/18 10:45	01/29/18 12:24	7440-09-7	
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/24/18 10:45	01/29/18 12:24	7440-22-4	
Sodium, Dissolved	**14300**	ug/L	500	28.4	1	01/24/18 10:45	01/29/18 12:24	7440-23-5	D9
Zinc, Dissolved	**16.1J**	ug/L	50.0	11.2	1	01/24/18 10:45	01/29/18 12:24	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.23J**	ug/L	1.0	0.026	1	01/23/18 13:30	01/25/18 18:47	7440-36-0	
Arsenic	**2.0**	ug/L	1.0	0.052	1	01/23/18 13:30	01/25/18 18:47	7440-38-2	
Cadmium	**0.24J**	ug/L	0.50	0.018	1	01/23/18 13:30	01/25/18 18:47	7440-43-9	
Chromium	**0.42J**	ug/L	1.0	0.054	1	01/23/18 13:30	01/25/18 18:47	7440-47-3	
Selenium	**0.55J**	ug/L	1.0	0.086	1	01/23/18 13:30	01/25/18 18:47	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-2 **Lab ID: 60262500001** Collected: 01/22/18 09:20 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.56J**	ug/L	1.0	0.036	1	01/23/18 13:30	01/25/18 18:47	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.22J**	ug/L	1.0	0.026	1	01/24/18 10:45	01/25/18 19:32	7440-36-0	
Arsenic, Dissolved	**2.0**	ug/L	1.0	0.052	1	01/24/18 10:45	01/25/18 19:32	7440-38-2	
Cadmium, Dissolved	**0.22J**	ug/L	0.50	0.018	1	01/24/18 10:45	01/25/18 19:32	7440-43-9	
Chromium, Dissolved	**0.35J**	ug/L	1.0	0.054	1	01/24/18 10:45	01/25/18 19:32	7440-47-3	B
Selenium, Dissolved	**0.60J**	ug/L	1.0	0.086	1	01/24/18 10:45	01/25/18 19:32	7782-49-2	
Thallium, Dissolved	**0.56J**	ug/L	1.0	0.036	1	01/24/18 10:45	01/25/18 19:32	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/24/18 09:37	01/24/18 13:15	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**219**	mg/L	20.0	4.9	1		01/29/18 09:33		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**320**	mg/L	5.0	5.0	1		01/24/18 09:40		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:19	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.5**	mg/L	2.0	1.0	2		01/28/18 12:55	16887-00-6	
Fluoride	**0.22**	mg/L	0.20	0.10	1		01/27/18 16:00	16984-48-8	
Sulfate	**48.5**	mg/L	5.0	2.5	5		01/28/18 13:36	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		01/29/18 10:21		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.2**	mg/L	1.0	0.13	1		01/24/18 22:58	7440-44-0	B

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-3S **Lab ID: 60262500002** Collected: 01/22/18 14:30 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**176**	ug/L	75.0	28.8	1	01/23/18 13:30	01/24/18 13:43	7429-90-5	
Barium	**32.9**	ug/L	5.0	0.91	1	01/23/18 13:30	01/24/18 13:43	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/23/18 13:30	01/24/18 13:43	7440-41-7	
Boron	**67800**	ug/L	200	7.0	2	01/23/18 13:30	01/24/18 14:35	7440-42-8	M1
Calcium	**501000**	ug/L	100	36.0	1	01/23/18 13:30	01/24/18 13:43	7440-70-2	M1
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/23/18 13:30	01/24/18 13:43	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/23/18 13:30	01/24/18 13:43	7440-50-8	
Iron	**34.3J**	ug/L	50.0	12.4	1	01/23/18 13:30	01/24/18 13:43	7439-89-6	
Lead	**2.6J**	ug/L	5.0	2.4	1	01/23/18 13:30	01/24/18 13:43	7439-92-1	
Lithium	**43.4**	ug/L	10.0	2.9	1	01/23/18 13:30	01/24/18 13:43	7439-93-2	
Magnesium	**9600**	ug/L	50.0	15.4	1	01/23/18 13:30	01/24/18 13:43	7439-95-4	
Manganese	**17.9**	ug/L	5.0	1.8	1	01/23/18 13:30	01/24/18 13:43	7439-96-5	
Molybdenum	**8070**	ug/L	20.0	1.3	1	01/23/18 13:30	01/24/18 13:43	7439-98-7	
Nickel	**3.6J**	ug/L	5.0	2.3	1	01/23/18 13:30	01/24/18 13:43	7440-02-0	
Potassium	**40100**	ug/L	500	52.3	1	01/23/18 13:30	01/24/18 13:43	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/23/18 13:30	01/24/18 13:43	7440-22-4	
Sodium	**58500**	ug/L	500	28.4	1	01/23/18 13:30	01/24/18 13:43	7440-23-5	
Total Hardness by 2340B	**1290000**	ug/L	500		1	01/23/18 13:30	01/24/18 13:43		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/23/18 13:30	01/24/18 13:43	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**159**	ug/L	75.0	28.8	1	01/24/18 10:45	01/29/18 12:26	7429-90-5	
Barium, Dissolved	**32.7**	ug/L	5.0	0.91	1	01/24/18 10:45	01/29/18 12:26	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/24/18 10:45	01/29/18 12:26	7440-41-7	
Boron, Dissolved	**64700**	ug/L	1000	35.1	10	01/24/18 10:45	01/29/18 15:14	7440-42-8	M1
Calcium, Dissolved	**468000**	ug/L	100	36.0	1	01/24/18 10:45	01/29/18 12:26	7440-70-2	M1
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/24/18 10:45	01/29/18 12:26	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/24/18 10:45	01/29/18 12:26	7440-50-8	
Iron, Dissolved	**30.5J**	ug/L	50.0	12.4	1	01/24/18 10:45	01/29/18 12:26	7439-89-6	
Lead, Dissolved	**2.5J**	ug/L	5.0	2.4	1	01/24/18 10:45	01/29/18 12:26	7439-92-1	
Lithium, Dissolved	**41.8**	ug/L	10.0	2.9	1	01/24/18 10:45	01/29/18 12:26	7439-93-2	
Magnesium, Dissolved	**8860**	ug/L	50.0	15.4	1	01/24/18 10:45	01/29/18 12:26	7439-95-4	
Manganese, Dissolved	**15.9**	ug/L	5.0	1.8	1	01/24/18 10:45	01/29/18 12:26	7439-96-5	
Molybdenum, Dissolved	**8380**	ug/L	20.0	1.3	1	01/24/18 10:45	01/29/18 12:26	7439-98-7	D9
Nickel, Dissolved	**3.5J**	ug/L	5.0	2.3	1	01/24/18 10:45	01/29/18 12:26	7440-02-0	
Potassium, Dissolved	**39200**	ug/L	500	52.3	1	01/24/18 10:45	01/29/18 12:26	7440-09-7	
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/24/18 10:45	01/29/18 12:26	7440-22-4	
Sodium, Dissolved	**59300**	ug/L	500	28.4	1	01/24/18 10:45	01/29/18 12:26	7440-23-5	D9
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/24/18 10:45	01/29/18 12:26	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.33J**	ug/L	1.0	0.026	1	01/23/18 13:30	01/25/18 17:18	7440-36-0	
Arsenic	**72.0**	ug/L	1.0	0.052	1	01/23/18 13:30	01/25/18 17:18	7440-38-2	
Cadmium	**1.6**	ug/L	0.50	0.018	1	01/23/18 13:30	01/25/18 17:18	7440-43-9	
Chromium	**0.30J**	ug/L	1.0	0.054	1	01/23/18 13:30	01/25/18 17:18	7440-47-3	B
Selenium	**1.7**	ug/L	1.0	0.086	1	01/23/18 13:30	01/25/18 17:18	7782-49-2	B

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-3S **Lab ID: 60262500002** Collected: 01/22/18 14:30 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.29J**	ug/L	1.0	0.036	1	01/23/18 13:30	01/25/18 17:18	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.31J**	ug/L	1.0	0.026	1	01/24/18 10:45	01/25/18 19:35	7440-36-0	
Arsenic, Dissolved	**70.8**	ug/L	1.0	0.052	1	01/24/18 10:45	01/25/18 19:35	7440-38-2	
Cadmium, Dissolved	**1.5**	ug/L	0.50	0.018	1	01/24/18 10:45	01/25/18 19:35	7440-43-9	
Chromium, Dissolved	**0.34J**	ug/L	1.0	0.054	1	01/24/18 10:45	01/25/18 19:35	7440-47-3	B
Selenium, Dissolved	**1.5**	ug/L	1.0	0.086	1	01/24/18 10:45	01/25/18 19:35	7782-49-2	
Thallium, Dissolved	**0.24J**	ug/L	1.0	0.036	1	01/24/18 10:45	01/25/18 19:35	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/24/18 09:37	01/24/18 13:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**170**	mg/L	20.0	4.9	1		01/29/18 09:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2150**	mg/L	5.0	5.0	1		01/24/18 09:40		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:20	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**23.1**	mg/L	2.0	1.0	2		01/28/18 13:50	16887-00-6	M1
Fluoride	**0.60**	mg/L	0.20	0.10	1		01/27/18 16:42	16984-48-8	
Sulfate	**1290**	mg/L	100	50.0	100		01/28/18 14:18	14808-79-8	M1
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**44.0**	mg/L	10.0	3.1	1		01/29/18 10:21		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**19.5**	mg/L	2.0	0.26	2		01/25/18 18:35	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-DUP-1 **Lab ID: 60262500003** Collected: 01/22/18 08:00 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**98.6**	ug/L	75.0	28.8	1	01/23/18 13:30	01/24/18 13:50	7429-90-5	
Barium	**163**	ug/L	5.0	0.91	1	01/23/18 13:30	01/24/18 13:50	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/23/18 13:30	01/24/18 13:50	7440-41-7	
Boron	**458**	ug/L	100	3.5	1	01/23/18 13:30	01/24/18 14:41	7440-42-8	
Calcium	**75300**	ug/L	100	36.0	1	01/23/18 13:30	01/24/18 13:50	7440-70-2	
Cobalt	**2.2J**	ug/L	5.0	0.73	1	01/23/18 13:30	01/24/18 13:50	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/23/18 13:30	01/24/18 13:50	7440-50-8	
Iron	**1540**	ug/L	50.0	12.4	1	01/23/18 13:30	01/24/18 13:50	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/23/18 13:30	01/24/18 13:50	7439-92-1	
Lithium	**17.1**	ug/L	10.0	2.9	1	01/23/18 13:30	01/24/18 13:50	7439-93-2	
Magnesium	**20400**	ug/L	50.0	15.4	1	01/23/18 13:30	01/24/18 13:50	7439-95-4	
Manganese	**116**	ug/L	5.0	1.8	1	01/23/18 13:30	01/24/18 13:50	7439-96-5	
Molybdenum	**32.8**	ug/L	20.0	1.3	1	01/23/18 13:30	01/24/18 13:50	7439-98-7	
Nickel	**4.3J**	ug/L	5.0	2.3	1	01/23/18 13:30	01/24/18 13:50	7440-02-0	
Potassium	**4490**	ug/L	500	52.3	1	01/23/18 13:30	01/24/18 13:50	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/23/18 13:30	01/24/18 13:50	7440-22-4	
Sodium	**14200**	ug/L	500	28.4	1	01/23/18 13:30	01/24/18 13:50	7440-23-5	
Total Hardness by 2340B	**272000**	ug/L	500		1	01/23/18 13:30	01/24/18 13:50		
Zinc	**35.3J**	ug/L	50.0	11.2	1	01/23/18 13:30	01/24/18 13:50	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**34.7J**	ug/L	75.0	28.8	1	01/24/18 10:45	01/29/18 12:33	7429-90-5	
Barium, Dissolved	**150**	ug/L	5.0	0.91	1	01/24/18 10:45	01/29/18 12:33	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/24/18 10:45	01/29/18 12:33	7440-41-7	
Boron, Dissolved	**565**	ug/L	100	3.5	1	01/24/18 10:45	01/29/18 12:33	7440-42-8	D9
Calcium, Dissolved	**69200**	ug/L	100	36.0	1	01/24/18 10:45	01/29/18 12:33	7440-70-2	
Cobalt, Dissolved	**1.7J**	ug/L	5.0	0.73	1	01/24/18 10:45	01/29/18 12:33	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/24/18 10:45	01/29/18 12:33	7440-50-8	
Iron, Dissolved	**1300**	ug/L	50.0	12.4	1	01/24/18 10:45	01/29/18 12:33	7439-89-6	
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/24/18 10:45	01/29/18 12:33	7439-92-1	
Lithium, Dissolved	**18.1**	ug/L	10.0	2.9	1	01/24/18 10:45	01/29/18 12:33	7439-93-2	D9
Magnesium, Dissolved	**18200**	ug/L	50.0	15.4	1	01/24/18 10:45	01/29/18 12:33	7439-95-4	
Manganese, Dissolved	**101**	ug/L	5.0	1.8	1	01/24/18 10:45	01/29/18 12:33	7439-96-5	
Molybdenum, Dissolved	**34.3**	ug/L	20.0	1.3	1	01/24/18 10:45	01/29/18 12:33	7439-98-7	D9
Nickel, Dissolved	**4.1J**	ug/L	5.0	2.3	1	01/24/18 10:45	01/29/18 12:33	7440-02-0	
Potassium, Dissolved	**4290**	ug/L	500	52.3	1	01/24/18 10:45	01/29/18 12:33	7440-09-7	
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/24/18 10:45	01/29/18 12:33	7440-22-4	
Sodium, Dissolved	**14100**	ug/L	500	28.4	1	01/24/18 10:45	01/29/18 12:33	7440-23-5	
Zinc, Dissolved	**29.3J**	ug/L	50.0	11.2	1	01/24/18 10:45	01/29/18 12:33	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.23J**	ug/L	1.0	0.026	1	01/23/18 13:30	01/25/18 18:51	7440-36-0	
Arsenic	**2.2**	ug/L	1.0	0.052	1	01/23/18 13:30	01/25/18 18:51	7440-38-2	
Cadmium	**0.23J**	ug/L	0.50	0.018	1	01/23/18 13:30	01/25/18 18:51	7440-43-9	
Chromium	**0.66J**	ug/L	1.0	0.054	1	01/23/18 13:30	01/25/18 18:51	7440-47-3	B
Selenium	**0.58J**	ug/L	1.0	0.086	1	01/23/18 13:30	01/25/18 18:51	7782-49-2	B

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262500

Sample: S-SCPA-DUP-1 **Lab ID: 60262500003** Collected: 01/22/18 08:00 Received: 01/23/18 03:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.56J**	ug/L	1.0	0.036	1	01/23/18 13:30	01/25/18 18:51	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.23J**	ug/L	1.0	0.026	1	01/24/18 10:45	01/25/18 19:46	7440-36-0	
Arsenic, Dissolved	**2.0**	ug/L	1.0	0.052	1	01/24/18 10:45	01/25/18 19:46	7440-38-2	
Cadmium, Dissolved	**0.23J**	ug/L	0.50	0.018	1	01/24/18 10:45	01/25/18 19:46	7440-43-9	
Chromium, Dissolved	**0.37J**	ug/L	1.0	0.054	1	01/24/18 10:45	01/25/18 19:46	7440-47-3	B
Selenium, Dissolved	**0.57J**	ug/L	1.0	0.086	1	01/24/18 10:45	01/25/18 19:46	7782-49-2	
Thallium, Dissolved	**0.57J**	ug/L	1.0	0.036	1	01/24/18 10:45	01/25/18 19:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/24/18 09:37	01/24/18 13:24	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**214**	mg/L	20.0	4.9	1		01/29/18 09:46		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**332**	mg/L	5.0	5.0	1		01/24/18 09:41		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:20	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.5**	mg/L	2.0	1.0	2		01/28/18 14:46	16887-00-6	
Fluoride	**0.23**	mg/L	0.20	0.10	1		01/27/18 17:10	16984-48-8	
Sulfate	**49.0**	mg/L	5.0	2.5	5		01/28/18 15:00	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		01/29/18 10:22		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.2**	mg/L	1.0	0.13	1		01/24/18 23:36	7440-44-0	B

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511586 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094818 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	01/24/18 13:02	

LABORATORY CONTROL SAMPLE: 2094819

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2094820 2094821

Parameter	Units	60262500002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.8	4.8	95	95	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511459 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094396 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<28.8	75.0	28.8	01/24/18 13:32	
Barium	ug/L	<0.91	5.0	0.91	01/24/18 13:32	
Beryllium	ug/L	<0.16	1.0	0.16	01/24/18 13:32	
Boron	ug/L	12.8J	100	3.5	01/24/18 14:30	
Calcium	ug/L	<36.0	100	36.0	01/24/18 13:32	
Cobalt	ug/L	<0.73	5.0	0.73	01/24/18 13:32	
Copper	ug/L	<4.8	10.0	4.8	01/24/18 13:32	
Iron	ug/L	<12.4	50.0	12.4	01/24/18 13:32	
Lead	ug/L	<2.4	5.0	2.4	01/24/18 13:32	
Lithium	ug/L	<2.9	10.0	2.9	01/24/18 13:32	
Magnesium	ug/L	<15.4	50.0	15.4	01/24/18 13:32	
Manganese	ug/L	<1.8	5.0	1.8	01/24/18 13:32	
Molybdenum	ug/L	<1.3	20.0	1.3	01/24/18 13:32	
Nickel	ug/L	<2.3	5.0	2.3	01/24/18 13:32	
Potassium	ug/L	<52.3	500	52.3	01/24/18 13:32	
Silver	ug/L	<1.9	7.0	1.9	01/24/18 13:32	
Sodium	ug/L	<28.4	500	28.4	01/24/18 13:32	
Total Hardness by 2340B	ug/L	7.2J	500		01/24/18 13:32	
Zinc	ug/L	<11.2	50.0	11.2	01/24/18 13:32	

LABORATORY CONTROL SAMPLE: 2094397

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9830	98	85-115	
Barium	ug/L	1000	1000	100	85-115	
Beryllium	ug/L	1000	1010	101	85-115	
Boron	ug/L	1000	1040	104	85-115	
Calcium	ug/L	10000	9970	100	85-115	
Cobalt	ug/L	1000	1010	101	85-115	
Copper	ug/L	1000	1010	101	85-115	
Iron	ug/L	10000	10000	100	85-115	
Lead	ug/L	1000	996	100	85-115	
Lithium	ug/L	1000	978	98	85-115	
Magnesium	ug/L	10000	9980	100	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Molybdenum	ug/L	1000	1000	100	85-115	
Nickel	ug/L	1000	991	99	85-115	
Potassium	ug/L	10000	9650	97	85-115	
Silver	ug/L	500	502	100	85-115	
Sodium	ug/L	10000	9490	95	85-115	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

LABORATORY CONTROL SAMPLE: 2094397

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Hardness by 2340B	ug/L		66000			
Zinc	ug/L	1000	1020	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2094398 2094399

Parameter	Units	60262500002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	176	10000	10000	10400	10500	102	103	70-130	1	20	
Barium	ug/L	32.9	1000	1000	1050	1070	102	104	70-130	2	20	
Beryllium	ug/L	<0.16	1000	1000	1030	1040	103	104	70-130	1	20	
Boron	ug/L	67800	1000	1000	70600	71200	278	334	70-130	1	20	M1
Calcium	ug/L	501000	10000	10000	516000	522000	152	212	70-130	1	20	M1
Cobalt	ug/L	<0.73	1000	1000	990	997	99	100	70-130	1	20	
Copper	ug/L	<4.8	1000	1000	1040	1050	104	105	70-130	1	20	
Iron	ug/L	34.3J	10000	10000	10100	10200	100	102	70-130	2	20	
Lead	ug/L	2.6J	1000	1000	940	943	94	94	70-130	0	20	
Lithium	ug/L	43.4	1000	1000	1100	1120	106	108	70-130	2	20	
Magnesium	ug/L	9600	10000	10000	19200	19300	96	97	70-130	0	20	
Manganese	ug/L	17.9	1000	1000	1030	1030	102	101	70-130	0	20	
Molybdenum	ug/L	8070	1000	1000	9000	9130	92	106	70-130	2	20	
Nickel	ug/L	3.6J	1000	1000	964	969	96	97	70-130	0	20	
Potassium	ug/L	40100	10000	10000	50600	51300	105	112	70-130	1	20	
Silver	ug/L	<1.9	500	500	519	523	104	105	70-130	1	20	
Sodium	ug/L	58500	10000	10000	68800	69700	103	112	70-130	1	20	
Total Hardness by 2340B	ug/L	1290000			1370000	1380000				1		
Zinc	ug/L	<11.2	1000	1000	1000	996	100	99	70-130	1	20	

MATRIX SPIKE SAMPLE: 2094400

Parameter	Units	60262502006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	<28.8	10000	10600	105	70-130	
Barium	ug/L	14.2	1000	1080	107	70-130	
Beryllium	ug/L	<0.16	1000	1070	107	70-130	
Boron	ug/L	209	1000	1210	100	70-130	
Calcium	ug/L	94800	10000	107000	122	70-130	
Cobalt	ug/L	29.2	1000	1080	105	70-130	
Copper	ug/L	<4.8	1000	1080	108	70-130	
Iron	ug/L	467	10000	11000	106	70-130	
Lead	ug/L	11.0	1000	1020	101	70-130	
Lithium	ug/L	23.2	1000	1100	108	70-130	
Magnesium	ug/L	80100	10000	91200	112	70-130	
Manganese	ug/L	64.8	1000	1130	106	70-130	
Molybdenum	ug/L	10.0J	1000	1080	107	70-130	
Nickel	ug/L	54.2	1000	1070	102	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

MATRIX SPIKE SAMPLE: 2094400

Parameter	Units	60262502006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Potassium	ug/L	6420	10000	17000	106	70-130	
Silver	ug/L	<1.9	500	539	108	70-130	
Sodium	ug/L	75200	10000	87200	119	70-130	
Total Hardness by 2340B	ug/L	566000		643000			
Zinc	ug/L	132	1000	1180	105	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511609 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094863 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<28.8	75.0	28.8	01/29/18 12:20	
Barium, Dissolved	ug/L	<0.91	5.0	0.91	01/29/18 12:20	
Beryllium, Dissolved	ug/L	<0.16	1.0	0.16	01/29/18 12:20	
Boron, Dissolved	ug/L	<3.5	100	3.5	01/29/18 12:20	
Calcium, Dissolved	ug/L	<36.0	100	36.0	01/29/18 12:20	
Cobalt, Dissolved	ug/L	<0.73	5.0	0.73	01/29/18 12:20	
Copper, Dissolved	ug/L	<4.8	10.0	4.8	01/29/18 12:20	
Iron, Dissolved	ug/L	<12.4	50.0	12.4	01/29/18 12:20	
Lead, Dissolved	ug/L	<2.4	5.0	2.4	01/29/18 12:20	
Lithium, Dissolved	ug/L	<2.9	10.0	2.9	01/29/18 12:20	
Magnesium, Dissolved	ug/L	<15.4	50.0	15.4	01/29/18 12:20	
Manganese, Dissolved	ug/L	<1.8	5.0	1.8	01/29/18 12:20	
Molybdenum, Dissolved	ug/L	<1.3	20.0	1.3	01/29/18 12:20	
Nickel, Dissolved	ug/L	<2.3	5.0	2.3	01/29/18 12:20	
Potassium, Dissolved	ug/L	<52.3	500	52.3	01/29/18 12:20	
Silver, Dissolved	ug/L	<1.9	7.0	1.9	01/29/18 12:20	
Sodium, Dissolved	ug/L	<28.4	500	28.4	01/29/18 12:20	
Zinc, Dissolved	ug/L	<11.2	50.0	11.2	01/29/18 12:20	

LABORATORY CONTROL SAMPLE: 2094864

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	9900	99	85-115	
Barium, Dissolved	ug/L	1000	992	99	85-115	
Beryllium, Dissolved	ug/L	1000	998	100	85-115	
Boron, Dissolved	ug/L	1000	941	94	85-115	
Calcium, Dissolved	ug/L	10000	9380	94	85-115	
Cobalt, Dissolved	ug/L	1000	1060	106	85-115	
Copper, Dissolved	ug/L	1000	981	98	85-115	
Iron, Dissolved	ug/L	10000	9630	96	85-115	
Lead, Dissolved	ug/L	1000	1040	104	85-115	
Lithium, Dissolved	ug/L	1000	1040	104	85-115	
Magnesium, Dissolved	ug/L	10000	9230	92	85-115	
Manganese, Dissolved	ug/L	1000	927	93	85-115	
Molybdenum, Dissolved	ug/L	1000	1050	105	85-115	
Nickel, Dissolved	ug/L	1000	1000	100	85-115	
Potassium, Dissolved	ug/L	10000	9640	96	85-115	
Silver, Dissolved	ug/L	500	497	99	85-115	
Sodium, Dissolved	ug/L	10000	9940	99	85-115	
Zinc, Dissolved	ug/L	1000	1020	102	85-115	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2094865 2094866

Parameter	Units	60262500002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	159	10000	10000	10300	10200	101	100	70-130	1	20	
Barium, Dissolved	ug/L	32.7	1000	1000	1040	1020	101	99	70-130	1	20	
Beryllium, Dissolved	ug/L	<0.16	1000	1000	1000	994	100	99	70-130	1	20	
Boron, Dissolved	ug/L	64700	1000	1000	67500	65800	281	117	70-130	2	20	M1
Calcium, Dissolved	ug/L	468000	10000	10000	487000	478000	192	100	70-130	2	20	M1
Cobalt, Dissolved	ug/L	<0.73	1000	1000	1020	1010	102	101	70-130	1	20	
Copper, Dissolved	ug/L	<4.8	1000	1000	1010	995	101	99	70-130	2	20	
Iron, Dissolved	ug/L	30.5J	10000	10000	9640	9560	96	95	70-130	1	20	
Lead, Dissolved	ug/L	2.5J	1000	1000	980	967	98	96	70-130	1	20	
Lithium, Dissolved	ug/L	41.8	1000	1000	1120	1110	108	107	70-130	1	20	
Magnesium, Dissolved	ug/L	8860	10000	10000	17800	17500	89	86	70-130	2	20	
Manganese, Dissolved	ug/L	15.9	1000	1000	938	923	92	91	70-130	2	20	
Molybdenum, Dissolved	ug/L	8380	1000	1000	9570	9350	118	97	70-130	2	20	
Nickel, Dissolved	ug/L	3.5J	1000	1000	973	960	97	96	70-130	1	20	
Potassium, Dissolved	ug/L	39200	10000	10000	50000	49200	108	100	70-130	2	20	
Silver, Dissolved	ug/L	<1.9	500	500	512	503	102	101	70-130	2	20	
Sodium, Dissolved	ug/L	59300	10000	10000	70800	69300	115	100	70-130	2	20	
Zinc, Dissolved	ug/L	<11.2	1000	1000	992	984	99	98	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511466 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094431 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	01/25/18 17:11	
Arsenic	ug/L	<0.052	1.0	0.052	01/25/18 17:11	
Cadmium	ug/L	<0.018	0.50	0.018	01/25/18 17:11	
Chromium	ug/L	0.099J	1.0	0.054	01/25/18 17:11	
Selenium	ug/L	0.27J	1.0	0.086	01/25/18 17:11	
Thallium	ug/L	<0.036	1.0	0.036	01/25/18 17:11	

LABORATORY CONTROL SAMPLE: 2094432

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.2	101	85-115	
Arsenic	ug/L	40	41.0	103	85-115	
Cadmium	ug/L	40	40.5	101	85-115	
Chromium	ug/L	40	39.7	99	85-115	
Selenium	ug/L	40	40.1	100	85-115	
Thallium	ug/L	40	39.5	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2094433 2094434

Parameter	Units	60262500002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.33J	40	40	40.2	40.6	100	101	70-130	1	20	
Arsenic	ug/L	72.0	40	40	113	113	102	103	70-130	0	20	
Cadmium	ug/L	1.6	40	40	38.7	38.7	93	93	70-130	0	20	
Chromium	ug/L	0.30J	40	40	39.2	38.5	97	95	70-130	2	20	
Selenium	ug/L	1.7	40	40	40.0	40.2	96	96	70-130	0	20	
Thallium	ug/L	0.29J	40	40	42.3	42.0	105	104	70-130	1	20	

MATRIX SPIKE SAMPLE: 2094435

Parameter	Units	60262493001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<1.0	40	40.3	100	70-130	
Arsenic	ug/L	1.2	40	40.9	99	70-130	
Cadmium	ug/L	<0.50	40	38.9	97	70-130	
Chromium	ug/L	<1.0	40	40.1	98	70-130	
Selenium	ug/L	<1.0	40	38.0	93	70-130	
Thallium	ug/L	<1.0	40	40.9	102	70-130	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511607 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094859 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.026	1.0	0.026	01/25/18 19:25	
Arsenic, Dissolved	ug/L	<0.052	1.0	0.052	01/25/18 19:25	
Cadmium, Dissolved	ug/L	<0.018	0.50	0.018	01/25/18 19:25	
Chromium, Dissolved	ug/L	0.059J	1.0	0.054	01/25/18 19:25	
Selenium, Dissolved	ug/L	<0.086	1.0	0.086	01/25/18 19:25	
Thallium, Dissolved	ug/L	<0.036	1.0	0.036	01/25/18 19:25	

LABORATORY CONTROL SAMPLE: 2094860

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	40.2	101	85-115	
Arsenic, Dissolved	ug/L	40	40.0	100	85-115	
Cadmium, Dissolved	ug/L	40	40.2	101	85-115	
Chromium, Dissolved	ug/L	40	38.2	95	85-115	
Selenium, Dissolved	ug/L	40	40.5	101	85-115	
Thallium, Dissolved	ug/L	40	39.2	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2094861 2094862

Parameter	Units	60262500002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony, Dissolved	ug/L	0.31J	40	40	40.7	40.9	101	101	70-130	0	20	
Arsenic, Dissolved	ug/L	70.8	40	40	111	111	99	102	70-130	1	20	
Cadmium, Dissolved	ug/L	1.5	40	40	38.8	38.9	93	94	70-130	0	20	
Chromium, Dissolved	ug/L	0.34J	40	40	37.5	37.0	93	92	70-130	1	20	
Selenium, Dissolved	ug/L	1.5	40	40	39.9	40.2	96	97	70-130	1	20	
Thallium, Dissolved	ug/L	0.24J	40	40	41.6	41.5	103	103	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511670 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2095050 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	01/29/18 09:28	

LABORATORY CONTROL SAMPLE: 2095051

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	512	102	90-110	

SAMPLE DUPLICATE: 2095052

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	170	171	0	10	H3

SAMPLE DUPLICATE: 2095053

Parameter	Units	60262435012 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	575	581	1	10	H3

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511481 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2094512 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/24/18 09:28	

LABORATORY CONTROL SAMPLE: 2094513

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1160	116	80-120	

SAMPLE DUPLICATE: 2094514

Parameter	Units	60262474002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	503	510	1	10	

SAMPLE DUPLICATE: 2094515

Parameter	Units	60262418007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	973	1020	4	10	

SAMPLE DUPLICATE: 2094516

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2150	2130	1	10	H3

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511992 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2096343 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	01/26/18 15:18	

LABORATORY CONTROL SAMPLE: 2096344

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.53	105	80-120	

MATRIX SPIKE SAMPLE: 2096345

Parameter	Units	60262500001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	<0.0048	.5	0.50	100	75-125	H3

SAMPLE DUPLICATE: 2096346

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	<0.0048	<0.0048		20	H3

SAMPLE DUPLICATE: 2096347

Parameter	Units	60262708001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	H3

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 512053 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2096662 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.20	0.10	01/27/18 15:33	

LABORATORY CONTROL SAMPLE: 2096663

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: 2096664 2096665

Parameter	Units	60262500001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.22	2.5	2.5	3.1	3.1	114	114	80-120	0	15	

MATRIX SPIKE SAMPLE: 2096666

Parameter	Units	60262500002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.60	2.5	3.6	119	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 512062 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2096897 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	01/28/18 12:27	
Sulfate	mg/L	<0.50	1.0	0.50	01/28/18 12:27	

LABORATORY CONTROL SAMPLE: 2096898

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

MATRIX SPIKE SAMPLE: 2096899

Parameter	Units	60262500002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	23.1	10	35.2	121	80-120	M1
Sulfate	mg/L	1290	500	1900	122	80-120	M1

MATRIX SPIKE SAMPLE: 2096900

Parameter	Units	60262153002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	325	250	619	118	80-120	
Sulfate	mg/L	503	250	807	121	80-120	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511913 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60262500001, 60262500002, 60262500003

METHOD BLANK: 2096026 Matrix: Water
Associated Lab Samples: 60262500001, 60262500002, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	01/29/18 10:16	

LABORATORY CONTROL SAMPLE: 2096027

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	48.8	98	90-110	

MATRIX SPIKE SAMPLE: 2096028

Parameter	Units	60262452001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	1610	750	2290	91	90-110	E

MATRIX SPIKE SAMPLE: 2096031

Parameter	Units	60262747005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	6.6J	50	61.3	109	90-110	

SAMPLE DUPLICATE: 2096030

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	44.0	43.5	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511695 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60262500001, 60262500003

METHOD BLANK: 2095119 Matrix: Water
Associated Lab Samples: 60262500001, 60262500003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.65J	1.0	0.13	01/24/18 21:03	

LABORATORY CONTROL SAMPLE: 2095120

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.6	112	80-120	

SAMPLE DUPLICATE: 2095123

Parameter	Units	60262500003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	2.2	2.2	3	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262500

QC Batch: 511753 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60262500002

METHOD BLANK: 2095413 Matrix: Water
Associated Lab Samples: 60262500002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.13J	1.0	0.13	01/25/18 18:10	

LABORATORY CONTROL SAMPLE: 2095414

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.8	96	80-120	

MATRIX SPIKE SAMPLE: 2095415

Parameter	Units	60262500002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	19.5	10	29.7	102	80-120	

SAMPLE DUPLICATE: 2095416

Parameter	Units	7580587001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	4.8	4.8	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SEC
Pace Project No.: 60262500

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

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60262500

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60262500001	**S-SCPA-2**	EPA 200.7	511459	EPA 200.7	511531
60262500002	**S-SCPA-3S**	EPA 200.7	511459	EPA 200.7	511531
60262500003	**S-SCPA-DUP-1**	EPA 200.7	511459	EPA 200.7	511531
60262500001	**S-SCPA-2**	EPA 200.7	511609	EPA 200.7	511702
60262500002	**S-SCPA-3S**	EPA 200.7	511609	EPA 200.7	511702
60262500003	**S-SCPA-DUP-1**	EPA 200.7	511609	EPA 200.7	511702
60262500001	**S-SCPA-2**	EPA 200.8	511466	EPA 200.8	511532
60262500002	**S-SCPA-3S**	EPA 200.8	511466	EPA 200.8	511532
60262500003	**S-SCPA-DUP-1**	EPA 200.8	511466	EPA 200.8	511532
60262500001	**S-SCPA-2**	EPA 200.8	511607	EPA 200.8	511701
60262500002	**S-SCPA-3S**	EPA 200.8	511607	EPA 200.8	511701
60262500003	**S-SCPA-DUP-1**	EPA 200.8	511607	EPA 200.8	511701
60262500001	**S-SCPA-2**	EPA 7470	511586	EPA 7470	511599
60262500002	**S-SCPA-3S**	EPA 7470	511586	EPA 7470	511599
60262500003	**S-SCPA-DUP-1**	EPA 7470	511586	EPA 7470	511599
60262500001	**S-SCPA-2**	SM 2320B	511670		
60262500002	**S-SCPA-3S**	SM 2320B	511670		
60262500003	**S-SCPA-DUP-1**	SM 2320B	511670		
60262500001	**S-SCPA-2**	SM 2540C	511481		
60262500002	**S-SCPA-3S**	SM 2540C	511481		
60262500003	**S-SCPA-DUP-1**	SM 2540C	511481		
60262500001	**S-SCPA-2**	SM 4500-S-2 D	511992		
60262500002	**S-SCPA-3S**	SM 4500-S-2 D	511992		
60262500003	**S-SCPA-DUP-1**	SM 4500-S-2 D	511992		
60262500001	**S-SCPA-2**	EPA 300.0	512053		
60262500001	**S-SCPA-2**	EPA 300.0	512062		
60262500002	**S-SCPA-3S**	EPA 300.0	512053		
60262500002	**S-SCPA-3S**	EPA 300.0	512062		
60262500003	**S-SCPA-DUP-1**	EPA 300.0	512053		
60262500003	**S-SCPA-DUP-1**	EPA 300.0	512062		
60262500001	**S-SCPA-2**	EPA 410.4	511913		
60262500002	**S-SCPA-3S**	EPA 410.4	511913		
60262500003	**S-SCPA-DUP-1**	EPA 410.4	511913		
60262500001	**S-SCPA-2**	SM 5310C	511695		
60262500002	**S-SCPA-3S**	SM 5310C	511753		
60262500003	**S-SCPA-DUP-1**	SM 5310C	511695		

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60262500

60262500

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

Cooler Temperature (°C): **As-read** 1.4/2.3 **Corr. Factor** CF 0.0 CF +0.2 **Corrected** 1.4/2.3

Date and initials of person examining contents: PW 1/23/18

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~~	PW 1/23/18
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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jami Check 1/23/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	maddock@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren SEC
Project Number:	1531406.0003

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285, line 5

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 + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N): 200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	Ferrous Iron/Ferric Iron			Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-SCPA-2		G			1/22/18	0920		7	2	2	2		1				✓	✓	✓	✓	✓	✓	✓	✓	✓					60262500
2	S-SCPA-35						1430																								
3	S-SCPA-35-MS						⊥																								
4	S-SCPA-35-MSD						⊥																								
5	S-SCPA-DUP-1						—																								
6																															
7																															
8																															
9																															
10																															
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: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness	Tommy Goodwin / Golder	1/22/18	1650		1/22/18	1650				
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl	[illegible] / PACE	1/22/18	1700		1/23/18	0345	1.4	X	X	Y
Fingerprint Metals							2.3	X	X	Y
No Ferrous/Ferric Iron										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Tommy Goodwin

SIGNATURE of SAMPLER: Tommy Goodwin DATE Signed (MM/DD/YY): 1/22/18

MEMORANDUM

Date:	March 23, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60262500**		

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.
- 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 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 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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/22/18

Laboratory: Pace Analytical

SDG #: 60262500

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-SCPA-2, S-SCPA-35, S-SCPA-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?	☒	☐	☐	1/22/18
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(12.8), TH(7.2), Cr(0.099), Se(0.27), Cr[illegible](0.05-4), TOC(0.65/0.13)
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☑	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☑	☐	☐	DUP-1 @ S-SCPA-2
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	See notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	☑	☐	☐	Alk, TDS, TOC
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, Ca, Bdis, Cadis, Chloride, Sulfate
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☐	☑	☐	B, Ca, Bdis, Cadis,
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

RPD: Al, tot (89.4); Al, dis (200); B, tot (27.3); B, dis (57.2); Ca, tot (20); Pb, dis (200); Mo, tot (21.2); Zn, tot (71.0); Zn, dis (58.1); Cr, tot (44.3)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCPA-2	Al, tot	37.7	J	RPD exceeded limit; Result > MDL
	Al, dis	28.8	UJ	MDL > Result
	B, tot	348	J	Result > MDL
	B, dis	307	J	
	Co, tot	1.8	J	
	Pb, dis	4.0	J	
	Mo, tot	26.5	J	
	Zn, tot	16.8	J	
	Zn (d)	16.1	J	
	Cr (t)	1.0	UJ	; Result < 10x Blank
	Se (t)	1.0	U	Result < 10x Blank; Result < PQL
	Cr (d)	1.0	U	
	TOC	2.2	J	Result > PQL
	Chloride	20.5	D	Result had a dilution factor (DF) of 2
	Sulfate	48.5	D	5
S-SCPA-35	Chloride	23.1	D	2
	Sulfate	1290	D	100
	Cr (t)	1.0	U	Result < 10x Blank; Result < PQL
	Se (t)	1.0	U	
	Cr (d)	1.0	U	
S-SCPA-DUP-1	Se (t)	1.0	U	
	Cr (d)	1.0	U	
	Cr (t)	1.0	UJ	; RPD exceeded limit
	TOC	2.2	J	; Result > PQL
	Chloride	20.5	D	DF of 2
	Sulfate	49.0	D	5
	Al, tot	98.6	J	RPD exceeded limit; Result > MDL
	Al, dis	34.7	J	
	B (t)	458	J	
	B (d)	565	J	
	Co (t)	2.2	J	

Signature: Tommy J Goodlett Date: 3/23/2018

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCPA-DUP-1	Pb(d)	2.4	UJ	Result exceeded limit; Result < MDL
	Mo(t)	32.8	J	; Result > MDL
	Zn(t)	35.3	J	
	Zn(d)	29.3	J	

Signature: Tommy J Goodwin Jr. Date: 3/23/2018

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

February 01, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60262747

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on January 24, 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
Pace Project No.: 60262747

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
Pace Project No.: 60262747

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60262747001	**S-SCPA-1D**	Water	01/23/18 14:17	01/24/18 15:30
60262747002	**S-SCPA-1S**	Water	01/23/18 14:32	01/24/18 15:30
60262747003	**S-SCPA-3D**	Water	01/24/18 09:00	01/24/18 15:30
60262747004	**S-LB4**	Water	01/24/18 13:30	01/24/18 15:30
60262747005	**S-LB5**	Water	01/24/18 13:35	01/24/18 15:30

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

SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60262747

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60262747001	**S-SCPA-1D**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262747002	**S-SCPA-1S**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262747003	**S-SCPA-3D**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262747004	**S-LB4**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60262747

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262747005	**S-LB5**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-1D **Lab ID: 60262747001** Collected: 01/23/18 14:17 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**90.1**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 13:52	7429-90-5	
Barium	**79.9**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 13:52	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 13:52	7440-41-7	
Boron	**7680**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 13:52	7440-42-8	
Calcium	**101000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 13:52	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 13:52	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 13:52	7440-50-8	
Iron	**779**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 13:52	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 13:52	7439-92-1	
Lithium	**28.7**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 13:52	7439-93-2	
Magnesium	**23900**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 13:52	7439-95-4	
Manganese	**97.9**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 13:52	7439-96-5	
Molybdenum	**2230**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 13:52	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 13:52	7440-02-0	
Potassium	**11800**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 13:52	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 13:52	7440-22-4	
Sodium	**27000**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 13:52	7440-23-5	
Total Hardness by 2340B	**350000**	ug/L	500		1	01/26/18 10:50	01/29/18 13:52		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 13:52	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**72.3J**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:36	7429-90-5	
Barium, Dissolved	**81.5**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:36	7440-39-3	D9
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:36	7440-41-7	
Boron, Dissolved	**8000**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 14:36	7440-42-8	D9
Calcium, Dissolved	**106000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:36	7440-70-2	D9
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:36	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:36	7440-50-8	
Iron, Dissolved	**806**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:36	7439-89-6	D9
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 14:36	7439-92-1	
Lithium, Dissolved	**29.1**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:36	7439-93-2	D9
Magnesium, Dissolved	**25200**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:36	7439-95-4	D9
Manganese, Dissolved	**104**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:36	7439-96-5	D9
Molybdenum, Dissolved	**2300**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:36	7439-98-7	D9
Nickel, Dissolved	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:36	7440-02-0	
Potassium, Dissolved	**12200**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:36	7440-09-7	D9
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:36	7440-22-4	
Sodium, Dissolved	**27700**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:36	7440-23-5	D9
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:36	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.31J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/30/18 16:04	7440-36-0	
Arsenic	**92.1**	ug/L	1.0	0.052	1	01/26/18 10:50	01/30/18 16:04	7440-38-2	
Cadmium	**0.44J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/30/18 16:04	7440-43-9	
Chromium	**0.19J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/30/18 16:04	7440-47-3	
Selenium	**0.37J**	ug/L	1.0	0.086	1	01/26/18 10:50	01/30/18 16:04	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-1D **Lab ID: 60262747001** Collected: 01/23/18 14:17 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.10J**	ug/L	1.0	0.036	1	01/26/18 10:50	01/30/18 16:04	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.27J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/31/18 10:58	7440-36-0	
Arsenic, Dissolved	**95.1**	ug/L	1.0	0.052	1	01/26/18 10:50	01/31/18 10:58	7440-38-2	D9
Cadmium, Dissolved	**0.42J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/31/18 10:58	7440-43-9	
Chromium, Dissolved	**0.17J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/31/18 10:58	7440-47-3	
Selenium, Dissolved	**0.30J**	ug/L	1.0	0.086	1	01/26/18 10:50	01/31/18 10:58	7782-49-2	
Thallium, Dissolved	**0.071J**	ug/L	1.0	0.036	1	01/26/18 10:50	01/31/18 10:58	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/29/18 08:51	01/29/18 14:46	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**228**	mg/L	20.0	4.9	1		01/29/18 13:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**560**	mg/L	5.0	5.0	1		01/29/18 18:06		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:20	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.0**	mg/L	2.0	1.0	2		01/30/18 10:15	16887-00-6	
Fluoride	**1.2**	mg/L	0.20	0.10	1		01/28/18 22:52	16984-48-8	
Sulfate	**200**	mg/L	20.0	10.0	20		01/31/18 14:04	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**10.5**	mg/L	10.0	3.1	1		01/29/18 10:24		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**4.7**	mg/L	1.0	0.13	1		01/26/18 14:26	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-1S **Lab ID: 60262747002** Collected: 01/23/18 14:32 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**1150**	ug/L	750	288	10	01/26/18 10:50	01/29/18 15:21	7429-90-5	
Barium	**46.0**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 13:58	7440-39-3	
Beryllium	**<1.6**	ug/L	10.0	1.6	10	01/26/18 10:50	01/29/18 15:21	7440-41-7	D3
Boron	**111000**	ug/L	1000	35.1	10	01/26/18 10:50	01/29/18 15:21	7440-42-8	
Calcium	**825000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 13:58	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 13:58	7440-48-4	
Copper	**<47.7**	ug/L	100	47.7	10	01/26/18 10:50	01/29/18 15:21	7440-50-8	D3
Iron	**<12.4**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 13:58	7439-89-6	
Lead	**<24.0**	ug/L	50.0	24.0	10	01/26/18 10:50	01/29/18 15:21	7439-92-1	D3
Lithium	**22.0**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 13:58	7439-93-2	
Magnesium	**4880**	ug/L	500	154	10	01/26/18 10:50	01/29/18 15:21	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 13:58	7439-96-5	
Molybdenum	**56600**	ug/L	200	12.7	10	01/26/18 10:50	01/29/18 15:21	7439-98-7	
Nickel	**26.8J**	ug/L	50.0	22.5	10	01/26/18 10:50	01/29/18 15:21	7440-02-0	
Potassium	**55200**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 13:58	7440-09-7	
Silver	**<19.1**	ug/L	70.0	19.1	10	01/26/18 10:50	01/29/18 15:21	7440-22-4	D3
Sodium	**81400**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 13:58	7440-23-5	
Total Hardness by 2340B	**2080000**	ug/L	5000		10	01/26/18 10:50	01/29/18 15:21		
Zinc	**15.2J**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 13:58	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**1240**	ug/L	750	288	10	01/26/18 10:50	01/29/18 15:25	7429-90-5	D9
Barium, Dissolved	**44.7**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:43	7440-39-3	
Beryllium, Dissolved	**<1.6**	ug/L	10.0	1.6	10	01/26/18 10:50	01/29/18 15:25	7440-41-7	D3
Boron, Dissolved	**112000**	ug/L	1000	35.1	10	01/26/18 10:50	01/29/18 15:25	7440-42-8	D9
Calcium, Dissolved	**840000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:43	7440-70-2	D9
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:43	7440-48-4	
Copper, Dissolved	**<47.7**	ug/L	100	47.7	10	01/26/18 10:50	01/29/18 15:25	7440-50-8	D3
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:43	7439-89-6	
Lead, Dissolved	**<24.0**	ug/L	50.0	24.0	10	01/26/18 10:50	01/29/18 15:25	7439-92-1	D3
Lithium, Dissolved	**19.1**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:43	7439-93-2	
Magnesium, Dissolved	**4550**	ug/L	500	154	10	01/26/18 10:50	01/29/18 15:25	7439-95-4	
Manganese, Dissolved	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:43	7439-96-5	
Molybdenum, Dissolved	**55700**	ug/L	200	12.7	10	01/26/18 10:50	01/29/18 15:25	7439-98-7	
Nickel, Dissolved	**29.5J**	ug/L	50.0	22.5	10	01/26/18 10:50	01/29/18 15:25	7440-02-0	
Potassium, Dissolved	**54400**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:43	7440-09-7	
Silver, Dissolved	**<19.1**	ug/L	70.0	19.1	10	01/26/18 10:50	01/29/18 15:25	7440-22-4	D3
Sodium, Dissolved	**75600**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:43	7440-23-5	
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:43	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**1.5J**	ug/L	10.0	0.26	10	01/26/18 10:50	01/30/18 16:08	7440-36-0	
Arsenic	**26.1**	ug/L	10.0	0.52	10	01/26/18 10:50	01/30/18 16:08	7440-38-2	
Cadmium	**9.5**	ug/L	5.0	0.18	10	01/26/18 10:50	01/30/18 16:08	7440-43-9	
Chromium	**<0.54**	ug/L	10.0	0.54	10	01/26/18 10:50	01/30/18 16:08	7440-47-3	
Selenium	**6.6J**	ug/L	10.0	0.86	10	01/26/18 10:50	01/30/18 16:08	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-1S **Lab ID: 60262747002** Collected: 01/23/18 14:32 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.49J**	ug/L	10.0	0.36	10	01/26/18 10:50	01/30/18 16:08	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**1.2J**	ug/L	5.0	0.13	5	01/26/18 10:50	01/31/18 11:02	7440-36-0	
Arsenic, Dissolved	**26.4**	ug/L	5.0	0.26	5	01/26/18 10:50	01/31/18 11:02	7440-38-2	D9
Cadmium, Dissolved	**8.7**	ug/L	2.5	0.089	5	01/26/18 10:50	01/31/18 11:02	7440-43-9	
Chromium, Dissolved	**<0.27**	ug/L	5.0	0.27	5	01/26/18 10:50	01/31/18 11:02	7440-47-3	
Selenium, Dissolved	**6.1**	ug/L	5.0	0.43	5	01/26/18 10:50	01/31/18 11:02	7782-49-2	
Thallium, Dissolved	**0.28J**	ug/L	5.0	0.18	5	01/26/18 10:50	01/31/18 11:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/29/18 08:51	01/29/18 14:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**549**	mg/L	20.0	4.9	1		01/29/18 13:48		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3440**	mg/L	5.0	5.0	1		01/29/18 18:06		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:21	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**26.0**	mg/L	2.0	1.0	2		01/30/18 10:43	16887-00-6	
Fluoride	**0.79**	mg/L	0.20	0.10	1		01/28/18 23:20	16984-48-8	
Sulfate	**2080**	mg/L	200	100	200		01/31/18 14:18	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**73.9**	mg/L	10.0	3.1	1		01/29/18 10:24		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**28.2**	mg/L	5.0	0.65	5		01/26/18 21:50	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-3D **Lab ID: 60262747003** Collected: 01/24/18 09:00 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**163**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:01	7429-90-5	
Barium	**77.7**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:01	7440-39-3	
Beryllium	**0.36J**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:01	7440-41-7	
Boron	**79500**	ug/L	1000	35.1	10	01/26/18 10:50	01/29/18 15:23	7440-42-8	
Calcium	**548000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:01	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:01	7440-48-4	
Copper	**5.4J**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:01	7440-50-8	
Iron	**138**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:01	7439-89-6	
Lead	**<24.0**	ug/L	50.0	24.0	10	01/26/18 10:50	01/29/18 15:23	7439-92-1	D3
Lithium	**170**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:01	7439-93-2	
Magnesium	**60200**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:01	7439-95-4	
Manganese	**202**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:01	7439-96-5	
Molybdenum	**43500**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:01	7439-98-7	
Nickel	**11.0**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:01	7440-02-0	
Potassium	**60300**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:01	7440-09-7	
Silver	**4.1J**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:01	7440-22-4	
Sodium	**116000**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:01	7440-23-5	
Total Hardness by 2340B	**1620000**	ug/L	500		1	01/26/18 10:50	01/29/18 14:01		
Zinc	**14.0J**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:01	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**46.1J**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:45	7429-90-5	
Barium, Dissolved	**76.8**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:45	7440-39-3	
Beryllium, Dissolved	**0.31J**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:45	7440-41-7	
Boron, Dissolved	**73400**	ug/L	1000	35.1	10	01/26/18 10:50	01/29/18 15:28	7440-42-8	
Calcium, Dissolved	**520000**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:45	7440-70-2	
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:45	7440-48-4	
Copper, Dissolved	**5.1J**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:45	7440-50-8	
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:45	7439-89-6	
Lead, Dissolved	**<24.0**	ug/L	50.0	24.0	10	01/26/18 10:50	01/29/18 15:28	7439-92-1	D3
Lithium, Dissolved	**158**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:45	7439-93-2	
Magnesium, Dissolved	**58100**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:45	7439-95-4	
Manganese, Dissolved	**186**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:45	7439-96-5	
Molybdenum, Dissolved	**39600**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:45	7439-98-7	
Nickel, Dissolved	**10.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:45	7440-02-0	
Potassium, Dissolved	**55300**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:45	7440-09-7	
Silver, Dissolved	**4.4J**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:45	7440-22-4	
Sodium, Dissolved	**110000**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:45	7440-23-5	
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:45	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**1.2J**	ug/L	5.0	0.13	5	01/26/18 10:50	01/30/18 16:13	7440-36-0	
Arsenic	**91.2**	ug/L	5.0	0.26	5	01/26/18 10:50	01/30/18 16:13	7440-38-2	
Cadmium	**7.4**	ug/L	2.5	0.089	5	01/26/18 10:50	01/30/18 16:13	7440-43-9	
Chromium	**0.62J**	ug/L	5.0	0.27	5	01/26/18 10:50	01/30/18 16:13	7440-47-3	
Selenium	**1.6J**	ug/L	5.0	0.43	5	01/26/18 10:50	01/30/18 16:13	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-SCPA-3D **Lab ID: 60262747003** Collected: 01/24/18 09:00 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**1.7J**	ug/L	5.0	0.18	5	01/26/18 10:50	01/30/18 16:13	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**1.2J**	ug/L	5.0	0.13	5	01/26/18 10:50	01/31/18 11:06	7440-36-0	
Arsenic, Dissolved	**97.7**	ug/L	5.0	0.26	5	01/26/18 10:50	01/31/18 11:06	7440-38-2	D9
Cadmium, Dissolved	**6.0**	ug/L	2.5	0.089	5	01/26/18 10:50	01/31/18 11:06	7440-43-9	
Chromium, Dissolved	**0.35J**	ug/L	5.0	0.27	5	01/26/18 10:50	01/31/18 11:06	7440-47-3	
Selenium, Dissolved	**1.5J**	ug/L	5.0	0.43	5	01/26/18 10:50	01/31/18 11:06	7782-49-2	
Thallium, Dissolved	**1.3J**	ug/L	5.0	0.18	5	01/26/18 10:50	01/31/18 11:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/29/18 08:51	01/29/18 14:55	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**185**	mg/L	20.0	4.9	1		01/29/18 13:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2880**	mg/L	5.0	5.0	1		01/30/18 13:02		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:22	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.1**	mg/L	2.0	1.0	2		01/30/18 11:39	16887-00-6	
Fluoride	**2.9**	mg/L	0.20	0.10	1		01/28/18 23:34	16984-48-8	
Sulfate	**1820**	mg/L	200	100	200		01/31/18 15:00	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**55.7**	mg/L	10.0	3.1	1		01/29/18 10:25		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**23.2**	mg/L	5.0	0.65	5		01/26/18 22:15	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-LB4 **Lab ID: 60262747004** Collected: 01/24/18 13:30 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**5320**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:03	7429-90-5	
Barium	**108**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:03	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:03	7440-41-7	
Boron	**6500**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 14:03	7440-42-8	
Calcium	**94100**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:03	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:03	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:03	7440-50-8	
Iron	**57.0**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:03	7439-89-6	
Lead	**2.7J**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 14:03	7439-92-1	
Lithium	**21.1**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:03	7439-93-2	
Magnesium	**108**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:03	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:03	7439-96-5	
Molybdenum	**526**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:03	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:03	7440-02-0	
Potassium	**25200**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:03	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:03	7440-22-4	
Sodium	**76100**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:03	7440-23-5	
Total Hardness by 2340B	**235000**	ug/L	500		1	01/26/18 10:50	01/29/18 14:03		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:03	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**5320**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:48	7429-90-5	
Barium, Dissolved	**103**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:48	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:48	7440-41-7	
Boron, Dissolved	**6550**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 14:48	7440-42-8	D9
Calcium, Dissolved	**95100**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:48	7440-70-2	
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:48	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:48	7440-50-8	
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:48	7439-89-6	
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 14:48	7439-92-1	
Lithium, Dissolved	**23.6**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:48	7439-93-2	D9
Magnesium, Dissolved	**97.1**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:48	7439-95-4	
Manganese, Dissolved	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:48	7439-96-5	
Molybdenum, Dissolved	**526**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:48	7439-98-7	
Nickel, Dissolved	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:48	7440-02-0	
Potassium, Dissolved	**25500**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:48	7440-09-7	D9
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:48	7440-22-4	
Sodium, Dissolved	**76600**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:48	7440-23-5	D9
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:48	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.56J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/30/18 16:17	7440-36-0	
Arsenic	**3.2**	ug/L	1.0	0.052	1	01/26/18 10:50	01/30/18 16:17	7440-38-2	
Cadmium	**0.082J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/30/18 16:17	7440-43-9	
Chromium	**0.27J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/30/18 16:17	7440-47-3	
Selenium	**7.2**	ug/L	1.0	0.086	1	01/26/18 10:50	01/30/18 16:17	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-LB4 **Lab ID: 60262747004** Collected: 01/24/18 13:30 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**<0.036**	ug/L	1.0	0.036	1	01/26/18 10:50	01/30/18 16:17	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.53J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/31/18 11:11	7440-36-0	
Arsenic, Dissolved	**3.7**	ug/L	1.0	0.052	1	01/26/18 10:50	01/31/18 11:11	7440-38-2	D9
Cadmium, Dissolved	**0.061J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/31/18 11:11	7440-43-9	
Chromium, Dissolved	**0.060J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/31/18 11:11	7440-47-3	
Selenium, Dissolved	**7.6**	ug/L	1.0	0.086	1	01/26/18 10:50	01/31/18 11:11	7782-49-2	D9
Thallium, Dissolved	**<0.036**	ug/L	1.0	0.036	1	01/26/18 10:50	01/31/18 11:11	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/29/18 08:51	01/29/18 14:57	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**115**	mg/L	20.0	4.9	1		01/29/18 14:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**560**	mg/L	5.0	5.0	1		01/29/18 18:06		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:22	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**38.2**	mg/L	5.0	2.5	5		01/30/18 12:06	16887-00-6	
Fluoride	**1.1**	mg/L	0.20	0.10	1		01/28/18 23:48	16984-48-8	
Sulfate	**318**	mg/L	50.0	25.0	50		01/31/18 15:14	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		01/29/18 10:25		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.81J**	mg/L	1.0	0.13	1		01/26/18 15:29	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-LB5 **Lab ID: 60262747005** Collected: 01/24/18 13:35 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	**31000**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:05	7429-90-5	
Barium	**215**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:05	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:05	7440-41-7	
Boron	**17900**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 14:05	7440-42-8	
Calcium	**40100**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:05	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:05	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:05	7440-50-8	
Iron	**21.9J**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:05	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 14:05	7439-92-1	
Lithium	**13.3**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:05	7439-93-2	
Magnesium	**28.4J**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:05	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:05	7439-96-5	
Molybdenum	**2430**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:05	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:05	7440-02-0	
Potassium	**91000**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:05	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:05	7440-22-4	
Sodium	**267000**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:05	7440-23-5	
Total Hardness by 2340B	**100000**	ug/L	500		1	01/26/18 10:50	01/29/18 14:05		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:05	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**30900**	ug/L	75.0	28.8	1	01/26/18 10:50	01/29/18 14:50	7429-90-5	
Barium, Dissolved	**213**	ug/L	5.0	0.91	1	01/26/18 10:50	01/29/18 14:50	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/26/18 10:50	01/29/18 14:50	7440-41-7	
Boron, Dissolved	**18000**	ug/L	100	3.5	1	01/26/18 10:50	01/29/18 14:50	7440-42-8	D9
Calcium, Dissolved	**39800**	ug/L	100	36.0	1	01/26/18 10:50	01/29/18 14:50	7440-70-2	
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/26/18 10:50	01/29/18 14:50	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/26/18 10:50	01/29/18 14:50	7440-50-8	
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/26/18 10:50	01/29/18 14:50	7439-89-6	
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/26/18 10:50	01/29/18 14:50	7439-92-1	
Lithium, Dissolved	**14.3**	ug/L	10.0	2.9	1	01/26/18 10:50	01/29/18 14:50	7439-93-2	D9
Magnesium, Dissolved	**24.2J**	ug/L	50.0	15.4	1	01/26/18 10:50	01/29/18 14:50	7439-95-4	
Manganese, Dissolved	**<1.8**	ug/L	5.0	1.8	1	01/26/18 10:50	01/29/18 14:50	7439-96-5	
Molybdenum, Dissolved	**2440**	ug/L	20.0	1.3	1	01/26/18 10:50	01/29/18 14:50	7439-98-7	D9
Nickel, Dissolved	**<2.3**	ug/L	5.0	2.3	1	01/26/18 10:50	01/29/18 14:50	7440-02-0	
Potassium, Dissolved	**91700**	ug/L	500	52.3	1	01/26/18 10:50	01/29/18 14:50	7440-09-7	D9
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/26/18 10:50	01/29/18 14:50	7440-22-4	
Sodium, Dissolved	**268000**	ug/L	500	28.4	1	01/26/18 10:50	01/29/18 14:50	7440-23-5	D9
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/26/18 10:50	01/29/18 14:50	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.59J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/30/18 16:21	7440-36-0	
Arsenic	**8.9**	ug/L	1.0	0.052	1	01/26/18 10:50	01/31/18 11:28	7440-38-2	
Cadmium	**0.40J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/30/18 16:21	7440-43-9	
Chromium	**0.33J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/31/18 11:28	7440-47-3	
Selenium	**29.0**	ug/L	1.0	0.086	1	01/26/18 10:50	01/31/18 11:28	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262747

Sample: S-LB5 **Lab ID: 60262747005** Collected: 01/24/18 13:35 Received: 01/24/18 15:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**<0.036**	ug/L	1.0	0.036	1	01/26/18 10:50	01/30/18 16:21	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.56J**	ug/L	1.0	0.026	1	01/26/18 10:50	01/31/18 11:15	7440-36-0	
Arsenic, Dissolved	**8.7**	ug/L	1.0	0.052	1	01/26/18 10:50	01/31/18 11:15	7440-38-2	
Cadmium, Dissolved	**0.41J**	ug/L	0.50	0.018	1	01/26/18 10:50	01/31/18 11:15	7440-43-9	
Chromium, Dissolved	**0.27J**	ug/L	1.0	0.054	1	01/26/18 10:50	01/31/18 11:15	7440-47-3	
Selenium, Dissolved	**28.1**	ug/L	1.0	0.086	1	01/26/18 10:50	01/31/18 11:15	7782-49-2	
Thallium, Dissolved	**<0.036**	ug/L	1.0	0.036	1	01/26/18 10:50	01/31/18 11:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/29/18 08:51	01/29/18 14:59	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**468**	mg/L	20.0	4.9	1		01/29/18 14:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1030**	mg/L	5.0	5.0	1		01/29/18 18:07		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		01/26/18 15:22	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**30.5**	mg/L	2.0	1.0	2		01/30/18 12:34	16887-00-6	
Fluoride	**1.2**	mg/L	0.20	0.10	1		01/29/18 00:02	16984-48-8	
Sulfate	**393**	mg/L	50.0	25.0	50		01/31/18 15:28	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**6.6J**	mg/L	10.0	3.1	1		01/29/18 10:26		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.7**	mg/L	1.0	0.13	1		01/26/18 15:44	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512003 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096384 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	01/29/18 14:37	

LABORATORY CONTROL SAMPLE: 2096385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2096386 2096387

Parameter	Units	60262747001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.9	4.9	98	98	75-125	0	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511927 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096063 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<28.8	75.0	28.8	01/29/18 13:47	
Barium	ug/L	<0.91	5.0	0.91	01/29/18 13:47	
Beryllium	ug/L	<0.16	1.0	0.16	01/29/18 13:47	
Boron	ug/L	<3.5	100	3.5	01/29/18 13:47	
Calcium	ug/L	<36.0	100	36.0	01/29/18 13:47	
Cobalt	ug/L	<0.73	5.0	0.73	01/29/18 13:47	
Copper	ug/L	<4.8	10.0	4.8	01/29/18 13:47	
Iron	ug/L	<12.4	50.0	12.4	01/29/18 13:47	
Lead	ug/L	<2.4	5.0	2.4	01/29/18 13:47	
Lithium	ug/L	<2.9	10.0	2.9	01/29/18 13:47	
Magnesium	ug/L	<15.4	50.0	15.4	01/29/18 13:47	
Manganese	ug/L	<1.8	5.0	1.8	01/29/18 13:47	
Molybdenum	ug/L	<1.3	20.0	1.3	01/29/18 13:47	
Nickel	ug/L	<2.3	5.0	2.3	01/29/18 13:47	
Potassium	ug/L	<52.3	500	52.3	01/29/18 13:47	
Silver	ug/L	<1.9	7.0	1.9	01/29/18 13:47	
Sodium	ug/L	<28.4	500	28.4	01/29/18 13:47	
Total Hardness by 2340B	ug/L	49.9J	500		01/29/18 13:47	
Zinc	ug/L	<11.2	50.0	11.2	01/29/18 13:47	

LABORATORY CONTROL SAMPLE: 2096064

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9780	98	85-115	
Barium	ug/L	1000	976	98	85-115	
Beryllium	ug/L	1000	980	98	85-115	
Boron	ug/L	1000	918	92	85-115	
Calcium	ug/L	10000	9180	92	85-115	
Cobalt	ug/L	1000	1020	102	85-115	
Copper	ug/L	1000	961	96	85-115	
Iron	ug/L	10000	9520	95	85-115	
Lead	ug/L	1000	1000	100	85-115	
Lithium	ug/L	1000	1030	103	85-115	
Magnesium	ug/L	10000	9010	90	85-115	
Manganese	ug/L	1000	904	90	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Nickel	ug/L	1000	975	97	85-115	
Potassium	ug/L	10000	9600	96	85-115	
Silver	ug/L	500	484	97	85-115	
Sodium	ug/L	10000	9760	98	85-115	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

LABORATORY CONTROL SAMPLE: 2096064

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Hardness by 2340B	ug/L		60000			
Zinc	ug/L	1000	985	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2096065 2096066

Parameter	Units	60262747001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	90.1	10000	10000	9950	10100	99	100	70-130	1	20	
Barium	ug/L	79.9	1000	1000	1060	1070	98	99	70-130	1	20	
Beryllium	ug/L	<0.16	1000	1000	981	992	98	99	70-130	1	20	
Boron	ug/L	7680	1000	1000	8650	8720	97	104	70-130	1	20	
Calcium	ug/L	101000	10000	10000	110000	111000	90	101	70-130	1	20	
Cobalt	ug/L	<0.73	1000	1000	997	1010	100	101	70-130	1	20	
Copper	ug/L	<4.8	1000	1000	974	987	97	98	70-130	1	20	
Iron	ug/L	779	10000	10000	10200	10400	95	96	70-130	2	20	
Lead	ug/L	<2.4	1000	1000	973	989	97	99	70-130	2	20	
Lithium	ug/L	28.7	1000	1000	1070	1080	104	105	70-130	1	20	
Magnesium	ug/L	23900	10000	10000	33000	33200	91	93	70-130	1	20	
Manganese	ug/L	97.9	1000	1000	1000	1020	90	92	70-130	2	20	
Molybdenum	ug/L	2230	1000	1000	3210	3240	98	101	70-130	1	20	
Nickel	ug/L	<2.3	1000	1000	952	965	95	96	70-130	1	20	
Potassium	ug/L	11800	10000	10000	21500	21600	97	97	70-130	0	20	
Silver	ug/L	<1.9	500	500	491	498	98	99	70-130	1	20	
Sodium	ug/L	27000	10000	10000	36800	36800	98	99	70-130	0	20	
Total Hardness by 2340B	ug/L	350000			410000	414000				1		
Zinc	ug/L	<11.2	1000	1000	967	983	97	98	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511929 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096067 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<28.8	75.0	28.8	01/29/18 14:34	
Barium, Dissolved	ug/L	<0.91	5.0	0.91	01/29/18 14:34	
Beryllium, Dissolved	ug/L	<0.16	1.0	0.16	01/29/18 14:34	
Boron, Dissolved	ug/L	14.1J	100	3.5	01/29/18 14:34	
Calcium, Dissolved	ug/L	<36.0	100	36.0	01/29/18 14:34	
Cobalt, Dissolved	ug/L	<0.73	5.0	0.73	01/29/18 14:34	
Copper, Dissolved	ug/L	<4.8	10.0	4.8	01/29/18 14:34	
Iron, Dissolved	ug/L	<12.4	50.0	12.4	01/29/18 14:34	
Lead, Dissolved	ug/L	<2.4	5.0	2.4	01/29/18 14:34	
Lithium, Dissolved	ug/L	<2.9	10.0	2.9	01/29/18 14:34	
Magnesium, Dissolved	ug/L	<15.4	50.0	15.4	01/29/18 14:34	
Manganese, Dissolved	ug/L	<1.8	5.0	1.8	01/29/18 14:34	
Molybdenum, Dissolved	ug/L	1.4J	20.0	1.3	01/29/18 14:34	
Nickel, Dissolved	ug/L	<2.3	5.0	2.3	01/29/18 14:34	
Potassium, Dissolved	ug/L	<52.3	500	52.3	01/29/18 14:34	
Silver, Dissolved	ug/L	<1.9	7.0	1.9	01/29/18 14:34	
Sodium, Dissolved	ug/L	<28.4	500	28.4	01/29/18 14:34	
Zinc, Dissolved	ug/L	<11.2	50.0	11.2	01/29/18 14:34	

LABORATORY CONTROL SAMPLE: 2096068

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	10200	102	85-115	
Barium, Dissolved	ug/L	1000	1010	101	85-115	
Beryllium, Dissolved	ug/L	1000	1020	102	85-115	
Boron, Dissolved	ug/L	1000	981	98	85-115	
Calcium, Dissolved	ug/L	10000	9660	97	85-115	
Cobalt, Dissolved	ug/L	1000	1060	106	85-115	
Copper, Dissolved	ug/L	1000	996	100	85-115	
Iron, Dissolved	ug/L	10000	9970	100	85-115	
Lead, Dissolved	ug/L	1000	1040	104	85-115	
Lithium, Dissolved	ug/L	1000	1070	107	85-115	
Magnesium, Dissolved	ug/L	10000	9430	94	85-115	
Manganese, Dissolved	ug/L	1000	948	95	85-115	
Molybdenum, Dissolved	ug/L	1000	1050	105	85-115	
Nickel, Dissolved	ug/L	1000	1020	102	85-115	
Potassium, Dissolved	ug/L	10000	10000	100	85-115	
Silver, Dissolved	ug/L	500	502	100	85-115	
Sodium, Dissolved	ug/L	10000	10000	100	85-115	
Zinc, Dissolved	ug/L	1000	1030	103	85-115	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2096069 2096070

Parameter	Units	60262747001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	72.3J	10000	10000	10200	10200	102	101	70-130	1	20	
Barium, Dissolved	ug/L	81.5	1000	1000	1090	1080	101	100	70-130	1	20	
Beryllium, Dissolved	ug/L	<0.16	1000	1000	1020	1010	101	101	70-130	1	20	
Boron, Dissolved	ug/L	8000	1000	1000	8920	8890	93	89	70-130	0	20	
Calcium, Dissolved	ug/L	106000	10000	10000	114000	114000	77	77	70-130	0	20	
Cobalt, Dissolved	ug/L	<0.73	1000	1000	1030	1020	103	102	70-130	1	20	
Copper, Dissolved	ug/L	<4.8	1000	1000	1000	994	100	99	70-130	1	20	
Iron, Dissolved	ug/L	806	10000	10000	10700	10600	99	98	70-130	1	20	
Lead, Dissolved	ug/L	<2.4	1000	1000	1010	997	101	100	70-130	1	20	
Lithium, Dissolved	ug/L	29.1	1000	1000	1100	1090	107	106	70-130	0	20	
Magnesium, Dissolved	ug/L	25200	10000	10000	34300	34100	91	89	70-130	0	20	
Manganese, Dissolved	ug/L	104	1000	1000	1050	1040	94	93	70-130	1	20	
Molybdenum, Dissolved	ug/L	2300	1000	1000	3300	3290	99	99	70-130	0	20	
Nickel, Dissolved	ug/L	<2.3	1000	1000	983	978	98	98	70-130	0	20	
Potassium, Dissolved	ug/L	12200	10000	10000	22100	22100	99	99	70-130	0	20	
Silver, Dissolved	ug/L	<1.9	500	500	509	503	102	101	70-130	1	20	
Sodium, Dissolved	ug/L	27700	10000	10000	37600	37600	98	98	70-130	0	20	
Zinc, Dissolved	ug/L	<11.2	1000	1000	1010	1000	100	99	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511926 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096058 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	01/30/18 15:43	
Arsenic	ug/L	<0.052	1.0	0.052	01/30/18 15:43	
Cadmium	ug/L	<0.018	0.50	0.018	01/30/18 15:43	
Chromium	ug/L	<0.054	1.0	0.054	01/30/18 15:43	
Selenium	ug/L	<0.086	1.0	0.086	01/30/18 15:43	
Thallium	ug/L	<0.036	1.0	0.036	01/30/18 15:43	

LABORATORY CONTROL SAMPLE: 2096059

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.1	98	85-115	
Arsenic	ug/L	40	39.6	99	85-115	
Cadmium	ug/L	40	39.4	98	85-115	
Chromium	ug/L	40	39.2	98	85-115	
Selenium	ug/L	40	39.3	98	85-115	
Thallium	ug/L	40	38.9	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2096060 2096061

Parameter	Units	60262674001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	30.3	40	40	69.3	68.7	98	96	70-130	1	20	
Arsenic	ug/L	39.7	40	40	80.7	79.8	103	100	70-130	1	20	
Cadmium	ug/L	3.7	40	40	38.9	38.7	88	87	70-130	0	20	
Chromium	ug/L	1.6	40	40	41.1	40.6	99	98	70-130	1	20	
Selenium	ug/L	565	40	40	616	619	128	135	70-130	0	20	M1
Thallium	ug/L	42.4	40	40	79.6	80.2	93	94	70-130	1	20	

MATRIX SPIKE SAMPLE: 2096062

Parameter	Units	60262627001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	ND	40	39.2	97	70-130	
Arsenic	ug/L	1.1	40	38.8	94	70-130	
Cadmium	ug/L	ND	40	37.0	92	70-130	
Chromium	ug/L	ND	40	39.5	97	70-130	
Selenium	ug/L	2.9	40	36.9	85	70-130	
Thallium	ug/L	ND	40	40.0	100	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511930 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096071 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.026	1.0	0.026	01/31/18 10:49	
Arsenic, Dissolved	ug/L	<0.052	1.0	0.052	01/31/18 10:49	
Cadmium, Dissolved	ug/L	<0.018	0.50	0.018	01/31/18 10:49	
Chromium, Dissolved	ug/L	<0.054	1.0	0.054	01/31/18 10:49	
Selenium, Dissolved	ug/L	<0.086	1.0	0.086	01/31/18 10:49	
Thallium, Dissolved	ug/L	<0.036	1.0	0.036	01/31/18 10:49	

LABORATORY CONTROL SAMPLE: 2096072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	39.6	99	85-115	
Arsenic, Dissolved	ug/L	40	41.1	103	85-115	
Cadmium, Dissolved	ug/L	40	40.3	101	85-115	
Chromium, Dissolved	ug/L	40	40.3	101	85-115	
Selenium, Dissolved	ug/L	40	40.4	101	85-115	
Thallium, Dissolved	ug/L	40	39.8	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2096073 2096074

Parameter	Units	60262747005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony, Dissolved	ug/L	0.56J	40	40	39.7	39.8	98	98	70-130	0	20	
Arsenic, Dissolved	ug/L	8.7	40	40	49.8	49.7	103	103	70-130	0	20	
Cadmium, Dissolved	ug/L	0.41J	40	40	37.1	37.2	92	92	70-130	0	20	
Chromium, Dissolved	ug/L	0.27J	40	40	39.7	39.9	99	99	70-130	0	20	
Selenium, Dissolved	ug/L	28.1	40	40	65.8	66.6	94	96	70-130	1	20	
Thallium, Dissolved	ug/L	<0.036	40	40	42.2	42.5	105	106	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512073 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096986 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	01/29/18 13:36	

LABORATORY CONTROL SAMPLE: 2096987

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	510	102	90-110	

SAMPLE DUPLICATE: 2096988

Parameter	Units	60262747002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	549	564	3	10	

SAMPLE DUPLICATE: 2096989

Parameter	Units	60262675004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	867	857	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512234 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60262747001, 60262747002, 60262747004, 60262747005

METHOD BLANK: 2097347 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/29/18 18:00	

LABORATORY CONTROL SAMPLE: 2097348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1110	111	80-120	

SAMPLE DUPLICATE: 2097349

Parameter	Units	60262792001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1140	1220	7	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512354 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60262747003

METHOD BLANK: 2097667 Matrix: Water
Associated Lab Samples: 60262747003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/30/18 13:01	

LABORATORY CONTROL SAMPLE: 2097668

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1150	115	80-120	

SAMPLE DUPLICATE: 2097669

Parameter	Units	60262656002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	54300	52600	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511992 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096343 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	01/26/18 15:18	

LABORATORY CONTROL SAMPLE: 2096344

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.53	105	80-120	

MATRIX SPIKE SAMPLE: 2096345

Parameter	Units	60262500001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	<0.0048	.5	0.50	100	75-125	H3

SAMPLE DUPLICATE: 2096346

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	<0.0048	<0.0048		20	H3

SAMPLE DUPLICATE: 2096347

Parameter	Units	60262708001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	H3

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512063 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096902 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.20	0.10	01/28/18 21:15	

LABORATORY CONTROL SAMPLE: 2096903

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	98	90-110	

MATRIX SPIKE SAMPLE: 2096906

Parameter	Units	60262747001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	1.2	2.5	4.1	116	80-120	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512328 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2097604 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	01/30/18 08:28	

LABORATORY CONTROL SAMPLE: 2097605

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.5	109	90-110	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 512528 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2098330 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.50	1.0	0.50	01/31/18 12:12	

LABORATORY CONTROL SAMPLE: 2098331

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2098332 2098333

Parameter	Units	60262674001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1560	500	500	2090	2090	106	106	80-120	0	15	E

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511913 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096026 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	01/29/18 10:16	

LABORATORY CONTROL SAMPLE: 2096027

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	48.8	98	90-110	

MATRIX SPIKE SAMPLE: 2096028

Parameter	Units	60262452001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	1610	750	2290	91	90-110	E

MATRIX SPIKE SAMPLE: 2096031

Parameter	Units	60262747005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	6.6J	50	61.3	109	90-110	

SAMPLE DUPLICATE: 2096030

Parameter	Units	60262500002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	44.0	43.5	1	25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262747

QC Batch: 511971 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

METHOD BLANK: 2096221 Matrix: Water
Associated Lab Samples: 60262747001, 60262747002, 60262747003, 60262747004, 60262747005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	<0.13	1.0	0.13	01/26/18 14:01	

LABORATORY CONTROL SAMPLE: 2096222

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.6	112	80-120	

MATRIX SPIKE SAMPLE: 2096223

Parameter	Units	60262747001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	4.7	5	10.4	113	80-120	

SAMPLE DUPLICATE: 2096224

Parameter	Units	60262747002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	28.2	28.3	0	25	

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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(913)599-5665

QUALIFIERS

Project: AMEREN SEC
Pace Project No.: 60262747

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

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60262747

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60262747001	**S-SCPA-1D**	EPA 200.7	511927	EPA 200.7	512031
60262747002	**S-SCPA-1S**	EPA 200.7	511927	EPA 200.7	512031
60262747003	**S-SCPA-3D**	EPA 200.7	511927	EPA 200.7	512031
60262747004	**S-LB4**	EPA 200.7	511927	EPA 200.7	512031
60262747005	**S-LB5**	EPA 200.7	511927	EPA 200.7	512031
60262747001	**S-SCPA-1D**	EPA 200.7	511929	EPA 200.7	512032
60262747002	**S-SCPA-1S**	EPA 200.7	511929	EPA 200.7	512032
60262747003	**S-SCPA-3D**	EPA 200.7	511929	EPA 200.7	512032
60262747004	**S-LB4**	EPA 200.7	511929	EPA 200.7	512032
60262747005	**S-LB5**	EPA 200.7	511929	EPA 200.7	512032
60262747001	**S-SCPA-1D**	EPA 200.8	511926	EPA 200.8	512030
60262747002	**S-SCPA-1S**	EPA 200.8	511926	EPA 200.8	512030
60262747003	**S-SCPA-3D**	EPA 200.8	511926	EPA 200.8	512030
60262747004	**S-LB4**	EPA 200.8	511926	EPA 200.8	512030
60262747005	**S-LB5**	EPA 200.8	511926	EPA 200.8	512030
60262747001	**S-SCPA-1D**	EPA 200.8	511930	EPA 200.8	512033
60262747002	**S-SCPA-1S**	EPA 200.8	511930	EPA 200.8	512033
60262747003	**S-SCPA-3D**	EPA 200.8	511930	EPA 200.8	512033
60262747004	**S-LB4**	EPA 200.8	511930	EPA 200.8	512033
60262747005	**S-LB5**	EPA 200.8	511930	EPA 200.8	512033
60262747001	**S-SCPA-1D**	EPA 7470	512003	EPA 7470	512142
60262747002	**S-SCPA-1S**	EPA 7470	512003	EPA 7470	512142
60262747003	**S-SCPA-3D**	EPA 7470	512003	EPA 7470	512142
60262747004	**S-LB4**	EPA 7470	512003	EPA 7470	512142
60262747005	**S-LB5**	EPA 7470	512003	EPA 7470	512142
60262747001	**S-SCPA-1D**	SM 2320B	512073		
60262747002	**S-SCPA-1S**	SM 2320B	512073		
60262747003	**S-SCPA-3D**	SM 2320B	512073		
60262747004	**S-LB4**	SM 2320B	512073		
60262747005	**S-LB5**	SM 2320B	512073		
60262747001	**S-SCPA-1D**	SM 2540C	512234		
60262747002	**S-SCPA-1S**	SM 2540C	512234		
60262747003	**S-SCPA-3D**	SM 2540C	512354		
60262747004	**S-LB4**	SM 2540C	512234		
60262747005	**S-LB5**	SM 2540C	512234		
60262747001	**S-SCPA-1D**	SM 4500-S-2 D	511992		
60262747002	**S-SCPA-1S**	SM 4500-S-2 D	511992		
60262747003	**S-SCPA-3D**	SM 4500-S-2 D	511992		
60262747004	**S-LB4**	SM 4500-S-2 D	511992		
60262747005	**S-LB5**	SM 4500-S-2 D	511992		
60262747001	**S-SCPA-1D**	EPA 300.0	512063		
60262747001	**S-SCPA-1D**	EPA 300.0	512328		
60262747001	**S-SCPA-1D**	EPA 300.0	512528		

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
Pace Project No.: 60262747

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60262747002	**S-SCPA-1S**	EPA 300.0	512063		
60262747002	**S-SCPA-1S**	EPA 300.0	512328		
60262747002	**S-SCPA-1S**	EPA 300.0	512528		
60262747003	**S-SCPA-3D**	EPA 300.0	512063		
60262747003	**S-SCPA-3D**	EPA 300.0	512328		
60262747003	**S-SCPA-3D**	EPA 300.0	512528		
60262747004	**S-LB4**	EPA 300.0	512063		
60262747004	**S-LB4**	EPA 300.0	512328		
60262747004	**S-LB4**	EPA 300.0	512528		
60262747005	**S-LB5**	EPA 300.0	512063		
60262747005	**S-LB5**	EPA 300.0	512328		
60262747005	**S-LB5**	EPA 300.0	512528		
60262747001	**S-SCPA-1D**	EPA 410.4	511913		
60262747002	**S-SCPA-1S**	EPA 410.4	511913		
60262747003	**S-SCPA-3D**	EPA 410.4	511913		
60262747004	**S-LB4**	EPA 410.4	511913		
60262747005	**S-LB5**	EPA 410.4	511913		
60262747001	**S-SCPA-1D**	SM 5310C	511971		
60262747002	**S-SCPA-1S**	SM 5310C	511971		
60262747003	**S-SCPA-3D**	SM 5310C	511971		
60262747004	**S-LB4**	SM 5310C	511971		
60262747005	**S-LB5**	SM 5310C	511971		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60262747

60262747

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 +0.2 / CF -0.1) **Type of Ice:** (Wet) Blue None

NMS 1/24

Cooler Temperature (°C): As-read 0.6 / 1.2 **Corr. Factor** (CF +0.2) CF -0.1 **Corrected** 0.8 / 1.2

Date and initials of person examining contents:

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☐No ☑N/A	
Rush Turn Around Time requested:	☐Yes ☐No ☑N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☑Yes ☐No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	
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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

WO#: 60262747

PM: JLS **Due Date: 01/31/18**

CLIENT: GOLDER STL

Pace Analy

-CUSTODY / Analytical Request Document

dy 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			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191	Fax: 636-724-9323	Project Name:	Ameren SEC	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	1531406.0003	Pace Profile #:	9285, line 4

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 + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	~~Ferrous Iron/Ferric Iron~~	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																													
1	S-SCPA-1D		G			1/23/18	14:17		7	2	2	2		1					✓	✓	✓	✓	✓	✓	✓	✓			001
2	S-SCPA-1S		G			1/23/18	14:32		7	2	2	2		1					✓	✓	✓	✓	✓	✓	✓	✓			002
3	S-SCPA-3D		G			1/24/18	09:00		7	2	2	2		1					✓	✓	✓	✓	✓	✓	✓	✓			003
4	S-LB4		G			1/24/18	13:30		7	2	2	2		1					✓	✓	✓	✓	✓	✓	✓	✓			004
5	S-LB5		G			1/24/18	13:35		7	2	2	2		1					✓	✓	✓	✓	✓	✓	✓	✓			005
6																													
7																													
8																													
9																													
10																													
11																													
12																													

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness *EPA 200.8: As, Cd, Cr, Se, Sb, Tl	Tommy Stoeckel/Golder	1/24/18	1530	Richard Manning	1/24/18	1530	1.2	Y	Y	Y
Fingerprint Metals										
No Ferrous/Ferric Iron										

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Eric Schneider		
SIGNATURE of SAMPLER:	Eric M Schneider	DATE Signed (MM/DD/YY):	01/24/18

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

MEMORANDUM

Date:	March 23, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60262747**		

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.
- Reported results with high levels of non-target analytes or other matrix interference were analyzed at dilution and qualified as dilution (D).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/23/18

Laboratory: Pace Analytical
SDG #: 60262747

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-SCPA-1D, S-SCPA-1S, S-SCPA-3D, S-LB4, S-LB5

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	1/23/18
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?	☑	☐	☐	See Notes
g) Were any matrix problems noted?	☑	☐	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☑	☐	☐	TH(49.9), B§d3(14.1), Mo§d3(1.4),
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☑	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☑	☐	
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☑	☐	☐	Alk, TDS, Sulfide, CoD, TOC
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:

- Diluted 200.7 Metals §DF of 10§: Al, Be, B, Cu, Pb, Mg, Mo, Ni, Ag, TH; Both Total + Diss. Report as Result value with dilution (D).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCPA-1D	Chloride	25.0	D	DF of 2
	Sulfate	200	D	20
S-SCPA-1S	All 200.8 Diss +Tot Metals	Result	D	5 (Diss) + 10 (Total)
	Chloride	26.0	D	2
	Sulfate	2080	D	200
	TOC	28.2	D	5
	Select 200.7 Tot+Dis Metals	Result	D	10 {See Previous Notes Page}
S-SCPA-3D	Sulfate	29.1	D	200
	Chloride	27.1	D	2
	TOC	23.2	D	5
	All 200.8 Tot+Dis Metals	Result	D	5
	B(t)	79500	D	10
	B(d)	73400	D	10
S-LB	Chloride	38.2	D	5
	Sulfate	318	D	50
S-LB5	Chloride	30.5	D	2
	Sulfate	393	D	50

Signature: [signature]

Date: 3/23/2018

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

February 05, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60262871

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on January 27, 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
Pace Project No.: 60262871

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
Pace Project No.: 60262871

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60262871001	**S-LB-2**	Water	01/25/18 09:45	01/27/18 04:00
60262871002	**S-SCPB-1**	Water	01/25/18 12:25	01/27/18 04:00
60262871003	**S-ASD-3S**	Water	01/25/18 13:50	01/27/18 04:00
60262871004	**S-ASD-3M**	Water	01/25/18 14:00	01/27/18 04:00
60262871005	**S-ASD-3D**	Water	01/25/18 16:03	01/27/18 04:00
60262871006	**S-FB-1**	Water	01/25/18 14:40	01/27/18 04:00

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60262871

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60262871001	**S-LB-2**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262871002	**S-SCPB-1**	EPA 200.7	JGP	19	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262871003	**S-ASD-3S**	EPA 200.7	JGP	19	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262871004	**S-ASD-3M**	EPA 200.7	JGP	19	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60262871

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262871005	**S-ASD-3D**	EPA 200.7	JGP	19	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60262871006	**S-FB-1**	EPA 200.7	JGP	19	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-LB-2 **Lab ID: 60262871001** Collected: 01/25/18 09:45 Received: 01/27/18 04:00 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								
Aluminum	**9590**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:18	7429-90-5	
Barium	**118**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:18	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:18	7440-41-7	
Boron	**4510**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:18	7440-42-8	
Calcium	**112000**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:18	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:18	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:18	7440-50-8	
Iron	**<12.4**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:18	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:18	7439-92-1	
Lithium	**24.4**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:18	7439-93-2	
Magnesium	**122**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:18	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:18	7439-96-5	
Molybdenum	**789**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:18	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:18	7440-02-0	
Potassium	**24900**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:18	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:18	7440-22-4	
Sodium	**108000**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:18	7440-23-5	
Total Hardness by 2340B	**281000**	ug/L	500		1	01/29/18 13:40	01/31/18 15:18		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:18	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**9760**	ug/L	75.0	28.8	1	01/30/18 10:10	02/01/18 13:44	7429-90-5	D9
Barium, Dissolved	**119**	ug/L	5.0	0.91	1	01/30/18 10:10	02/01/18 13:44	7440-39-3	D9
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/30/18 10:10	02/01/18 13:44	7440-41-7	
Boron, Dissolved	**4730**	ug/L	100	3.5	1	01/30/18 10:10	02/01/18 13:44	7440-42-8	D9
Calcium, Dissolved	**112000**	ug/L	100	36.0	1	01/30/18 10:10	02/01/18 13:44	7440-70-2	
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/30/18 10:10	02/01/18 13:44	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/30/18 10:10	02/01/18 13:44	7440-50-8	
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/30/18 10:10	02/01/18 13:44	7439-89-6	
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/30/18 10:10	02/01/18 13:44	7439-92-1	
Lithium, Dissolved	**24.4**	ug/L	10.0	2.9	1	01/30/18 10:10	02/01/18 13:44	7439-93-2	
Magnesium, Dissolved	**124**	ug/L	50.0	15.4	1	01/30/18 10:10	02/01/18 13:44	7439-95-4	D9
Manganese, Dissolved	**<1.8**	ug/L	5.0	1.8	1	01/30/18 10:10	02/01/18 13:44	7439-96-5	
Molybdenum, Dissolved	**815**	ug/L	20.0	1.3	1	01/30/18 10:10	02/01/18 13:44	7439-98-7	D9
Nickel, Dissolved	**<2.3**	ug/L	5.0	2.3	1	01/30/18 10:10	02/01/18 13:44	7440-02-0	
Potassium, Dissolved	**25300**	ug/L	500	52.3	1	01/30/18 10:10	02/01/18 13:44	7440-09-7	D9
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/30/18 10:10	02/01/18 13:44	7440-22-4	
Sodium, Dissolved	**110000**	ug/L	500	28.4	1	01/30/18 10:10	02/01/18 13:44	7440-23-5	D9,M1
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/30/18 10:10	02/01/18 13:44	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.56J**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:26	7440-36-0	
Arsenic	**3.6**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:26	7440-38-2	
Cadmium	**0.13J**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:26	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:26	7440-47-3	
Selenium	**11.7**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:26	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-LB-2 **Lab ID: 60262871001** Collected: 01/25/18 09:45 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**<0.036**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:26	7440-28-0	
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.56J**	ug/L	1.0	0.026	1	01/30/18 10:10	02/02/18 11:17	7440-36-0	
Arsenic, Dissolved	**3.5**	ug/L	1.0	0.052	1	01/30/18 10:10	02/02/18 11:17	7440-38-2	
Cadmium, Dissolved	**0.089J**	ug/L	0.50	0.018	1	01/30/18 10:10	02/02/18 11:17	7440-43-9	
Chromium, Dissolved	**0.12J**	ug/L	1.0	0.054	1	01/30/18 10:10	02/02/18 11:17	7440-47-3	
Selenium, Dissolved	**11.2**	ug/L	1.0	0.086	1	01/30/18 10:10	02/02/18 11:17	7782-49-2	
Thallium, Dissolved	**0.038J**	ug/L	1.0	0.036	1	01/30/18 10:10	02/02/18 11:17	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/30/18 15:53	01/31/18 14:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**133**	mg/L	20.0	4.9	1		01/30/18 10:34		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**777**	mg/L	5.0	5.0	1		01/31/18 14:44		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:06	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.7**	mg/L	2.0	1.0	2		02/04/18 08:09	16887-00-6	
Fluoride	**1.3**	mg/L	0.20	0.10	1		02/04/18 00:13	16984-48-8	
Sulfate	**451**	mg/L	50.0	25.0	50		02/04/18 08:23	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		01/31/18 14:21		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.83J**	mg/L	1.0	0.13	1		01/29/18 15:17	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-SCPB-1 **Lab ID: 60262871002** Collected: 01/25/18 12:25 Received: 01/27/18 04:00 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								
Aluminum	**15000**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:24	7429-90-5	
Barium	**71.2**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:24	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:24	7440-41-7	
Boron	**10700**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:24	7440-42-8	
Calcium	**37200**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:24	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:24	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:24	7440-50-8	
Iron	**69.7**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:24	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:24	7439-92-1	
Lithium	**<2.9**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:24	7439-93-2	
Magnesium	**38.7J**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:24	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:24	7439-96-5	
Molybdenum	**3710**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:24	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:24	7440-02-0	
Potassium	**74900**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:24	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:24	7440-22-4	
Sodium	**314000**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:24	7440-23-5	
Total Hardness by 2340B	**93000**	ug/L	500		1	01/29/18 13:40	01/31/18 15:24		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:24	7440-66-6	
200.7 Metals, Dissolved	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum, Dissolved	**14800**	ug/L	75.0	28.8	1	01/30/18 10:10	02/01/18 13:50	7429-90-5	
Barium, Dissolved	**67.2**	ug/L	5.0	0.91	1	01/30/18 10:10	02/01/18 13:50	7440-39-3	
Beryllium, Dissolved	**<0.16**	ug/L	1.0	0.16	1	01/30/18 10:10	02/01/18 13:50	7440-41-7	
Boron, Dissolved	**11100**	ug/L	100	3.5	1	01/30/18 10:10	02/01/18 13:50	7440-42-8	D9
Calcium, Dissolved	**36700**	ug/L	100	36.0	1	01/30/18 10:10	02/01/18 13:50	7440-70-2	
Cobalt, Dissolved	**<0.73**	ug/L	5.0	0.73	1	01/30/18 10:10	02/01/18 13:50	7440-48-4	
Copper, Dissolved	**<4.8**	ug/L	10.0	4.8	1	01/30/18 10:10	02/01/18 13:50	7440-50-8	
Iron, Dissolved	**<12.4**	ug/L	50.0	12.4	1	01/30/18 10:10	02/01/18 13:50	7439-89-6	
Lead, Dissolved	**<2.4**	ug/L	5.0	2.4	1	01/30/18 10:10	02/01/18 13:50	7439-92-1	
Lithium, Dissolved	**3.0J**	ug/L	10.0	2.9	1	01/30/18 10:10	02/01/18 13:50	7439-93-2	
Magnesium, Dissolved	**36.2J**	ug/L	50.0	15.4	1	01/30/18 10:10	02/01/18 13:50	7439-95-4	
Manganese, Dissolved	**<1.8**	ug/L	5.0	1.8	1	01/30/18 10:10	02/01/18 13:50	7439-96-5	
Molybdenum, Dissolved	**3740**	ug/L	20.0	1.3	1	01/30/18 10:10	02/01/18 13:50	7439-98-7	D9
Nickel, Dissolved	**<2.3**	ug/L	5.0	2.3	1	01/30/18 10:10	02/01/18 13:50	7440-02-0	
Potassium, Dissolved	**73900**	ug/L	500	52.3	1	01/30/18 10:10	02/01/18 13:50	7440-09-7	
Silver, Dissolved	**<1.9**	ug/L	7.0	1.9	1	01/30/18 10:10	02/01/18 13:50	7440-22-4	
Sodium, Dissolved	**313000**	ug/L	500	28.4	1	01/30/18 10:10	02/01/18 13:50	7440-23-5	
Zinc, Dissolved	**<11.2**	ug/L	50.0	11.2	1	01/30/18 10:10	02/01/18 13:50	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.78J**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:39	7440-36-0	
Arsenic	**7.1**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:39	7440-38-2	
Cadmium	**0.51**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:39	7440-43-9	
Chromium	**0.44J**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:39	7440-47-3	
Selenium	**25.2**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:39	7782-49-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-SCPB-1 **Lab ID: 60262871002** Collected: 01/25/18 12:25 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Thallium	**0.061J**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:39	7440-28-0	B
200.8 MET ICPMS, Dissolved	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony, Dissolved	**0.79J**	ug/L	1.0	0.026	1	01/30/18 10:10	02/02/18 11:22	7440-36-0	
Arsenic, Dissolved	**7.1**	ug/L	1.0	0.052	1	01/30/18 10:10	02/02/18 11:22	7440-38-2	
Cadmium, Dissolved	**0.46J**	ug/L	0.50	0.018	1	01/30/18 10:10	02/02/18 11:22	7440-43-9	
Chromium, Dissolved	**0.45J**	ug/L	1.0	0.054	1	01/30/18 10:10	02/02/18 11:22	7440-47-3	
Selenium, Dissolved	**26.2**	ug/L	1.0	0.086	1	01/30/18 10:10	02/02/18 11:22	7782-49-2	D9
Thallium, Dissolved	**<0.036**	ug/L	1.0	0.036	1	01/30/18 10:10	02/02/18 11:22	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.092J**	ug/L	0.20	0.046	1	01/31/18 14:07	02/01/18 09:14	7439-97-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**326**	mg/L	20.0	4.9	1		01/30/18 10:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1240**	mg/L	5.0	5.0	1		01/31/18 14:45		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:06	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**51.7**	mg/L	5.0	2.5	5		02/04/18 08:37	16887-00-6	
Fluoride	**1.8**	mg/L	0.20	0.10	1		02/04/18 00:26	16984-48-8	
Sulfate	**630**	mg/L	50.0	25.0	50		02/04/18 09:19	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**10.2**	mg/L	10.0	3.1	1		01/31/18 14:23		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.7**	mg/L	1.0	0.13	1		01/29/18 15:30	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-ASD-3S **Lab ID: 60262871003** Collected: 01/25/18 13:50 Received: 01/27/18 04:00 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								
Aluminum	**49.9J**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:27	7429-90-5	
Barium	**188**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:27	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:27	7440-41-7	
Boron	**8850**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:27	7440-42-8	
Calcium	**217000**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:27	7440-70-2	
Cobalt	**18.6**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:27	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:27	7440-50-8	
Iron	**1840**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:27	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:27	7439-92-1	
Lithium	**41.8**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:27	7439-93-2	
Magnesium	**26000**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:27	7439-95-4	
Manganese	**463**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:27	7439-96-5	
Molybdenum	**532**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:27	7439-98-7	
Nickel	**10.1**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:27	7440-02-0	
Potassium	**13000**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:27	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:27	7440-22-4	
Sodium	**73500**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:27	7440-23-5	
Total Hardness by 2340B	**649000**	ug/L	500		1	01/29/18 13:40	01/31/18 15:27		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:27	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.29J**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:43	7440-36-0	
Arsenic	**0.47J**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:43	7440-38-2	
Cadmium	**0.43J**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:43	7440-43-9	
Chromium	**0.90J**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:43	7440-47-3	
Selenium	**0.10J**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:43	7782-49-2	
Thallium	**0.49J**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:43	7440-28-0	B
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/30/18 15:53	01/31/18 14:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**440**	mg/L	20.0	4.9	1		01/30/18 10:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1040**	mg/L	5.0	5.0	1		01/31/18 14:45		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:07	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**147**	mg/L	20.0	10.0	20		02/04/18 09:33	16887-00-6	
Fluoride	**0.39**	mg/L	0.20	0.10	1		02/04/18 00:40	16984-48-8	
Sulfate	**212**	mg/L	20.0	10.0	20		02/04/18 09:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-ASD-3S **Lab ID: 60262871003** Collected: 01/25/18 13:50 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**5.7J**	mg/L	10.0	3.1	1		01/31/18 14:23		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.93J**	mg/L	1.0	0.13	1		01/29/18 15:42	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-ASD-3M **Lab ID: 60262871004** Collected: 01/25/18 14:00 Received: 01/27/18 04:00 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								
Aluminum	**41.2J**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:29	7429-90-5	
Barium	**116**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:29	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:29	7440-41-7	
Boron	**7330**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:29	7440-42-8	
Calcium	**124000**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:29	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:29	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:29	7440-50-8	
Iron	**789**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:29	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:29	7439-92-1	
Lithium	**32.8**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:29	7439-93-2	
Magnesium	**25500**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:29	7439-95-4	
Manganese	**304**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:29	7439-96-5	
Molybdenum	**675**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:29	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:29	7440-02-0	
Potassium	**15600**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:29	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:29	7440-22-4	
Sodium	**37600**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:29	7440-23-5	
Total Hardness by 2340B	**414000**	ug/L	500		1	01/29/18 13:40	01/31/18 15:29		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:29	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.16J**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:47	7440-36-0	
Arsenic	**0.70J**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:47	7440-38-2	
Cadmium	**0.094J**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:47	7440-43-9	
Chromium	**0.21J**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:47	7440-47-3	
Selenium	**0.093J**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:47	7782-49-2	
Thallium	**0.84J**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:47	7440-28-0	B
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/30/18 15:53	01/31/18 14:19	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**215**	mg/L	20.0	4.9	1		01/30/18 10:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**692**	mg/L	5.0	5.0	1		01/31/18 14:47		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:07	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**31.9**	mg/L	2.0	1.0	2		02/04/18 10:15	16887-00-6	
Fluoride	**0.55**	mg/L	0.20	0.10	1		02/04/18 00:54	16984-48-8	
Sulfate	**278**	mg/L	20.0	10.0	20		02/04/18 10:29	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
Pace Project No.: 60262871

Sample: S-ASD-3M **Lab ID: 60262871004** Collected: 01/25/18 14:00 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.8J**	mg/L	10.0	3.1	1		01/31/18 14:24		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.9**	mg/L	1.0	0.13	1		01/29/18 16:32	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-ASD-3D **Lab ID: 60262871005** Collected: 01/25/18 16:03 Received: 01/27/18 04:00 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								
Aluminum	**176**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:31	7429-90-5	
Barium	**96.4**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:31	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:31	7440-41-7	
Boron	**4450**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:31	7440-42-8	
Calcium	**128000**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:31	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:31	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:31	7440-50-8	
Iron	**3460**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:31	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:31	7439-92-1	
Lithium	**35.0**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:31	7439-93-2	
Magnesium	**13500**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:31	7439-95-4	
Manganese	**484**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:31	7439-96-5	
Molybdenum	**814**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:31	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:31	7440-02-0	
Potassium	**14900**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:31	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:31	7440-22-4	
Sodium	**29600**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:31	7440-23-5	
Total Hardness by 2340B	**376000**	ug/L	500		1	01/29/18 13:40	01/31/18 15:31		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:31	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.19J**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:52	7440-36-0	
Arsenic	**0.48J**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:52	7440-38-2	
Cadmium	**0.11J**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:52	7440-43-9	
Chromium	**2.4**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:52	7440-47-3	
Selenium	**0.10J**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:52	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/30/18 15:53	01/31/18 14:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**207**	mg/L	20.0	4.9	1		01/30/18 10:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**585**	mg/L	5.0	5.0	1		01/31/18 14:47		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:07	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**28.5**	mg/L	2.0	1.0	2		02/04/18 10:42	16887-00-6	
Fluoride	**0.59**	mg/L	0.20	0.10	1		02/04/18 01:08	16984-48-8	
Sulfate	**219**	mg/L	20.0	10.0	20		02/04/18 10:56	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
Pace Project No.: 60262871

Sample: S-ASD-3D **Lab ID: 60262871005** Collected: 01/25/18 16:03 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**12.3**	mg/L	10.0	3.1	1		01/31/18 14:24		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**3.3**	mg/L	1.0	0.13	1		01/29/18 16:45	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-FB-1 **Lab ID: 60262871006** Collected: 01/25/18 14:40 Received: 01/27/18 04:00 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								
Aluminum	**<28.8**	ug/L	75.0	28.8	1	01/29/18 13:40	01/31/18 15:34	7429-90-5	
Barium	**<0.91**	ug/L	5.0	0.91	1	01/29/18 13:40	01/31/18 15:34	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	01/29/18 13:40	01/31/18 15:34	7440-41-7	
Boron	**24.7J**	ug/L	100	3.5	1	01/29/18 13:40	01/31/18 15:34	7440-42-8	
Calcium	**42.4J**	ug/L	100	36.0	1	01/29/18 13:40	01/31/18 15:34	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	01/29/18 13:40	01/31/18 15:34	7440-48-4	
Copper	**<4.8**	ug/L	10.0	4.8	1	01/29/18 13:40	01/31/18 15:34	7440-50-8	
Iron	**<12.4**	ug/L	50.0	12.4	1	01/29/18 13:40	01/31/18 15:34	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	01/29/18 13:40	01/31/18 15:34	7439-92-1	
Lithium	**<2.9**	ug/L	10.0	2.9	1	01/29/18 13:40	01/31/18 15:34	7439-93-2	
Magnesium	**<15.4**	ug/L	50.0	15.4	1	01/29/18 13:40	01/31/18 15:34	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	01/29/18 13:40	01/31/18 15:34	7439-96-5	
Molybdenum	**<1.3**	ug/L	20.0	1.3	1	01/29/18 13:40	01/31/18 15:34	7439-98-7	
Nickel	**<2.3**	ug/L	5.0	2.3	1	01/29/18 13:40	01/31/18 15:34	7440-02-0	
Potassium	**73.8J**	ug/L	500	52.3	1	01/29/18 13:40	01/31/18 15:34	7440-09-7	
Silver	**<1.9**	ug/L	7.0	1.9	1	01/29/18 13:40	01/31/18 15:34	7440-22-4	
Sodium	**141J**	ug/L	500	28.4	1	01/29/18 13:40	01/31/18 15:34	7440-23-5	
Total Hardness by 2340B	**114J**	ug/L	500		1	01/29/18 13:40	01/31/18 15:34		
Zinc	**<11.2**	ug/L	50.0	11.2	1	01/29/18 13:40	01/31/18 15:34	7440-66-6	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	01/29/18 13:40	02/02/18 10:56	7440-36-0	
Arsenic	**<0.052**	ug/L	1.0	0.052	1	01/29/18 13:40	02/02/18 10:56	7440-38-2	
Cadmium	**0.028J**	ug/L	0.50	0.018	1	01/29/18 13:40	02/02/18 10:56	7440-43-9	
Chromium	**0.12J**	ug/L	1.0	0.054	1	01/29/18 13:40	02/02/18 10:56	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	01/29/18 13:40	02/02/18 10:56	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	01/29/18 13:40	02/02/18 10:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	01/30/18 15:53	01/31/18 14:23	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		01/30/18 11:02		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5.0**	mg/L	5.0	5.0	1		01/31/18 14:48		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/01/18 12:08	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	1.0	0.50	1		02/04/18 01:21	16887-00-6	
Fluoride	**<0.10**	mg/L	0.20	0.10	1		02/04/18 01:21	16984-48-8	
Sulfate	**0.60J**	mg/L	1.0	0.50	1		02/04/18 01:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60262871

Sample: S-FB-1 **Lab ID: 60262871006** Collected: 01/25/18 14:40 Received: 01/27/18 04:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		01/31/18 14:25		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.37J**	mg/L	1.0	0.13	1		01/29/18 16:57	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512332 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60262871001, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097616 Matrix: Water
Associated Lab Samples: 60262871001, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	01/31/18 14:01	

LABORATORY CONTROL SAMPLE: 2097617

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2097618 2097619

Parameter	Units	60262871001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	5.2	5.0	103	101	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512491 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60262871002

METHOD BLANK: 2098202 Matrix: Water
Associated Lab Samples: 60262871002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	0.097J	0.20	0.046	02/01/18 08:54	

LABORATORY CONTROL SAMPLE: 2098203

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.6	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2098204 2098205

Parameter	Units	60262715001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.7	4.6	92	90	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512190 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097200 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<28.8	75.0	28.8	01/31/18 14:57	
Barium	ug/L	<0.91	5.0	0.91	01/31/18 14:57	
Beryllium	ug/L	<0.16	1.0	0.16	01/31/18 14:57	
Boron	ug/L	<3.5	100	3.5	01/31/18 14:57	
Calcium	ug/L	<36.0	100	36.0	01/31/18 14:57	
Cobalt	ug/L	<0.73	5.0	0.73	01/31/18 14:57	
Copper	ug/L	<4.8	10.0	4.8	01/31/18 14:57	
Iron	ug/L	<12.4	50.0	12.4	01/31/18 14:57	
Lead	ug/L	<2.4	5.0	2.4	01/31/18 14:57	
Lithium	ug/L	<2.9	10.0	2.9	01/31/18 14:57	
Magnesium	ug/L	<15.4	50.0	15.4	01/31/18 14:57	
Manganese	ug/L	<1.8	5.0	1.8	01/31/18 14:57	
Molybdenum	ug/L	<1.3	20.0	1.3	01/31/18 14:57	
Nickel	ug/L	<2.3	5.0	2.3	01/31/18 14:57	
Potassium	ug/L	<52.3	500	52.3	01/31/18 14:57	
Silver	ug/L	<1.9	7.0	1.9	01/31/18 14:57	
Sodium	ug/L	<28.4	500	28.4	01/31/18 14:57	
Total Hardness by 2340B	ug/L	<0	500		01/31/18 14:57	
Zinc	ug/L	<11.2	50.0	11.2	01/31/18 14:57	

LABORATORY CONTROL SAMPLE: 2097201

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9630	96	85-115	
Barium	ug/L	1000	981	98	85-115	
Beryllium	ug/L	1000	985	99	85-115	
Boron	ug/L	1000	945	94	85-115	
Calcium	ug/L	10000	9880	99	85-115	
Cobalt	ug/L	1000	1000	100	85-115	
Copper	ug/L	1000	966	97	85-115	
Iron	ug/L	10000	10000	100	85-115	
Lead	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	979	98	85-115	
Magnesium	ug/L	10000	9590	96	85-115	
Manganese	ug/L	1000	987	99	85-115	
Molybdenum	ug/L	1000	989	99	85-115	
Nickel	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9670	97	85-115	
Silver	ug/L	500	484	97	85-115	
Sodium	ug/L	10000	9450	94	85-115	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

LABORATORY CONTROL SAMPLE: 2097201

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Hardness by 2340B	ug/L		64200			
Zinc	ug/L	1000	1010	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2097202 2097203

Parameter	Units	60262663001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	ug/L	144	10000	10000	9640	10000	95	99	70-130	4	20	
Barium	ug/L	124	1000	1000	1080	1120	96	100	70-130	4	20	
Beryllium	ug/L	ND	1000	1000	966	1000	97	100	70-130	4	20	
Boron	ug/L	628	1000	1000	1530	1570	90	95	70-130	3	20	
Calcium	ug/L	55400	10000	10000	63600	65600	82	102	70-130	3	20	
Cobalt	ug/L	ND	1000	1000	972	1000	97	100	70-130	3	20	
Copper	ug/L	ND	1000	1000	942	972	94	97	70-130	3	20	
Iron	ug/L	186	10000	10000	9970	10400	98	102	70-130	4	20	
Lead	ug/L	ND	1000	1000	994	1020	99	102	70-130	3	20	
Lithium	ug/L	ND	1000	1000	968	1010	97	100	70-130	4	20	
Magnesium	ug/L	12500	10000	10000	20900	21500	84	91	70-130	3	20	
Manganese	ug/L	98.2	1000	1000	1050	1080	96	98	70-130	3	20	
Molybdenum	ug/L	ND	1000	1000	983	1010	97	101	70-130	3	20	
Nickel	ug/L	ND	1000	1000	970	1000	97	100	70-130	3	20	
Potassium	ug/L	6370	10000	10000	15400	16100	91	97	70-130	4	20	
Silver	ug/L	ND	500	500	475	486	95	97	70-130	2	20	
Sodium	ug/L	17200	10000	10000	25900	26700	88	96	70-130	3	20	
Total Hardness by 2340B	ug/L	190000			245000	252000				3		
Zinc	ug/L	ND	1000	1000	986	1020	98	102	70-130	4	20	

MATRIX SPIKE SAMPLE: 2097204

Parameter	Units	60262825001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	32.0J	10000	9700	97	70-130	
Barium	ug/L	21.5	1000	991	97	70-130	
Beryllium	ug/L	ND	1000	976	98	70-130	
Boron	ug/L	555	1000	1490	94	70-130	
Calcium	ug/L	72800	10000	81900	91	70-130	
Cobalt	ug/L	ND	1000	954	95	70-130	
Copper	ug/L	0.0078J mg/L	1000	956	95	70-130	
Iron	ug/L	158	10000	10100	99	70-130	
Lead	ug/L	ND	1000	963	96	70-130	
Lithium	ug/L	155	1000	1140	98	70-130	
Magnesium	ug/L	87200	10000	95100	79	70-130	
Manganese	ug/L	8.1	1000	965	96	70-130	
Molybdenum	ug/L	0.0017J mg/L	1000	975	97	70-130	
Nickel	ug/L	ND	1000	953	95	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

MATRIX SPIKE SAMPLE: 2097204

Parameter	Units	60262825001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Potassium	ug/L	14700	10000	24400	96	70-130	
Silver	ug/L	ND	500	481	96	70-130	
Sodium	ug/L	249000	10000	258000	92	70-130	
Total Hardness by 2340B	ug/L	541000		596000			
Zinc	ug/L	ND	1000	987	98	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512320 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
Associated Lab Samples: 60262871001, 60262871002

METHOD BLANK: 2097575 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<28.8	75.0	28.8	02/01/18 13:39	
Barium, Dissolved	ug/L	<0.91	5.0	0.91	02/01/18 13:39	
Beryllium, Dissolved	ug/L	<0.16	1.0	0.16	02/01/18 13:39	
Boron, Dissolved	ug/L	13.1J	100	3.5	02/01/18 13:39	
Calcium, Dissolved	ug/L	<36.0	100	36.0	02/01/18 13:39	
Cobalt, Dissolved	ug/L	<0.73	5.0	0.73	02/01/18 13:39	
Copper, Dissolved	ug/L	<4.8	10.0	4.8	02/01/18 13:39	
Iron, Dissolved	ug/L	<12.4	50.0	12.4	02/01/18 13:39	
Lead, Dissolved	ug/L	<2.4	5.0	2.4	02/01/18 13:39	
Lithium, Dissolved	ug/L	<2.9	10.0	2.9	02/01/18 13:39	
Magnesium, Dissolved	ug/L	<15.4	50.0	15.4	02/01/18 13:39	
Manganese, Dissolved	ug/L	<1.8	5.0	1.8	02/01/18 13:39	
Molybdenum, Dissolved	ug/L	<1.3	20.0	1.3	02/01/18 13:39	
Nickel, Dissolved	ug/L	<2.3	5.0	2.3	02/01/18 13:39	
Potassium, Dissolved	ug/L	<52.3	500	52.3	02/01/18 13:39	
Silver, Dissolved	ug/L	<1.9	7.0	1.9	02/01/18 13:39	
Sodium, Dissolved	ug/L	123J	500	28.4	02/01/18 13:39	
Zinc, Dissolved	ug/L	<11.2	50.0	11.2	02/01/18 13:39	

LABORATORY CONTROL SAMPLE: 2097576

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	9770	98	85-115	
Barium, Dissolved	ug/L	1000	989	99	85-115	
Beryllium, Dissolved	ug/L	1000	1000	100	85-115	
Boron, Dissolved	ug/L	1000	996	100	85-115	
Calcium, Dissolved	ug/L	10000	9920	99	85-115	
Cobalt, Dissolved	ug/L	1000	1010	101	85-115	
Copper, Dissolved	ug/L	1000	1020	102	85-115	
Iron, Dissolved	ug/L	10000	10000	100	85-115	
Lead, Dissolved	ug/L	1000	992	99	85-115	
Lithium, Dissolved	ug/L	1000	1000	100	85-115	
Magnesium, Dissolved	ug/L	10000	9970	100	85-115	
Manganese, Dissolved	ug/L	1000	1030	103	85-115	
Molybdenum, Dissolved	ug/L	1000	1000	100	85-115	
Nickel, Dissolved	ug/L	1000	1010	101	85-115	
Potassium, Dissolved	ug/L	10000	9820	98	85-115	
Silver, Dissolved	ug/L	500	512	102	85-115	
Sodium, Dissolved	ug/L	10000	9560	96	85-115	
Zinc, Dissolved	ug/L	1000	1020	102	85-115	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2097577 2097578

Parameter	Units	60262871001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	ug/L	9760	10000	10000	19400	19300	96	96	70-130	0	20	
Barium, Dissolved	ug/L	119	1000	1000	1100	1100	98	98	70-130	0	20	
Beryllium, Dissolved	ug/L	<0.16	1000	1000	996	998	100	100	70-130	0	20	
Boron, Dissolved	ug/L	4730	1000	1000	5720	5680	99	95	70-130	1	20	
Calcium, Dissolved	ug/L	112000	10000	10000	120000	119000	79	77	70-130	0	20	
Cobalt, Dissolved	ug/L	<0.73	1000	1000	988	984	99	98	70-130	0	20	
Copper, Dissolved	ug/L	<4.8	1000	1000	1020	1020	102	101	70-130	0	20	
Iron, Dissolved	ug/L	<12.4	10000	10000	9950	9990	99	100	70-130	0	20	
Lead, Dissolved	ug/L	<2.4	1000	1000	954	954	95	95	70-130	0	20	
Lithium, Dissolved	ug/L	24.4	1000	1000	1030	1030	101	100	70-130	1	20	
Magnesium, Dissolved	ug/L	124	10000	10000	9860	9790	97	97	70-130	1	20	
Manganese, Dissolved	ug/L	<1.8	1000	1000	1020	1010	102	101	70-130	1	20	
Molybdenum, Dissolved	ug/L	815	1000	1000	1770	1750	95	94	70-130	1	20	
Nickel, Dissolved	ug/L	<2.3	1000	1000	979	972	98	97	70-130	1	20	
Potassium, Dissolved	ug/L	25300	10000	10000	34600	34600	94	93	70-130	0	20	
Silver, Dissolved	ug/L	<1.9	500	500	514	511	103	102	70-130	1	20	
Sodium, Dissolved	ug/L	110000	10000	10000	118000	117000	74	67	70-130	1	20	M1
Zinc, Dissolved	ug/L	<11.2	1000	1000	1010	1010	101	101	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512194 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097214 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	02/02/18 10:17	
Arsenic	ug/L	<0.052	1.0	0.052	02/02/18 10:17	
Cadmium	ug/L	<0.018	0.50	0.018	02/02/18 10:17	
Chromium	ug/L	<0.054	1.0	0.054	02/02/18 10:17	
Selenium	ug/L	<0.086	1.0	0.086	02/02/18 10:17	
Thallium	ug/L	0.41J	1.0	0.036	02/02/18 10:17	

LABORATORY CONTROL SAMPLE: 2097215

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	39.6	99	85-115	
Chromium	ug/L	40	39.1	98	85-115	
Selenium	ug/L	40	39.9	100	85-115	
Thallium	ug/L	40	38.4	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2097216 2097217

Parameter	Units	60262871001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.56J	40	40	40.2	39.2	99	97	70-130	3	20	
Arsenic	ug/L	3.6	40	40	42.8	42.0	98	96	70-130	2	20	
Cadmium	ug/L	0.13J	40	40	38.6	37.8	96	94	70-130	2	20	
Chromium	ug/L	0.18J	40	40	38.1	37.3	95	93	70-130	2	20	
Selenium	ug/L	11.7	40	40	49.4	47.8	94	90	70-130	3	20	
Thallium	ug/L	<0.036	40	40	38.4	38.0	96	95	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512321 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60262871001, 60262871002

METHOD BLANK: 2097579 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.026	1.0	0.026	02/02/18 11:09	
Arsenic, Dissolved	ug/L	<0.052	1.0	0.052	02/02/18 11:09	
Cadmium, Dissolved	ug/L	<0.018	0.50	0.018	02/02/18 11:09	
Chromium, Dissolved	ug/L	<0.054	1.0	0.054	02/02/18 11:09	
Selenium, Dissolved	ug/L	<0.086	1.0	0.086	02/02/18 11:09	
Thallium, Dissolved	ug/L	<0.036	1.0	0.036	02/02/18 11:09	

LABORATORY CONTROL SAMPLE: 2097580

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	40.6	102	85-115	
Arsenic, Dissolved	ug/L	40	41.3	103	85-115	
Cadmium, Dissolved	ug/L	40	40.9	102	85-115	
Chromium, Dissolved	ug/L	40	39.2	98	85-115	
Selenium, Dissolved	ug/L	40	41.8	104	85-115	
Thallium, Dissolved	ug/L	40	39.9	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2097581 2097582

Parameter	Units	60262871002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony, Dissolved	ug/L	0.79J	40	40	41.6	41.6	102	102	70-130	0	20	
Arsenic, Dissolved	ug/L	7.1	40	40	47.8	47.9	102	102	70-130	0	20	
Cadmium, Dissolved	ug/L	0.46J	40	40	39.4	40.4	97	100	70-130	3	20	
Chromium, Dissolved	ug/L	0.45J	40	40	37.6	38.1	93	94	70-130	1	20	
Selenium, Dissolved	ug/L	26.2	40	40	67.9	67.0	104	102	70-130	1	20	
Thallium, Dissolved	ug/L	<0.036	40	40	38.6	38.9	96	97	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512283 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097496 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	01/30/18 10:23	

LABORATORY CONTROL SAMPLE: 2097497

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	493	99	90-110	

SAMPLE DUPLICATE: 2097498

Parameter	Units	60262871001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	133	135	2	10	

SAMPLE DUPLICATE: 2097499

Parameter	Units	60262633005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	130	131	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512467 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2098138 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/31/18 14:39	

LABORATORY CONTROL SAMPLE: 2098139

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1160	116	80-120	

SAMPLE DUPLICATE: 2098140

Parameter	Units	40163951001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	5100	4800	6	10	

SAMPLE DUPLICATE: 2098141

Parameter	Units	60262900003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	963	963	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512508 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2098247 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	02/01/18 12:04	

LABORATORY CONTROL SAMPLE: 2098248

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.52	105	80-120	

MATRIX SPIKE SAMPLE: 2098249

Parameter	Units	60262758002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	ND	.5	0.28	56	75-125	M1

SAMPLE DUPLICATE: 2098250

Parameter	Units	60262900003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	

SAMPLE DUPLICATE: 2098251

Parameter	Units	60262900004 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512329 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097608 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	02/03/18 21:42	
Fluoride	mg/L	<0.10	0.20	0.10	02/03/18 21:42	
Sulfate	mg/L	<0.50	1.0	0.50	02/03/18 21:42	

LABORATORY CONTROL SAMPLE: 2097609

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100080 2100081

Parameter	Units	60262468007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1250	500	500	1790	1790	108	108	80-120	0	15	
Fluoride	mg/L	ND	125	125	134	135	102	103	80-120	1	15	
Sulfate	mg/L	411	250	250	683	683	109	109	80-120	0	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512953 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005

METHOD BLANK: 2100088 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	02/04/18 06:45	
Sulfate	mg/L	<0.50	1.0	0.50	02/04/18 06:45	

LABORATORY CONTROL SAMPLE: 2100089

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100090 2100091

Parameter	Units	60262871003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	147	100	100	254	253	107	106	80-120	0	15	
Sulfate	mg/L	212	100	100	317	316	105	104	80-120	0	15	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512282 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097491 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	01/31/18 14:09	

LABORATORY CONTROL SAMPLE: 2097492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	54.1	108	90-110	

MATRIX SPIKE SAMPLE: 2097493

Parameter	Units	60262675009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	109	50	152	85	90-110	E,M1

MATRIX SPIKE SAMPLE: 2097495

Parameter	Units	60262532001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	61.7	50	110	96	90-110	

SAMPLE DUPLICATE: 2097494

Parameter	Units	60262675011 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	18.2	18.1	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60262871

QC Batch: 512198 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

METHOD BLANK: 2097229 Matrix: Water
Associated Lab Samples: 60262871001, 60262871002, 60262871003, 60262871004, 60262871005, 60262871006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	<0.13	1.0	0.13	01/29/18 14:02	

LABORATORY CONTROL SAMPLE: 2097230

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.9	98	80-120	

MATRIX SPIKE SAMPLE: 2097231

Parameter	Units	7581146001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	24.7	25	47.7	92	80-120	

SAMPLE DUPLICATE: 2097232

Parameter	Units	7581146002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	3.3	3.1	6	25	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SEC
Pace Project No.: 60262871

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

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within 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
Pace Project No.: 60262871

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60262871001	**S-LB-2**	EPA 200.7	512190	EPA 200.7	512302
60262871002	**S-SCPB-1**	EPA 200.7	512190	EPA 200.7	512302
60262871003	**S-ASD-3S**	EPA 200.7	512190	EPA 200.7	512302
60262871004	**S-ASD-3M**	EPA 200.7	512190	EPA 200.7	512302
60262871005	**S-ASD-3D**	EPA 200.7	512190	EPA 200.7	512302
60262871006	**S-FB-1**	EPA 200.7	512190	EPA 200.7	512302
60262871001	**S-LB-2**	EPA 200.7	512320	EPA 200.7	512375
60262871002	**S-SCPB-1**	EPA 200.7	512320	EPA 200.7	512375
60262871001	**S-LB-2**	EPA 200.8	512194	EPA 200.8	512303
60262871002	**S-SCPB-1**	EPA 200.8	512194	EPA 200.8	512303
60262871003	**S-ASD-3S**	EPA 200.8	512194	EPA 200.8	512303
60262871004	**S-ASD-3M**	EPA 200.8	512194	EPA 200.8	512303
60262871005	**S-ASD-3D**	EPA 200.8	512194	EPA 200.8	512303
60262871006	**S-FB-1**	EPA 200.8	512194	EPA 200.8	512303
60262871001	**S-LB-2**	EPA 200.8	512321	EPA 200.8	512374
60262871002	**S-SCPB-1**	EPA 200.8	512321	EPA 200.8	512374
60262871001	**S-LB-2**	EPA 7470	512332	EPA 7470	512434
60262871002	**S-SCPB-1**	EPA 7470	512491	EPA 7470	512610
60262871003	**S-ASD-3S**	EPA 7470	512332	EPA 7470	512434
60262871004	**S-ASD-3M**	EPA 7470	512332	EPA 7470	512434
60262871005	**S-ASD-3D**	EPA 7470	512332	EPA 7470	512434
60262871006	**S-FB-1**	EPA 7470	512332	EPA 7470	512434
60262871001	**S-LB-2**	SM 2320B	512283		
60262871002	**S-SCPB-1**	SM 2320B	512283		
60262871003	**S-ASD-3S**	SM 2320B	512283		
60262871004	**S-ASD-3M**	SM 2320B	512283		
60262871005	**S-ASD-3D**	SM 2320B	512283		
60262871006	**S-FB-1**	SM 2320B	512283		
60262871001	**S-LB-2**	SM 2540C	512467		
60262871002	**S-SCPB-1**	SM 2540C	512467		
60262871003	**S-ASD-3S**	SM 2540C	512467		
60262871004	**S-ASD-3M**	SM 2540C	512467		
60262871005	**S-ASD-3D**	SM 2540C	512467		
60262871006	**S-FB-1**	SM 2540C	512467		
60262871001	**S-LB-2**	SM 4500-S-2 D	512508		
60262871002	**S-SCPB-1**	SM 4500-S-2 D	512508		
60262871003	**S-ASD-3S**	SM 4500-S-2 D	512508		
60262871004	**S-ASD-3M**	SM 4500-S-2 D	512508		
60262871005	**S-ASD-3D**	SM 4500-S-2 D	512508		
60262871006	**S-FB-1**	SM 4500-S-2 D	512508		
60262871001	**S-LB-2**	EPA 300.0	512329		
60262871001	**S-LB-2**	EPA 300.0	512953		
60262871002	**S-SCPB-1**	EPA 300.0	512329		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60262871

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60262871002	**S-SCPB-1**	EPA 300.0	512953		
60262871003	**S-ASD-3S**	EPA 300.0	512329		
60262871003	**S-ASD-3S**	EPA 300.0	512953		
60262871004	**S-ASD-3M**	EPA 300.0	512329		
60262871004	**S-ASD-3M**	EPA 300.0	512953		
60262871005	**S-ASD-3D**	EPA 300.0	512329		
60262871005	**S-ASD-3D**	EPA 300.0	512953		
60262871006	**S-FB-1**	EPA 300.0	512329		
60262871001	**S-LB-2**	EPA 410.4	512282		
60262871002	**S-SCPB-1**	EPA 410.4	512282		
60262871003	**S-ASD-3S**	EPA 410.4	512282		
60262871004	**S-ASD-3M**	EPA 410.4	512282		
60262871005	**S-ASD-3D**	EPA 410.4	512282		
60262871006	**S-FB-1**	EPA 410.4	512282		
60262871001	**S-LB-2**	SM 5310C	512198		
60262871002	**S-SCPB-1**	SM 5310C	512198		
60262871003	**S-ASD-3S**	SM 5310C	512198		
60262871004	**S-ASD-3M**	SM 5310C	512198		
60262871005	**S-ASD-3D**	SM 5310C	512198		
60262871006	**S-FB-1**	SM 5310C	512198		

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Sample Condition Upon Receipt

WO# : 60262871

60262871

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: CF+0.2 / CF -0.1 T-260 / T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 0.0 / 3.4 **Corr. Factor** CF +0.2 CF -0.1 **Corrected** 0.2 / 3.6

Date and initials of person examining contents: 11/27/18 AE

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	NMO 11/27
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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

WO#: 60262871
PM: JLS Due Date: 02/05/18
CLIENT: GOLDER STL

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	maddock@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren SEC
Project Number:	153140 6.0003

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285, line 4

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: 200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	Ferrous Iron/Ferricyanide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-LB-2		G			1/25/18	0945		7	2	2	2		1				✓	✓	✓	✓	✓	✓	✓	✓			60262871
2	S-SCPB-1					"	1225		7	2	2	2		1				✓	✓	✓	✓	✓	✓	✓	✓			
3	S-ASD-3S					1/26/18	1350		6	2	2	1		1				✓		✓	✓	✓	✓	✓	✓			
4	S-ASD-3M						1400		6	2	2	1		1				✓		✓	✓	/	✓	✓	/			
5	S-ASD-3D						1603		6	2	2	1		1				✓		✓	✓	/	✓	✓	/			
6	S-FB-1						1440		6	2	2	1		1				✓		✓	✓	✓	✓	✓	✓			
7																												
8																												
9																												
10																												
11																												
12																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness							
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl Fingerprint Metals for Item #1+2		1/26/18	1700		1/26/18	1700	
No Ferric/Ferrous Iron		1/26/18	1700		1/27/18	0400	3.6 Y Y Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 01/26/18

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

MEMORANDUM

Date:	March 23, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60262871**		

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.
- 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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/23/18

Laboratory: Pace Analytical
SDG #: 60262871

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-LB2, S-SCPB-1, S-ASD-1, S-ASD-35, S-ASD-3M, S-ASD-3D, S-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?	☒	☐	☐	1/25/18
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)?	☑	☐	☐	002: Hg (0.097), All: B di (13.1), Na di (123), Th (0.41)
b) Were analytes detected in the field blank(s)?	☑	☐	☐	FB-1: B(24.7), Ca(42.4), K(73.8), Na(141), TH(114),
c) Were analytes detected in the equipment blank(s)?	☐	☐	☑	Cd(0.028), Cr(0.12), TDS(5.0), Sulfite(0.6[illegible])
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	TOC(0.37)

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)?	☐	☑	☐	FB-1 @ S-ASD-3M
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☑	☐	☐	Alk, TDS, Sulfide, COD, TOC
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?	☐	☑	☐	Sulfide, COD
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☐	☑	☐	Na, COD
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-LB2	Chloride	25.7	D	DF of 2
↓	Sulfate	451	D	50
S-SCPB-1	Chloride	51.7	D	5
↓	Sulfate	630	D	50
↓	Hg	0.20	U	Detected in blank; PQL > Result > MDL
↓	Tl	1.0	U	↓ ↓
S-ASD-3S	Tl	1.0	U	
↓	Chloride	147	D	DF of 20
↓	Sulfate	212	D	20
S-ASD-3M	Chloride	31.9	D	2
↓	Sulfate	278	D	20
↓	Tl	1.0	U	Blank; PQL > Result > MDL
↓	Cd	0.50	U	↓ ↓
↓	Cr	1.0	U	
S-ASD-3D	Chloride	28.5	D	DF of 2
↓	Sulfate	219	D	20
S-FB-1	None	—	—	—

Signature: Tommy A Goodwin Date: 3/23/18

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

February 12, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60263132

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on February 01, 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
Pace Project No.: 60263132

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
Pace Project No.: 60263132

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60263132001	**S-ASD-1S**	Water	01/31/18 10:55	02/01/18 03:55
60263132002	**S-ASD-1M**	Water	01/31/18 13:35	02/01/18 03:55
60263132003	**S-ASD-1D**	Water	01/31/18 15:10	02/01/18 03:55
60263132004	**S-ASD-2S**	Water	01/30/18 12:10	02/01/18 03:55
60263132005	**S-ASD-2M**	Water	01/30/18 16:15	02/01/18 03:55
60263132006	**S-ASD-2D**	Water	01/30/18 15:30	02/01/18 03:55

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(913)599-5665

SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263132

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60263132001	**S-ASD-1S**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263132002	**S-ASD-1M**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263132003	**S-ASD-1D**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263132004	**S-ASD-2S**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263132005	**S-ASD-2M**	EPA 200.7	JGP	14	PASI-K

Pace Analytical Services, LLC
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Lenexa, KS 66219
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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263132

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263132006	**S-ASD-2D**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	LDB, OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-1S **Lab ID: 60263132001** Collected: 01/31/18 10:55 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**65.1**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:17	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:17	7440-41-7	
Boron	**588**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:17	7440-42-8	
Calcium	**108000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:17	7440-70-2	
Cobalt	**1.4J**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:17	7440-48-4	
Iron	**1580**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:17	7439-89-6	
Lead	**3.2J**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:17	7439-92-1	
Lithium	**8.4J**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:17	7439-93-2	
Magnesium	**26100**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:17	7439-95-4	
Manganese	**1900**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:17	7439-96-5	
Molybdenum	**24.8**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:17	7439-98-7	
Potassium	**6600**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:17	7440-09-7	
Sodium	**38000**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:17	7440-23-5	
Total Hardness by 2340B	**376000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:17		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.26J**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 13:27	7440-36-0	
Arsenic	**4.8**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 13:27	7440-38-2	
Cadmium	**0.27J**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 13:27	7440-43-9	
Chromium	**3.5**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 13:27	7440-47-3	
Selenium	**98.5**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 13:27	7782-49-2	
Thallium	**0.076J**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 17:57	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:03	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**241**	mg/L	20.0	4.9	1		02/05/18 11:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**339**	mg/L	5.0	5.0	1		02/02/18 17:03		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:06	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**35.0**	mg/L	2.0	1.0	2		02/08/18 13:51	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	0.10	1		02/06/18 16:28	16984-48-8	
Sulfate	**195**	mg/L	20.0	10.0	20		02/08/18 14:06	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**71.2**	mg/L	10.0	3.1	1		02/05/18 11:18		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**17.2**	mg/L	1.0	0.13	1		02/06/18 12:56	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-1M **Lab ID: 60263132002** Collected: 01/31/18 13:35 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**143**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:19	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:19	7440-41-7	
Boron	**555**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:19	7440-42-8	
Calcium	**110000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:19	7440-70-2	
Cobalt	**0.74J**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:19	7440-48-4	
Iron	**4760**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:19	7439-89-6	
Lead	**2.6J**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:19	7439-92-1	
Lithium	**16.2**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:19	7439-93-2	
Magnesium	**19300**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:19	7439-95-4	
Manganese	**616**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:19	7439-96-5	
Molybdenum	**43.3**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:19	7439-98-7	
Potassium	**12400**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:19	7440-09-7	
Sodium	**23400**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:19	7440-23-5	
Total Hardness by 2340B	**354000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:19		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.048J**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 13:31	7440-36-0	
Arsenic	**1.1**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 13:31	7440-38-2	
Cadmium	**0.052J**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 13:31	7440-43-9	
Chromium	**2.2**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 13:31	7440-47-3	
Selenium	**0.35J**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 13:31	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 18:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:05	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**230**	mg/L	20.0	4.9	1		02/05/18 11:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**427**	mg/L	5.0	5.0	1		02/02/18 17:03		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:07	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**35.7**	mg/L	5.0	2.5	5		02/08/18 14:20	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.10	1		02/06/18 16:42	16984-48-8	
Sulfate	**129**	mg/L	10.0	5.0	10		02/08/18 14:33	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**11.6**	mg/L	10.0	3.1	1		02/07/18 15:25		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.3**	mg/L	1.0	0.13	1		02/06/18 13:08	7440-44-0	B

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-1D **Lab ID: 60263132003** Collected: 01/31/18 15:10 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**127**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:21	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:21	7440-41-7	
Boron	**1150**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:21	7440-42-8	
Calcium	**107000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:21	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:21	7440-48-4	
Iron	**8250**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:21	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:21	7439-92-1	
Lithium	**22.7**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:21	7439-93-2	
Magnesium	**20700**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:21	7439-95-4	
Manganese	**624**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:21	7439-96-5	
Molybdenum	**131**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:21	7439-98-7	
Potassium	**5920**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:21	7440-09-7	
Sodium	**24400**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:21	7440-23-5	
Total Hardness by 2340B	**352000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:21		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 13:36	7440-36-0	
Arsenic	**0.49J**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 13:36	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 13:36	7440-43-9	
Chromium	**0.47J**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 13:36	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 13:36	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 18:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**217**	mg/L	20.0	4.9	1		02/05/18 11:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**459**	mg/L	5.0	5.0	1		02/02/18 17:04		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:07	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**28.1**	mg/L	2.0		2		02/10/18 20:34	16887-00-6	
Fluoride	**0.30**	mg/L	0.20	0.10	1		02/06/18 16:56	16984-48-8	
Sulfate	**162**	mg/L	20.0		20		02/10/18 21:15	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**6.7J**	mg/L	10.0	3.1	1		02/07/18 15:25		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.7**	mg/L	1.0	0.13	1		02/06/18 13:21	7440-44-0	B

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-2S **Lab ID: 60263132004** Collected: 01/30/18 12:10 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**298**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:28	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:28	7440-41-7	
Boron	**744**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:28	7440-42-8	
Calcium	**228000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:28	7440-70-2	
Cobalt	**3.4J**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:28	7440-48-4	
Iron	**468**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:28	7439-89-6	
Lead	**3.4J**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:28	7439-92-1	
Lithium	**24.9**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:28	7439-93-2	
Magnesium	**63900**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:28	7439-95-4	
Manganese	**319**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:28	7439-96-5	
Molybdenum	**184**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:28	7439-98-7	
Potassium	**13800**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:28	7440-09-7	
Sodium	**120000**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:28	7440-23-5	
Total Hardness by 2340B	**834000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:28		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.20J**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 13:49	7440-36-0	
Arsenic	**0.85J**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 13:49	7440-38-2	
Cadmium	**0.27J**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 13:49	7440-43-9	
Chromium	**1.2**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 13:49	7440-47-3	
Selenium	**7.2**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 13:49	7782-49-2	
Thallium	**0.057J**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 18:19	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:14	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**262**	mg/L	20.0	4.9	1		02/05/18 12:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1390**	mg/L	5.0	5.0	1		02/02/18 17:00		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:05	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**654**	mg/L	50.0		50		02/08/18 15:30	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.10	1		02/06/18 17:38	16984-48-8	
Sulfate	**54.3**	mg/L	5.0		5		02/08/18 15:17	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**8.6J**	mg/L	10.0	3.1	1		02/07/18 15:26		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.31J**	mg/L	1.0	0.13	1		02/06/18 13:46	7440-44-0	B

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-2M **Lab ID: 60263132005** Collected: 01/30/18 16:15 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**149**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:30	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:30	7440-41-7	
Boron	**451**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:30	7440-42-8	
Calcium	**120000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:30	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:30	7440-48-4	
Iron	**4140**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:30	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:30	7439-92-1	
Lithium	**14.6**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:30	7439-93-2	
Magnesium	**29500**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:30	7439-95-4	
Manganese	**1400**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:30	7439-96-5	
Molybdenum	**59.9**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:30	7439-98-7	
Potassium	**10100**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:30	7440-09-7	
Sodium	**23500**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:30	7440-23-5	
Total Hardness by 2340B	**420000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:30		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.028J**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 13:53	7440-36-0	
Arsenic	**1.0**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 13:53	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 13:53	7440-43-9	
Chromium	**0.43J**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 13:53	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 13:53	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 18:23	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**263**	mg/L	20.0	4.9	1		02/05/18 12:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**563**	mg/L	5.0	5.0	1		02/02/18 17:00		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:05	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.6**	mg/L	2.0		2		02/08/18 15:44	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.10	1		02/06/18 18:19	16984-48-8	
Sulfate	**193**	mg/L	20.0		20		02/08/18 16:00	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**4.6J**	mg/L	10.0	3.1	1		02/07/18 15:28		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.0**	mg/L	1.0	0.13	1		02/06/18 13:59	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263132

Sample: S-ASD-2D **Lab ID: 60263132006** Collected: 01/30/18 15:30 Received: 02/01/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**128**	ug/L	5.0	0.91	1	02/02/18 12:00	02/06/18 16:32	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/02/18 12:00	02/06/18 16:32	7440-41-7	
Boron	**385**	ug/L	100	3.5	1	02/02/18 12:00	02/06/18 16:32	7440-42-8	
Calcium	**103000**	ug/L	100	36.0	1	02/02/18 12:00	02/06/18 16:32	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/02/18 12:00	02/06/18 16:32	7440-48-4	
Iron	**3060**	ug/L	50.0	12.4	1	02/02/18 12:00	02/06/18 16:32	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/02/18 12:00	02/06/18 16:32	7439-92-1	
Lithium	**12.4**	ug/L	10.0	2.9	1	02/02/18 12:00	02/06/18 16:32	7439-93-2	
Magnesium	**25800**	ug/L	50.0	15.4	1	02/02/18 12:00	02/06/18 16:32	7439-95-4	
Manganese	**918**	ug/L	5.0	1.8	1	02/02/18 12:00	02/06/18 16:32	7439-96-5	
Molybdenum	**46.3**	ug/L	20.0	1.3	1	02/02/18 12:00	02/06/18 16:32	7439-98-7	
Potassium	**5950**	ug/L	500	52.3	1	02/02/18 12:00	02/06/18 16:32	7440-09-7	
Sodium	**21400**	ug/L	500	28.4	1	02/02/18 12:00	02/06/18 16:32	7440-23-5	
Total Hardness by 2340B	**363000**	ug/L	500		1	02/02/18 12:00	02/06/18 16:32		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	02/02/18 12:00	02/06/18 14:07	7440-36-0	
Arsenic	**1.4**	ug/L	1.0	0.052	1	02/02/18 12:00	02/06/18 14:07	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/02/18 12:00	02/06/18 14:07	7440-43-9	
Chromium	**0.55J**	ug/L	1.0	0.054	1	02/02/18 12:00	02/06/18 14:07	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/02/18 12:00	02/06/18 14:07	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/02/18 12:00	02/07/18 18:28	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**249**	mg/L	20.0	4.9	1		02/05/18 12:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**482**	mg/L	5.0	5.0	1		02/02/18 17:01		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:05	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.9**	mg/L	2.0		2		02/08/18 16:14	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.10	1		02/06/18 18:33	16984-48-8	
Sulfate	**147**	mg/L	10.0		10		02/08/18 16:29	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.7J**	mg/L	10.0	3.1	1		02/07/18 15:28		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.9**	mg/L	1.0	0.13	1		02/06/18 14:11	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512995 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100228 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	02/05/18 14:59	

LABORATORY CONTROL SAMPLE: 2100229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100230 2100231

Parameter	Units	60263132003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.8	4.7	97	94	75-125	3	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512868 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2099494 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<0.91	5.0	0.91	02/06/18 16:12	
Beryllium	ug/L	<0.16	1.0	0.16	02/06/18 16:12	
Boron	ug/L	<3.5	100	3.5	02/06/18 16:12	
Calcium	ug/L	<36.0	100	36.0	02/06/18 16:12	
Cobalt	ug/L	<0.73	5.0	0.73	02/06/18 16:12	
Iron	ug/L	<12.4	50.0	12.4	02/06/18 16:12	
Lead	ug/L	<2.4	5.0	2.4	02/06/18 16:12	
Lithium	ug/L	<2.9	10.0	2.9	02/06/18 16:12	
Magnesium	ug/L	<15.4	50.0	15.4	02/06/18 16:12	
Manganese	ug/L	<1.8	5.0	1.8	02/06/18 16:12	
Molybdenum	ug/L	<1.3	20.0	1.3	02/06/18 16:12	
Potassium	ug/L	<52.3	500	52.3	02/06/18 16:12	
Sodium	ug/L	<28.4	500	28.4	02/06/18 16:12	
Total Hardness by 2340B	ug/L	34.0J	500		02/06/18 16:12	

LABORATORY CONTROL SAMPLE: 2099495

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Beryllium	ug/L	1000	1010	101	85-115	
Boron	ug/L	1000	982	98	85-115	
Calcium	ug/L	10000	9890	99	85-115	
Cobalt	ug/L	1000	1030	103	85-115	
Iron	ug/L	10000	10100	101	85-115	
Lead	ug/L	1000	991	99	85-115	
Lithium	ug/L	1000	995	100	85-115	
Magnesium	ug/L	10000	9870	99	85-115	
Manganese	ug/L	1000	995	100	85-115	
Molybdenum	ug/L	1000	1030	103	85-115	
Potassium	ug/L	10000	9850	99	85-115	
Sodium	ug/L	10000	9870	99	85-115	
Total Hardness by 2340B	ug/L		65400			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2099496 2099497

Parameter	Units	60263132003 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	1170	1170	104	104	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2099496 2099497

Parameter	Units	60263132003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Beryllium	ug/L	<0.16	1000	1000	1040	1040	104	104	70-130	0	20	
Boron	ug/L	1150	1000	1000	2150	2160	100	101	70-130	0	20	
Calcium	ug/L	107000	10000	10000	117000	117000	103	105	70-130	0	20	
Cobalt	ug/L	<0.73	1000	1000	1030	1030	103	103	70-130	0	20	
Iron	ug/L	8250	10000	10000	18300	18400	101	102	70-130	0	20	
Lead	ug/L	<2.4	1000	1000	998	1000	100	100	70-130	0	20	
Lithium	ug/L	22.7	1000	1000	1070	1080	105	105	70-130	0	20	
Magnesium	ug/L	20700	10000	10000	30100	30300	94	96	70-130	1	20	
Manganese	ug/L	624	1000	1000	1640	1640	101	102	70-130	0	20	
Molybdenum	ug/L	131	1000	1000	1190	1200	106	107	70-130	0	20	
Potassium	ug/L	5920	10000	10000	16200	16200	103	103	70-130	0	20	
Sodium	ug/L	24400	10000	10000	35000	35000	106	106	70-130	0	20	
Total Hardness by 2340B	ug/L	352000			416000	418000				0		

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512869 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2099499 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	02/06/18 13:14	
Arsenic	ug/L	<0.052	1.0	0.052	02/06/18 13:14	
Cadmium	ug/L	<0.018	0.50	0.018	02/06/18 13:14	
Chromium	ug/L	<0.054	1.0	0.054	02/06/18 13:14	
Selenium	ug/L	<0.086	1.0	0.086	02/06/18 13:14	
Thallium	ug/L	<0.036	1.0	0.036	02/07/18 17:35	

LABORATORY CONTROL SAMPLE: 2099500

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.0	97	85-115	
Arsenic	ug/L	40	38.7	97	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	39.4	98	85-115	
Selenium	ug/L	40	39.1	98	85-115	
Thallium	ug/L	40	38.7	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2099501 2099502

Parameter	Units	60263132003 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	39.5	39.6	99	99	70-130	0	20	
Arsenic	ug/L	0.49J	40	40	40.4	40.1	100	99	70-130	1	20	
Cadmium	ug/L	<0.018	40	40	38.8	38.6	97	97	70-130	0	20	
Chromium	ug/L	0.47J	40	40	39.6	39.7	98	98	70-130	0	20	
Selenium	ug/L	<0.086	40	40	37.2	37.4	93	93	70-130	0	20	
Thallium	ug/L	<0.036	40	40	40.5	40.7	101	102	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512971 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100167 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	02/05/18 10:00	

LABORATORY CONTROL SAMPLE: 2100168

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	502	100	90-110	

SAMPLE DUPLICATE: 2100169

Parameter	Units	60262900003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	82.1	83.5	2	10	

SAMPLE DUPLICATE: 2100170

Parameter	Units	60262900004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	82.7	85.1	3	10	

SAMPLE DUPLICATE: 2100171

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	217	222	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512821 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2099273 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/02/18 16:47	

LABORATORY CONTROL SAMPLE: 2099274

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1140	114	80-120	

SAMPLE DUPLICATE: 2099275

Parameter	Units	60263132004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1390	1360	2	10	

SAMPLE DUPLICATE: 2099276

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	459	445	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512975 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100177 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	02/05/18 14:59	

LABORATORY CONTROL SAMPLE: 2100178

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.54	107	80-120	

MATRIX SPIKE SAMPLE: 2100179

Parameter	Units	60263046001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	ND	.5	0.48	96	75-125	

SAMPLE DUPLICATE: 2100180

Parameter	Units	60263046002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	

SAMPLE DUPLICATE: 2100181

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	<0.0048	<0.0048		20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 513217 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100896 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.10	0.20	0.10	02/06/18 13:19	

LABORATORY CONTROL SAMPLE: 2100897

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: 2100898 2100899

Parameter	Units	60263132003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.30	2.5	2.5	3.1	3.2	112	114	80-120	2	15	

MATRIX SPIKE SAMPLE: 2100900

Parameter	Units	60262677005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.18J	2.5	3.0	114	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 513259 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263132001, 60263132002, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2101092 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	02/08/18 10:11	
Sulfate	mg/L	<0.50	1.0	0.50	02/08/18 10:11	

LABORATORY CONTROL SAMPLE: 2101093

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2101094 2101095

Parameter	Units	60263110001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	24.9	100	100	129	128	104	103	80-120	1	15	
Sulfate	mg/L	187	100	100	293	288	106	101	80-120	2	15	

MATRIX SPIKE SAMPLE: 2101096

Parameter	Units	60263110002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	<50.0	500	563	104	80-120	
Sulfate	mg/L	871	500	1460	117	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 513663 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263132003

METHOD BLANK: 2102590 Matrix: Water
Associated Lab Samples: 60263132003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.0J	1.0		02/10/18 20:06	
Sulfate	mg/L	0.0J	1.0		02/10/18 20:06	

LABORATORY CONTROL SAMPLE: 2102591

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102592 2102593

Parameter	Units	60263132003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	28.1	10	10	39.6	39.4	115	113	80-120	1	15	
Sulfate	mg/L	162	100	100	256	253	94	91	80-120	1	15	

MATRIX SPIKE SAMPLE: 2102594

Parameter	Units	60263000004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	3220	1000	4400	118	80-120	E

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 512813 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60263132001

METHOD BLANK: 2099254 Matrix: Water
Associated Lab Samples: 60263132001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	02/05/18 10:53	

LABORATORY CONTROL SAMPLE: 2099255

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	52.2	104	90-110	

MATRIX SPIKE SAMPLE: 2099256

Parameter	Units	60263016002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	199	100	307	108	90-110	

SAMPLE DUPLICATE: 2099257

Parameter	Units	60263016004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	<10.0	<3.1		25	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 513128 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100592 Matrix: Water
Associated Lab Samples: 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	02/07/18 15:15	

LABORATORY CONTROL SAMPLE: 2100593

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	49.5	99	90-110	

MATRIX SPIKE SAMPLE: 2100594

Parameter	Units	60262361008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	138	50	188	101	90-110	

MATRIX SPIKE SAMPLE: 2100596

Parameter	Units	60262802001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	356	250	697	136	90-110	M1

SAMPLE DUPLICATE: 2100595

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	6.7J	8.2J		25	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263132

QC Batch: 513134 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

METHOD BLANK: 2100609 Matrix: Water
Associated Lab Samples: 60263132001, 60263132002, 60263132003, 60263132004, 60263132005, 60263132006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.19J	1.0	0.13	02/06/18 09:58	

LABORATORY CONTROL SAMPLE: 2100610

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.6	111	80-120	

MATRIX SPIKE SAMPLE: 2100611

Parameter	Units	7581287001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	ND	5	6.9	123	80-120	M1

SAMPLE DUPLICATE: 2100612

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	1.7	1.7	1	25	

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
Pace Project No.: 60263132

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

SAMPLE QUALIFIERS

Sample: 60263132003

[1]	Run 2x & 20X for Cl & SO

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60263132

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263132001	**S-ASD-1S**	EPA 200.7	512868	EPA 200.7	512914
60263132002	**S-ASD-1M**	EPA 200.7	512868	EPA 200.7	512914
60263132003	**S-ASD-1D**	EPA 200.7	512868	EPA 200.7	512914
60263132004	**S-ASD-2S**	EPA 200.7	512868	EPA 200.7	512914
60263132005	**S-ASD-2M**	EPA 200.7	512868	EPA 200.7	512914
60263132006	**S-ASD-2D**	EPA 200.7	512868	EPA 200.7	512914
60263132001	**S-ASD-1S**	EPA 200.8	512869	EPA 200.8	512912
60263132002	**S-ASD-1M**	EPA 200.8	512869	EPA 200.8	512912
60263132003	**S-ASD-1D**	EPA 200.8	512869	EPA 200.8	512912
60263132004	**S-ASD-2S**	EPA 200.8	512869	EPA 200.8	512912
60263132005	**S-ASD-2M**	EPA 200.8	512869	EPA 200.8	512912
60263132006	**S-ASD-2D**	EPA 200.8	512869	EPA 200.8	512912
60263132001	**S-ASD-1S**	EPA 7470	512995	EPA 7470	513060
60263132002	**S-ASD-1M**	EPA 7470	512995	EPA 7470	513060
60263132003	**S-ASD-1D**	EPA 7470	512995	EPA 7470	513060
60263132004	**S-ASD-2S**	EPA 7470	512995	EPA 7470	513060
60263132005	**S-ASD-2M**	EPA 7470	512995	EPA 7470	513060
60263132006	**S-ASD-2D**	EPA 7470	512995	EPA 7470	513060
60263132001	**S-ASD-1S**	SM 2320B	512971		
60263132002	**S-ASD-1M**	SM 2320B	512971		
60263132003	**S-ASD-1D**	SM 2320B	512971		
60263132004	**S-ASD-2S**	SM 2320B	512971		
60263132005	**S-ASD-2M**	SM 2320B	512971		
60263132006	**S-ASD-2D**	SM 2320B	512971		
60263132001	**S-ASD-1S**	SM 2540C	512821		
60263132002	**S-ASD-1M**	SM 2540C	512821		
60263132003	**S-ASD-1D**	SM 2540C	512821		
60263132004	**S-ASD-2S**	SM 2540C	512821		
60263132005	**S-ASD-2M**	SM 2540C	512821		
60263132006	**S-ASD-2D**	SM 2540C	512821		
60263132001	**S-ASD-1S**	SM 4500-S-2 D	512975		
60263132002	**S-ASD-1M**	SM 4500-S-2 D	512975		
60263132003	**S-ASD-1D**	SM 4500-S-2 D	512975		
60263132004	**S-ASD-2S**	SM 4500-S-2 D	512975		
60263132005	**S-ASD-2M**	SM 4500-S-2 D	512975		
60263132006	**S-ASD-2D**	SM 4500-S-2 D	512975		
60263132001	**S-ASD-1S**	EPA 300.0	513217		
60263132001	**S-ASD-1S**	EPA 300.0	513259		
60263132002	**S-ASD-1M**	EPA 300.0	513217		
60263132002	**S-ASD-1M**	EPA 300.0	513259		
60263132003	**S-ASD-1D**	EPA 300.0	513217		
60263132003	**S-ASD-1D**	EPA 300.0	513663		
60263132004	**S-ASD-2S**	EPA 300.0	513217		

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
Pace Project No.: 60263132

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263132004	**S-ASD-2S**	EPA 300.0	513259		
60263132005	**S-ASD-2M**	EPA 300.0	513217		
60263132005	**S-ASD-2M**	EPA 300.0	513259		
60263132006	**S-ASD-2D**	EPA 300.0	513217		
60263132006	**S-ASD-2D**	EPA 300.0	513259		
60263132001	**S-ASD-1S**	EPA 410.4	512813		
60263132002	**S-ASD-1M**	EPA 410.4	513128		
60263132003	**S-ASD-1D**	EPA 410.4	513128		
60263132004	**S-ASD-2S**	EPA 410.4	513128		
60263132005	**S-ASD-2M**	EPA 410.4	513128		
60263132006	**S-ASD-2D**	EPA 410.4	513128		
60263132001	**S-ASD-1S**	SM 5310C	513134		
60263132002	**S-ASD-1M**	SM 5310C	513134		
60263132003	**S-ASD-1D**	SM 5310C	513134		
60263132004	**S-ASD-2S**	SM 5310C	513134		
60263132005	**S-ASD-2M**	SM 5310C	513134		
60263132006	**S-ASD-2D**	SM 5310C	513134		

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Sample Condition Upon Receipt

WO# : 60263132

60263132

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: CF+0.2 / CF -0.1 T-266 / T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 1.0 / 1.4 **Corr. Factor** CF+0.2 / CF -0.1 **Corrected** 1.2 / 1.6

Temperature should be above freezing to 6°C

Date and initials of person examining contents: JW 2/1/18

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	1L volume w/ ASD-1M arrived w/ ~50ml
Correct containers used:	☑Yes ☐No ☐N/A	of sample volume
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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Check 2/1/18 Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	820 South Main Street, Suite 100	Copy To:	Jeffrey Ingram	Company Name:	
	St Charles, MO 63301			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191	Fax: 636-724-9323	Project Name:	Ameren SEC	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153706.0003	Pace Profile #:	9285, line 4

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	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 + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	Ferrous Iron/Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-ASD-1S	W	G			1/31/18	1055		6	2	2	1		1				✓	✓		✓	✓	✓	✓	✓	✓	✓			60263132
2	S-ASD-1M						1335																						
3	S-ASD-1D						1510																						
4	S-ASD-2S					1/30/18	1210																						
5	S-ASD-2M						1615																						
6	S-ASD-2D						1530																						
7	S-ASD-1D-MS					1/31/18	1335																						
8	S-ASD-1D-MSD																												
9																													
10																													
11																													
12																													

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness	Golder	1/31/18	1635	PACE	1/31/18	1635	
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl	PACE	1/31/18	1700		01.1.18	0355	1-2 Y Y Y
• S-ASD-1M (14 vaptes) only ~400 mL due to no water							1-6 Y Y Y
650 mL total with both vaps bottles combined.							
• No Ferrous/Ferric Iron							

SAMPLER NAME AND SIGNATURE			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Eric Schneider					
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY): 01/31/18				

MEMORANDUM

Date:	March 23, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60263132**		

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.
- 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 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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/23/18

Laboratory: Pace Analytical
SDG #: 60263132

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-ASD-1S, S-ASD-1M, S-ASD-1D, S-ASD-2S, S-ASD-2M, S-ASD-2D

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	1/31/18
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)?	☑	☐	☐	TH(31.0), chloride(a0), sulfate(0.0), TOC(0.19)
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☑	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☑	☐	
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?	☐	☑	☐	COD, TOC
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☑	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-ASD-1S	Chloride	35.0	D	DF of 2
⊥	Sulfate	195	D	20
S-ASD-1M	Chloride	35.7	D	5
⊥	Sulfate	129	D	10
⊥	TOC	1.3	J	Blank; 10× Blank > Result > PQL
S-ASD-1D	TOC	1.7	J	⊥ ⊥
⊥	Chloride	28.1	D	DF of 2
⊥	Sulfate	162	D	20
S-ASD-2S	Chloride	654	D	50
⊥	Sulfate	54.3	D	5
⊥	TOC	1.0	U	Blank; PQL > Result > MDL
S-ASD-2M	Chloride	21.6	D	DF of 2
⊥	Sulfate	193	D	20
S-ASD-2D	Chloride	22.9	D	2
⊥	Sulfate	147	D	10

Signature: Tommy J. Goodwin Jr Date: 3/23/2018

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

February 12, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60263259

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on February 03, 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

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: AMEREN SEC
Pace Project No.: 60263259

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
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SAMPLE SUMMARY

Project: AMEREN SEC
Pace Project No.: 60263259

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60263259001	**S-ASD-6S**	Water	02/02/18 10:18	02/03/18 04:35
60263259002	**S-DUP-2**	Water	02/02/18 10:18	02/03/18 04:35

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263259

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60263259001	**S-ASD-6S**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263259002	**S-DUP-2**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	HMM	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263259

Sample: S-ASD-6S **Lab ID: 60263259001** Collected: 02/02/18 10:18 Received: 02/03/18 04:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**159**	ug/L	5.0	0.91	1	02/05/18 09:10	02/05/18 15:57	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/05/18 09:10	02/05/18 15:57	7440-41-7	
Boron	**5100**	ug/L	100	3.5	1	02/05/18 09:10	02/05/18 15:57	7440-42-8	
Calcium	**213000**	ug/L	100	36.0	1	02/05/18 09:10	02/05/18 15:57	7440-70-2	M1
Cobalt	**21.6**	ug/L	5.0	0.73	1	02/05/18 09:10	02/05/18 15:57	7440-48-4	
Iron	**2280**	ug/L	50.0	12.4	1	02/05/18 09:10	02/05/18 15:57	7439-89-6	
Lead	**3.3J**	ug/L	5.0	2.4	1	02/05/18 09:10	02/05/18 15:57	7439-92-1	
Lithium	**27.0**	ug/L	10.0	2.9	1	02/05/18 09:10	02/05/18 15:57	7439-93-2	
Magnesium	**60200**	ug/L	50.0	15.4	1	02/05/18 09:10	02/05/18 15:57	7439-95-4	
Manganese	**740**	ug/L	5.0	1.8	1	02/05/18 09:10	02/05/18 15:57	7439-96-5	
Molybdenum	**10.8J**	ug/L	20.0	1.3	1	02/05/18 09:10	02/05/18 15:57	7439-98-7	
Potassium	**7200**	ug/L	500	52.3	1	02/05/18 09:10	02/05/18 15:57	7440-09-7	
Sodium	**42900**	ug/L	500	28.4	1	02/05/18 09:10	02/05/18 15:57	7440-23-5	
Total Hardness by 2340B	**780000**	ug/L	500		1	02/05/18 09:10	02/05/18 15:57		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.24J**	ug/L	1.0	0.026	1	02/05/18 09:10	02/06/18 11:45	7440-36-0	
Arsenic	**0.37J**	ug/L	1.0	0.052	1	02/05/18 09:10	02/06/18 11:45	7440-38-2	
Cadmium	**0.29J**	ug/L	0.50	0.018	1	02/05/18 09:10	02/06/18 11:45	7440-43-9	
Chromium	**0.69J**	ug/L	1.0	0.054	1	02/05/18 09:10	02/06/18 11:45	7440-47-3	B
Selenium	**0.12J**	ug/L	1.0	0.086	1	02/05/18 09:10	02/06/18 11:45	7782-49-2	
Thallium	**0.064J**	ug/L	1.0	0.036	1	02/05/18 09:10	02/07/18 18:50	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:27	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**456**	mg/L	20.0	4.9	1		02/05/18 12:28		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1120**	mg/L	5.0	5.0	1		02/06/18 11:36		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:08	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**46.9**	mg/L	5.0	2.5	5		02/07/18 15:26	16887-00-6	
Fluoride	**0.82**	mg/L	0.20	0.10	1		02/07/18 15:12	16984-48-8	
Sulfate	**469**	mg/L	50.0		50		02/10/18 09:22	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**21.7**	mg/L	10.0	3.1	1		02/07/18 15:30		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**6.9**	mg/L	1.0	0.13	1		02/06/18 14:24	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263259

Sample: S-DUP-2 **Lab ID: 60263259002** Collected: 02/02/18 10:18 Received: 02/03/18 04:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**163**	ug/L	5.0	0.91	1	02/05/18 09:10	02/05/18 16:04	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/05/18 09:10	02/05/18 16:04	7440-41-7	
Boron	**5300**	ug/L	100	3.5	1	02/05/18 09:10	02/05/18 16:04	7440-42-8	
Calcium	**221000**	ug/L	100	36.0	1	02/05/18 09:10	02/05/18 16:04	7440-70-2	
Cobalt	**23.6**	ug/L	5.0	0.73	1	02/05/18 09:10	02/05/18 16:04	7440-48-4	
Iron	**2530**	ug/L	50.0	12.4	1	02/05/18 09:10	02/05/18 16:04	7439-89-6	
Lead	**2.8J**	ug/L	5.0	2.4	1	02/05/18 09:10	02/05/18 16:04	7439-92-1	
Lithium	**26.1**	ug/L	10.0	2.9	1	02/05/18 09:10	02/05/18 16:04	7439-93-2	
Magnesium	**61700**	ug/L	50.0	15.4	1	02/05/18 09:10	02/05/18 16:04	7439-95-4	
Manganese	**840**	ug/L	5.0	1.8	1	02/05/18 09:10	02/05/18 16:04	7439-96-5	
Molybdenum	**12.3J**	ug/L	20.0	1.3	1	02/05/18 09:10	02/05/18 16:04	7439-98-7	
Potassium	**7300**	ug/L	500	52.3	1	02/05/18 09:10	02/05/18 16:04	7440-09-7	
Sodium	**44000**	ug/L	500	28.4	1	02/05/18 09:10	02/05/18 16:04	7440-23-5	
Total Hardness by 2340B	**807000**	ug/L	500		1	02/05/18 09:10	02/05/18 16:04		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.36J**	ug/L	1.0	0.026	1	02/05/18 09:10	02/06/18 11:49	7440-36-0	
Arsenic	**0.44J**	ug/L	1.0	0.052	1	02/05/18 09:10	02/06/18 11:49	7440-38-2	
Cadmium	**0.33J**	ug/L	0.50	0.018	1	02/05/18 09:10	02/06/18 11:49	7440-43-9	
Chromium	**1.2**	ug/L	1.0	0.054	1	02/05/18 09:10	02/06/18 11:49	7440-47-3	
Selenium	**0.14J**	ug/L	1.0	0.086	1	02/05/18 09:10	02/06/18 11:49	7782-49-2	
Thallium	**0.065J**	ug/L	1.0	0.036	1	02/05/18 09:10	02/07/18 18:54	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/05/18 12:06	02/05/18 15:29	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**457**	mg/L	20.0	4.9	1		02/06/18 15:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1090**	mg/L	5.0	5.0	1		02/06/18 00:00		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/05/18 15:09	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**47.3**	mg/L	5.0	2.5	5		02/07/18 16:36	16887-00-6	
Fluoride	**0.82**	mg/L	0.20	0.10	1		02/07/18 16:22	16984-48-8	
Sulfate	**457**	mg/L	50.0		50		02/10/18 10:33	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**25.5**	mg/L	10.0	3.1	1		02/07/18 15:30		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**7.3**	mg/L	1.0	0.13	1		02/06/18 15:02	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 512995 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100228 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	02/05/18 14:59	

LABORATORY CONTROL SAMPLE: 2100229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100230 2100231

Parameter	Units	60263132003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.8	4.7	97	94	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 512988
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100207
Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<0.91	5.0	0.91	02/05/18 15:51	
Beryllium	ug/L	<0.16	1.0	0.16	02/05/18 15:51	
Boron	ug/L	<3.5	100	3.5	02/05/18 15:51	
Calcium	ug/L	<36.0	100	36.0	02/05/18 15:51	
Cobalt	ug/L	<0.73	5.0	0.73	02/05/18 15:51	
Iron	ug/L	<12.4	50.0	12.4	02/05/18 15:51	
Lead	ug/L	<2.4	5.0	2.4	02/05/18 15:51	
Lithium	ug/L	<2.9	10.0	2.9	02/05/18 15:51	
Magnesium	ug/L	<15.4	50.0	15.4	02/05/18 15:51	
Manganese	ug/L	<1.8	5.0	1.8	02/05/18 15:51	
Molybdenum	ug/L	<1.3	20.0	1.3	02/05/18 15:51	
Potassium	ug/L	<52.3	500	52.3	02/05/18 15:51	
Sodium	ug/L	<28.4	500	28.4	02/05/18 15:51	
Total Hardness by 2340B	ug/L	30.2J	500		02/05/18 15:51	

LABORATORY CONTROL SAMPLE: 2100208

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	943	94	85-115	
Beryllium	ug/L	1000	959	96	85-115	
Boron	ug/L	1000	920	92	85-115	
Calcium	ug/L	10000	9450	94	85-115	
Cobalt	ug/L	1000	970	97	85-115	
Iron	ug/L	10000	9580	96	85-115	
Lead	ug/L	1000	961	96	85-115	
Lithium	ug/L	1000	928	93	85-115	
Magnesium	ug/L	10000	9440	94	85-115	
Manganese	ug/L	1000	951	95	85-115	
Molybdenum	ug/L	1000	957	96	85-115	
Potassium	ug/L	10000	9150	91	85-115	
Sodium	ug/L	10000	9130	91	85-115	
Total Hardness by 2340B	ug/L		62500			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100209 2100210

Parameter	Units	60263259001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	159	1000	1000	1040	1150	89	99	70-130	9	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100209 2100210

Parameter	Units	60263259001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Beryllium	ug/L	<0.16	1000	1000	876	974	88	97	70-130	11	20	
Boron	ug/L	5100	1000	1000	5860	5990	76	89	70-130	2	20	
Calcium	ug/L	213000	10000	10000	218000	218000	46	45	70-130	0	20	M1
Cobalt	ug/L	21.6	1000	1000	890	991	87	97	70-130	11	20	
Iron	ug/L	2280	10000	10000	11000	12000	87	97	70-130	8	20	
Lead	ug/L	3.3J	1000	1000	878	974	87	97	70-130	10	20	
Lithium	ug/L	27.0	1000	1000	940	1050	91	102	70-130	11	20	
Magnesium	ug/L	60200	10000	10000	67600	68400	73	82	70-130	1	20	
Manganese	ug/L	740	1000	1000	1590	1690	85	95	70-130	6	20	
Molybdenum	ug/L	10.8J	1000	1000	905	1010	89	100	70-130	11	20	
Potassium	ug/L	7200	10000	10000	16000	17000	88	98	70-130	6	20	
Sodium	ug/L	42900	10000	10000	50900	51900	80	90	70-130	2	20	
Total Hardness by 2340B	ug/L	780000			822000	825000				0		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 512989 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100211 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	02/06/18 11:31	
Arsenic	ug/L	<0.052	1.0	0.052	02/06/18 11:31	
Cadmium	ug/L	<0.018	0.50	0.018	02/06/18 11:31	
Chromium	ug/L	0.074J	1.0	0.054	02/06/18 11:31	
Selenium	ug/L	<0.086	1.0	0.086	02/06/18 11:31	
Thallium	ug/L	<0.036	1.0	0.036	02/07/18 18:32	

LABORATORY CONTROL SAMPLE: 2100212

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.1	98	85-115	
Arsenic	ug/L	40	38.4	96	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	38.8	97	85-115	
Selenium	ug/L	40	39.2	98	85-115	
Thallium	ug/L	40	39.5	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2100213 2100214

Parameter	Units	60263259002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.36J	40	40	40.4	39.7	100	98	70-130	2	20	
Arsenic	ug/L	0.44J	40	40	39.7	39.1	98	97	70-130	2	20	
Cadmium	ug/L	0.33J	40	40	39.5	38.9	98	96	70-130	2	20	
Chromium	ug/L	1.2	40	40	40.0	39.6	97	96	70-130	1	20	
Selenium	ug/L	0.14J	40	40	37.8	37.2	94	93	70-130	2	20	
Thallium	ug/L	0.065J	40	40	41.5	40.6	104	101	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 512971
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60263259001

METHOD BLANK: 2100167 Matrix: Water
Associated Lab Samples: 60263259001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	02/05/18 10:00	

LABORATORY CONTROL SAMPLE: 2100168

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	502	100	90-110	

SAMPLE DUPLICATE: 2100169

Parameter	Units	60262900003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	82.1	83.5	2	10	

SAMPLE DUPLICATE: 2100170

Parameter	Units	60262900004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	82.7	85.1	3	10	

SAMPLE DUPLICATE: 2100171

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	217	222	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513181 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60263259002

METHOD BLANK: 2100722 Matrix: Water
Associated Lab Samples: 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	02/06/18 15:09	

LABORATORY CONTROL SAMPLE: 2100723

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

SAMPLE DUPLICATE: 2100724

Parameter	Units	60262361001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	79.0	81.4	3	10	H1

SAMPLE DUPLICATE: 2100725

Parameter	Units	60263109003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	92.6	89.4	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513114 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100543 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/06/18 11:34	

LABORATORY CONTROL SAMPLE: 2100544

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1140	114	80-120	

SAMPLE DUPLICATE: 2100545

Parameter	Units	60263143001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2550	2590	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 512975 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100177 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	02/05/18 14:59	

LABORATORY CONTROL SAMPLE: 2100178

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.54	107	80-120	

MATRIX SPIKE SAMPLE: 2100179

Parameter	Units	60263046001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	ND	.5	0.48	96	75-125	

SAMPLE DUPLICATE: 2100180

Parameter	Units	60263046002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	

SAMPLE DUPLICATE: 2100181

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	<0.0048	<0.0048		20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513260 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2101099 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	02/07/18 12:23	
Fluoride	mg/L	<0.10	0.20	0.10	02/07/18 12:23	

LABORATORY CONTROL SAMPLE: 2101100

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2101101 2101102

Parameter	Units	60263200001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2140	1000	1000	3430	3410	129	127	80-120	1	15	M1
Fluoride	mg/L	ND	500	500	566	568	109	109	80-120	0	15	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513560 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2102169 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	0.0J	1.0		02/10/18 08:12	

LABORATORY CONTROL SAMPLE: 2102170

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.2	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102171 2102172

Parameter	Units	60263259001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	469	250	250	711	714	97	98	80-120	0	15	

MATRIX SPIKE SAMPLE: 2102173

Parameter	Units	60263259002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	457	250	719	105	80-120	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513128 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100592 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	02/07/18 15:15	

LABORATORY CONTROL SAMPLE: 2100593

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	49.5	99	90-110	

MATRIX SPIKE SAMPLE: 2100594

Parameter	Units	60262361008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	138	50	188	101	90-110	

MATRIX SPIKE SAMPLE: 2100596

Parameter	Units	60262802001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	356	250	697	136	90-110	M1

SAMPLE DUPLICATE: 2100595

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	6.7J	8.2J		25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263259

QC Batch: 513134 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60263259001, 60263259002

METHOD BLANK: 2100609 Matrix: Water
Associated Lab Samples: 60263259001, 60263259002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	0.19J	1.0	0.13	02/06/18 09:58	

LABORATORY CONTROL SAMPLE: 2100610

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	5.6	111	80-120	

MATRIX SPIKE SAMPLE: 2100611

Parameter	Units	7581287001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	ND	5	6.9	123	80-120	M1

SAMPLE DUPLICATE: 2100612

Parameter	Units	60263132003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	1.7	1.7	1	25	

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
Pace Project No.: 60263259

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

B	Analyte was detected in the associated method blank.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60263259

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263259001	**S-ASD-6S**	EPA 200.7	512988	EPA 200.7	513056
60263259002	**S-DUP-2**	EPA 200.7	512988	EPA 200.7	513056
60263259001	**S-ASD-6S**	EPA 200.8	512989	EPA 200.8	513057
60263259002	**S-DUP-2**	EPA 200.8	512989	EPA 200.8	513057
60263259001	**S-ASD-6S**	EPA 7470	512995	EPA 7470	513060
60263259002	**S-DUP-2**	EPA 7470	512995	EPA 7470	513060
60263259001	**S-ASD-6S**	SM 2320B	512971		
60263259002	**S-DUP-2**	SM 2320B	513181		
60263259001	**S-ASD-6S**	SM 2540C	513114		
60263259002	**S-DUP-2**	SM 2540C	513114		
60263259001	**S-ASD-6S**	SM 4500-S-2 D	512975		
60263259002	**S-DUP-2**	SM 4500-S-2 D	512975		
60263259001	**S-ASD-6S**	EPA 300.0	513260		
60263259001	**S-ASD-6S**	EPA 300.0	513560		
60263259002	**S-DUP-2**	EPA 300.0	513260		
60263259002	**S-DUP-2**	EPA 300.0	513560		
60263259001	**S-ASD-6S**	EPA 410.4	513128		
60263259002	**S-DUP-2**	EPA 410.4	513128		
60263259001	**S-ASD-6S**	SM 5310C	513134		
60263259002	**S-DUP-2**	SM 5310C	513134		

Pace Analytical®
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60263259

60263259

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: CF +0.2 / CF -0.1 T-266 / T-239 **Type of Ice:** (Wet) Blue None

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

Date and initials of person examining contents: NMO 2/3

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☐No ☑N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	
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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

WO#: 60263259

PM: JLS **Due Date: 02/12/18**

CLIENT: GOLDER STL

Pace Analy www.pac

-CUSTODY / Analytical Request Document

ody 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			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren SEC	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:		Pace Profile #:	9285, line 4

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	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 + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Y/N Analysis Test: 200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	Ferrous Iron/Ferric Iron (2)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-ASD-GS	DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WP, AR, OT, TS	W	G			2/2/18	1018		6	2	2	1		1				✓	✓	✓	✓	✓	✓	✓	✓	/		
2	S-DUP-2		W	G			1	—		6	2	2	1		1				✓	✓	✓	✓	✓	✓	✓	✓	/		
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn Hardness	Tommy Haddock/Golder	2/2/18	16:10		2/2/18	16:10				
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl		2/2/18	1700		2/13/18	0435	2.5	Y	Y	Y
No ferrous/ferric iron										

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Eric Schneider				
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 2/2/18				

MEMORANDUM

Date:	March 26, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60263259**		

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.
- 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 or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/26/18

Laboratory: Pace Analytical
SDG #: 60263259

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS, 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste
Sample Names: S-ASD-65, S-DUP-2

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	2/2/18
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)?	☑	☐	☐	TH(30.2), Cr(0.074), TOC(0.19)
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☑	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☑	☐	☐	DUP-2 @ ASD-65
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Sb(40), Cr+(54)
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?	☐	☑	☐	Ca, COD, TOC
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☐	☑	☐	Ca
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-ASD-6S	Sb(t)	0.24	J	RPD exceeded limit; Result > MDL
↓	Cr(t)	1.0	UJ	RPD exceeded limit; PQL > Result > MDL; Detected in Blank
↓	Chloride	46.9	D	DF of 5
↓	Sulfate	469	D	50
S-DUP-2	Chloride	47.3	D	5
↓	Sulfate	457	D	50
↓	Sb(t)	0.36	J	RPD exceeded limit; Result > MDL
↓	Cr(t)	1.2	J	↓ ↓

Signature: Tommy J. Hood Jr. Date: 3/26/2018

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

February 16, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60263615

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on February 08, 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
Pace Project No.: 60263615

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
Pace Project No.: 60263615

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60263615001	**S-ASD-6D**	Water	02/05/18 12:27	02/08/18 04:50
60263615002	**S-FB2**	Water	02/05/18 14:15	02/08/18 04:50
60263615003	**S-ASD-6M**	Water	02/05/18 16:05	02/08/18 04:50

Pace Analytical Services, LLC
9608 Loiret Blvd.
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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263615

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60263615001	**S-ASD-6D**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263615002	**S-FB2**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263615003	**S-ASD-6M**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	TDS	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263615

Sample: S-ASD-6D **Lab ID: 60263615001** Collected: 02/05/18 12:27 Received: 02/08/18 04:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**109**	ug/L	5.0	0.91	1	02/09/18 15:20	02/12/18 18:55	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/09/18 15:20	02/12/18 18:55	7440-41-7	
Boron	**1980**	ug/L	100	3.5	1	02/09/18 15:20	02/12/18 18:55	7440-42-8	
Calcium	**107000**	ug/L	100	36.0	1	02/09/18 15:20	02/12/18 18:55	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/09/18 15:20	02/12/18 18:55	7440-48-4	
Iron	**7230**	ug/L	50.0	12.4	1	02/09/18 15:20	02/12/18 18:55	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/09/18 15:20	02/12/18 18:55	7439-92-1	
Lithium	**40.1**	ug/L	10.0	2.9	1	02/09/18 15:20	02/12/18 18:55	7439-93-2	
Magnesium	**22800**	ug/L	50.0	15.4	1	02/09/18 15:20	02/12/18 18:55	7439-95-4	
Manganese	**728**	ug/L	5.0	1.8	1	02/09/18 15:20	02/12/18 18:55	7439-96-5	
Molybdenum	**172**	ug/L	20.0	1.3	1	02/09/18 15:20	02/12/18 18:55	7439-98-7	
Potassium	**7310**	ug/L	500	52.3	1	02/09/18 15:20	02/12/18 18:55	7440-09-7	
Sodium	**29000**	ug/L	500	28.4	1	02/09/18 15:20	02/12/18 18:55	7440-23-5	
Total Hardness by 2340B	**362000**	ug/L	500		1	02/09/18 15:20	02/12/18 18:55		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	02/09/18 15:20	02/12/18 15:02	7440-36-0	
Arsenic	**0.24J**	ug/L	1.0	0.052	1	02/09/18 15:20	02/12/18 15:02	7440-38-2	
Cadmium	**0.018J**	ug/L	0.50	0.018	1	02/09/18 15:20	02/12/18 15:02	7440-43-9	
Chromium	**0.63J**	ug/L	1.0	0.054	1	02/09/18 15:20	02/12/18 15:02	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/09/18 15:20	02/12/18 15:02	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/09/18 15:20	02/12/18 15:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/13/18 15:35	02/14/18 10:03	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**203**	mg/L	20.0	4.9	1		02/12/18 11:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**596**	mg/L	5.0	5.0	1		02/12/18 13:23		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/09/18 15:55	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**31.4**	mg/L	5.0	2.5	5		02/11/18 22:05	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.10	1		02/11/18 21:51	16984-48-8	
Sulfate	**208**	mg/L	50.0	25.0	50		02/11/18 22:19	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.3J**	mg/L	10.0	3.1	1		02/13/18 14:58		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.3**	mg/L	1.0	0.13	1		02/12/18 11:52	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263615

Sample: S-FB2 **Lab ID: 60263615002** Collected: 02/05/18 14:15 Received: 02/08/18 04:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**<0.91**	ug/L	5.0	0.91	1	02/09/18 15:20	02/12/18 19:02	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/09/18 15:20	02/12/18 19:02	7440-41-7	
Boron	**6.0J**	ug/L	100	3.5	1	02/09/18 15:20	02/12/18 19:02	7440-42-8	
Calcium	**<36.0**	ug/L	100	36.0	1	02/09/18 15:20	02/12/18 19:02	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/09/18 15:20	02/12/18 19:02	7440-48-4	
Iron	**<12.4**	ug/L	50.0	12.4	1	02/09/18 15:20	02/12/18 19:02	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/09/18 15:20	02/12/18 19:02	7439-92-1	
Lithium	**<2.9**	ug/L	10.0	2.9	1	02/09/18 15:20	02/12/18 19:02	7439-93-2	
Magnesium	**<15.4**	ug/L	50.0	15.4	1	02/09/18 15:20	02/12/18 19:02	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	02/09/18 15:20	02/12/18 19:02	7439-96-5	
Molybdenum	**<1.3**	ug/L	20.0	1.3	1	02/09/18 15:20	02/12/18 19:02	7439-98-7	
Potassium	**<52.3**	ug/L	500	52.3	1	02/09/18 15:20	02/12/18 19:02	7440-09-7	
Sodium	**264J**	ug/L	500	28.4	1	02/09/18 15:20	02/12/18 19:02	7440-23-5	
Total Hardness by 2340B	**87.6J**	ug/L	500		1	02/09/18 15:20	02/12/18 19:02		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	02/09/18 15:20	02/12/18 15:07	7440-36-0	
Arsenic	**<0.052**	ug/L	1.0	0.052	1	02/09/18 15:20	02/12/18 15:07	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/09/18 15:20	02/12/18 15:07	7440-43-9	
Chromium	**0.16J**	ug/L	1.0	0.054	1	02/09/18 15:20	02/12/18 15:07	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/09/18 15:20	02/12/18 15:07	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/09/18 15:20	02/12/18 15:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/13/18 15:35	02/14/18 10:05	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		02/12/18 11:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**10**	mg/L	5.0	5.0	1		02/12/18 13:23		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/09/18 15:55	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	1.0	0.50	1		02/11/18 22:33	16887-00-6	
Fluoride	**<0.10**	mg/L	0.20	0.10	1		02/11/18 22:33	16984-48-8	
Sulfate	**<0.50**	mg/L	1.0	0.50	1		02/11/18 22:33	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		02/13/18 14:58		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**<0.13**	mg/L	1.0	0.13	1		02/12/18 12:05	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263615

Sample: S-ASD-6M **Lab ID: 60263615003** Collected: 02/05/18 16:05 Received: 02/08/18 04:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Barium	**95.8**	ug/L	5.0	0.91	1	02/09/18 15:20	02/12/18 19:04	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/09/18 15:20	02/12/18 19:04	7440-41-7	
Boron	**4110**	ug/L	100	3.5	1	02/09/18 15:20	02/12/18 19:04	7440-42-8	
Calcium	**120000**	ug/L	100	36.0	1	02/09/18 15:20	02/12/18 19:04	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/09/18 15:20	02/12/18 19:04	7440-48-4	
Iron	**8090**	ug/L	50.0	12.4	1	02/09/18 15:20	02/12/18 19:04	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/09/18 15:20	02/12/18 19:04	7439-92-1	
Lithium	**46.2**	ug/L	10.0	2.9	1	02/09/18 15:20	02/12/18 19:04	7439-93-2	
Magnesium	**28300**	ug/L	50.0	15.4	1	02/09/18 15:20	02/12/18 19:04	7439-95-4	
Manganese	**747**	ug/L	5.0	1.8	1	02/09/18 15:20	02/12/18 19:04	7439-96-5	
Molybdenum	**551**	ug/L	20.0	1.3	1	02/09/18 15:20	02/12/18 19:04	7439-98-7	
Potassium	**6320**	ug/L	500	52.3	1	02/09/18 15:20	02/12/18 19:04	7440-09-7	
Sodium	**48800**	ug/L	500	28.4	1	02/09/18 15:20	02/12/18 19:04	7440-23-5	
Total Hardness by 2340B	**418000**	ug/L	500		1	02/09/18 15:20	02/12/18 19:04		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.10J**	ug/L	1.0	0.026	1	02/09/18 15:20	02/12/18 15:11	7440-36-0	B
Arsenic	**0.78J**	ug/L	1.0	0.052	1	02/09/18 15:20	02/12/18 15:11	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/09/18 15:20	02/12/18 15:11	7440-43-9	
Chromium	**2.9**	ug/L	1.0	0.054	1	02/09/18 15:20	02/12/18 15:11	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/09/18 15:20	02/12/18 15:11	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/09/18 15:20	02/12/18 15:11	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/13/18 15:35	02/14/18 10:07	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**212**	mg/L	20.0	4.9	1		02/12/18 11:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**699**	mg/L	5.0	5.0	1		02/12/18 13:24		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/09/18 15:56	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**35.5**	mg/L	5.0	2.5	5		02/11/18 23:28	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.10	1		02/11/18 23:14	16984-48-8	
Sulfate	**329**	mg/L	50.0	25.0	50		02/11/18 23:42	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.0J**	mg/L	10.0	3.1	1		02/13/18 14:59		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.9**	mg/L	1.0	0.13	1		02/12/18 12:17	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 514030 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2104025 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	02/14/18 09:35	

LABORATORY CONTROL SAMPLE: 2104026

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2104027 2104028

Parameter	Units	60263615001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.9	4.7	98	94	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513626 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102405 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<0.91	5.0	0.91	02/12/18 18:34	
Beryllium	ug/L	<0.16	1.0	0.16	02/12/18 18:34	
Boron	ug/L	5.6J	100	3.5	02/12/18 18:34	
Calcium	ug/L	<36.0	100	36.0	02/12/18 18:34	
Cobalt	ug/L	<0.73	5.0	0.73	02/12/18 18:34	
Iron	ug/L	<12.4	50.0	12.4	02/12/18 18:34	
Lead	ug/L	<2.4	5.0	2.4	02/12/18 18:34	
Lithium	ug/L	<2.9	10.0	2.9	02/12/18 18:34	
Magnesium	ug/L	<15.4	50.0	15.4	02/12/18 18:34	
Manganese	ug/L	<1.8	5.0	1.8	02/12/18 18:34	
Molybdenum	ug/L	<1.3	20.0	1.3	02/12/18 18:34	
Potassium	ug/L	78.1J	500	52.3	02/12/18 18:34	
Sodium	ug/L	285J	500	28.4	02/12/18 18:34	
Total Hardness by 2340B	ug/L	33.1J	500		02/12/18 18:34	

LABORATORY CONTROL SAMPLE: 2102406

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1040	104	85-115	
Beryllium	ug/L	1000	1020	102	85-115	
Boron	ug/L	1000	976	98	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Cobalt	ug/L	1000	1060	106	85-115	
Iron	ug/L	10000	10300	103	85-115	
Lead	ug/L	1000	1030	103	85-115	
Lithium	ug/L	1000	1040	104	85-115	
Magnesium	ug/L	10000	9790	98	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Molybdenum	ug/L	1000	1030	103	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10200	102	85-115	
Total Hardness by 2340B	ug/L		65800			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102407 2102408

Parameter	Units	60263420001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	35.6	1000	1000	1170	1160	114	112	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102407 2102408

Parameter	Units	60263420001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Beryllium	ug/L	ND	1000	1000	1030	1030	103	103	70-130	0	20	
Boron	ug/L	ND	1000	1000	1660	1640	165	163	70-130	1	20	M1
Calcium	ug/L	61900	10000	10000	67500	68300	56	64	70-130	1	20	M1
Cobalt	ug/L	ND	1000	1000	1050	1050	105	105	70-130	0	20	
Iron	ug/L	ND	10000	10000	10300	10400	103	104	70-130	1	20	
Lead	ug/L	ND	1000	1000	1020	1010	101	101	70-130	0	20	
Lithium	ug/L	ND	1000	1000	1040	1050	104	105	70-130	1	20	
Magnesium	ug/L	38100	10000	10000	22000	21800	-161	-163	70-130	1	20	M1
Manganese	ug/L	ND	1000	1000	1110	1100	111	110	70-130	1	20	
Molybdenum	ug/L	ND	1000	1000	1060	1050	105	105	70-130	0	20	
Potassium	ug/L	851	10000	10000	16600	16600	157	158	70-130	0	20	M1
Sodium	ug/L	4950	10000	10000	28200	28100	232	232	70-130	0	20	M1
Total Hardness by 2340B	ug/L	311000			259000	260000				1		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513627 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102409 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	0.055J	1.0	0.026	02/12/18 14:06	
Arsenic	ug/L	<0.052	1.0	0.052	02/12/18 14:06	
Cadmium	ug/L	<0.018	0.50	0.018	02/12/18 14:06	
Chromium	ug/L	<0.054	1.0	0.054	02/12/18 14:06	
Selenium	ug/L	<0.086	1.0	0.086	02/12/18 14:06	
Thallium	ug/L	0.039J	1.0	0.036	02/12/18 14:06	

LABORATORY CONTROL SAMPLE: 2102410

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.2	98	85-115	
Arsenic	ug/L	40	39.1	98	85-115	
Cadmium	ug/L	40	40.4	101	85-115	
Chromium	ug/L	40	40.1	100	85-115	
Selenium	ug/L	40	37.6	94	85-115	
Thallium	ug/L	40	39.1	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102411 2102412

Parameter	Units	60263326001 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	38.6	38.3	97	96	70-130	1	20	
Arsenic	ug/L	ND	40	40	39.1	38.3	98	96	70-130	2	20	
Cadmium	ug/L	ND	40	40	39.4	39.4	98	98	70-130	0	20	
Chromium	ug/L	ND	40	40	40.4	39.5	101	98	70-130	2	20	
Selenium	ug/L	ND	40	40	37.2	36.6	93	91	70-130	2	20	
Thallium	ug/L	ND	40	40	39.3	40.3	98	101	70-130	2	20	

MATRIX SPIKE SAMPLE: 2102413

Parameter	Units	60263602001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	151	40	190	98	70-130	
Arsenic	ug/L	23.8	40	62.0	95	70-130	
Cadmium	ug/L	6.6	40	40.2	84	70-130	
Chromium	ug/L	10	40	47.1	93	70-130	
Selenium	ug/L	550	40	595	112	70-130	
Thallium	ug/L	18.6	40	53.2	87	70-130	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513679 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102627 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	02/12/18 09:58	

LABORATORY CONTROL SAMPLE: 2102628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	506	101	90-110	

SAMPLE DUPLICATE: 2102629

Parameter	Units	60263042001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	422	434	3	10	

SAMPLE DUPLICATE: 2102630

Parameter	Units	60263615001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	203	208	2	10	

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

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513757 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102911 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/12/18 13:20	

LABORATORY CONTROL SAMPLE: 2102912

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1100	110	80-120	

SAMPLE DUPLICATE: 2102913

Parameter	Units	60263659001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	24000	31800	28	10	D6,H3

SAMPLE DUPLICATE: 2102914

Parameter	Units	60263446001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4820	4410	9	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513579 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102250 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	02/09/18 15:52	

LABORATORY CONTROL SAMPLE: 2102251

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.48	95	80-120	

MATRIX SPIKE SAMPLE: 2102252

Parameter	Units	60263197002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	ND	.5	0.28	57	75-125	H1,M1

SAMPLE DUPLICATE: 2102253

Parameter	Units	60263327001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513668 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102595 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	0.50	02/11/18 14:12	
Fluoride	mg/L	<0.10	0.20	0.10	02/11/18 14:12	
Sulfate	mg/L	<0.50	1.0	0.50	02/11/18 14:12	

LABORATORY CONTROL SAMPLE: 2102596

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2102597 2102598

Parameter	Units	60263107004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	87.3	50	50	143	142	112	110	80-120	1	15	
Fluoride	mg/L	ND	25	25	28.1	27.8	110	109	80-120	1	15	
Sulfate	mg/L	96.0	50	50	151	150	110	107	80-120	1	15	

MATRIX SPIKE SAMPLE: 2102599

Parameter	Units	60263331001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	62.5	25	91.8	117	80-120	
Fluoride	mg/L	<0.50	12.5	14.7	113	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513681 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102633 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	02/13/18 14:49	

LABORATORY CONTROL SAMPLE: 2102634

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	53.3	107	90-110	

MATRIX SPIKE SAMPLE: 2102635

Parameter	Units	60263641001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	26.4	50	78.9	105	90-110	

SAMPLE DUPLICATE: 2102636

Parameter	Units	60263643001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	ND	<3.1		25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263615

QC Batch: 513673 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60263615001, 60263615002, 60263615003

METHOD BLANK: 2102610 Matrix: Water
Associated Lab Samples: 60263615001, 60263615002, 60263615003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	<0.13	1.0	0.13	02/12/18 09:07	

LABORATORY CONTROL SAMPLE: 2102611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.8	95	80-120	

MATRIX SPIKE SAMPLE: 2102612

Parameter	Units	7581599001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	4.9	5	10.9	120	80-120	

SAMPLE DUPLICATE: 2102613

Parameter	Units	7581599002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	3.0	3.0	1	25	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALIFIERS

Project: AMEREN SEC
Pace Project No.: 60263615

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

B	Analyte was detected in the associated method blank.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
H1	Analysis conducted outside the EPA method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60263615

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263615001	**S-ASD-6D**	EPA 200.7	513626	EPA 200.7	513645
60263615002	**S-FB2**	EPA 200.7	513626	EPA 200.7	513645
60263615003	**S-ASD-6M**	EPA 200.7	513626	EPA 200.7	513645
60263615001	**S-ASD-6D**	EPA 200.8	513627	EPA 200.8	513646
60263615002	**S-FB2**	EPA 200.8	513627	EPA 200.8	513646
60263615003	**S-ASD-6M**	EPA 200.8	513627	EPA 200.8	513646
60263615001	**S-ASD-6D**	EPA 7470	514030	EPA 7470	514048
60263615002	**S-FB2**	EPA 7470	514030	EPA 7470	514048
60263615003	**S-ASD-6M**	EPA 7470	514030	EPA 7470	514048
60263615001	**S-ASD-6D**	SM 2320B	513679		
60263615002	**S-FB2**	SM 2320B	513679		
60263615003	**S-ASD-6M**	SM 2320B	513679		
60263615001	**S-ASD-6D**	SM 2540C	513757		
60263615002	**S-FB2**	SM 2540C	513757		
60263615003	**S-ASD-6M**	SM 2540C	513757		
60263615001	**S-ASD-6D**	SM 4500-S-2 D	513579		
60263615002	**S-FB2**	SM 4500-S-2 D	513579		
60263615003	**S-ASD-6M**	SM 4500-S-2 D	513579		
60263615001	**S-ASD-6D**	EPA 300.0	513668		
60263615002	**S-FB2**	EPA 300.0	513668		
60263615003	**S-ASD-6M**	EPA 300.0	513668		
60263615001	**S-ASD-6D**	EPA 410.4	513681		
60263615002	**S-FB2**	EPA 410.4	513681		
60263615003	**S-ASD-6M**	EPA 410.4	513681		
60263615001	**S-ASD-6D**	SM 5310C	513673		
60263615002	**S-FB2**	SM 5310C	513673		
60263615003	**S-ASD-6M**	SM 5310C	513673		

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Sample Condition Upon Receipt

WO# : 60263615

60263615

Client Name: Gadler Assoc.

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

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

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

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

Thermometer Used: T-266 / T-239 (CF +0.2 / CF -0.1) **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2-0 **Corr. Factor** CF +0.2 CF -0.1 **Corrected** 2.2

Date and initials of person examining contents: 2/8/18

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? (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	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jami Check 2/9/18

Project Manager Review: _____ Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

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			Address:	
Email To:	maddock@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191	Fax: 636-724-9323	Project Name:	Ameren SEC	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	1531406.0003	Pace Profile #:	9285, line 4

REGULATORY AGENCY: NPDES | GROUND WATER | DRINKING WATER | UST | RCRA | OTHER ____

Site Location STATE: MO

Section D Required Client Information

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

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID		MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	TIME	COMPOSITE END/GRAB DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test	200.7/200.8 Metals* + Hg	200.7/200.8 Metals, Diss.	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	~~Ferrous Iron/Ferric Iron~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60263615
1	5-ASD-6D	BP4U, BP3N	W	G	BP32		2/5/18	1227		6	1	2	1		1	BP3S				✓	[redacted]	✓	✓	✓	✓	✓	✓		BP3U, AG3S	001
2	5-FB2	↓	↓	↓	↓		↓	1415		↓	↓	↓	↓		↓	↓				↓		↓	↓	↓	↓	↓	↓		↓	002
3	5-ASD-6A	↓	↓	↓	↓		↓	1605		↓	↓	↓	↓		↓	↓				↓		↓	↓	↓	↓	↓	↓		↓	003
4																					JV2									
5																														
6																														
7																														
8																														
9																														
10																														
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: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness	[signature] Golder	2/7/18	10:15	[signature]	2/7/18	10:15				
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl	[signature]	2/7/18	1700	E Brockett / Pace	2/8/18	0450	2.0	Y	Y	Y

SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 02/07/18

MEMORANDUM

Date:	March 26, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60263615**		

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.
- 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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/26/18

Laboratory: Pace Analytical
SDG #: 60263615

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-ASD-6D, S-FB2, S-ASD-6M

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?	☒	☐	☐	2/5/18
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)?	☑	☐	☐	Sb(0.055), TL(0.039), B(5.6), K(78.1), Na(285), TH(33.1)
b) Were analytes detected in the field blank(s)?	☑	☐	☐	B(6.0), Na(264), TH(87.6), Cr(0.16), TDS(10),
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)?	☐	☑	☐	FB-2 @ S-ASD-6M
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)?	☐	☑	☐	TDS(28),

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?	☐	☑	☐	Sulfide, B, Ca, Mg, K, Na
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☐	☑	☐	B, Ca, Mg, K, Na
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-ASD-6D	Chloride	31.4	D	DF of 5
⊥	Sulfate	208	D	⊥ 50
S-ASD-6M	Chloride	35.5	D	⊥ 5
⊥	Sulfate	329	D	⊥ 50
⊥	Sb	1.0	U	Detected in Blank; PQL>Result>MDL
S-FB 2	Total Hardness (TH)	500	U	⊥ ⊥
⊥	Na	500	U	
⊥	B	100	U	

Signature: Tommy J. Hood Jr. Date: 3/26/2018

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

February 22, 2018

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

RE: Project: AMEREN SEC
Pace Project No.: 60263782

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on February 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 SEC
Pace Project No.: 60263782

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

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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SEC
Pace Project No.: 60263782

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60263782001	**S-ASD-4S**	Water	02/09/18 09:10	02/10/18 05:25
60263782002	**S-ASD-4M**	Water	02/09/18 09:55	02/10/18 05:25
60263782003	**S-ASD-4D**	Water	02/09/18 15:25	02/10/18 05:25
60263782004	**S-ASD-5M**	Water	02/08/18 11:30	02/10/18 05:25
60263782005	**S-ASD-5S**	Water	02/08/18 14:20	02/10/18 05:25
60263782006	**S-ASD-5D**	Water	02/08/18 16:45	02/10/18 05:25
60263782007	**S-DUP-3**	Water	02/08/18 08:00	02/10/18 05:25
60263782008	**S-FB-3**	Water	02/08/18 14:45	02/10/18 05:25

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263782

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60263782001	**S-ASD-4S**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782002	**S-ASD-4M**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782003	**S-ASD-4D**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782004	**S-ASD-5M**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782005	**S-ASD-5S**	EPA 200.7	JGP	14	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC
Pace Project No.: 60263782

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782006	**S-ASD-5D**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782007	**S-DUP-3**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K
60263782008	**S-FB-3**	EPA 200.7	JGP	14	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JRS	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		SM 4500-S-2 D	MJK	1	PASI-K
		EPA 300.0	OL	3	PASI-K
		EPA 410.4	MJK	1	PASI-K
		SM 5310C	LDF	1	PASI-K

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-4S **Lab ID: 60263782001** Collected: 02/09/18 09:10 Received: 02/10/18 05:25 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	**149**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:24	7440-39-3	
Beryllium	**0.39J**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:24	7440-41-7	
Boron	**717**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:24	7440-42-8	
Calcium	**189000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:24	7440-70-2	
Cobalt	**8.4**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:24	7440-48-4	
Iron	**949**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:24	7439-89-6	
Lead	**2.9J**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:24	7439-92-1	
Lithium	**36.0**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:24	7439-93-2	
Magnesium	**49400**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:24	7439-95-4	
Manganese	**2160**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:24	7439-96-5	
Molybdenum	**3.0J**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:24	7439-98-7	
Potassium	**5640**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:24	7440-09-7	
Sodium	**15100**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:24	7440-23-5	
Total Hardness by 2340B	**675000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:24		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.27J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 16:52	7440-36-0	
Arsenic	**0.32J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 16:52	7440-38-2	
Cadmium	**0.50J**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 16:52	7440-43-9	
Chromium	**0.79J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 16:52	7440-47-3	
Selenium	**0.20J**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 16:52	7782-49-2	
Thallium	**0.058J**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 16:52	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:03	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**469**	mg/L	20.0	4.9	1		02/13/18 12:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**848**	mg/L	5.0	5.0	1		02/15/18 16:39		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:34	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**20.4**	mg/L	2.0	1.0	2		02/14/18 12:41	16887-00-6	
Fluoride	**0.60**	mg/L	0.20	0.063	1		02/13/18 13:45	16984-48-8	
Sulfate	**255**	mg/L	20.0	10.0	20		02/14/18 12:55	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		02/15/18 11:03		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.4**	mg/L	1.0	0.13	1		02/13/18 11:05	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-4M **Lab ID: 60263782002** Collected: 02/09/18 09:55 Received: 02/10/18 05:25 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	**161**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:26	7440-39-3	
Beryllium	**0.29J**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:26	7440-41-7	
Boron	**2990**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:26	7440-42-8	
Calcium	**189000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:26	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:26	7440-48-4	
Iron	**8500**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:26	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:26	7439-92-1	
Lithium	**37.2**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:26	7439-93-2	
Magnesium	**49600**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:26	7439-95-4	
Manganese	**1630**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:26	7439-96-5	
Molybdenum	**30.5**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:26	7439-98-7	
Potassium	**7710**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:26	7440-09-7	
Sodium	**37400**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:26	7440-23-5	
Total Hardness by 2340B	**676000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:26		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.12J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 16:56	7440-36-0	
Arsenic	**1.6**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 16:56	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 16:56	7440-43-9	
Chromium	**0.34J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 16:56	7440-47-3	
Selenium	**0.14J**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 16:56	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 16:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.046**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:10	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**405**	mg/L	20.0	4.9	1		02/13/18 12:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**932**	mg/L	5.0	5.0	1		02/15/18 16:39		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:34	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**34.4**	mg/L	5.0	2.5	5		02/16/18 09:46	16887-00-6	
Fluoride	**0.50**	mg/L	0.20	0.063	1		02/13/18 14:55	16984-48-8	
Sulfate	**348**	mg/L	50.0	25.0	50		02/16/18 10:00	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**14.5**	mg/L	10.0	3.1	1		02/15/18 11:03		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**4.9**	mg/L	1.0	0.13	1		02/13/18 11:18	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-4D **Lab ID: 60263782003** Collected: 02/09/18 15:25 Received: 02/10/18 05:25 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	**113**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:33	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:33	7440-41-7	
Boron	**4400**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:33	7440-42-8	
Calcium	**126000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:33	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:33	7440-48-4	
Iron	**8720**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:33	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:33	7439-92-1	
Lithium	**40.1**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:33	7439-93-2	
Magnesium	**31900**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:33	7439-95-4	
Manganese	**985**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:33	7439-96-5	
Molybdenum	**161**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:33	7439-98-7	
Potassium	**5830**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:33	7440-09-7	
Sodium	**41700**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:33	7440-23-5	
Total Hardness by 2340B	**445000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:33		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.077J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 16:59	7440-36-0	
Arsenic	**0.50J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 16:59	7440-38-2	
Cadmium	**0.054J**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 16:59	7440-43-9	
Chromium	**1.5**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 16:59	7440-47-3	
Selenium	**0.12J**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 16:59	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 16:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.057J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:16	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**228**	mg/L	20.0	4.9	1		02/13/18 12:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**671**	mg/L	5.0	5.0	1		02/15/18 16:40		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:34	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**31.1**	mg/L	2.0	1.0	2		02/16/18 10:55	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.063	1		02/13/18 15:23	16984-48-8	
Sulfate	**268**	mg/L	20.0	10.0	20		02/16/18 11:09	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.7J**	mg/L	10.0	3.1	1		02/15/18 11:03		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.5**	mg/L	1.0	0.13	1		02/13/18 12:09	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-5M **Lab ID: 60263782004** Collected: 02/08/18 11:30 Received: 02/10/18 05:25 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	**121**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:35	7440-39-3	
Beryllium	**0.21J**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:35	7440-41-7	
Boron	**2400**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:35	7440-42-8	
Calcium	**174000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:35	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:35	7440-48-4	
Iron	**10900**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:35	7439-89-6	
Lead	**2.6J**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:35	7439-92-1	
Lithium	**42.6**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:35	7439-93-2	
Magnesium	**41800**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:35	7439-95-4	
Manganese	**1580**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:35	7439-96-5	
Molybdenum	**10.9J**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:35	7439-98-7	
Potassium	**5570**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:35	7440-09-7	
Sodium	**19000**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:35	7440-23-5	
Total Hardness by 2340B	**607000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:35		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.028J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 17:02	7440-36-0	
Arsenic	**0.39J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 17:02	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 17:02	7440-43-9	
Chromium	**0.83J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 17:02	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 17:02	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 17:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.058J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:18	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**303**	mg/L	20.0	4.9	1		02/13/18 12:46		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**809**	mg/L	5.0	5.0	1		02/15/18 16:36		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:32	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.4**	mg/L	2.0	1.0	2		02/16/18 11:23	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.063	1		02/13/18 15:37	16984-48-8	
Sulfate	**342**	mg/L	50.0	25.0	50		02/16/18 11:37	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**7.6J**	mg/L	10.0	3.1	1		02/15/18 11:04		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.5**	mg/L	1.0	0.13	1		02/13/18 12:22	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-5S **Lab ID: 60263782005** Collected: 02/08/18 14:20 Received: 02/10/18 05:25 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	**128**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:38	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:38	7440-41-7	
Boron	**4960**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:38	7440-42-8	
Calcium	**181000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:38	7440-70-2	
Cobalt	**4.5J**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:38	7440-48-4	
Iron	**336**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:38	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:38	7439-92-1	
Lithium	**17.1**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:38	7439-93-2	
Magnesium	**43300**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:38	7439-95-4	
Manganese	**231**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:38	7439-96-5	
Molybdenum	**27.7**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:38	7439-98-7	
Potassium	**4270**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:38	7440-09-7	
Sodium	**19300**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:38	7440-23-5	
Total Hardness by 2340B	**630000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:38		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.11J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 17:06	7440-36-0	
Arsenic	**0.59J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 17:06	7440-38-2	
Cadmium	**0.10J**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 17:06	7440-43-9	
Chromium	**0.53J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 17:06	7440-47-3	
Selenium	**7.9**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 17:06	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 17:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.057J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:21	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**307**	mg/L	20.0	4.9	1		02/13/18 12:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**875**	mg/L	5.0	5.0	1		02/15/18 16:37		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:33	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**17.2**	mg/L	1.0	0.46	1		02/13/18 15:51	16887-00-6	
Fluoride	**0.45**	mg/L	0.20	0.063	1		02/13/18 15:51	16984-48-8	
Sulfate	**372**	mg/L	50.0	25.0	50		02/16/18 11:51	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		02/15/18 11:04		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**1.5**	mg/L	1.0	0.13	1		02/13/18 12:34	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-ASD-5D **Lab ID: 60263782006** Collected: 02/08/18 16:45 Received: 02/10/18 05:25 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	**63.6**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:40	7440-39-3	
Beryllium	**0.20J**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:40	7440-41-7	
Boron	**3990**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:40	7440-42-8	
Calcium	**85500**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:40	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:40	7440-48-4	
Iron	**7170**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:40	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:40	7439-92-1	
Lithium	**45.0**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:40	7439-93-2	
Magnesium	**22000**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:40	7439-95-4	
Manganese	**578**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:40	7439-96-5	
Molybdenum	**12.9J**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:40	7439-98-7	
Potassium	**5260**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:40	7440-09-7	
Sodium	**38800**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:40	7440-23-5	
Total Hardness by 2340B	**304000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:40		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.038J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 17:09	7440-36-0	
Arsenic	**0.44J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 17:09	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 17:09	7440-43-9	
Chromium	**1.4**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 17:09	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 17:09	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 17:09	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.058J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:23	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**195**	mg/L	20.0	4.9	1		02/13/18 13:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**493**	mg/L	5.0	5.0	1		02/15/18 16:37		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:33	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24.3**	mg/L	2.0	1.0	2		02/16/18 12:05	16887-00-6	
Fluoride	**0.23**	mg/L	0.20	0.063	1		02/13/18 16:05	16984-48-8	
Sulfate	**174**	mg/L	20.0	10.0	20		02/16/18 12:19	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**5.7J**	mg/L	10.0	3.1	1		02/15/18 11:05		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.6**	mg/L	1.0	0.13	1		02/13/18 12:47	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-DUP-3 **Lab ID: 60263782007** Collected: 02/08/18 08:00 Received: 02/10/18 05:25 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	**122**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:43	7440-39-3	
Beryllium	**0.16J**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:43	7440-41-7	
Boron	**2460**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:43	7440-42-8	
Calcium	**176000**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:43	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:43	7440-48-4	
Iron	**11000**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:43	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:43	7439-92-1	
Lithium	**46.1**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:43	7439-93-2	
Magnesium	**42700**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 14:43	7439-95-4	
Manganese	**1600**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 14:43	7439-96-5	
Molybdenum	**10.4J**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:43	7439-98-7	
Potassium	**5620**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:43	7440-09-7	
Sodium	**19100**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:43	7440-23-5	
Total Hardness by 2340B	**614000**	ug/L	500		1	02/13/18 13:30	02/14/18 14:43		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**0.028J**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 17:12	7440-36-0	
Arsenic	**0.38J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 17:12	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 17:12	7440-43-9	
Chromium	**0.82J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 17:12	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 17:12	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 17:12	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.057J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:25	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**304**	mg/L	20.0	4.9	1		02/13/18 13:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**831**	mg/L	5.0	5.0	1		02/15/18 16:38		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:33	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.3**	mg/L	2.0	1.0	2		02/16/18 12:33	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.063	1		02/13/18 16:18	16984-48-8	
Sulfate	**344**	mg/L	50.0	25.0	50		02/16/18 12:47	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**5.9J**	mg/L	10.0	3.1	1		02/15/18 11:05		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**2.4**	mg/L	1.0	0.13	1		02/13/18 13:00	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC
Pace Project No.: 60263782

Sample: S-FB-3 **Lab ID: 60263782008** Collected: 02/08/18 14:45 Received: 02/10/18 05:25 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	**<0.91**	ug/L	5.0	0.91	1	02/13/18 13:30	02/14/18 14:45	7440-39-3	
Beryllium	**<0.16**	ug/L	1.0	0.16	1	02/13/18 13:30	02/14/18 14:45	7440-41-7	
Boron	**11.1J**	ug/L	100	3.5	1	02/13/18 13:30	02/14/18 14:45	7440-42-8	
Calcium	**69.5J**	ug/L	100	36.0	1	02/13/18 13:30	02/14/18 14:45	7440-70-2	
Cobalt	**<0.73**	ug/L	5.0	0.73	1	02/13/18 13:30	02/14/18 14:45	7440-48-4	
Iron	**<12.4**	ug/L	50.0	12.4	1	02/13/18 13:30	02/14/18 14:45	7439-89-6	
Lead	**<2.4**	ug/L	5.0	2.4	1	02/13/18 13:30	02/14/18 14:45	7439-92-1	
Lithium	**<2.9**	ug/L	10.0	2.9	1	02/13/18 13:30	02/14/18 14:45	7439-93-2	
Magnesium	**<15.4**	ug/L	50.0	15.4	1	02/13/18 13:30	02/14/18 15:04	7439-95-4	
Manganese	**<1.8**	ug/L	5.0	1.8	1	02/13/18 13:30	02/14/18 15:04	7439-96-5	
Molybdenum	**<1.3**	ug/L	20.0	1.3	1	02/13/18 13:30	02/14/18 14:45	7439-98-7	
Potassium	**<52.3**	ug/L	500	52.3	1	02/13/18 13:30	02/14/18 14:45	7440-09-7	
Sodium	**218J**	ug/L	500	28.4	1	02/13/18 13:30	02/14/18 14:45	7440-23-5	
Total Hardness by 2340B	**200J**	ug/L	500		1	02/13/18 13:30	02/14/18 14:45		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	**<0.026**	ug/L	1.0	0.026	1	02/13/18 13:30	02/20/18 16:49	7440-36-0	
Arsenic	**0.059J**	ug/L	1.0	0.052	1	02/13/18 13:30	02/20/18 16:49	7440-38-2	
Cadmium	**<0.018**	ug/L	0.50	0.018	1	02/13/18 13:30	02/20/18 16:49	7440-43-9	
Chromium	**0.18J**	ug/L	1.0	0.054	1	02/13/18 13:30	02/20/18 16:49	7440-47-3	
Selenium	**<0.086**	ug/L	1.0	0.086	1	02/13/18 13:30	02/20/18 16:49	7782-49-2	
Thallium	**<0.036**	ug/L	1.0	0.036	1	02/13/18 13:30	02/20/18 16:49	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**0.059J**	ug/L	0.20	0.046	1	02/14/18 14:31	02/15/18 10:27	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		02/13/18 13:18		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		02/15/18 16:38		
4500S2D Sulfide, Total	Analytical Method: SM 4500-S-2 D								
Sulfide, Total	**<0.0048**	mg/L	0.050	0.0048	1		02/14/18 13:33	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		02/13/18 16:32	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		02/13/18 16:32	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		02/13/18 16:32	14808-79-8	
410.4 COD	Analytical Method: EPA 410.4								
Chemical Oxygen Demand	**<3.1**	mg/L	10.0	3.1	1		02/15/18 11:10		
5310C TOC	Analytical Method: SM 5310C								
Total Organic Carbon	**0.32J**	mg/L	1.0	0.13	1		02/13/18 13:12	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 514109 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2104274 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.046	0.20	0.046	02/15/18 09:59	

LABORATORY CONTROL SAMPLE: 2104275

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.6	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2104276 2104277

Parameter	Units	60263782001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.046	5	5	4.5	4.3	89	85	75-125	4	20	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513903 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103658 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<0.91	5.0	0.91	02/14/18 14:05	
Beryllium	ug/L	<0.16	1.0	0.16	02/14/18 14:05	
Boron	ug/L	<3.5	100	3.5	02/14/18 14:05	
Calcium	ug/L	<36.0	100	36.0	02/14/18 14:05	
Cobalt	ug/L	<0.73	5.0	0.73	02/14/18 14:05	
Iron	ug/L	<12.4	50.0	12.4	02/14/18 14:05	
Lead	ug/L	<2.4	5.0	2.4	02/14/18 14:05	
Lithium	ug/L	<2.9	10.0	2.9	02/14/18 14:05	
Magnesium	ug/L	<15.4	50.0	15.4	02/14/18 14:05	
Manganese	ug/L	<1.8	5.0	1.8	02/14/18 14:05	
Molybdenum	ug/L	<1.3	20.0	1.3	02/14/18 14:05	
Potassium	ug/L	<52.3	500	52.3	02/14/18 14:05	
Sodium	ug/L	30.6J	500	28.4	02/14/18 14:05	
Total Hardness by 2340B	ug/L	93.4J	500		02/14/18 14:05	

LABORATORY CONTROL SAMPLE: 2103659

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	969	97	85-115	
Calcium	ug/L	10000	9720	97	85-115	
Cobalt	ug/L	1000	963	96	85-115	
Iron	ug/L	10000	10400	104	85-115	
Lead	ug/L	1000	978	98	85-115	
Lithium	ug/L	1000	1000	100	85-115	
Magnesium	ug/L	10000	9650	96	85-115	
Manganese	ug/L	1000	1040	104	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	9630	96	85-115	
Total Hardness by 2340B	ug/L		64000			

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2103660 2103661

Parameter	Units	60263674001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	13.2	1000	1000	1050	1050	104	104	70-130	0	20	
Beryllium	ug/L	0.25J	1000	1000	1030	1040	103	104	70-130	1	20	
Boron	ug/L	122	1000	1000	1150	1160	102	104	70-130	1	20	
Calcium	ug/L	84500	10000	10000	94700	96800	103	123	70-130	2	20	
Cobalt	ug/L	45.5	1000	1000	1020	1020	97	97	70-130	0	20	
Iron	ug/L	47.8J	10000	10000	10400	10600	104	105	70-130	1	20	
Lead	ug/L	<2.4	1000	1000	978	981	98	98	70-130	0	20	
Lithium	ug/L	19.9	1000	1000	1050	1050	103	103	70-130	0	20	
Magnesium	ug/L	72400	10000	10000	83000	84600	106	122	70-130	2	20	
Manganese	ug/L	77.6	1000	1000	1130	1130	105	105	70-130	1	20	
Molybdenum	ug/L	8.1J	1000	1000	1070	1070	106	106	70-130	0	20	
Potassium	ug/L	5680	10000	10000	16000	16300	103	106	70-130	2	20	
Sodium	ug/L	64400	10000	10000	75500	76500	111	121	70-130	1	20	
Total Hardness by 2340B	ug/L	509000			578000	590000				2		

MATRIX SPIKE SAMPLE: 2103662

Parameter	Units	60263782008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	<0.91	1000	1030	103	70-130	
Beryllium	ug/L	<0.16	1000	1040	103	70-130	
Boron	ug/L	11.1J	1000	992	98	70-130	
Calcium	ug/L	69.5J	10000	10000	99	70-130	
Cobalt	ug/L	<0.73	1000	988	99	70-130	
Iron	ug/L	<12.4	10000	10500	105	70-130	
Lead	ug/L	<2.4	1000	992	99	70-130	
Lithium	ug/L	<2.9	1000	1020	102	70-130	
Magnesium	ug/L	<15.4	10000	9890	99	70-130	
Manganese	ug/L	<1.8	1000	1060	106	70-130	
Molybdenum	ug/L	<1.3	1000	1050	105	70-130	
Potassium	ug/L	<52.3	10000	10300	103	70-130	
Sodium	ug/L	218J	10000	9930	97	70-130	
Total Hardness by 2340B	ug/L	200J		65700			

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513907 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103677 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.026	1.0	0.026	02/20/18 16:12	
Arsenic	ug/L	<0.052	1.0	0.052	02/20/18 16:12	
Cadmium	ug/L	<0.018	0.50	0.018	02/20/18 16:12	
Chromium	ug/L	<0.054	1.0	0.054	02/20/18 16:12	
Selenium	ug/L	<0.086	1.0	0.086	02/20/18 16:12	
Thallium	ug/L	<0.036	1.0	0.036	02/20/18 16:12	

LABORATORY CONTROL SAMPLE: 2103678

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.0	97	85-115	
Arsenic	ug/L	40	39.6	99	85-115	
Cadmium	ug/L	40	39.4	98	85-115	
Chromium	ug/L	40	39.9	100	85-115	
Selenium	ug/L	40	38.3	96	85-115	
Thallium	ug/L	40	40.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2103679 2103680

Parameter	Units	60263674002 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	39.8	39.6	99	99	70-130	1	20	
Arsenic	ug/L	<0.052	40	40	39.9	39.7	100	99	70-130	1	20	
Cadmium	ug/L	<0.018	40	40	39.4	39.1	99	98	70-130	1	20	
Chromium	ug/L	0.11J	40	40	41.0	40.4	102	101	70-130	1	20	
Selenium	ug/L	0.14J	40	40	37.6	37.8	94	94	70-130	1	20	
Thallium	ug/L	<0.036	40	40	41.4	41.3	103	103	70-130	0	20	

MATRIX SPIKE SAMPLE: 2103681

Parameter	Units	60263782007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.028J	40	40.5	101	70-130	
Arsenic	ug/L	0.38J	40	40.5	100	70-130	
Cadmium	ug/L	<0.018	40	38.4	96	70-130	
Chromium	ug/L	0.82J	40	41.0	101	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

MATRIX SPIKE SAMPLE: 2103681

Parameter	Units	60263782007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Selenium	ug/L	<0.086	40	37.4	93	70-130	
Thallium	ug/L	<0.036	40	41.6	104	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513888 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103627 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	02/13/18 12:03	

LABORATORY CONTROL SAMPLE: 2103628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	509	102	90-110	

SAMPLE DUPLICATE: 2103629

Parameter	Units	60262936004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	735	752	2	10	H1

SAMPLE DUPLICATE: 2103630

Parameter	Units	60263782007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	304	298	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 514209 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2104569 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/15/18 16:35	

LABORATORY CONTROL SAMPLE: 2104570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1080	108	80-120	

SAMPLE DUPLICATE: 2104571

Parameter	Units	60263782004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	809	801	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513904 Analysis Method: SM 4500-S-2 D
QC Batch Method: SM 4500-S-2 D Analysis Description: 4500S2D Sulfide, Total
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103663 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide, Total	mg/L	<0.0048	0.050	0.0048	02/14/18 13:29	

LABORATORY CONTROL SAMPLE: 2103664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	.5	0.47	95	80-120	

MATRIX SPIKE SAMPLE: 2103665

Parameter	Units	60263586002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide, Total	mg/L	ND	.5	0.30	61	75-125	H1,M1

SAMPLE DUPLICATE: 2103666

Parameter	Units	60263782004 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	<0.0048	<0.0048		20	H1

SAMPLE DUPLICATE: 2103667

Parameter	Units	10419832005 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfide, Total	mg/L	ND	<0.0048		20	H1

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513873 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103523 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	02/13/18 08:24	
Fluoride	mg/L	<0.063	0.20	0.063	02/13/18 08:24	
Sulfate	mg/L	<0.24	1.0	0.24	02/13/18 08:24	

LABORATORY CONTROL SAMPLE: 2103524

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2103525 2103526

Parameter	Units	60263782001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.60	2.5	2.5	3.2	3.2	105	105	80-120	0	15	

MATRIX SPIKE SAMPLE: 2103527

Parameter	Units	60263782002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.50	2.5	2.9	94	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 514077
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263782001

METHOD BLANK: 2104156 Matrix: Water
Associated Lab Samples: 60263782001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	02/14/18 08:45	
Sulfate	mg/L	<0.24	1.0	0.24	02/14/18 08:45	

LABORATORY CONTROL SAMPLE: 2104157

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2104158 2104159

Parameter	Units	60263331002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	73.5	25	25	103	99.8	118	105	80-120	3	15	E

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 514457 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007

METHOD BLANK: 2105529 Matrix: Water
Associated Lab Samples: 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.46	1.0	0.46	02/16/18 13:28	
Sulfate	mg/L	<0.24	1.0	0.24	02/16/18 13:28	

LABORATORY CONTROL SAMPLE: 2105530

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Sulfate	mg/L	5	5.3	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2105271 2105272

Parameter	Units	60263431002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	2500	2500	2590	2550	96	94	80-120	1	15	
Sulfate	mg/L	3160	2500	2500	5730	5950	103	111	80-120	4	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2105531 2105532

Parameter	Units	60263782005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	372	250	250	640	632	107	104	80-120	1	15	

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QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 514062 Analysis Method: EPA 410.4
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2104062 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	10.0	3.1	02/15/18 11:00	

LABORATORY CONTROL SAMPLE: 2104063

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	50	49.5	99	90-110	

MATRIX SPIKE SAMPLE: 2104064

Parameter	Units	60263432002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	364	250	627	105	90-110	

SAMPLE DUPLICATE: 2104065

Parameter	Units	60263273001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	470	484	3	25	

SAMPLE DUPLICATE: 2105050

Parameter	Units	60263782008 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	<3.1	<3.1		25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC
Pace Project No.: 60263782

QC Batch: 513890 Analysis Method: SM 5310C
QC Batch Method: SM 5310C Analysis Description: 5310C Total Organic Carbon
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

METHOD BLANK: 2103636 Matrix: Water
Associated Lab Samples: 60263782001, 60263782002, 60263782003, 60263782004, 60263782005, 60263782006, 60263782007, 60263782008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	<0.13	1.0	0.13	02/13/18 09:36	

LABORATORY CONTROL SAMPLE: 2103637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	5	4.5	90	80-120	

MATRIX SPIKE SAMPLE: 2103638

Parameter	Units	7581651012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	4.5	5	11.0	130	80-120	M1

SAMPLE DUPLICATE: 2103639

Parameter	Units	7581658001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	5.0	4.9	0	25	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
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QUALIFIERS

Project: AMEREN SEC
Pace Project No.: 60263782

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

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC
Pace Project No.: 60263782

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263782001	**S-ASD-4S**	EPA 200.7	513903	EPA 200.7	514036
60263782002	**S-ASD-4M**	EPA 200.7	513903	EPA 200.7	514036
60263782003	**S-ASD-4D**	EPA 200.7	513903	EPA 200.7	514036
60263782004	**S-ASD-5M**	EPA 200.7	513903	EPA 200.7	514036
60263782005	**S-ASD-5S**	EPA 200.7	513903	EPA 200.7	514036
60263782006	**S-ASD-5D**	EPA 200.7	513903	EPA 200.7	514036
60263782007	**S-DUP-3**	EPA 200.7	513903	EPA 200.7	514036
60263782008	**S-FB-3**	EPA 200.7	513903	EPA 200.7	514036
60263782001	**S-ASD-4S**	EPA 200.8	513907	EPA 200.8	514037
60263782002	**S-ASD-4M**	EPA 200.8	513907	EPA 200.8	514037
60263782003	**S-ASD-4D**	EPA 200.8	513907	EPA 200.8	514037
60263782004	**S-ASD-5M**	EPA 200.8	513907	EPA 200.8	514037
60263782005	**S-ASD-5S**	EPA 200.8	513907	EPA 200.8	514037
60263782006	**S-ASD-5D**	EPA 200.8	513907	EPA 200.8	514037
60263782007	**S-DUP-3**	EPA 200.8	513907	EPA 200.8	514037
60263782008	**S-FB-3**	EPA 200.8	513907	EPA 200.8	514037
60263782001	**S-ASD-4S**	EPA 7470	514109	EPA 7470	514202
60263782002	**S-ASD-4M**	EPA 7470	514109	EPA 7470	514202
60263782003	**S-ASD-4D**	EPA 7470	514109	EPA 7470	514202
60263782004	**S-ASD-5M**	EPA 7470	514109	EPA 7470	514202
60263782005	**S-ASD-5S**	EPA 7470	514109	EPA 7470	514202
60263782006	**S-ASD-5D**	EPA 7470	514109	EPA 7470	514202
60263782007	**S-DUP-3**	EPA 7470	514109	EPA 7470	514202
60263782008	**S-FB-3**	EPA 7470	514109	EPA 7470	514202
60263782001	**S-ASD-4S**	SM 2320B	513888		
60263782002	**S-ASD-4M**	SM 2320B	513888		
60263782003	**S-ASD-4D**	SM 2320B	513888		
60263782004	**S-ASD-5M**	SM 2320B	513888		
60263782005	**S-ASD-5S**	SM 2320B	513888		
60263782006	**S-ASD-5D**	SM 2320B	513888		
60263782007	**S-DUP-3**	SM 2320B	513888		
60263782008	**S-FB-3**	SM 2320B	513888		
60263782001	**S-ASD-4S**	SM 2540C	514209		
60263782002	**S-ASD-4M**	SM 2540C	514209		
60263782003	**S-ASD-4D**	SM 2540C	514209		
60263782004	**S-ASD-5M**	SM 2540C	514209		
60263782005	**S-ASD-5S**	SM 2540C	514209		
60263782006	**S-ASD-5D**	SM 2540C	514209		
60263782007	**S-DUP-3**	SM 2540C	514209		
60263782008	**S-FB-3**	SM 2540C	514209		
60263782001	**S-ASD-4S**	SM 4500-S-2 D	513904		
60263782002	**S-ASD-4M**	SM 4500-S-2 D	513904		
60263782003	**S-ASD-4D**	SM 4500-S-2 D	513904		
60263782004	**S-ASD-5M**	SM 4500-S-2 D	513904		
60263782005	**S-ASD-5S**	SM 4500-S-2 D	513904		
60263782006	**S-ASD-5D**	SM 4500-S-2 D	513904		

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
Pace Project No.: 60263782

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60263782007	**S-DUP-3**	SM 4500-S-2 D	513904		
60263782008	**S-FB-3**	SM 4500-S-2 D	513904		
60263782001	**S-ASD-4S**	EPA 300.0	513873		
60263782001	**S-ASD-4S**	EPA 300.0	514077		
60263782002	**S-ASD-4M**	EPA 300.0	513873		
60263782002	**S-ASD-4M**	EPA 300.0	514457		
60263782003	**S-ASD-4D**	EPA 300.0	513873		
60263782003	**S-ASD-4D**	EPA 300.0	514457		
60263782004	**S-ASD-5M**	EPA 300.0	513873		
60263782004	**S-ASD-5M**	EPA 300.0	514457		
60263782005	**S-ASD-5S**	EPA 300.0	513873		
60263782005	**S-ASD-5S**	EPA 300.0	514457		
60263782006	**S-ASD-5D**	EPA 300.0	513873		
60263782006	**S-ASD-5D**	EPA 300.0	514457		
60263782007	**S-DUP-3**	EPA 300.0	513873		
60263782007	**S-DUP-3**	EPA 300.0	514457		
60263782008	**S-FB-3**	EPA 300.0	513873		
60263782001	**S-ASD-4S**	EPA 410.4	514062		
60263782002	**S-ASD-4M**	EPA 410.4	514062		
60263782003	**S-ASD-4D**	EPA 410.4	514062		
60263782004	**S-ASD-5M**	EPA 410.4	514062		
60263782005	**S-ASD-5S**	EPA 410.4	514062		
60263782006	**S-ASD-5D**	EPA 410.4	514062		
60263782007	**S-DUP-3**	EPA 410.4	514062		
60263782008	**S-FB-3**	EPA 410.4	514062		
60263782001	**S-ASD-4S**	SM 5310C	513890		
60263782002	**S-ASD-4M**	SM 5310C	513890		
60263782003	**S-ASD-4D**	SM 5310C	513890		
60263782004	**S-ASD-5M**	SM 5310C	513890		
60263782005	**S-ASD-5S**	SM 5310C	513890		
60263782006	**S-ASD-5D**	SM 5310C	513890		
60263782007	**S-DUP-3**	SM 5310C	513890		
60263782008	**S-FB-3**	SM 5310C	513890		

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Sample Condition Upon Receipt

WO# : 60263782

60263782

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 (CF +0.2) / T-239 (CF -0.1) **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 1.1/1.9 **Corr. Factor** 0 (CF +0.2 CF -0.1) **Corrected** 1.3/2.1

Date and initials of person examining contents: PV 2/12/18

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: LT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	
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: _____

Project Manager Review: Jami Check 2/12/18 Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	maddock@golder.com
Phone:	636-724-9191 — Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren SEC
Project Number:	1531406.0003

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285, line 4

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

Pace Project No./ Lab I.D.: 60263782

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 + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	200.7/200.8 Metals* + Hg	~~200.7/200.8 Metals, Diss.~~	COD	Alkalinity	Chloride/Fluoride/Sulfate	TDS	TOC	Sulfide	~~Ferrous Iron/Ferric Iron~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-ASD-4S		G			2/9/18	0910		6	2	2	1		1				✓		✓	✓	✓	✓	✓	✓	BP3U	AG3S	BP3S BP3C BP2Z BP1U 001
2	S-ASD-4M		G			2/9/18	0955		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	002
3	S-ASD-4D		G			2/8/18	1525		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	003
4	S-ASD-5M		G			2/8/18	1130		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	004
5	S-ASD-5S		G			2/8/18	1420		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	005
6	S-ASD-5D		G			2/8/18	1645		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	006
7	S-Dup-3		G			2/8/18	—		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	007
8	S-FB-3		G			2/8/18	1445		6	2	2	1		1				↓		↓	↓	↓	↓	↓	↓	↓	↓	008
9																												
10																												
11																												
12																												

ADDITIONAL COMMENTS

*EPA 200.7: Al, Pb, Li, Ba, Be, B, Ca, Cr, Co, Cu, Fe, Mg, Mn, Mo, Ni, K, Ag, Na, Zn, Hardness
*EPA 200.8: As, Cd, Cr, Se, Sb, Tl

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)
[signature]	2/9/18	1631	[signature] / PACE	2/9/18	1631				
[signature]	2/9/18	1700	[signature] / PASI	2/10/18	0525	1.3	Y	Y	Y
						2.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] — DATE Signed (MM/DD/YY): 02/09/18

MEMORANDUM

Date:	March 26, 2018	**Project No.:**	1531406
To:	Project File	**Project:**	Ameren
From:	Tommy Goodwin		
cc:	Amanda Derhake, Jeff Ingram	**Email:**	
RE:	**DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – ASD - 60263782**		

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.
- 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 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 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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-SEC-ASD
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406.0003K
Validation Date: 3/26/18

Laboratory: Pace Analytical
SDG #: 60263782

Analytical Method (type and no.): 200.7 Metals & Diss., 200.8 MET ICPMS & Diss., 7470 Hg, 2320B Alk., 2540C TDS,
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ 4500S2D Sulfide, 300.0 IC Anions, 410.4 COD, 5310C TOC
Sample Names: S-ASD-4S, S-ASD-4M, S-ASD-4D, S-ASD-5S, S-ASD-5M, S-ASD-5D, S-DUP-3, S-FB-3

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	2/9/18
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)?	☑	☐	☐	Na(30.6), TH(93.4),
b) Were analytes detected in the field blank(s)?	☑	☐	☐	B(11.1), Ca(69.5), Na(218), TH(200), As(0.058), Cr(0.18) Hg(0.057), TOC(0.32)
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-3 @ S-ASD-SM
	☑	☐	☐	FB-3 @ S-ASD-SD
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Be(27), Pb(200), COD(25.2)
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?	☐	☑	☐	Sulfide, TOC
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
b) Was MSD accuracy criteria met?	☑	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☑	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-ASD-4S	Chloride	20.4	D	DF of 2
↓	Sulfate	255	D	20
S-ASD-4M	Chloride	34.4	D	5
↓	Sulfate	348	D	50
S-ASD-4D	Chloride	31.1	D	2
↓	Sulfate	268	D	20
S-ASD-5S	Sulfate	372	D	50
S-ASD-5M	Chloride	29.4	D	2
↓	Sulfate	342	D	50
↓	Be	0.21	J	RPD exceeded limit; Result > MDL
↓	Pb	2.6	J	↓ ↓
↓	COD	7.6	J	↓
S-DUP-3	Be	0.16	J	↓
↓	COD	5.9	J	↓
↓	Pb	2.4	UJ	; Result < MDL
↓	Chloride	29.3	D	DF of 2
↓	Sulfate	344	D	50
S-ASD-5D	Chloride	24.3	D	2
↓	Sulfate	174	D	20
↓	As	1.0	U	Detected in Blank; PQL > Result > MDL
↓	Hg	0.20	U	↓
↓	Cr	1.4	J	; 10x Blank > Result > PQL
S-FB-3	Na	500	U	; PQL > Result > MDL
↓	Total Hardness (TH)	500	U	↓

Signature: Tommy McGoodwin Jr. Date: 3/26/2018

APPENDIX D

FALCON Analysis

GOLDER

CALCULATIONS

Subject:	Ameren CCR Rule Groundwater		
Date:	March 23, 2018	**Prepared:**	J. Ingram
Project No.:	153-1406	**Checked:**	E. Schneider / R. Feldmann
Project Short Title:	SCPB ASD - FALCON Analysis	**Reviewed:**	M. Haddock

1.0 OBJECTIVE

The objective of this calculation is to determine if there is a correlation between the ion ratio fingerprints in the SCPA, SCPB or background groundwater with the downgradient monitoring wells in the alluvial aquifer the SEC.

2.0 Fingerprint Analysis of Leachate Contaminants (FALCON) Method

The Fingerprint Analysis of Leachate Contaminants (FALCON) method was developed in 2004 by the United States Environmental Protection Agency (USEPA) as a tool to identify the source of impacts within groundwater. The FALCON method compiles ion ratios for multiple constituents in order to develop a distinctive chemical fingerprint for each possible contaminant source and un-impacted background groundwater. These signatures are then correlated to data downgradient of the sources and are used to characterize the source of the contaminant plume. For this calculation, background groundwater quality will be based on background wells located approximately 0.5 to 1 mile west of the SCPB. Source data is from pore-water collected from temporary piezometers within the SCPA and SCPB. Fingerprints from these three sources (background, SCPA and SCPB) will then be compared to data from alluvial aquifer sampling locations at the SEC.

3.0 Selection of Constituents to Use

The first step in completing the FALCON analysis is to select a subset of constituents that are representative of the potential source areas. When selecting these constituents it is important to include constituents that are mobile in the hydrogeological environment and that can uniquely characterize each water type. In order to do this, data from the background monitoring wells were averaged based on available data. Then values of the three different sources were compared to see which constituents fit the criteria. A table of the values used is provided in **Attachment 1**. After comparing the data from each of these sources and comparing possible fingerprint correlations it was determined that SCPA-2 and SCPA-1D were not representative of the SCPA impacts, so they were not used in the the calculation. After these points were discarded, the following constituents were selected to complete the FALCON analysis;

- Total Boron
- Total Calcium
- Total Chloride
- Total Lithium
- Total Magnesium
- Total Manganese
- Total Molybdenum
- Total Selenium
- Total Sodium
- Total Sulfate

Subject:	Ameren CCR Rule Groundwater		
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4.0 Data Tabulation and Normalization

Once the constituents were selected, the data were tabulated, normalized and a graphical presentation of the fingerprint was produced. These steps are provided below for the three different sources (background groundwater, SCPA pore-water and SCPB pore-water).

4.1 Background Groundwater

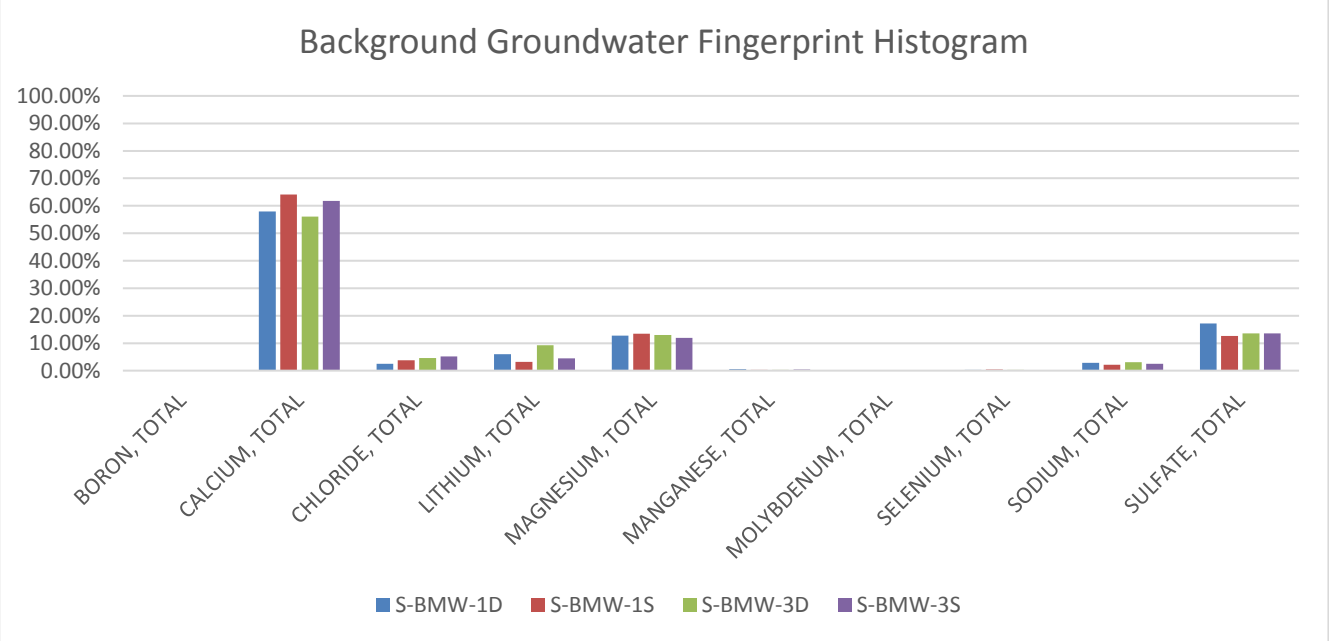
Constituent	Number	Units	CCR Rule Monitoring Wells			
			S-BMW-1D	S-BMW-1S	S-BMW-3D	S-BMW-3S
BORON, TOTAL	1	mg/L	0.179	0.095	0.056	0.067
CALCIUM, TOTAL	2	mg/L	129	147	110	123
CHLORIDE, TOTAL	3	mg/L	5.5	8.6	8.9	10.2
LITHIUM, TOTAL	4	µg/L	13.4	7.2	18.1	8.8
MAGNESIUM, TOTAL	5	mg/L	28.4	30.9	25.4	23.8
MANGANESE, TOTAL	6	mg/L	1.06	0.58	0.52	0.78
MOLYBDENUM, TOTAL	7	mg/L	0.00337	0.00309	0.00623	0.00520
SELENIUM, TOTAL	8	µg/L	0.50	1.03	0.45	0.38
SODIUM, TOTAL	9	mg/L	6.4	4.9	6.1	4.9
SULFATE, TOTAL	10	mg/L	38.2	29.0	26.6	27.0
Sum 1-10			222.5	229.5	195.8	198.9

Constituent	Number	CCR Rule Monitoring Wells				Average
		S-BMW-1D	S-BMW-1S	S-BMW-3D	S-BMW-3S	
BORON, TOTAL	1	0.08%	0.04%	0.03%	0.03%	0.05%
CALCIUM, TOTAL	2	57.97%	64.16%	56.06%	61.83%	60.00%
CHLORIDE, TOTAL	3	2.47%	3.73%	4.54%	5.14%	3.97%
LITHIUM, TOTAL	4	6.00%	3.15%	9.22%	4.42%	5.70%
MAGNESIUM, TOTAL	5	12.76%	13.47%	12.97%	11.96%	12.79%
MANGANESE, TOTAL	6	0.48%	0.25%	0.26%	0.39%	0.35%
MOLYBDENUM, TOTAL	7	0.00%	0.00%	0.00%	0.00%	0.00%
SELENIUM, TOTAL	8	0.22%	0.45%	0.23%	0.19%	0.27%
SODIUM, TOTAL	9	2.86%	2.11%	3.12%	2.47%	2.64%
SULFATE, TOTAL	10	17.16%	12.64%	13.56%	13.57%	14.23%
Sum 1-10		100%	100%	100%	100%	100%

GOLDER

CALCULATIONS

Subject:	Ameren CCR Rule Groundwater		
Date:	March 23, 2018	**Prepared:**	J. Ingram
Project No.:	153-1406	**Checked:**	E. Schneider / R. Feldmann
Project Short Title:	SCPB ASD - FALCON Analysis	**Reviewed:**	M. Haddock



Correlation Between Wells

	S-BMW-1D	*S-BMW-1S*	*S-BMW-3D*	*S-BMW-3S*
S-BMW-1D	100.0%			
S-BMW-1S	99.4%	100.0%		
S-BMW-3D	99.5%	99.3%	100.0%	
S-BMW-3S	99.5%	99.9%	99.5%	100.0%
Average Fingerprint Reproducibility			99.5%	

4.2 SCPA Pore-Water

Constituent	Number	Units	Temporary Piezometers		
			S-SCPA-1S	S-SCPA-3D	S-SCPA-3S
BORON, TOTAL	1	mg/L	111.0	79.5	67.8
CALCIUM, TOTAL	2	mg/L	825	548	501
CHLORIDE, TOTAL	3	mg/L	26.0	27.1	23.1
LITHIUM, TOTAL	4	µg/L	22.0	170.0	43.4
MAGNESIUM, TOTAL	5	mg/L	4.88	60.2	9.6
MANGANESE, TOTAL	6	mg/L	0.003	0.202	0.018
MOLYBDENUM, TOTAL	7	mg/L	56.6	43.5	8.1
SELENIUM, TOTAL	8	µg/L	6.60	1.60	1.70
SODIUM, TOTAL	9	mg/L	81.4	116.0	58.5
SULFATE, TOTAL	10	mg/L	2080	1820	1290
Sum 1-10			3213.5	2866.1	2003.2

GOLDER

CALCULATIONS

Subject:	Ameren CCR Rule Groundwater		
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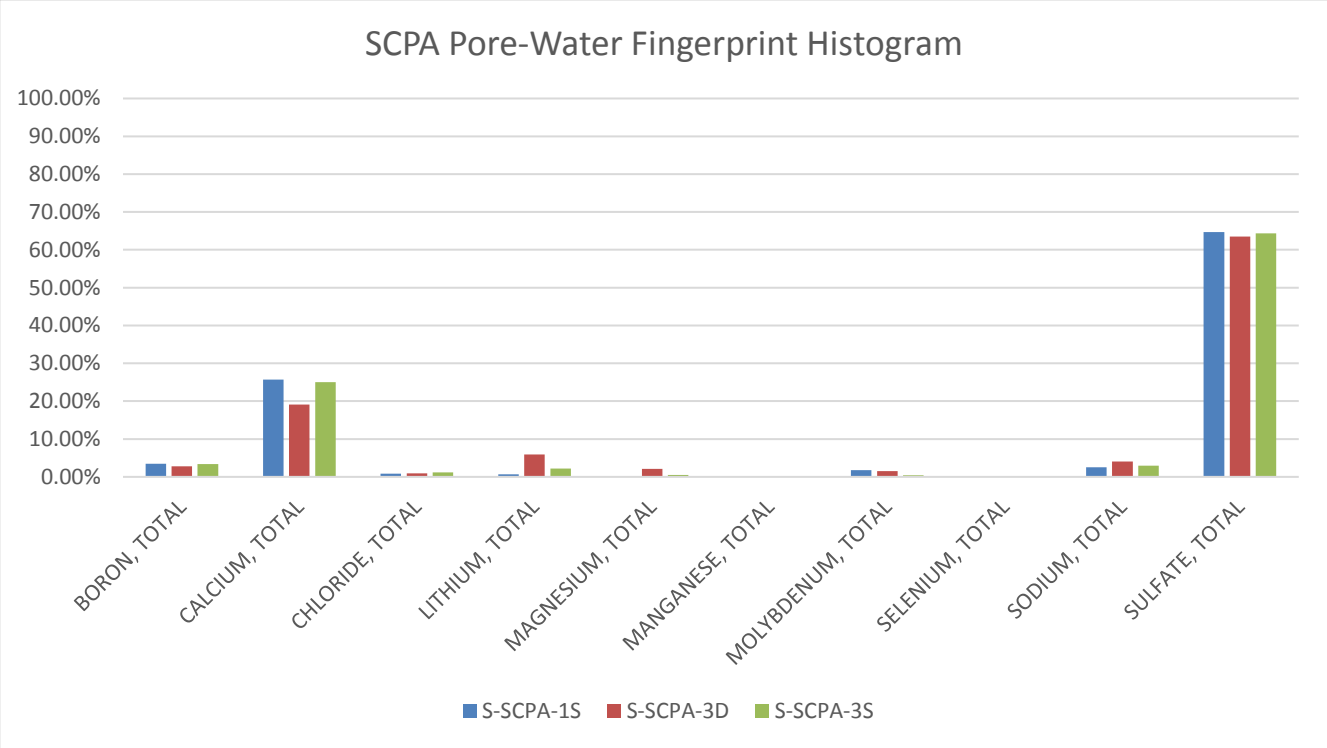
Project Short Title:	SCPB ASD - FALCON Analysis	**Reviewed:**	M. Haddock

Constituent	Number	Temporary Piezometers			Average
		S-SCPA-1S	S-SCPA-3D	S-SCPA-3S	
BORON, TOTAL	1	3.45%	2.77%	3.38%	3.20%
CALCIUM, TOTAL	2	25.67%	19.12%	25.01%	23.27%
CHLORIDE, TOTAL	3	0.81%	0.95%	1.15%	0.97%
LITHIUM, TOTAL	4	0.68%	5.93%	2.17%	2.93%
MAGNESIUM, TOTAL	5	0.15%	2.10%	0.48%	0.91%
MANGANESE, TOTAL	6	0.00%	0.01%	0.00%	0.00%
MOLYBDENUM, TOTAL	7	1.76%	1.52%	0.40%	1.23%
SELENIUM, TOTAL	8	0.21%	0.06%	0.08%	0.12%
SODIUM, TOTAL	9	2.53%	4.05%	2.92%	3.17%
SULFATE, TOTAL	10	64.73%	63.50%	64.40%	64.21%
Sum 1-10		100%	100%	100%	100%



Correlation Between Wells

	S-SCPA-1S	*S-SCPA-3D*	*S-SCPA-3S*
S-SCPA-1S	100.0%		
S-SCPA-3D	99.1%	100.0%	
S-SCPA-3S	99.9%	99.3%	100.0%
Average Fingerprint Reproducibility			99.5%

GOLDER

CALCULATIONS

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Project Short Title:	SCPB ASD - FALCON Analysis	**Reviewed:**	M. Haddock

4.3 SCPB Pore-Water

Constituent	Number	Units	CCR Rule Monitoring Wells			
			S-LB-2	S-LB-4	S-LB-5	S-SCPB-1
BORON, TOTAL	1	mg/L	4.5	6.5	17.9	10.7
CALCIUM, TOTAL	2	mg/L	112	94	40	37.2
CHLORIDE, TOTAL	3	mg/L	25.7	38.2	30.5	51.7
LITHIUM, TOTAL	4	µg/L	24.4	21.1	13.3	5.0
MAGNESIUM, TOTAL	5	mg/L	0.12	0.11	0.03	0.04
MANGANESE, TOTAL	6	mg/L	0.003	0.003	0.003	0.003
MOLYBDENUM, TOTAL	7	mg/L	0.79	0.53	2.43	3.71
SELENIUM, TOTAL	8	µg/L	11.7	7.2	29.0	25.2
SODIUM, TOTAL	9	mg/L	108.0	76.1	267.0	314.0
SULFATE, TOTAL	10	mg/L	451	318	393	630
Sum 1-10			738.2	561.8	793.3	1077.6

Constituent	Number	CCR Rule Monitoring Wells				Average
		S-LB-2	S-LB-4	S-LB-5	S-SCPB-1	
BORON, TOTAL	1	0.61%	1.16%	2.26%	0.99%	1.25%
CALCIUM, TOTAL	2	15.17%	16.75%	5.06%	3.45%	10.11%
CHLORIDE, TOTAL	3	3.48%	6.80%	3.84%	4.80%	4.73%
LITHIUM, TOTAL	4	3.31%	3.76%	1.68%	0.46%	2.30%
MAGNESIUM, TOTAL	5	0.02%	0.02%	0.00%	0.00%	0.01%
MANGANESE, TOTAL	6	0.00%	0.00%	0.00%	0.00%	0.00%
MOLYBDENUM, TOTAL	7	0.11%	0.09%	0.31%	0.34%	0.21%
SELENIUM, TOTAL	8	1.58%	1.28%	3.66%	2.34%	2.22%
SODIUM, TOTAL	9	14.63%	13.54%	33.66%	29.14%	22.74%
SULFATE, TOTAL	10	61.09%	56.60%	49.54%	58.47%	56.43%
Sum 1-10		100%	100%	100%	100%	100%

Subject:	Ameren CCR Rule Groundwater		
Date:	March 23, 2018	**Prepared:**	J. Ingram
Project No.:	153-1406	**Checked:**	E. Schneider / R. Feldmann
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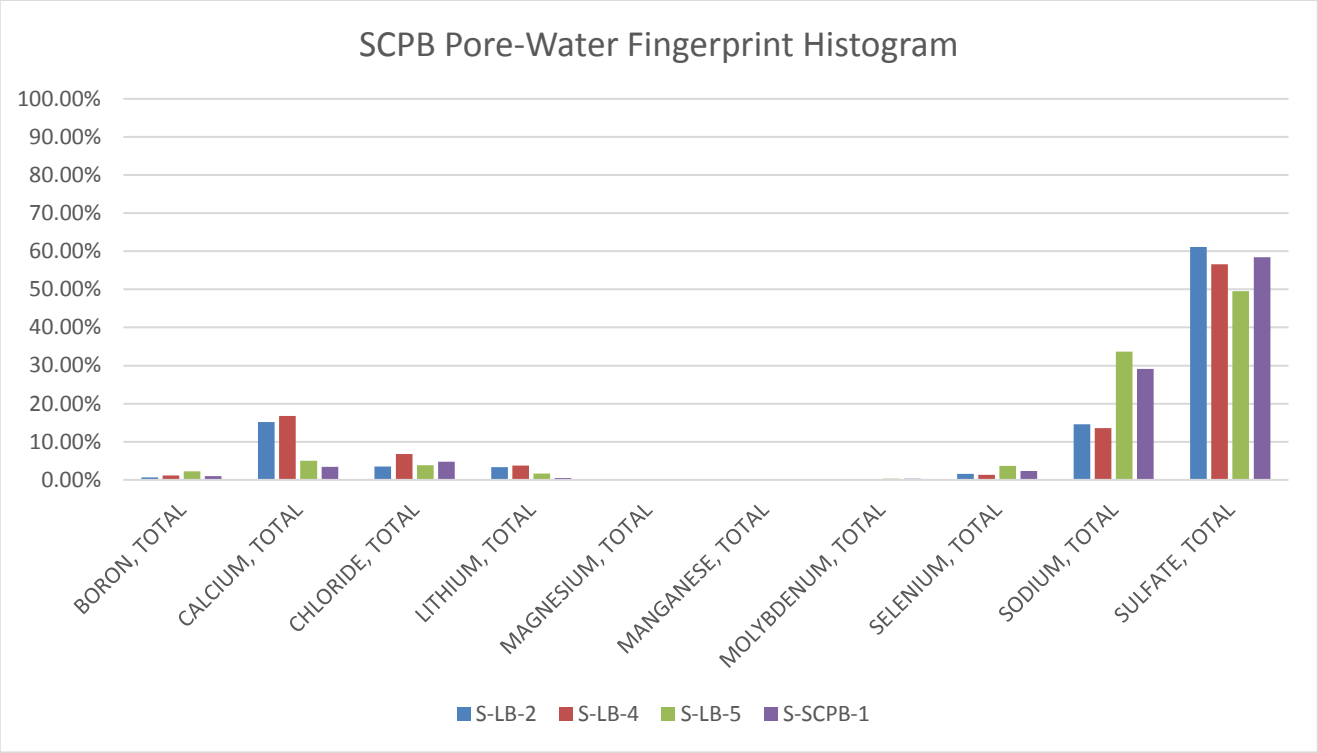

Correlation Between Wells

	S-LB-2	*S-LB-4*	*S-LB-5*	*S-SCPB-1*
S-LB-2	100.0%			
S-LB-4	99.7%	100.0%		
S-LB-5	90.0%	88.7%	100.0%	
S-SCPB-1	94.4%	93.2%	98.8%	100.0%
Average Fingerprint Reproducibility			94.1%	

5.0 Correlating Alluvial Aquifer Samples with Sources

A correlation between the average groundwater concentration and the different source waters was completed to demonstrate which source better correlates with each alluvial aquifer groundwater sample. Results from this correlation are provided below. Groundwater concentrations used for this analysis are the averages from available samples collected at that monitoring point. Values used for this correlation are provided in **Attachment 2**. The results demonstrate that groundwater in the alluvial aquifer either correlates better with the SCPA pore-water or background groundwater than it does with the SCPB pore-water. In no case, did a downgradient alluvial aquifer sample correlate better with the SCPB than with the SCPA or background groundwater.

GOLDER

CALCULATIONS

Subject:	Ameren CCR Rule Groundwater		
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Project No.:	153-1406	**Checked:**	E. Schneider / R. Feldmann
Project Short Title:	SCPB ASD - FALCON Analysis	**Reviewed:**	M. Haddock

Piezometers				CCR Rule Monitoring Wells			
	Percent Correlation				Percent Correlation		
Well ID	SCPA	SCPB	Background	Well ID	SCPA	SCPB	Background
S-ASD-1D	**95%**	84%	63%	S-LMW-1S	**94%**	84%	64%
S-ASD-1M	**89%**	77%	72%	S-LMW-2S	**83%**	76%	63%
S-ASD-1S	**87%**	81%	46%	S-LMW-3S	41%	19%	**99%**
S-ASD-2D	**94%**	82%	66%	S-LMW-4S	39%	18%	**100%**
S-ASD-2M	**96%**	85%	61%	S-LMW-5S	**99%**	93%	38%
S-ASD-2S	-4%	-1%	**20%**	S-LMW-6S	**99%**	93%	38%
S-ASD-3D	**97%**	87%	57%	S-LMW-7S	**96%**	82%	61%
S-ASD-3M	**99%**	91%	47%	S-LMW-8S	**99%**	93%	43%
S-ASD-3S	**75%**	67%	70%	S-LMW-9S	**92%**	81%	65%
S-ASD-4D	**98%**	91%	49%	S-TMW-1	47%	23%	**98%**
S-ASD-4M	**98%**	87%	56%	S-TMW-2	43%	19%	**98%**
S-ASD-4S	**93%**	77%	69%	S-TMW-3	57%	34%	**97%**
S-ASD-5D	**96%**	90%	49%	S-UG-1A	55%	36%	**91%**
S-ASD-5M	**98%**	86%	53%	S-UG-2	50%	41%	**88%**
S-ASD-5S	**99%**	87%	52%	S-UG-3	58%	42%	**93%**
S-ASD-6D	**97%**	88%	52%	S-UMW-1D	**89%**	75%	74%
S-ASD-6M	**99%**	93%	40%	S-UMW-2D	**100%**	93%	40%
S-ASD-6S	**99%**	89%	49%	S-UMW-3D	**100%**	94%	39%
				S-UMW-4D	**100%**	94%	39%
				S-UMW-5D	45%	28%	**95%**
				S-UMW-6D	**83%**	67%	82%
				S-DG-1	45%	20%	**98%**
				S-DG-2	44%	20%	**97%**
				S-DG-3	51%	27%	**97%**
				S-DG-4	41%	19%	**95%**

Notes:

1) Values display percent correlation between each sampling point and the SCPA pore-water, SCPB pore-water, and background groundwater chemistry.

2) The higher the value, the better the two correlate. The best correlation for each sampling point is bolded.

3) The darker red the cell, the better the correlation.

Attachment 1
Summary of Source Water Concentrations
SCPB Alternative Source Demonstration - FALCON Analysis
Sioux Energy Center, St. Charles County, MO

Analyte	Units	Background Groundwater				SCPB Pore-Water				SCPA Pore-Water				
		S-BMW-1D	S-BMW-1S	S-BMW-3D	S-BMW-3S	S-LB-2	S-LB4	S-LB5	S-SCPB-1	S-SCPA-1D	S-SCPA-1S	S-SCPA-2	S-SCPA-3D	S-SCPA-3S
ALKALINITY	mg/L	394	448	344	377	133	115	468	326	228	549	219	185	170
ANTIMONY, TOTAL	µg/L	0.50	0.14	0.30	0.18	0.56	0.56	0.59	0.78	0.31	1.50	0.23	1.20	0.33
ARSENIC, TOTAL	µg/L	0.3	0.8	0.5	0.9	3.6	3.2	8.9	7.1	92.1	26.1	2.0	91.2	72.0
BARIUM, TOTAL	µg/L	321	150	604	223	118	108	215	71	80	46	153	78	33
BERYLLIUM, TOTAL	µg/L	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.36	0.50
BORON, TOTAL	µg/L	179	95	56	67	4510	6500	17900	10700	7680	111000	348	79500	67800
CADMIUM, TOTAL	µg/L	0.250	0.177	0.193	0.195	0.130	0.082	0.400	0.510	0.440	9.500	0.240	7.400	1.600
CALCIUM, TOTAL	µg/L	129000	147222	109789	123000	112000	94100	40100	37200	101000	825000	73400	548000	501000
CHLORIDE, TOTAL	mg/L	5.5	8.6	8.9	10.2	25.7	38.2	30.5	51.7	25.0	26.0	20.5	27.1	23.1
CHROMIUM, TOTAL	µg/L	0.42	0.45	0.57	0.44	0.18	0.27	0.33	0.44	0.19	2.50	2.50	0.62	2.50
COBALT, TOTAL	µg/L	2.28	2.50	2.54	1.93	2.50	2.50	2.50	2.50	2.50	2.50	1.80	2.50	2.50
FLUORIDE, TOTAL	mg/L	0.28	0.29	0.30	0.33	1.30	1.10	1.20	1.80	1.20	0.79	0.22	2.90	0.60
IRON, TOTAL	µg/L	9790	19.8	7740	516	25	57	21.9	69.7	779	25	1350	138	34.3
LEAD, TOTAL	µg/L	2.7	2.5	2.5	2.5	2.5	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.6
LITHIUM, TOTAL	µg/L	13.4	7.2	18.1	8.8	24.4	21.1	13.3	5.0	28.7	22.0	16.7	170.0	43.4
MAGNESIUM, TOTAL	µg/L	28400	30900	25400	23800	122	108	28.4	38.7	23900	4880	20000	60200	9600
MANGANESE, TOTAL	µg/L	1060	580	518	782	2.5	2.5	2.5	2.5	97.9	2.5	113	202	17.9
MERCURY, TOTAL	µg/L	0.09	0.09	0.07	0.07	0.10	0.10	0.10	0.09	0.10	0.10	0.10	0.10	0.10
MOLYBDENUM, TOTAL	µg/L	3.4	3.1	6.2	5.2	789	526	2430	3710	2230	56600	26.5	43500	8070
POTASSIUM, TOTAL	µg/L	2520	395	3550	664	24900	25200	91000	74900	11800	55200	4350	60300	40100
SELENIUM, TOTAL	µg/L	0.50	1.03	0.45	0.38	11.7	7.2	29	25.2	0.37	6.6	0.6	1.6	1.5
SODIUM, TOTAL	µg/L	6360	4850	6110	4910	108000	76100	267000	314000	27000	81400	13900	116000	58500
SULFATE, TOTAL	mg/L	38	29	27	27	451	318	393	630	200	2080	49	1820	1290
THALLIUM, TOTAL	µg/L	0.50	0.50	0.45	0.39	0.50	0.50	0.50	0.50	0.10	0.49	0.56	1.70	0.29
TOTAL DISSOLVED SOLIDS	mg/L	473	520	418	441	777	560	1030	1240	560	3440	320	2880	2150

Notes:
1) Values for background groundwater monitoring wells represent an average from samples collected at that monitoring well as a part of the CCR Rule.
2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.
3) One half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less that the Method Detection Limit (MDL)).

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

Attachment 2
Summary of Alluvial Aquifer Concentrations Used for Correlation
SCPB Alternative Source Demonstration - FALCON Analysis
Sioux Energy Center, St. Charles County, MO

Analyte	Units	S-ASD-1D	S-ASD-1M	S-ASD-1S	S-ASD-2D	S-ASD-2M	S-ASD-2S	S-ASD-3D	S-ASD-3M	S-ASD-3S	S-ASD-4D	S-ASD-4M	S-ASD-4S
BORON, TOTAL	mg/L	1.15	0.56	0.59	0.39	0.45	0.74	4.45	7.33	8.85	4.40	2.99	0.72
CALCIUM, TOTAL	mg/L	107	110	108	103	120	228	128	124	217	126	189	189
CHLORIDE, TOTAL	mg/L	28	36	35	23	22	654	29	32	147	31	34	20
LITHIUM, TOTAL	µg/L	22.7	16.2	8.4	12.4	14.6	24.9	35.0	32.8	41.8	40.1	37.2	36.0
MAGNESIUM, TOTAL	mg/L	20.7	19.3	26.1	25.8	29.5	63.9	13.5	25.5	26.0	31.9	49.6	49.4
MANGANESE, TOTAL	mg/L	0.624	0.616	1.900	0.918	1.400	0.319	0.484	0.304	0.463	0.985	1.630	2.160
MOLYBDENUM, TOTAL	mg/L	0.131	0.043	0.025	0.046	0.060	0.184	0.814	0.675	0.532	0.161	0.031	0.003
SELENIUM, TOTAL	µg/L	0.50	0.35	98.50	0.50	0.50	7.20	0.10	0.09	0.10	0.12	0.14	0.20
SODIUM, TOTAL	mg/L	24	23	38	21	24	120	30	38	74	42	37	15
SULFATE, TOTAL	mg/L	162	129	195	147	193	54	219	278	212	268	348	255
Sum 1-10		367.3	335.2	511.5	334.3	404.6	1153.5	459.4	538.2	727.2	544.5	700.4	568.0

Analyte	S-ASD-1D	S-ASD-1M	S-ASD-1S	S-ASD-2D	S-ASD-2M	S-ASD-2S	S-ASD-3D	S-ASD-3M	S-ASD-3S	S-ASD-4D	S-ASD-4M	S-ASD-4S
BORON, TOTAL	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	1.0%	1.4%	1.2%	0.8%	0.4%	0.1%
CALCIUM, TOTAL	29.1%	32.8%	21.1%	30.8%	29.7%	19.8%	27.9%	23.0%	29.8%	23.1%	27.0%	33.3%
CHLORIDE, TOTAL	7.7%	10.7%	6.8%	6.8%	5.3%	56.7%	6.2%	5.9%	20.2%	5.7%	4.9%	3.6%
LITHIUM, TOTAL	6.2%	4.8%	1.6%	3.7%	3.6%	2.2%	7.6%	6.1%	5.7%	7.4%	5.3%	6.3%
MAGNESIUM, TOTAL	5.6%	5.8%	5.1%	7.7%	7.3%	5.5%	2.9%	4.7%	3.6%	5.9%	7.1%	8.7%
MANGANESE, TOTAL	0.2%	0.2%	0.4%	0.3%	0.3%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.4%
MOLYBDENUM, TOTAL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%
SELENIUM, TOTAL	0.1%	0.1%	19.3%	0.1%	0.1%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SODIUM, TOTAL	6.6%	7.0%	7.4%	6.4%	5.8%	10.4%	6.4%	7.0%	10.1%	7.7%	5.3%	2.7%
SULFATE, TOTAL	44.1%	38.5%	38.1%	44.0%	47.7%	4.7%	47.7%	51.7%	29.2%	49.2%	49.7%	44.9%
Sum 1-10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes:
1) Values for CCR Rule monitoring wells represent average from samples collected as a part of the CCR Rule.
2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.
3) One-half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less than the Method Detection Limit (MDL).

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

Attachment 2
Summary of Alluvial Aquifer Concentrations Used for Correlation
SCPB Alternative Source Demonstration - FALCON Analysis
Sioux Energy Center, St. Charles County, MO

Analyte	Units	S-ASD-5D	S-ASD-5M	S-ASD-5S	S-ASD-6D	S-ASD-6M	S-ASD-6S	S-BMW-1D	S-BMW-1S	S-BMW-3D	S-BMW-3S	S-DG-1	S-DG-2
BORON, TOTAL	mg/L	3.99	2.40	4.96	1.98	4.11	5.10	0.18	0.10	0.06	0.07	0.10	0.09
CALCIUM, TOTAL	mg/L	86	174	181	107	120	213	129	147	110	123	140	138
CHLORIDE, TOTAL	mg/L	24	29	17	31	36	47	6	9	9	10	8	7
LITHIUM, TOTAL	µg/L	45.0	42.6	17.1	40.1	46.2	27.0	13.4	7.2	18.1	8.8	35.7	36.7
MAGNESIUM, TOTAL	mg/L	22.0	41.8	43.3	22.8	28.3	60.2	28.4	30.9	25.4	23.8	30.3	28.9
MANGANESE, TOTAL	mg/L	0.578	1.580	0.231	0.728	0.747	0.740	1.060	0.580	0.518	0.782	0.209	0.400
MOLYBDENUM, TOTAL	mg/L	0.013	0.011	0.028	0.172	0.551	0.011	0.003	0.003	0.006	0.005	0.004	0.004
SELENIUM, TOTAL	µg/L	0.50	0.50	7.90	0.50	0.50	0.12	0.50	1.03	0.45	0.38	20.94	20.49
SODIUM, TOTAL	mg/L	39	19	19	29	49	43	6	5	6	5	4	4
SULFATE, TOTAL	mg/L	174	342	372	208	329	469	38	29	27	27	45	44
Sum 1-10		394.7	653.3	663.0	441.7	613.7	865.0	222.5	229.5	195.8	198.9	283.9	279.3

Analyte	S-ASD-5D	S-ASD-5M	S-ASD-5S	S-ASD-6D	S-ASD-6M	S-ASD-6S	S-BMW-1D	S-BMW-1S	S-BMW-3D	S-BMW-3S	S-DG-1	S-DG-2
BORON, TOTAL	1.0%	0.4%	0.7%	0.4%	0.7%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
CALCIUM, TOTAL	21.7%	26.6%	27.3%	24.2%	19.6%	24.6%	58.0%	64.2%	56.1%	61.8%	49.3%	49.2%
CHLORIDE, TOTAL	6.2%	4.5%	2.6%	7.1%	5.8%	5.4%	2.5%	3.7%	4.5%	5.1%	2.7%	2.7%
LITHIUM, TOTAL	11.4%	6.5%	2.6%	9.1%	7.5%	3.1%	6.0%	3.1%	9.2%	4.4%	12.6%	13.1%
MAGNESIUM, TOTAL	5.6%	6.4%	6.5%	5.2%	4.6%	7.0%	12.8%	13.5%	13.0%	12.0%	10.7%	10.4%
MANGANESE, TOTAL	0.1%	0.2%	0.0%	0.2%	0.1%	0.1%	0.5%	0.3%	0.3%	0.4%	0.1%	0.1%
MOLYBDENUM, TOTAL	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SELENIUM, TOTAL	0.1%	0.1%	1.2%	0.1%	0.1%	0.0%	0.2%	0.4%	0.2%	0.2%	7.4%	7.3%
SODIUM, TOTAL	9.8%	2.9%	2.9%	6.6%	8.0%	5.0%	2.9%	2.1%	3.1%	2.5%	1.5%	1.4%
SULFATE, TOTAL	44.1%	52.4%	56.1%	47.1%	53.6%	54.2%	17.2%	12.6%	13.6%	13.6%	15.8%	15.7%
Sum 1-10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes:
1) Values for CCR Rule monitoring wells represent average from samples collected as a part of the CCR Rule.
2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.
3) One-half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less than the Method Detection Limit (MDL).

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Checked By:EMS
Reviewed By:MNH

Attachment 2
Summary of Alluvial Aquifer Concentrations Used for Correlation
SCPB Alternative Source Demonstration - FALCON Analysis
Sioux Energy Center, St. Charles County, MO

Analyte	Units	S-DG-3	S-DG-4	S-LB-2	S-LB4	S-LB5	S-SCPB-1	S-LMW-1S	S-LMW-2S	S-LMW-3S	S-LMW-4S	S-LMW-5S	S-LMW-6S
BORON, TOTAL	mg/L	0.09	0.09	4.51	6.50	17.90	10.70	1.08	10.61	0.27	0.22	11.27	15.36
CALCIUM, TOTAL	mg/L	143	139	112	94	40	37	99	203	136	143	265	292
CHLORIDE, TOTAL	mg/L	9	46	26	38	31	52	25	145	26	3	30	5
LITHIUM, TOTAL	µg/L	36.4	40.0	24.4	21.1	13.3	5.0	17.1	32.7	19.8	20.0	58.7	23.8
MAGNESIUM, TOTAL	mg/L	28.9	43.6	0.1	0.1	0.0	0.0	27.2	41.0	31.9	37.9	50.4	62.1
MANGANESE, TOTAL	mg/L	0.621	0.484	0.003	0.003	0.003	0.003	0.040	0.500	0.006	0.267	1.230	0.499
MOLYBDENUM, TOTAL	mg/L	0.003	0.004	0.789	0.526	2.430	3.710	0.070	1.162	0.005	0.003	0.633	0.004
SELENIUM, TOTAL	µg/L	20.48	21.52	11.70	7.20	29.00	25.20	3.36	0.40	2.30	3.88	0.42	0.50
SODIUM, TOTAL	mg/L	4	13	108	76	267	314	29	76	11	14	90	99
SULFATE, TOTAL	mg/L	56	49	451	318	393	630	148	257	37	35	789	884
Sum 1-10		298.6	351.3	738.2	561.8	793.3	1077.6	348.9	766.8	264.0	257.2	1296.0	1381.5

Analyte	S-DG-3	S-DG-4	S-LB-2	S-LB4	S-LB5	S-SCPB-1	S-LMW-1S	S-LMW-2S	S-LMW-3S	S-LMW-4S	S-LMW-5S	S-LMW-6S
BORON, TOTAL	0.0%	0.0%	0.6%	1.2%	2.3%	1.0%	0.3%	1.4%	0.1%	0.1%	0.9%	1.1%
CALCIUM, TOTAL	48.0%	39.5%	15.2%	16.7%	5.1%	3.5%	28.4%	26.5%	51.5%	55.6%	20.5%	21.1%
CHLORIDE, TOTAL	2.9%	13.0%	3.5%	6.8%	3.8%	4.8%	7.1%	18.9%	9.8%	1.4%	2.3%	0.3%
LITHIUM, TOTAL	12.2%	11.4%	3.3%	3.8%	1.7%	0.5%	4.9%	4.3%	7.5%	7.8%	4.5%	1.7%
MAGNESIUM, TOTAL	9.7%	12.4%	0.0%	0.0%	0.0%	0.0%	7.8%	5.3%	12.1%	14.7%	3.9%	4.5%
MANGANESE, TOTAL	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%
MOLYBDENUM, TOTAL	0.0%	0.0%	0.1%	0.1%	0.3%	0.3%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
SELENIUM, TOTAL	6.9%	6.1%	1.6%	1.3%	3.7%	2.3%	1.0%	0.1%	0.9%	1.5%	0.0%	0.0%
SODIUM, TOTAL	1.4%	3.6%	14.6%	13.5%	33.7%	29.1%	8.2%	9.9%	4.1%	5.3%	6.9%	7.2%
SULFATE, TOTAL	18.7%	13.8%	61.1%	56.6%	49.5%	58.5%	42.3%	33.5%	14.1%	13.5%	60.8%	64.0%
Sum 1-10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes:
1) Values for CCR Rule monitoring wells represent average from samples collected as a part of the CCR Rule.
2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.
3) One-half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less than the Method Detection Limit (MDL).

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

Attachment 2
Summary of Alluvial Aquifer Concentrations Used for Correlation
SCPB Alternative Source Demonstration - FALCON Analysis
Sioux Energy Center, St. Charles County, MO

Analyte	Units	S-LMW-7S	S-LMW-8S	S-LMW-9S	S-SCPA-1D	S-SCPA-1S	S-SCPA-2	S-SCPA-3D	S-SCPA-3S	S-TMW-1	S-TMW-2	S-TMW-3	S-UG-1A
BORON, TOTAL	mg/L	2.18	6.12	1.38	7.68	111.00	0.35	79.50	67.80	0.07	0.08	0.09	0.23
CALCIUM, TOTAL	mg/L	232	160	215	101	825	73	548	501	103	117	126	163
CHLORIDE, TOTAL	mg/L	17	43	83	25	26	21	27	23	3	3	2	70
LITHIUM, TOTAL	µg/L	22.1	21.2	47.4	28.7	22.0	16.7	170.0	43.4	24.0	28.5	30.2	36.6
MAGNESIUM, TOTAL	mg/L	73.0	40.9	58.3	23.9	4.9	20.0	60.2	9.6	16.1	20.8	24.5	36.4
MANGANESE, TOTAL	mg/L	0.544	0.499	0.814	0.098	0.003	0.113	0.202	0.018	0.261	0.416	0.614	0.510
MOLYBDENUM, TOTAL	mg/L	0.005	0.153	0.008	2.230	56.600	0.027	43.500	8.070	0.003	0.003	0.004	0.004
SELENIUM, TOTAL	µg/L	1.69	0.42	0.42	0.37	6.60	0.60	1.60	1.50	0.41	0.50	0.45	20.69
SODIUM, TOTAL	mg/L	18	60	48	27	81	14	116	59	3	4	6	19
SULFATE, TOTAL	mg/L	386	404	305	200	2080	49	1820	1290	33	33	56	83
Sum 1-10		753.0	737.4	759.1	416.0	3213.5	194.1	2866.1	2003.0	182.1	207.0	245.3	429.4

Analyte	S-LMW-7S	S-LMW-8S	S-LMW-9S	S-SCPA-1D	S-SCPA-1S	S-SCPA-2	S-SCPA-3D	S-SCPA-3S	S-TMW-1	S-TMW-2	S-TMW-3	S-UG-1A
BORON, TOTAL	0.3%	0.8%	0.2%	1.8%	3.5%	0.2%	2.8%	3.4%	0.0%	0.0%	0.0%	0.1%
CALCIUM, TOTAL	30.8%	21.8%	28.3%	24.3%	25.7%	37.8%	19.1%	25.0%	56.5%	56.7%	51.4%	37.9%
CHLORIDE, TOTAL	2.3%	5.9%	10.9%	6.0%	0.8%	10.6%	0.9%	1.2%	1.6%	1.4%	0.8%	16.4%
LITHIUM, TOTAL	2.9%	2.9%	6.2%	6.9%	0.7%	8.6%	5.9%	2.2%	13.2%	13.8%	12.3%	8.5%
MAGNESIUM, TOTAL	9.7%	5.5%	7.7%	5.7%	0.2%	10.3%	2.1%	0.5%	8.8%	10.0%	10.0%	8.5%
MANGANESE, TOTAL	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%	0.3%	0.1%
MOLYBDENUM, TOTAL	0.0%	0.0%	0.0%	0.5%	1.8%	0.0%	1.5%	0.4%	0.0%	0.0%	0.0%	0.0%
SELENIUM, TOTAL	0.2%	0.1%	0.1%	0.1%	0.2%	0.3%	0.1%	0.1%	0.2%	0.2%	0.2%	4.8%
SODIUM, TOTAL	2.4%	8.2%	6.3%	6.5%	2.5%	7.2%	4.0%	2.9%	1.6%	1.7%	2.3%	4.5%
SULFATE, TOTAL	51.3%	54.8%	40.2%	48.1%	64.7%	25.0%	63.5%	64.4%	17.9%	15.8%	22.6%	19.3%
Sum 1-10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes:
1) Values for CCR Rule monitoring wells represent average from samples collected as a part of the CCR Rule.
2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.
3) One-half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less than the Method Detection Limit (MDL).

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

Attachment 2

Summary of Alluvial Aquifer Concentrations Used for Correlation

SCPB Alternative Source Demonstration - FALCON Analysis

Sioux Energy Center, St. Charles County, MO

Analyte	Units	S-UG-2	S-UG-3	S-UMW-1D	S-UMW-2D	S-UMW-3D	S-UMW-4D	S-UMW-5D	S-UMW-6D
BORON, TOTAL	mg/L	0.34	0.27	0.40	18.51	25.38	25.19	8.04	0.85
CALCIUM, TOTAL	mg/L	120	130	77	220	240	182	86	77
CHLORIDE, TOTAL	mg/L	54	42	21	20	21	25	24	19
LITHIUM, TOTAL	µg/L	18.7	27.1	13.2	27.6	19.1	38.2	29.0	12.7
MAGNESIUM, TOTAL	mg/L	24.6	23.4	21.3	11.4	5.8	25.3	15.8	19.7
MANGANESE, TOTAL	mg/L	0.161	0.629	0.125	0.287	0.476	1.650	0.414	0.442
MOLYBDENUM, TOTAL	mg/L	0.003	0.003	0.035	1.466	4.100	7.236	0.262	0.109
SELENIUM, TOTAL	µg/L	20.73	20.77	0.50	0.45	0.26	0.28	0.26	0.50
SODIUM, TOTAL	mg/L	44	26	15	70	81	72	18	14
SULFATE, TOTAL	mg/L	58	68	89	614	686	509	32	72
Sum 1-10		339.7	337.7	237.9	983.1	1082.8	885.4	213.0	216.8

									Source Averages		
Analyte	S-UG-2	S-UG-3	S-UMW-1D	S-UMW-2D	S-UMW-3D	S-UMW-4D	S-UMW-5D	S-UMW-6D	SCPA	SCPB	Background
BORON, TOTAL	0.1%	0.1%	0.2%	1.9%	2.3%	2.8%	3.8%	0.4%	3.2%	1.3%	0.0%
CALCIUM, TOTAL	35.2%	38.6%	32.5%	22.3%	22.1%	20.5%	40.4%	35.6%	23.3%	10.1%	60.0%
CHLORIDE, TOTAL	15.9%	12.4%	8.8%	2.0%	2.0%	2.9%	11.1%	8.9%	1.0%	4.7%	4.0%
LITHIUM, TOTAL	5.5%	8.0%	5.5%	2.8%	1.8%	4.3%	13.6%	5.9%	2.9%	2.3%	5.7%
MAGNESIUM, TOTAL	7.2%	6.9%	9.0%	1.2%	0.5%	2.9%	7.4%	9.1%	0.9%	0.0%	12.8%
MANGANESE, TOTAL	0.0%	0.2%	0.1%	0.0%	0.0%	0.2%	0.2%	0.2%	0.0%	0.0%	0.3%
MOLYBDENUM, TOTAL	0.0%	0.0%	0.0%	0.1%	0.4%	0.8%	0.1%	0.1%	1.2%	0.2%	0.0%
SELENIUM, TOTAL	6.1%	6.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	2.2%	0.3%
SODIUM, TOTAL	12.9%	7.7%	6.1%	7.1%	7.5%	8.1%	8.4%	6.3%	3.2%	22.7%	2.6%
SULFATE, TOTAL	17.0%	20.0%	37.6%	62.5%	63.3%	57.5%	14.9%	33.3%	64.2%	56.4%	14.2%
Sum 1-10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes:

1) Values for CCR Rule monitoring wells represent average from samples collected as a part of the CCR Rule.

2) Unit abbreviations - µg/L - micrograms per liter, mg/L - milligrams per liter.

3) One-half the value of the Practical Quantitation Limit (PQL) is used for non-detect values (values less than the Method Detection Limit (MDL).

Prepared By:JSI

Checked By:EMS

Reviewed By:MNH

golder.com

APPENDIX C

Alternative Source Demonstration – May 2018 Sampling Event

TECHNICAL MEMORANDUM

DATE November 1, 2018 **Project No.** 1531406

TO Ameren Missouri
1901 Chouteau Ave, St. Louis, Mo 63103

FROM Golder Associates, Inc

SCPB – ATERNATIVE SOURCE DEMONSTRATION – MAY 2018 SAMPLING EVENT

1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), Golder Associates ("Golder") has prepared this Technical Memorandum that indicates Statistically Significant Increases (SSIs) calculated at Ameren Missouri's (Ameren) Sioux Energy Center (SEC), fly ash surface impoundment (SCPB) result from an alternative source. This SCPB Alternative Source Demonstration satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

2.0 BACKGROUND

In November 2017, the first round of detection monitoring was completed at the SEC's SCPB Coal Combustion Residual (CCR) Unit in St. Charles County, Missouri. This sampling was completed in accordance with the CCR Rule and SSIs were identified and verified. In February/March 2018, additional drilling and a detailed analysis of results were completed for the SCPB and it was determined that the SSIs in the CCR Rule groundwater monitoring wells at the SCPB were not caused by impacts from the SCPB. The SSIs observed in SCPB wells were caused by an alternative source, which is the unlined, adjacent SCPA surface impoundment. A copy of the Alternative Source Demonstration (ASD) report for the November 2017 sampling event is provided in **Appendix B** of the 2018 SCPB Annual Groundwater Monitoring and Corrective Action Report.

3.0 MAY 2018 SAMPLING EVENT

A summary of the May 2018 sampling results can be found in **Table 3** of the 2018 SCPB Annual Groundwater Monitoring and Corrective Action Report. **Figure 1** of this Technical Memorandum displays where May 2018 SCPB CCR Rule groundwater monitoring well samples plot in comparison to cations/anions for the SCPA pore-water, SCPB pore-water, and background groundwater zones. As displayed in this figure, the monitoring wells around the SCPB plot in similar locations to those from November 2017. These results also display that monitoring wells that have SSIs in the May 2018 sampling event plot between the background groundwater quality and the SCPA pore-water. Like the November 2017 Sampling Event ASD, results from this diagram demonstrate that groundwater data from the monitoring wells around the SCPB are impacted by the SCPA and not the SCPB.

Additional supporting lines of evidence from the November 2017 Sampling Event ASD are also applicable in this May 2018 Sampling Event ASD. Summaries of supporting lines of evidence include:

- Potentiometric surface mapping from 2018 continue to show that while groundwater conditions can be variable, net groundwater flow around the SCPB is toward the east/southeast, flowing from the SCPA toward the SCPB. This supports the conclusion that the unlined SCPA is the source of impacts at the downgradient monitoring wells because impacted monitoring wells around the SCPB are frequently downgradient from the SCPA.
- The SCPB was constructed with an engineered liner system consisting of a 60-mil High Density Polyethylene (HDPE) geomembrane liner with a bottom elevation of approximately 419 FT MSL at its lowest point. The SCPA began operation in 1967 and has a bottom elevation estimated to be at approximately 370 FT MSL. Additionally, as shown in the SCPA Annual report, there are elevated concentrations of CCR indicators in the intermediate and deep zones of the alluvial aquifer. Since impacts are present in the shallow, middle, and deep alluvial zones and are not isolated to the shallow zone, the impacts are most likely from the SCPA, which extends to deeper depths in the aquifer.

In summary, groundwater chemistry, pore-water chemistry fingerprints, cell construction and hydrogeological evidence all demonstrate that impacts (SSIs) calculated during the May 2018 Sampling Event for the SCPB CCR Unit were not caused by impacts from the SCPB surface impoundment, and the SCPA surface impoundment is the source of the SCPB SSIs.

CERTIFICATION STATEMENT

This *SCPB – Alternative Source Demonstration – May 2018 Sampling Event has* been prepared to comply with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this *SCPB – Alternative Source Demonstration – May 2018 Sampling Event* located at 8501 Missouri 94, West Alton, Missouri 63386 has been prepared to meet the requirements of 40 CFR §257.94(e)(2).

GOLDER ASSOCIATES INC.

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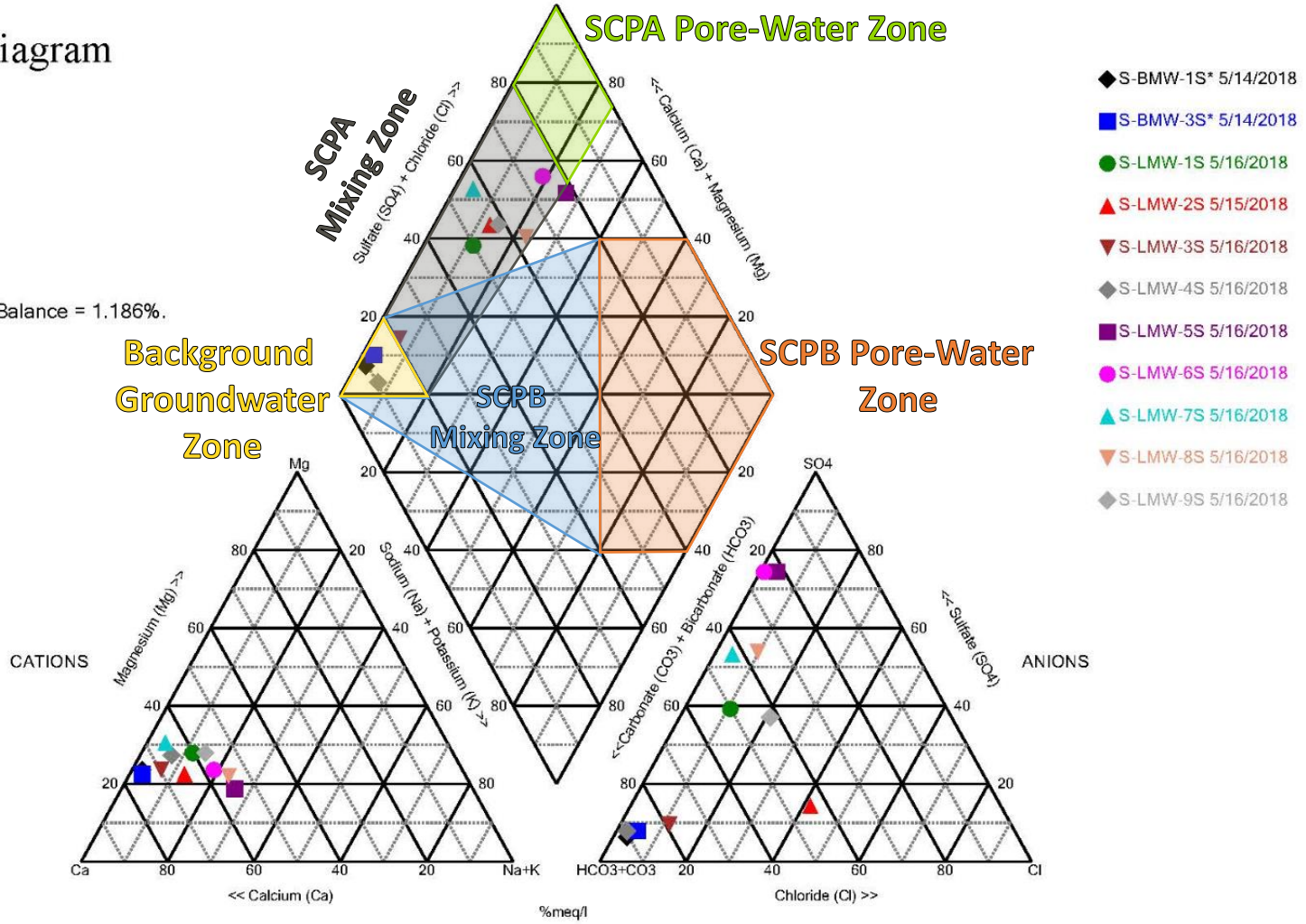
Mark Haddock, P.E., R.G.

Principal, Practice Leader

Piper Diagram



Notes:

1.) Data used to generate diagram available SCPB Annual Report.

2.) Piper diagram generated using Sanitas Software.

CLIENT/PROJECT					TITLE					
AMEREN MISSOURI SIOUX ENERGY CENTER				GOLDER	SCPB PIPER DIAGRAM FOR MAY 2018					
PREPARED	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	PROJECT NO.	DRAWING NO.	SUBTITLE	REV. NO.	FIGURE
JSI	MSG	MNH	2018/10/30	NA	NA	153-1406.0003	NA	NA	0	1

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