2018 Annual Groundwater Monitoring and Corrective Action Report

SCPC 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.
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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 Utility Waste Landfill (UWL) SCPC Surface Impoundment at the Sioux Energy Center (SEC) is subject to the requirements of the CCR Rule. This Annual Report for the SCPC 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 SCPC. The groundwater monitoring system consists of eight (8) monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monioring wells were installed or decommissioned in 2018 as a part of the CCR Rule monitoring program for the SCPC. For more information on the groundwater monitoring network, see the 2017 Annual Groundwater Monitoring Report for the SCPC.

3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCPC 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	UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4	
	Date of Sample Collection								
January 2018 Verification Sampling	-	-	-	1/9/2018	-	-	-	1/9/2018	Detection
May 2018 Detection Monitoring Sampling	5/14/2018	5/14/2018	5/14/2018	5/15/2018	5/15/2018	5/15/2018	5/15/2018	5/15/2018	Detection
July 2018 Verification Sampling	-	-	-	-	7/6/2018	-	-	-	Detection
November 2018 Detection Monitoring Sampling	11/12/2018	11/12/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	Detection
Total Number of Samples Collected	2	2	2	3	3	2	2	3	NA

Notes:
1.) Verification Sampling Events tested for Appendix III Parameters with initial exceedances.
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 completed in January 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 SCPC, Utility Waste Landfill, are not caused by the SCPC CCR unit and the SCPC 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 unverified SSIs. None of the SSIs were verified. 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**.

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 SCPC was toward the southeast, but ranged from northeast to directly south. Horizontal

gradients calculated by the program range from 0.0002 to 0.0010 feet/foot with an estimated net annual groundwater velocity of approximately 16 feet per year.

4.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

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

4.1 Sampling Issues

During the statistical analysis of the May 2018 detection monitoring event only 1 Initial exceedance was identified which was for Boron at DG-1. Subsequent verification sampling at this well did not validate this SSI and no SSIs were identified. During preparation of this Annual Report, it was recognized that two SSIs that were above their upper prediction limits were not initially identified. These SSIs were for boron at DG-3 and DG-4. A verification sample was not collected at these wells at the same time as the verification sample was collected at DG-1. The next sampling event at these monitoring wells was completed as a part of the November 2018 sampling. Results from this event were below the prediction limits for boron at these monitoring wells. November 2018 results are used as the verification sampling results, and therefore, no verified SSIs were identified during the May 2018 detection monitoring event.

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
SCPC Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS											
		BMW-1S	BMW-3S	Prediction Limit UG-1A	UG-1A	Prediction Limit UG-2	UG-2	Prediction Limit DG-1	DG-1	Prediction Limit DG-2	DG-2	Prediction Limit DG-3	DG-3	Prediction Limit DG-4	DG-4
November 2017 Detection Monitoring Event															
DATE	NA	11/13/2017	11/13/2017	NA	11/14/2017	NA	11/14/2017	NA	11/14/2017	NA	11/14/2017	NA	11/14/2017	NA	11/14/2017
pH	SU	6.95	7.08	6.294-7.616	6.90	6.031-7.969	7.22	6.759-7.323	7.05	6.73-7.482	7.09	6.156-7.702	7.03	6.291-7.62	7.04
BORON, TOTAL	µg/L	118	104	362.5	192	234.6	154	122.5	102	119.3	90.9 J	115.1	96.1 J	DQR	100
CALCIUM, TOTAL	µg/L	156,000	128,000	164,715	148,000	133,251	114,000	146,584	126,000	142,779	128,000	159,563	144,000	147,361	129,000
CHLORIDE, TOTAL	mg/L	7.7	10.5	131.6	79.1	125.3	83.3	9.962	4.4	9.817	4.1	16.08	4.7	115.1	43.5
FLUORIDE, TOTAL	mg/L	0.30	0.34	0.3822	0.30	0.24	0.26	0.3844	0.33	0.4365	0.34	0.4619	0.39	0.37	0.36
SULFATE, TOTAL	mg/L	41.4	28.2	103.2	56.0	101.6	38.1	66.1	23.0	47.44	36.0	61.41	52.8	57.15	51.6
TOTAL DISSOLVED SOLIDS	mg/L	526	446	818.8	515	613.7	565	569.1	449	521.6	459	580	521	698.9	528
January 2018 Verification Sampling Event															
DATE	NA						1/9/2018								1/9/2018
pH	SU														
BORON, TOTAL	µg/L														63.0 J
CALCIUM, TOTAL	µg/L														
CHLORIDE, TOTAL	mg/L														
FLUORIDE, TOTAL	mg/L						0.28								
SULFATE, TOTAL	mg/L														
TOTAL DISSOLVED SOLIDS	mg/L														

NOTES:

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

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

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

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS											
		BMW-1S	BMW-3S	Prediction Limit UG-1A	UG-1A	Prediction Limit UG-2	UG-2	Prediction Limit DG-1	DG-1	Prediction Limit DG-2	DG-2	Prediction Limit DG-3	DG-3	Prediction Limit DG-4	DG-4
May 2018 Detection Monitoring Event															
DATE	NA	5/14/2018	5/14/2018	NA	5/14/2018	NA	5/15/2018	NA	5/15/2018	NA	5/15/2018	NA	5/15/2018	NA	5/15/2018
pH	SU	7.84	7.17	6.294-7.616	6.78	6.031-7.969	7.08	6.759-7.323	6.87	6.73-7.482	6.94	6.156-7.702	6.84	6.291-7.62	6.86
BORON, TOTAL	µg/L	74.0 J	65.6 J	362.5	180	234.6	151	122.5	126	119.3	119	115.1	121	DQR	116
CALCIUM, TOTAL	µg/L	147,000	126,000	164,715	121,000	133,251	117,000	146,584	130,000	142,779	124,000	159,563	143,000	147,361	127,000 J
CHLORIDE, TOTAL	mg/L	6.3	10.0	131.6	53.9	125.3	43.7	9.962	7.4	9.817	7.0	16.08	15.7	115.1	18.9
FLUORIDE, TOTAL	mg/L	0.30	0.36	0.3822	0.32	0.24	0.24	0.3844	0.31	0.4365	0.40	0.4619	0.38	0.37	0.37
SULFATE, TOTAL	mg/L	23.6	28.5	103.2	61.8	101.6	31.4	66.1	46.7	47.44	30.3	61.41	53.0	57.15	55.8
TOTAL DISSOLVED SOLIDS	mg/L	1,170	565	818.8	64.0	613.7	525 J	569.1	504	521.6	503	580	483 J	698.9	530
July 2018 Verification Sampling Event															
DATE	NA								7/6/2018				11/13/2018		11/13/2018
pH	SU								7.38				6.12		7.05
BORON, TOTAL	µg/L								113				108		73.2 J
CALCIUM, TOTAL	µg/L														
CHLORIDE, TOTAL	mg/L														
FLUORIDE, TOTAL	mg/L														
SULFATE, TOTAL	mg/L														
TOTAL DISSOLVED SOLIDS	mg/L														

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. Prediction Limits calculated using Sanitas Software.
5. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.
6. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
7. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
8. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
9. Due to error, DG-3 and DG-4 were not sampled during verification sampling. November 2018 results are used as verification sampling results.

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

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

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS					
		BMW-1S	BMW-3S	UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4
November 2018 Detection Monitoring Event									
DATE	NA	11/12/2018	11/12/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018
pH	SU	7.46	7.49	7.00	6.76	6.11	6.20	6.12	7.05
BORON, TOTAL	µg/L	72.9 J	61.5 J	145	145	125	114	108	73.2 J
CALCIUM, TOTAL	µg/L	157,000	124,000	116,000	105,000	129,000	122,000	137,000	121,000
CHLORIDE, TOTAL	mg/L	6.7	10.1	65.4	24.4	8.6	6.9	9.1	80.2
FLUORIDE, TOTAL	mg/L	0.34	0.36	ND	ND	ND	ND	ND	ND
SULFATE, TOTAL	mg/L	28.8	25.6	65.9	17.7	27.1	29.0	64.7	39.3
TOTAL DISSOLVED SOLIDS	mg/L	556	436	549	607 J	511	470	545	611

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

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

Figures

N

LEGEND

- Sioux Energy Center Property Boundary
- UWL Perimeter Fence
- SCPC - WFGD Disposal Area
- Water Recycle Pond

Sample/Measurement Location

- SCPC Monitoring Well
- Background Monitoring Well
- Groundwater Elevation Piezometer

KEY MAP

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GOLDER GROUNDWATER MONITORING WELLS SURVEYED BY ZAHNER AND ASSOCIATES, INC.
3.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
4.) WFGD - WASTE FLUE GAS DESULFURIZATION.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 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	2018-12-12
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:
1in
0

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\2018 Annual Report\Figure 1 - SCPC - 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\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
SCPC POTENTIOMETRIC SURFACE MAP - MAY 14, 2018

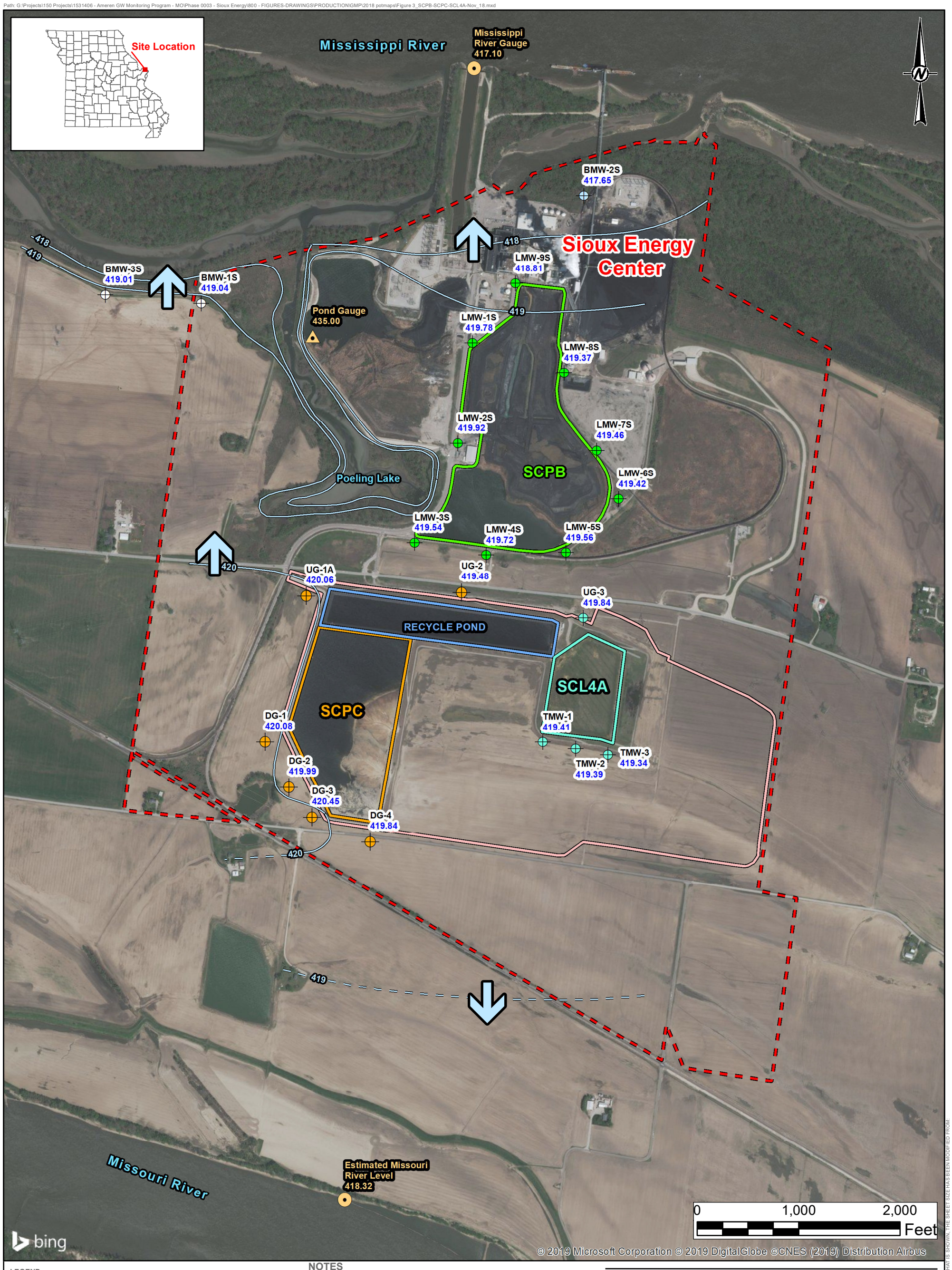
CONSULTANT
GOLDER

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



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

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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
SCPC 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-SCPC
Pace Project No.: 60261740

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-SCPC
Pace Project No.: 60261740

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-SCPC
Pace Project No.: 60261740

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60261740001	**S-SCPC-UG-2**	Water	01/09/18 10:10	01/10/18 03:50
60261740002	**S-SCPC-DG-4**	Water	01/09/18 10:10	01/10/18 03:50

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60261740001	**S-SCPC-UG-2**	EPA 300.0	LDB	1	PASI-K
60261740002	**S-SCPC-DG-4**	EPA 200.7	TDS	1	PASI-K

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

Sample: S-SCPC-UG-2 **Lab ID: 60261740001** Collected: 01/09/18 10:10 Received: 01/10/18 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Fluoride	**0.28**	mg/L	0.20	0.10	1		01/11/18 17:56	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

Sample: S-SCPC-DG-4 **Lab ID: 60261740002** Collected: 01/09/18 10:10 Received: 01/10/18 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**63.0J**	ug/L	100	3.5	1	01/11/18 15:30	01/12/18 10:46	7440-42-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

QC Batch: 510288
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60261740002

METHOD BLANK: 2089641
Matrix: Water
Associated Lab Samples: 60261740002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<3.5	100	3.5	01/12/18 10:42	

LABORATORY CONTROL SAMPLE: 2089642

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	981	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2089643 2089644

Parameter	Units	60261740002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	63.0J	1000	1000	1040	1070	98	100	70-130	3	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

QC Batch: 510259 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60261740001

METHOD BLANK: 2089535 Matrix: Water
Associated Lab Samples: 60261740001

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

LABORATORY CONTROL SAMPLE: 2089536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.6	105	90-110	

MATRIX SPIKE SAMPLE: 2089539

Parameter	Units	60261746008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.94	2.5	3.5	102	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
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QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR-SCPC
Pace Project No.: 60261740

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60261740002	**S-SCPC-DG-4**	EPA 200.7	510288	EPA 200.7	510357
60261740001	**S-SCPC-UG-2**	EPA 300.0	510259		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60261740

60261740

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 1-9/13/20 **Corr. Factor** (CF 0.0) CF +0.2 **Corrected** 1-9/13/2-0

Date and initials of person examining contents: PM 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) ☐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	TLS

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Check 1/10/18

Project Manager Review: _____ Date: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

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 - SCPC
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

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		60461740
1	S-SCPC-UG-2	WT	G			1-9-18	1010		2	1		1							1							BP3N20 BP2U 001
2	S-SCPC-DG-4	WT	G			1	0850		1	1		1							1							002
3		WT	G																							
4		WT	G																							
5		WT	G																							
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
See Jeff Ingram to confirm analysis	Golder	1/09/18	1400	PACE	1/9/18	1400				
	PACE	1/9/18	1700		1/10/18	0850	1.9	X	X	Y
							1.3			
							2.0			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Works

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 1/09/18

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

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

MEMORANDUM

DATE January 15, 2018 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPC – AMEREN GROUNDWATER – DATA PACKAGE 60261740

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

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren-Sioux-SCPC- VS 2018 Jan
Reviewer: T Goodwin

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

Laboratory: Pace Analytical
SDG #: 60261740
Analytical Method (type and no.): 200.7 Metals, Total; 2540C TDS; 300.0 IC Anions
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names ~~S-UG-1A~~, S-UG-2, ~~S-DG-1, S-DG-2, S-DG-3~~, S-DG-4, ~~S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S~~
(10) (12) (13)

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?	☐	☑	☐	
g) Were any matrix problems noted?	☐	☑	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☐	☑	☐	
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	☐	☑	☐	
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☑	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☑	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCPC-DG-4	Boron (B)	63.0	J	Result detected between MDL + PQL
			(J)	

Signature: Tommy J Gerard Jr Date: 1/15/2018

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

December 28, 2018

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

RE: Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on May 16, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

REV-1, 12/28/18: Samples S-BMW-1S and S-BMW-3S added to report.

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

Sincerely,

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

Enclosures

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

Pace Analytical Services, LLC
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(913)599-5665

CERTIFICATIONS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Kansas Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60270507001	**S-UG-1A**	Water	05/15/18 08:50	05/16/18 03:20
60270507002	**S-UG-2**	Water	05/15/18 14:05	05/16/18 03:20
60270507003	**S-DG-1**	Water	05/15/18 09:45	05/16/18 03:20
60270507004	**S-DG-2**	Water	05/15/18 10:35	05/16/18 03:20
60270507005	**S-DG-3**	Water	05/15/18 11:55	05/16/18 03:20
60270507006	**S-DG-4**	Water	05/15/18 12:45	05/16/18 03:20
60270507007	**S-SCPC-DUP-1**	Water	05/15/18 08:50	05/16/18 03:20
60270507008	**S-SCPC-FB-1**	Water	05/15/18 13:45	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

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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60270507001	**S-UG-1A**	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
60270507002	**S-UG-2**	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
60270507003	**S-DG-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
60270507004	**S-DG-2**	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
60270507005	**S-DG-3**	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
60270507006	**S-DG-4**	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
60270507007	**S-SCPC-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
60270507008	**S-SCPC-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
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

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDB	1	PASI-K
		EPA 300.0	OL	3	PASI-K

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-UG-1A **Lab ID: 60270507001** Collected: 05/15/18 08:50 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	**180**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:27	7440-42-8	
Calcium	**121000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:27	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:27	7439-89-6	
Magnesium	**28000**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:27	7439-95-4	
Manganese	**194**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:27	7439-96-5	
Potassium	**9070**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:27	7440-09-7	
Sodium	**22900**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:27	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**352**	mg/L	20.0	4.9	1		05/24/18 09:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**64.0**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**53.9**	mg/L	5.0	2.3	5		05/30/18 14:53	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.063	1		05/26/18 17:33	16984-48-8	
Sulfate	**61.8**	mg/L	5.0	1.2	5		05/30/18 14:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-UG-2 **Lab ID: 60270507002** Collected: 05/15/18 14:05 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	**151**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:29	7440-42-8	
Calcium	**117000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:29	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:29	7439-89-6	
Magnesium	**25900**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:29	7439-95-4	
Manganese	**62.0**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:29	7439-96-5	
Potassium	**5360**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:29	7440-09-7	
Sodium	**47700**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:29	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**387**	mg/L	20.0	4.9	1		05/24/18 09:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**525**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**43.7**	mg/L	5.0	2.3	5		05/30/18 15:08	16887-00-6	
Fluoride	**0.24**	mg/L	0.20	0.063	1		05/26/18 17:48	16984-48-8	
Sulfate	**31.4**	mg/L	5.0	1.2	5		05/30/18 15:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-DG-1 **Lab ID: 60270507003** Collected: 05/15/18 09:45 Received: 05/16/18 03:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**126**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:36	7440-42-8	
Calcium	**130000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:36	7440-70-2	
Iron	**471**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:36	7439-89-6	
Magnesium	**29100**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:36	7439-95-4	
Manganese	**68.6**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:36	7439-96-5	
Potassium	**5830**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:36	7440-09-7	
Sodium	**4590**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:36	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**426**	mg/L	20.0	4.9	1		05/24/18 09:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**504**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.4**	mg/L	1.0	0.46	1		05/26/18 18:03	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.063	1		05/26/18 18:03	16984-48-8	
Sulfate	**46.7**	mg/L	5.0	1.2	5		05/30/18 15:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-DG-2 **Lab ID: 60270507004** Collected: 05/15/18 10:35 Received: 05/16/18 03:20 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**119**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:38	7440-42-8	
Calcium	**124000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:38	7440-70-2	
Iron	**258**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:38	7439-89-6	
Magnesium	**29600**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:38	7439-95-4	
Manganese	**190**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:38	7439-96-5	
Potassium	**6110**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:38	7440-09-7	
Sodium	**4730**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**466**	mg/L	20.0	4.9	1		05/24/18 09:49		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**503**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.0**	mg/L	1.0	0.46	1		05/26/18 18:18	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.063	1		05/26/18 18:18	16984-48-8	
Sulfate	**30.3**	mg/L	2.0	0.47	2		05/30/18 15:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-DG-3 **Lab ID: 60270507005** Collected: 05/15/18 11:55 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	**121**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:41	7440-42-8	
Calcium	**143000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:41	7440-70-2	
Iron	**2830**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:41	7439-89-6	
Magnesium	**29400**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:41	7439-95-4	
Manganese	**750**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:41	7439-96-5	
Potassium	**5280**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:41	7440-09-7	
Sodium	**4780**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:41	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**418**	mg/L	20.0	4.9	1		05/24/18 09:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**483**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15.7**	mg/L	1.0	0.46	1		05/26/18 18:33	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.063	1		05/26/18 18:33	16984-48-8	
Sulfate	**53.0**	mg/L	5.0	1.2	5		05/30/18 15:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-DG-4 **Lab ID: 60270507006** Collected: 05/15/18 12:45 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	**116**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:43	7440-42-8	
Calcium	**127000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:43	7440-70-2	M1
Iron	**51.7**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:43	7439-89-6	
Magnesium	**41900**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:43	7439-95-4	
Manganese	**176**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:43	7439-96-5	
Potassium	**7140**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:43	7440-09-7	
Sodium	**15200**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:43	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**487**	mg/L	20.0	4.9	1		05/24/18 10:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**530**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**18.9**	mg/L	2.0	0.92	2		05/30/18 16:08	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.063	1		05/26/18 19:18	16984-48-8	
Sulfate	**55.8**	mg/L	5.0	1.2	5		05/30/18 17:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-SCPC-DUP-1 **Lab ID: 60270507007** Collected: 05/15/18 08:50 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	**119**	ug/L	100	12.5	1	05/17/18 13:15	05/18/18 19:49	7440-42-8	
Calcium	**142000**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:49	7440-70-2	
Iron	**2790**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:49	7439-89-6	
Magnesium	**29200**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:49	7439-95-4	
Manganese	**685**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:49	7439-96-5	
Potassium	**5280**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:49	7440-09-7	
Sodium	**4770**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:49	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**425**	mg/L	20.0	4.9	1		05/25/18 10:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**393**	mg/L	5.0	5.0	1		05/22/18 17:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15.5**	mg/L	1.0	0.46	1		05/26/18 19:47	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.063	1		05/26/18 19:47	16984-48-8	
Sulfate	**53.0**	mg/L	5.0	1.2	5		05/30/18 17:37	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Sample: S-SCPC-FB-1 **Lab ID: 60270507008** Collected: 05/15/18 13:45 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 19:51	7440-42-8	
Calcium	**<53.5**	ug/L	200	53.5	1	05/17/18 13:15	05/18/18 19:51	7440-70-2	
Iron	**<6.1**	ug/L	50.0	6.1	1	05/17/18 13:15	05/18/18 19:51	7439-89-6	
Magnesium	**<14.0**	ug/L	50.0	14.0	1	05/17/18 13:15	05/18/18 19:51	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	05/17/18 13:15	05/18/18 19:51	7439-96-5	
Potassium	**<79.3**	ug/L	500	79.3	1	05/17/18 13:15	05/18/18 19:51	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	05/17/18 13:15	05/18/18 19:51	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		05/25/18 11:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**272**	mg/L	5.0	5.0	1		05/19/18 12:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.46**	mg/L	1.0	0.46	1		05/26/18 20:02	16887-00-6	
Fluoride	**<0.063**	mg/L	0.20	0.063	1		05/26/18 20:02	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		05/26/18 20:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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 SCPC
Pace Project No.: 60270507

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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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

QC Batch: 526186 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007, 60270507008

METHOD BLANK: 2154784 Matrix: Water
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007, 60270507008

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

LABORATORY CONTROL SAMPLE: 2154785

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154786 2154787

Parameter	Units	60270506001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	15600	1000	1000	17000	16400	141	83	70-130	3	20	M1
Calcium	ug/L	147000	10000	10000	160000	154000	128	73	70-130	4	20	
Iron	ug/L	73.5	10000	10000	9930	9810	99	97	70-130	1	20	
Magnesium	ug/L	5670	10000	10000	15100	14700	94	91	70-130	2	20	
Manganese	ug/L	159	1000	1000	1130	1110	97	95	70-130	2	20	
Potassium	ug/L	21300	10000	10000	32100	31000	109	98	70-130	3	20	
Sodium	ug/L	48200	10000	10000	59500	57300	113	91	70-130	4	20	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2154788 2154789

Parameter	Units	60270507006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	116	1000	1000	1110	1120	99	100	70-130	1	20	
Calcium	ug/L	127000	10000	10000	133000	136000	64	87	70-130	2	20	M1
Iron	ug/L	51.7	10000	10000	9800	9930	97	99	70-130	1	20	
Magnesium	ug/L	41900	10000	10000	50400	51300	84	94	70-130	2	20	
Manganese	ug/L	176	1000	1000	1130	1140	96	97	70-130	1	20	
Potassium	ug/L	7140	10000	10000	17000	17200	98	100	70-130	1	20	
Sodium	ug/L	15200	10000	10000	25100	25600	99	104	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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

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

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	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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	

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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

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

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 SCPC
Pace Project No.: 60270507

QC Batch: 527077 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006

METHOD BLANK: 2158919 Matrix: Water
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006

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

LABORATORY CONTROL SAMPLE: 2158920

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

SAMPLE DUPLICATE: 2158921

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

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

QC Batch: 527256 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60270507007, 60270507008

METHOD BLANK: 2159906 Matrix: Water
Associated Lab Samples: 60270507007, 60270507008

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 SCPC
Pace Project No.: 60270507

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

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

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 SCPC
Pace Project No.: 60270507

QC Batch: 526317 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507008

METHOD BLANK: 2155429 Matrix: Water
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507008

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 SCPC
Pace Project No.: 60270507

QC Batch: 526720 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60270507007

METHOD BLANK: 2157172 Matrix: Water
Associated Lab Samples: 60270507007

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 SCPC
Pace Project No.: 60270507

QC Batch: 527490 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007, 60270507008

METHOD BLANK: 2160723 Matrix: Water
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007, 60270507008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	05/26/18 10:21	
Fluoride	mg/L	<0.19	0.20	0.19	05/26/18 10:21	
Sulfate	mg/L	<0.24	1.0	0.24	05/26/18 10:21	

LABORATORY CONTROL SAMPLE: 2160724

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2160725 2160726

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

MATRIX SPIKE SAMPLE: 2160727

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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

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

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	05/26/18 21:02	
Fluoride	mg/L	<0.19	0.20	0.19	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	

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 SCPC
Pace Project No.: 60270507

QC Batch: 527546 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007

METHOD BLANK: 2161064 Matrix: Water
Associated Lab Samples: 60270507001, 60270507002, 60270507003, 60270507004, 60270507005, 60270507006, 60270507007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	05/30/18 08:44	
Sulfate	mg/L	<0.24	1.0	0.24	05/30/18 08:44	

LABORATORY CONTROL SAMPLE: 2161065

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2161066 2161067

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

MATRIX SPIKE SAMPLE: 2161068

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

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

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

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
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
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
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 SCPC
Pace Project No.: 60270507

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
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 SCPC
Pace Project No.: 60270507

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270507001	S-UG-1A	EPA 200.7	526186	EPA 200.7	526232
60270507002	S-UG-2	EPA 200.7	526186	EPA 200.7	526232
60270507003	S-DG-1	EPA 200.7	526186	EPA 200.7	526232
60270507004	S-DG-2	EPA 200.7	526186	EPA 200.7	526232
60270507005	S-DG-3	EPA 200.7	526186	EPA 200.7	526232
60270507006	S-DG-4	EPA 200.7	526186	EPA 200.7	526232
60270507007	S-SCPC-DUP-1	EPA 200.7	526186	EPA 200.7	526232
60270507008	S-SCPC-FB-1	EPA 200.7	526186	EPA 200.7	526232
60270510002	S-BMW-1S	EPA 200.7	526189	EPA 200.7	526234
60270510003	S-BMW-3S	EPA 200.7	526189	EPA 200.7	526234
60270507001	S-UG-1A	SM 2320B	527077		
60270507002	S-UG-2	SM 2320B	527077		
60270507003	S-DG-1	SM 2320B	527077		
60270507004	S-DG-2	SM 2320B	527077		
60270507005	S-DG-3	SM 2320B	527077		
60270507006	S-DG-4	SM 2320B	527077		
60270507007	S-SCPC-DUP-1	SM 2320B	527256		
60270507008	S-SCPC-FB-1	SM 2320B	527256		
60270510002	S-BMW-1S	SM 2320B	526735		
60270510003	S-BMW-3S	SM 2320B	526735		
60270507001	S-UG-1A	SM 2540C	526317		
60270507002	S-UG-2	SM 2540C	526317		
60270507003	S-DG-1	SM 2540C	526317		
60270507004	S-DG-2	SM 2540C	526317		
60270507005	S-DG-3	SM 2540C	526317		
60270507006	S-DG-4	SM 2540C	526317		
60270507007	S-SCPC-DUP-1	SM 2540C	526720		
60270507008	S-SCPC-FB-1	SM 2540C	526317		
60270510002	S-BMW-1S	SM 2540C	526312		
60270510003	S-BMW-3S	SM 2540C	526312		
60270507001	S-UG-1A	EPA 300.0	527490		
60270507001	S-UG-1A	EPA 300.0	527546		
60270507002	S-UG-2	EPA 300.0	527490		
60270507002	S-UG-2	EPA 300.0	527546		
60270507003	S-DG-1	EPA 300.0	527490		
60270507003	S-DG-1	EPA 300.0	527546		
60270507004	S-DG-2	EPA 300.0	527490		
60270507004	S-DG-2	EPA 300.0	527546		
60270507005	S-DG-3	EPA 300.0	527490		
60270507005	S-DG-3	EPA 300.0	527546		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC SCPC
Pace Project No.: 60270507

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60270507006	**S-DG-4**	EPA 300.0	527490		
60270507006	**S-DG-4**	EPA 300.0	527546		
60270507007	**S-SCPC-DUP-1**	EPA 300.0	527490		
60270507007	**S-SCPC-DUP-1**	EPA 300.0	527546		
60270507008	**S-SCPC-FB-1**	EPA 300.0	527490		
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		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60270507

60270507

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** 2.8 **Corr. Factor** +1.0 **Corrected** 3.8

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

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.

Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	maddock@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
	Ryan Feldmann
Purchase Order No.:	
Project Name:	Ameren SEC SCPC
Project Number:	153-1406.0003G

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	ALKALINITY	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-UG-1A	NT	G			5/15	0850		3	1		3						✓	✓	✓	✓	✓		602 70507 BP2U 001
2	S-UG-2						1405																	002
3	S-DG-1						0945																	003
4	S-DG-2						1035		1	1														004
5	S-DG-3						1155		3	1		3												005
6	S-DG-4						1245		12	3		9												(3) BP2U 006
7	S-SCPC-DUP-1						—		3	1		3												BP3N 007
8	S-SCPC-FB-1						1345		1	1		1												008
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca Mg, K, Na, Fe, Mn		5/15/18	1740		5/16	0820	3.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 05/15/18

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

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 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 Check 5/17/18

Project Manager Review: _____ Date: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 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

ITEM #	SAMPLE ID (A-Z, 0-9 / ,) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	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						Y	✓	✓		✓		60270510
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						Y	✓	✓	✓	✓		BP2N BP3N	001
11	S-BMW-3S	WT	G			5/14/18	1025		2	1		1						Y	✓	✓	✓	✓		↓ ↓	002 003
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

Pace Analytical
www.pacelabs.com

The 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

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	Requested Analysis Filtered (Y/N): Y/N	Analysis Test: 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~~ 1145	RF	2	1			1					✓	✓	✓	✓			60270510	
3	~~S-LMW-FB-2~~																								
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

BP2N BP3N^{2-} 004

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 2007.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		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 5/15/16					

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 60270507

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).
- 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 - SCPC - SEC - May 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/15/19

Laboratory: Pace Analytical
SDG #: 60270507
Analytical Method (type and no.): Metals (200.7&~~200.8~~), ~~Hg (7470)~~, Alk (SM 2320B), TDS (SM 2540C), ~~Fe (SM 3500-Fe B)~~, Anions (300.0), ~~R (365.4), Ra (903.1&904.0)~~
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names S-UG-1A, S-UG-2, S-DG-3, S-DG-2, S-DG-1, S-DG-4, S-BMW-13, S-BMW-35, S-SCPC-DUP-1, S-SCPC-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?	☒	☐	☐	5/14-15/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☑	☐	☐	
b) Were analytes detected in the field blank(s)?	☑	☐	☐	FB-1: TDS (27.2)
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ S-DG-3
	☑	☐	☐	FB-1@ S-UG-2
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	TDS (20.5)
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, Ca, SO_4^{2-},
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-UG-2	TDS	525	J	Method Blank;
S-DG-3	"	483	J	RPD exceeded limit; Result > MDL
S-SMPL-DUP-1	"	393	J	" "

Signature: Tommy Hutchins Date: 1/15/19

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: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

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

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

Kansas Certification IDs

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

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

SAMPLE SUMMARY

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60274319001	**S-DG-1**	Water	07/06/18 09:30	07/07/18 03:10

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

SAMPLE ANALYTE COUNT

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60274319001	**S-DG-1**	EPA 200.7	TDS	1	PASI-K

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

ANALYTICAL RESULTS

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

Sample: S-DG-1 **Lab ID: 60274319001** Collected: 07/06/18 09:30 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								
Boron	**113**	ug/L	100	12.5	1	07/09/18 14:45	07/16/18 13:45	7440-42-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

QC Batch: 533483 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60274319001

METHOD BLANK: 2184967 Matrix: Water
Associated Lab Samples: 60274319001

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

LABORATORY CONTROL SAMPLE: 2184968

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2184969 2184970

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

MATRIX SPIKE SAMPLE: 2184971

Parameter	Units	60274291001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	ND	1000	1030	97	70-130	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
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QUALIFIERS

Project: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

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: SCPC AMEREN MO CCR MONITORING
Pace Project No.: 60274319

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60274319001	**S-DG-1**	EPA 200.7	533483	EPA 200.7	533524

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60274319

60274319

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: AE 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: _____

Project Manager Review: Jami Check Date: 7/9/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

Company:	Golder Associates
Address:	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:	SCPC Ameren MO CCR Monitoring
Project Number:	153-1406.8003

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 #	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		60274319
1	WT	G			07/6/18	0930		2	1		1							✓							BP2U BP3N
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			
	Mark Haddock / Golder	07/06/18	1615	Jamie Church / PACE	7/6/18	1615				
	Jamie Church / PACE	7/6/18	1700	Kansas City pool	7/7/18	03:10	0.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric McGowan

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

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

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

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

MEMORANDUM

DATE August 20, 2018 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

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

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPC – AMEREN GROUNDWATER – DATA PACKAGE 60274319

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- SCPL- VS2
Reviewer: T Goodwin

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

Laboratory: Pace Analytical
SDG #: 60274319
Analytical Method (type and no.): Metals (EPA 200.7)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names: S-DG-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?	☒	☐	☐	7/6/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Flow, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

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

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
	☒ TR	☑	☐	FB-1@
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒ TR	☑	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☑	

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

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

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy J. Good Jr 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 SCPC
Pace Project No.: 60286655

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory between November 13, 2018 and November 14, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

REV-1, 1/14/19: 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.
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(913)599-5665

CERTIFICATIONS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Kansas Certification IDs

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

Pace Analytical Services, LLC
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(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60286655001	**S-UG-1A**	Water	11/13/18 10:30	11/14/18 03:40
60286655002	**S-UG-2**	Water	11/13/18 13:15	11/14/18 03:40
60286655003	**S-DG-1**	Water	11/13/18 10:20	11/14/18 03:40
60286655004	**S-DG-2**	Water	11/13/18 11:10	11/14/18 03:40
60286655005	**S-DG-3**	Water	11/13/18 12:05	11/14/18 03:40
60286655006	**S-DG-4**	Water	11/13/18 11:15	11/14/18 03:40
60286655007	**S-SCPC-DUP-1**	Water	11/13/18 10:20	11/14/18 03:40
60286655008	**S-SCPC-FB-1**	Water	11/13/18 10:08	11/14/18 03:40
60286568001	**S-BMW-1S**	Water	11/12/18 13:45	11/13/18 03:47
60286568002	**S-BMW-3S**	Water	11/12/18 11:05	11/13/18 03:47

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60286655001	**S-UG-1A**	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
60286655002	**S-UG-2**	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	LDB	1	PASI-K
60286655003	**S-DG-1**	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	LDB	1	PASI-K
60286655004	**S-DG-2**	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	LDB	1	PASI-K
60286655005	**S-DG-3**	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	LDB	1	PASI-K
60286655006	**S-DG-4**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	ZMH	1	PASI-K

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		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	LDB	1	PASI-K
60286655007	**S-SCPC-DUP-1**	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	LDB	1	PASI-K
60286655008	**S-SCPC-FB-1**	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	LDB	1	PASI-K
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

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-UG-1A **Lab ID: 60286655001** Collected: 11/13/18 10:30 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**145**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:46	7440-42-8	
Calcium	**116000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:46	7440-70-2	
Iron	**11.1J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:46	7439-89-6	B
Magnesium	**27800**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:46	7439-95-4	
Manganese	**219**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:46	7439-96-5	
Potassium	**7260**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:46	7440-09-7	
Sodium	**22100**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:46	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**339**	mg/L	20.0	4.9	1		11/20/18 19:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**549**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.011J**	mg/L	0.050		1		11/30/18 15:46	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**<0.012**	mg/L	0.20	0.012	1		11/17/18 10:56		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**65.4**	mg/L	10.0	2.9	10		11/30/18 02:28	16887-00-6	
Fluoride	**<1.9**	mg/L	2.0	1.9	10		11/30/18 02:28	16984-48-8	
Sulfate	**65.9**	mg/L	10.0	2.4	10		11/30/18 02:28	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/20/18 18:30	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-UG-2 **Lab ID: 60286655002** Collected: 11/13/18 13:15 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**145**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:48	7440-42-8	
Calcium	**105000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:48	7440-70-2	
Iron	**8.3J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:48	7439-89-6	B
Magnesium	**22100**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:48	7439-95-4	
Manganese	**266**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:48	7439-96-5	
Potassium	**5110**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:48	7440-09-7	
Sodium	**38400**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:48	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**351**	mg/L	20.0	4.9	1		11/20/18 19:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**607**	mg/L	5.0	5.0	1		11/17/18 10:13		D6
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0083J**	mg/L	0.050		1		11/30/18 15:46	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 10:57		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**24.4**	mg/L	5.0	1.4	5		11/30/18 03:11	16887-00-6	M1
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 02:42	16984-48-8	M1
Sulfate	**17.7**	mg/L	5.0	1.2	5		11/30/18 03:11	14808-79-8	M1
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**<0.050**	mg/L	0.10	0.050	1		11/24/18 09:47	7723-14-0	M1

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-DG-1 **Lab ID: 60286655003** Collected: 11/13/18 10:20 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**125**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:54	7440-42-8	
Calcium	**129000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:54	7440-70-2	
Iron	**1120**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:54	7439-89-6	
Magnesium	**29800**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:54	7439-95-4	
Manganese	**371**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:54	7439-96-5	
Potassium	**5400**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:54	7440-09-7	
Sodium	**4460**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:54	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**418**	mg/L	20.0	4.9	1		11/20/18 19:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**511**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**1.1**	mg/L	0.050		1		11/30/18 15:46	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.042J**	mg/L	0.20	0.012	1		11/17/18 10:58		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.6**	mg/L	1.0	0.29	1		11/30/18 03:39	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 03:39	16984-48-8	
Sulfate	**27.1**	mg/L	5.0	1.2	5		11/30/18 03:53	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 09:49	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-DG-2 **Lab ID: 60286655004** Collected: 11/13/18 11:10 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**114**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:57	7440-42-8	
Calcium	**122000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:57	7440-70-2	
Iron	**265**	ug/L	50.0	6.1	1	11/28/18 19:00	11/30/18 14:05	7439-89-6	
Magnesium	**29700**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:57	7439-95-4	
Manganese	**519**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:57	7439-96-5	
Potassium	**5930**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:57	7440-09-7	
Sodium	**4410**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:57	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**426**	mg/L	20.0	4.9	1		11/20/18 19:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**470**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.27**	mg/L	0.050		1		11/30/18 15:46	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 10:59		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.9**	mg/L	1.0	0.29	1		11/29/18 20:51	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 20:51	16984-48-8	
Sulfate	**29.0**	mg/L	5.0	1.2	5		11/29/18 21:07	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 09:50	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-DG-3 **Lab ID: 60286655005** Collected: 11/13/18 12:05 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**108**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 16:59	7440-42-8	
Calcium	**137000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 16:59	7440-70-2	
Iron	**2260**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 16:59	7439-89-6	
Magnesium	**29500**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 16:59	7439-95-4	
Manganese	**737**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 16:59	7439-96-5	
Potassium	**5120**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 16:59	7440-09-7	
Sodium	**4420**	ug/L	500	157	1	11/28/18 19:00	11/29/18 16:59	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**432**	mg/L	20.0	4.9	1		11/20/18 20:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**545**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**2.2**	mg/L	0.050		1		11/30/18 15:46	7439-89-6	
Iron, Ferrous	Analytical Method: SM 3500-Fe B#4								
Iron, Ferrous	**0.11J**	mg/L	0.20	0.012	1		11/17/18 11:00		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**9.1**	mg/L	1.0	0.29	1		11/29/18 23:02	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 23:02	16984-48-8	
Sulfate	**64.7**	mg/L	5.0	1.2	5		11/29/18 23:19	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.050J**	mg/L	0.10	0.050	1		11/24/18 09:51	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-DG-4 **Lab ID: 60286655006** Collected: 11/13/18 11:15 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**73.2J**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 17:58	7440-42-8	
Calcium	**121000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 17:58	7440-70-2	
Iron	**42.6J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 17:58	7439-89-6	B
Magnesium	**37800**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 17:58	7439-95-4	
Manganese	**574**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 17:58	7439-96-5	
Potassium	**7540**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 17:58	7440-09-7	
Sodium	**33800**	ug/L	500	157	1	11/28/18 19:00	11/29/18 17:58	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**412**	mg/L	20.0	4.9	1		11/20/18 20:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**611**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.043J**	mg/L	0.050		1		11/30/18 15:46	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 11:00		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**80.2**	mg/L	5.0	1.4	5		11/29/18 23:51	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/29/18 23:35	16984-48-8	
Sulfate	**39.3**	mg/L	5.0	1.2	5		11/29/18 23:51	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	**0.057J**	mg/L	0.10	0.050	1		11/24/18 09:52	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-SCPC-DUP-1 **Lab ID: 60286655007** Collected: 11/13/18 10:20 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**74.2J**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 18:05	7440-42-8	
Calcium	**122000**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 18:05	7440-70-2	
Iron	**25.5J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 18:05	7439-89-6	B
Magnesium	**38200**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 18:05	7439-95-4	
Manganese	**569**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 18:05	7439-96-5	
Potassium	**7580**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 18:05	7440-09-7	
Sodium	**33700**	ug/L	500	157	1	11/28/18 19:00	11/29/18 18:05	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**413**	mg/L	20.0	4.9	1		11/20/18 20:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**585**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.026J**	mg/L	0.050		1		11/30/18 15:46	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 11:01		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**76.2**	mg/L	5.0	1.4	5		11/30/18 00:24	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 00:08	16984-48-8	
Sulfate	**38.4**	mg/L	5.0	1.2	5		11/30/18 00:24	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 09:53	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Sample: S-SCPC-FB-1 **Lab ID: 60286655008** Collected: 11/13/18 10:08 Received: 11/14/18 03:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**<12.5**	ug/L	100	12.5	1	11/28/18 19:00	11/29/18 18:07	7440-42-8	
Calcium	**55.3J**	ug/L	200	53.5	1	11/28/18 19:00	11/29/18 18:07	7440-70-2	
Iron	**9.7J**	ug/L	50.0	6.1	1	11/28/18 19:00	11/29/18 18:07	7439-89-6	B
Magnesium	**<14.0**	ug/L	50.0	14.0	1	11/28/18 19:00	11/29/18 18:07	7439-95-4	
Manganese	**<0.73**	ug/L	5.0	0.73	1	11/28/18 19:00	11/29/18 18:07	7439-96-5	
Potassium	**86.4J**	ug/L	500	79.3	1	11/28/18 19:00	11/29/18 18:07	7440-09-7	
Sodium	**<157**	ug/L	500	157	1	11/28/18 19:00	11/29/18 18:07	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<4.9**	mg/L	20.0	4.9	1		11/20/18 20:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/17/18 10:13		
Iron, Ferric (Calculation)	Analytical Method: SM 3500-Fe B#4								
Iron, Ferric	**0.0097J**	mg/L	0.050		1		11/30/18 15:46	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 11:01		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.29**	mg/L	1.0	0.29	1		11/30/18 00:41	16887-00-6	
Fluoride	**<0.19**	mg/L	0.20	0.19	1		11/30/18 00:41	16984-48-8	
Sulfate	**<0.24**	mg/L	1.0	0.24	1		11/30/18 00:41	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 09:54	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
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 SCPC
Pace Project No.: 60286655

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

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
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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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

QC Batch: 557358 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2286636 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<12.5	100	12.5	11/29/18 16:21	
Calcium	ug/L	<53.5	200	53.5	11/29/18 16:21	
Iron	ug/L	16.7J	50.0	6.1	11/30/18 13:58	
Magnesium	ug/L	<14.0	50.0	14.0	11/29/18 16:21	
Manganese	ug/L	<0.73	5.0	0.73	11/29/18 16:21	
Potassium	ug/L	<79.3	500	79.3	11/29/18 16:21	
Sodium	ug/L	<157	500	157	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	986	99	85-115	
Calcium	ug/L	10000	9430	94	85-115	
Iron	ug/L	10000	9440	94	85-115	
Magnesium	ug/L	10000	9720	97	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9760	98	85-115	
Sodium	ug/L	10000	9450	94	85-115	

MATRIX SPIKE SAMPLE: 2286638

Parameter	Units	60286569007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	432	1000	1410	98	70-130	
Calcium	ug/L	67500	10000	76700	91	70-130	
Iron	ug/L	1700	10000	11000	93	70-130	
Magnesium	ug/L	14400	10000	23800	94	70-130	
Manganese	ug/L	576	1000	1550	98	70-130	
Potassium	ug/L	10200	10000	19600	95	70-130	
Sodium	ug/L	17300	10000	26400	92	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286639 2286640

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	145	1000	1000	1160	1160	102	101	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286639 2286640

Parameter	Units	60286655002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	105000	10000	10000	113000	114000	76	82	70-130	1	20	
Iron	ug/L	8.3J	10000	10000	9390	9330	94	93	70-130	1	20	
Magnesium	ug/L	22100	10000	10000	31300	31300	92	93	70-130	0	20	
Manganese	ug/L	266	1000	1000	1260	1250	99	98	70-130	1	20	
Potassium	ug/L	5110	10000	10000	14600	14600	95	95	70-130	0	20	
Sodium	ug/L	38400	10000	10000	46800	47000	84	86	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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 SCPC
Pace Project No.: 60286655

QC Batch: 556417 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2282875 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/20/18 19:30	

LABORATORY CONTROL SAMPLE: 2282876

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	491	98	90-110	

SAMPLE DUPLICATE: 2282877

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	351	363	3	10	

SAMPLE DUPLICATE: 2282878

Parameter	Units	60286571005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	430	454	5	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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 SCPC
Pace Project No.: 60286655

QC Batch: 555739 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2280014 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/17/18 10:13	

LABORATORY CONTROL SAMPLE: 2280015

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

SAMPLE DUPLICATE: 2280018

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	607	513	17	10	D6

SAMPLE DUPLICATE: 2280019

Parameter	Units	60286654010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2210	2280	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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 SCPC
Pace Project No.: 60286655

QC Batch: 555662 Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004

METHOD BLANK: 2279575 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003, 60286655004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/17/18 10:46	H6

LABORATORY CONTROL SAMPLE: 2279576

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

SAMPLE DUPLICATE: 2279577

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.096J	0.10J		20	H6

SAMPLE DUPLICATE: 2279578

Parameter	Units	60286655002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	<0.012	<0.012		20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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: 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2279582 Matrix: Water
Associated Lab Samples: 60286655005, 60286655006, 60286655007, 60286655008

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		20	H6

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

QC Batch: 557506 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286655001, 60286655002, 60286655003

METHOD BLANK: 2287139 Matrix: Water
Associated Lab Samples: 60286655001, 60286655002, 60286655003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/29/18 20:47	
Fluoride	mg/L	<0.19	0.20	0.19	11/29/18 20:47	
Sulfate	mg/L	<0.24	1.0	0.24	11/29/18 20:47	

LABORATORY CONTROL SAMPLE: 2287140

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.4	94	90-110	
Fluoride	mg/L	5	4.5	91	90-110	
Sulfate	mg/L	10	9.6	96	90-110	

MATRIX SPIKE SAMPLE: 2287141

Parameter	Units	60286655002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	24.4	25	67.2	171	90-110	H1,M1
Fluoride	mg/L	<0.19	2.5	3.0	113	90-110	H1,M1
Sulfate	mg/L	17.7	25	64.5	187	90-110	H1,M1

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

QC Batch: 557508 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2287152 Matrix: Water
Associated Lab Samples: 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/29/18 20:18	
Fluoride	mg/L	<0.19	0.20	0.19	11/29/18 20:18	
Sulfate	mg/L	<0.24	1.0	0.24	11/29/18 20:18	

LABORATORY CONTROL SAMPLE: 2287153

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

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	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

QC Batch: 556193 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286655001

METHOD BLANK: 2282073 Matrix: Water
Associated Lab Samples: 60286655001

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

LABORATORY CONTROL SAMPLE: 2282074

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

MATRIX SPIKE SAMPLE: 2282075

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

MATRIX SPIKE SAMPLE: 2282077

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

SAMPLE DUPLICATE: 2282076

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

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

QC Batch: 556414 Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

METHOD BLANK: 2282866 Matrix: Water
Associated Lab Samples: 60286655002, 60286655003, 60286655004, 60286655005, 60286655006, 60286655007, 60286655008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/24/18 09:23	

LABORATORY CONTROL SAMPLE: 2282867

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

MATRIX SPIKE SAMPLE: 2282868

Parameter	Units	60285123001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1.1	2	2.8	87	90-110	M1

MATRIX SPIKE SAMPLE: 2282870

Parameter	Units	60286655002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.8	89	90-110	M1

SAMPLE DUPLICATE: 2282869

Parameter	Units	60285123001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	1.1	<0.050		10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

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.
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
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX SCPC
Pace Project No.: 60286655

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286568001	**S-BMW-1S**	EPA 200.7	557225	EPA 200.7	557391
60286568002	**S-BMW-3S**	EPA 200.7	557225	EPA 200.7	557391
60286655001	**S-UG-1A**	EPA 200.7	557358	EPA 200.7	557423
60286655002	**S-UG-2**	EPA 200.7	557358	EPA 200.7	557423
60286655003	**S-DG-1**	EPA 200.7	557358	EPA 200.7	557423
60286655004	**S-DG-2**	EPA 200.7	557358	EPA 200.7	557423
60286655005	**S-DG-3**	EPA 200.7	557358	EPA 200.7	557423
60286655006	**S-DG-4**	EPA 200.7	557358	EPA 200.7	557423
60286655007	**S-SCPC-DUP-1**	EPA 200.7	557358	EPA 200.7	557423
60286655008	**S-SCPC-FB-1**	EPA 200.7	557358	EPA 200.7	557423
60286568001	**S-BMW-1S**	SM 2320B	556192		
60286568002	**S-BMW-3S**	SM 2320B	556192		
60286655001	**S-UG-1A**	SM 2320B	556417		
60286655002	**S-UG-2**	SM 2320B	556417		
60286655003	**S-DG-1**	SM 2320B	556417		
60286655004	**S-DG-2**	SM 2320B	556417		
60286655005	**S-DG-3**	SM 2320B	556417		
60286655006	**S-DG-4**	SM 2320B	556417		
60286655007	**S-SCPC-DUP-1**	SM 2320B	556417		
60286655008	**S-SCPC-FB-1**	SM 2320B	556417		
60286568001	**S-BMW-1S**	SM 2540C	555505		
60286568002	**S-BMW-3S**	SM 2540C	555505		
60286655001	**S-UG-1A**	SM 2540C	555739		
60286655002	**S-UG-2**	SM 2540C	555739		
60286655003	**S-DG-1**	SM 2540C	555739		
60286655004	**S-DG-2**	SM 2540C	555739		
60286655005	**S-DG-3**	SM 2540C	555739		
60286655006	**S-DG-4**	SM 2540C	555739		
60286655007	**S-SCPC-DUP-1**	SM 2540C	555739		
60286655008	**S-SCPC-FB-1**	SM 2540C	555739		
60286568001	**S-BMW-1S**	SM 3500-Fe B#4	557638		
60286568002	**S-BMW-3S**	SM 3500-Fe B#4	557638		
60286655001	**S-UG-1A**	SM 3500-Fe B#4	557770		
60286655002	**S-UG-2**	SM 3500-Fe B#4	557770		
60286655003	**S-DG-1**	SM 3500-Fe B#4	557770		
60286655004	**S-DG-2**	SM 3500-Fe B#4	557770		
60286655005	**S-DG-3**	SM 3500-Fe B#4	557770		
60286655006	**S-DG-4**	SM 3500-Fe B#4	557770		
60286655007	**S-SCPC-DUP-1**	SM 3500-Fe B#4	557770		
60286655008	**S-SCPC-FB-1**	SM 3500-Fe B#4	557770		
60286568001	**S-BMW-1S**	SM 3500-Fe B#4	555661		
60286568002	**S-BMW-3S**	SM 3500-Fe B#4	555661		
60286655001	**S-UG-1A**	SM 3500-Fe B#4	555662		
60286655002	**S-UG-2**	SM 3500-Fe B#4	555662		

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 SCPC
Pace Project No.: 60286655

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60286655003	**S-DG-1**	SM 3500-Fe B#4	555662		
60286655004	**S-DG-2**	SM 3500-Fe B#4	555662		
60286655005	**S-DG-3**	SM 3500-Fe B#4	555663		
60286655006	**S-DG-4**	SM 3500-Fe B#4	555663		
60286655007	**S-SCPC-DUP-1**	SM 3500-Fe B#4	555663		
60286655008	**S-SCPC-FB-1**	SM 3500-Fe B#4	555663		
60286568001	**S-BMW-1S**	EPA 300.0	557070		
60286568002	**S-BMW-3S**	EPA 300.0	557070		
60286655001	**S-UG-1A**	EPA 300.0	557506		
60286655002	**S-UG-2**	EPA 300.0	557506		
60286655003	**S-DG-1**	EPA 300.0	557506		
60286655004	**S-DG-2**	EPA 300.0	557508		
60286655005	**S-DG-3**	EPA 300.0	557508		
60286655006	**S-DG-4**	EPA 300.0	557508		
60286655007	**S-SCPC-DUP-1**	EPA 300.0	557508		
60286655008	**S-SCPC-FB-1**	EPA 300.0	557508		
60286568001	**S-BMW-1S**	EPA 365.4	554984		
60286568002	**S-BMW-3S**	EPA 365.4	554984		
60286655001	**S-UG-1A**	EPA 365.4	556193		
60286655002	**S-UG-2**	EPA 365.4	556414		
60286655003	**S-DG-1**	EPA 365.4	556414		
60286655004	**S-DG-2**	EPA 365.4	556414		
60286655005	**S-DG-3**	EPA 365.4	556414		
60286655006	**S-DG-4**	EPA 365.4	556414		
60286655007	**S-SCPC-DUP-1**	EPA 365.4	556414		
60286655008	**S-SCPC-FB-1**	EPA 365.4	556414		

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Sample Condition Upon Receipt

WO# : 60286655

60286655

Client Name: Golder

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

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

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

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

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

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

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

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Jann Chunk 11/14/18

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPC
Project Number:	153-1406.0003G (COC #17)

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS				Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N					60286655
1	S-UG-1A	WT	G			11/13/18	1030		4	2	1	1							✓	✓	✓	(2) BP3U4	BP3S	BP3N		001
2	S-UG-2	WT	G				1315															(2)				002
3	S-DG-1	WT	G				1820																			003
4	S-DG-2	WT	G				1110																			004
5	S-DG-3	WT	G				1205																			005
6	S-DG-4	WT	G				1115																			006
7	S-SCPC-DUP-1	WT	G				—																			007
8	S-SCPC-FB-1	WT	G				1008		1	1	1	1							1	1	1	1				008
9	S-SCPC-MS-1 ~~S-BMW-1S~~ ~~S-MS-1~~	WT	G			11/13/18	1315		4	2	1	1							✓	✓	✓					
10	S-SCPC-MSD-1 ~~S-BMW-2S~~	WT	G				1315		1	1	1	1							1	1	1					
11		WT	G																							
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca	Golder	11/13/18	1715		11/14/18	0340	4.0	Y	Y	Y
							3.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bri Works

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

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

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

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	Ameren Sioux EC SCPA N&E
Project Number:	153-1406.0003L (COC #18)

Section C Invoice Information:

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

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-UG-1A	WT	G			11/13/18	1030		4	2	1	1							✓	✓	✓	✓	✓		
2	S-UG-2	WT	G			"	1315		1	1	1	1													
3	S-DG-1	WT	G				1020																		
4	S-DG-2	WT	G				1110																		
5	S-DG-3	WT	G				1705																		
6	S-DG-4	WT	G				1115																		
7	S-SCPC-DUP-1	WT	G				—																		
8	S-SCPC-FB-1	WT	G				1008																		
9	S-SCPC-MS-1 ~~S-BMW-1S~~	WT	G				1315																		
10	S-SCPC-MSD ~~S-BMW-2S~~	WT	G			"	1315																		
11		WT	G																						
12		WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Ba, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: As	Golder	11/13/18	1715		11/14/18	0540	4.0	Y	Y	Y
							3.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brian Marks

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

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

MEMORANDUM

DATE January 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 60286655R1

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).

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QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SEC-SCPC-Nov 2018
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 1/15/19

Laboratory: Pace Analytical (12)
SDG #: 6028655 r1 (12)
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-UG-1A, S-UG-2, S-DG-1, S-DG-2, S-DG-3, S-DG-4, S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/12-13/18
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

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

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☐	☐	☒	
b) Were hold times met for sample analysis?	☐	☑	☐	Fe^{2+}
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☑	☐	☐	
g) Were any matrix problems noted?	☐	☐	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☑	☐	☐	See Notes
b) Were analytes detected in the field blank(s)?	☑	☐	☐	Ca(55.3), Fe(9.7), K(86.4), Fe^{3+}(0.0097),
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ S-DG-4
	☑	☐	☐	FB-1@ S-UG-1A
b) Were field dup. precision criteria met (note RPD)?	☐	☑	☐	Fe(50), P(200), Fe^{3+}(49)
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☑	☐	[5002] TDS(17)

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-}, Cl^-, 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:
[5001-02] Fe(8.6), K(179)
[5001-08] Fe(16.7)

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-UG-1A	Iron (Fe)	50.0	U	Detected in Method Blank (MB); PQL>Result>MDL
S-UG-2	〃	50.0	U	〃 〃
〃	TDS	607	J	RPD exceeded limits; Result>MDL
S-DG-4	Fe	50.0	U	MB; PQL>Result>MDL
〃	Phosphorus (P)	0.057	J	RPD exceeded limits; Result>MDL
〃	Ferric Iron (Fe^{3+})	0.043	J	〃 〃
S-SCPC-DUP-1	Fe^{3+}	0.026	J	〃 〃
〃	P	0.050	UJ	〃 〃; MDL>Result
〃	Fe	50.0	U	MB; PQL>Result>MDL
S-SCPC-FB-1	Fe	50.0	U	〃 〃
S-BMW-1S	Potassium (K)	500	U	〃 〃
〃	Fe	50.0	U	〃 〃
S-BMW-3S	K	500	U	〃 〃
〃	Fe	50.0	U	〃 〃

Signature: Tommy J. Woodard Jr. Date: 1/15/19

APPENDIX B

Alternative Source Demonstration – November 2017 Sampling Event

SCPC - 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

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April 13, 2018

Distribution List

1 Electronic Copy - Ameren Missouri

1 Hard Copy - Golder

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1.0 CERTIFICATION STATEMENT

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

GOLDER ASSOCIATES INC.

_____

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

Principal, Practice Leader

2.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this *SCPC – Alternative Source Demonstration* has been prepared to document an Alternative Source Demonstration (ASD) for a Statistically Significant Increase (SSI) calculated at Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) SCPC Cell 1. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused 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.

3.0 SITE DESCRIPTION AND BACKGROUND

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

3.1 Geological and Hydrogeological Setting

The SCPC 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 unconformable on top of bedrock. These alluvial deposits, which can range from approximately 100 to 130 feet thick, make up the uppermost aquifer called the alluvial aquifer. Overall, this aquifer is described as a fining upwards sequence of stratified sands and gravels with varying amounts of silts and clays. Drilling in the alluvial aquifer identified different sub-units, including floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of these alluvial deposits are highly variable.

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

3.2 Utility Waste Landfill Cell 1 - SCPC

UWL Cell 1 is referred to by Ameren as the SCPC, or "Gypsum Pond" Cell 1. The SCPC is approximately 37.5 acres in size and is located south of the generating plant on the south side of Highway 94 (**Figure 1**). The CCR Unit manages Coal Combustion Residuals (CCR) from the SEC Wet Flue-Gas Desulfurization System (WFGD) which began operation in 2010.

The WFGD process occurs after the removal of slag and fly ash where a crushed limestone ($CaCO_3$) mix is introduced into the boiler flue gas flow. The limestone reacts with the sulfur dioxide (SO_2) in the flue gas and produces 'synthetic' gypsum (calcium sulfate dihydrate ($CaSO_4 * 2H_2O$)). The resulted gypsum material is wet sluiced from the plant across the highway to the SCPC. Once there, the gypsum dewaters by gravity with the sluice conveying water recycled back to the WFGD for reuse. The primary soluble constituents of the gypsum CCR are sulfate, calcium, chloride, and sodium (Gredell and Reitz & Jens, 2014).

The SCPC was constructed with a composite liner system consisting of two feet of compacted clay soil with a hydraulic conductivity of less than 1 X 10^{-7} centimeters per second (cm/sec) overlain by a 80-mil HDPE geomembrane liner. Information on the design of the UWL is available in the 2014 Proposed Construction Permit Modification, Construction Permit Number 0918301 (Gredell and Reitz & Jens, 2014).

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

The permit for the SCPC was issued July 30, 2010 (permit #0918301). Nine sampling events were performed prior to July 30, 2010, and represent groundwater quality prior to WFGD placement in the UWL. The results from these pre-disposal monitoring events are used in conjunction with other site information in the ASD presented below.

3.3 CCR Rule Groundwater Monitoring

As required by the CCR Rule, the following were completed prior to the October 17, 2017 deadline; (1) a groundwater monitoring well system was installed and certified by a Professional Engineer, (2) a Statistical Method Certification was prepared and certified by a Professional Engineer, (3) a Groundwater Monitoring Plan (GMP) was prepared recording the design, installation, development, sampling procedures, as well as statistical methods, and placed in the owner's operating record, and (4) eight baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of CCR Rule.

The groundwater monitoring system for the SCPC consists of eight monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. Six existing monitoring wells (UG-1A, UG-2, DG-1, DG-2, DG-3, and DG-4) were installed by Gredell Engineering Resources, Inc., in December 2007 and June 2008 as a part of the state UWL monitoring program. The remaining monitoring wells (BMW-1S and BMW-3S) were installed by Golder in 2016 for CCR Rule groundwater monitoring purposes. More information on the design and installation of the monitoring wells is provided in the SCPC GMP and the SCPC 2017 Annual Report.

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

- Boron
- Calcium
- Chloride
- pH
- Sulfate
- Total Dissolved Solids (TDS)
- Fluoride

In January 2018, background results from the eight baseline sampling events were used to calculate statistical upper prediction limits (UPL's). 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 to be an initial exceedance, in which case a verification sample was then collected and tested in accordance with the SCPC statistical analysis plan. At the SCPC, initial exceedances were identified in monitoring well UG-2 for fluoride, and DG-4 for boron. Verification sampling results confirmed a Statistically Significant Increase (SSI) for Fluoride at UG-2.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASE

The SSI for fluoride occurred at monitoring well UG-2. UG-2 is screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown on **Figure 1**, UG-2 is located north of the SCPC and south of Highway 94, the generating plant, and the two surface impoundments near the plant (SCPA and SCPB).

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

The intrawell UPL for fluoride at UG-2 is 0.24 milligrams per liter (mg/L), which is slightly above the Practical Quantitation Limit (PQL) of 0.20 mg/L provided by the laboratory. The UPL of 0.24 mg/L was based on the results of the eight baseline sampling events for UG-2 that ranged from 0.17 to 0.24 mg/L. The results from this small dataset could not be normalized, therefore, a non-parametric limit was used as the prediction limit (i.e., the highest of the baseline sampling results) (See **Figure 2**). During the Detection Monitoring event, a value of 0.26 mg/L was reported, which was confirmed by a value of 0.28 mg/L during the Verification Sampling. These values do represent an SSI, but it is important to note they are very low (within 0.04 mg/L of baseline) and close to the PQL value the laboratory can accurately detect.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

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

- Documentation of pre-existing, low level concentrations of CCR indicators in groundwater that pre-date the SCPC operation.
- Comparison of key WFGD indicator parameter concentrations (Sulfate, Calcium, Chloride, Sodium and Boron) prior to and following receipt of CCR in the SCPC.
- Review of fluoride concentrations in adjacent and background monitoring wells.
- Hydrogeological analysis of groundwater flow.
- Documentation of the construction of the SCPC with a 80-mil geomembrane liner and a 2-foot thick clay barrier.
- Preparation of geochemical models displaying current and historical groundwater chemistries.

5.1 CCR Indicators

Several types of CCR byproducts are generated by coal-fired power plants. The different types of CCR typically display distinct geochemical signatures and indicator parameters. **Table 1** below describes the different types of CCRs and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017).

Table 1: Types of CCR and Typical Indicator Parameters

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

Notes:

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

In 2011 the Electric Power Research Institute (EPRI) completed a study of FGD composition from many sites across the country and determined that in greater than 90% of the material that is present in FGD deposits is calcium sulfate dihydrate ($CaSO_4*2H_20$). Therefore, impacts from WFGD deposits will likely contain high concentrations in sulfate and calcium compared to background and adjacent samples. No impacts are noted for sulfate or calcium in SCPC monitoring wells, indicating that WFGD is not likely the source of the fluoride SSI reported for monitoring well UG-2. Additionally, chloride, fluoride, boron and sodium concentrations are also potential indicators of WFGD gypsum (EPRI 2012, EPRI 2017) and details on the concentration of these parameters are provided in the following sub-sections.

5.1.1 Sulfate Concentration

Sulfate is the key indicator of potential WFGD impacts because high concentrations of sulfate are found ubiquitously in WFGD materials with the exception of strongly reducing conditions, and sulfate is relatively mobile in most hydrogeological environments. The groundwater around the SCPC does not demonstrate strongly reducing conditions, such as dissolved oxygen values below 0.5 mg/L, negative oxidation reduction potential

(ORP), dissolved iron concentrations above 1 mg/L, nor are hydrogen sulfide odors reported at the SCPC. Therefore, if the SSI was caused by impacts from the SCPC, it would be expected that high sulfate values would increase following placement of CCR materials.

Figure 3 displays the full historical set of sulfate concentrations at UG-2 including the period prior to the receipt of CCR. If the SSI was caused by impacts from the SCPC, sulfate concentrations would be expected to increase following the placement of CCR materials. **Figure 3** demonstrates that current sulfate concentrations are at similar levels to those from pre-CCR placement.

5.1.2 Calcium Concentration

Calcium is a key indicator in FGD impoundments because there are high concentrations of calcium in WFGD (calcium sulfate dihydrate) type impoundments. Like sulfate, if the SSI was caused by impacts from the SCPC, calcium concentrations would be noticeably higher and at levels statistically higher than pre-CCR placement. **Figure 4** displays calcium concentration at UG-2 from prior to the receipt of CCR through the current CCR Rule sampling. This figure demonstrates that calcium concentrations are not higher than pre-CCR placement concentrations and are at similar levels (or slightly less) to those from pre-CCR placement.

5.1.3 Fluoride Concentrations

While sulfate and calcium are the two primary components of WFGD byproducts, fluoride (which triggered the SSI at UG-2) may also be an indicator of potential impacts from WFGD deposits. However, any increased fluoride concentrations associated with a release from a FGD type impoundment would be expected to also contain increasing sulfate and calcium concentrations. So while it is possible that the SSI reported for fluoride in monitoring well UG-2 is from a release of WFGD, the absence of increased concentrations for sulfate and calcium appear to nullify WFGD as the source. **Figure 5** shows a time series plot of fluoride and compares data from historic State UWL sampling and CCR Rule sampling.

As shown on **Figure 5**, current fluoride concentrations in monitoring well UG-2 are similar to those reported prior to the operation of the SCPC. In addition, fluoride concentrations have varied between 0.16 mg/L and 0.34 mg/L over the entire historical monitoring period. Based on these data, in addition to the observations reported above for sulfate and calcium, it is Golder's opinion that the variability in fluoride concentrations over time is not a result of WFGD influence on the groundwater, but is likely a result of natural geochemical variability or other sources not related to the SCPC.

As also shown on **Figure 5**, if only the fluoride results reported prior to placement of WFGD waste are used, the calculated UPL is 0.339 mg/L, which is approximately 0.16 mg/L higher than the UPL calculated from the eight baseline samples collected for the CCR rule and 0.06 mg/L higher than the result reported for the verification sampling event. From this, it is clear that the calculated prediction limit from the CCR Rule was biased low because the results reported during the initial 8 baseline sampling rounds were relatively low for fluoride in this well[1]. If the historical data are used to supplement the results collected during the CCR rule baseline period, no SSI would be triggered for fluoride in UG-2.

The pre-CCR based prediction limit of 0.339 mg/L is also within the range of fluoride concentrations reported for upgradient background wells BMW-1S and BMW-2S, which are located approximately ½ mile to the northwest of

[1] Given that the WFGD material was not placed in SCPC until after a multi-layer liner system was installed, it is not likely that the decreased concentrations at UG-2 observed during CCR sampling are a result of isolation any previous release of WFGD materials.

the SEC. The calculated background limit for fluoride in background wells BMW-1S and BMW-2S is 0.38 mg/L. It is Golder's opinion that the similarity in concentrations between the upgradient background wells and the pre-CCR based prediction limit for the SCPC is an indication that the pre-CCR based prediction limit for fluoride is more representative of true background limits for fluoride.

5.1.4 Chloride and Sodium Concentrations

Chloride and sodium can be present at elevated concentrations within the SCPC because the water used for transporting the slurry to the SCPC is in a closed loop, meaning water is being recycled and re-used, resulting in increased chloride and sodium concentration. Chloride and sodium are also highly soluble, mobile, and conservative (i.e., doesn't interact with geologic materials) under most hydrogeological environments, and as such, are routinely used as indicator parameters of landfill leachate migration at municipal waste facilities throughout the United States. Therefore, if the SSI was caused by impact from the SCPC, chloride and sodium concentrations would be expected to increase after the placement of CCR.

Figures 6 and **7** display chloride and sodium concentrations at UG-2 from prior to the receipt of CCR through the current CCR Rule sampling. This figure demonstrates that current chloride and sodium concentrations are at similar levels to those from pre-CCR placement.

Figures 6 and **7** also display a relatively high degree of variability for chloride and sodium over time. These plots do not display an increasing or decreasing trend, but instead show large swings in concentrations. While CCR materials contain high concentrations of sodium and chloride, a common alternative source for both sodium and chloride is road salt (sodium chloride). Road salt is commonly used for road de-icing purposes on Missouri State Highway 94, which is located within 100 feet of UG-2.

Figure 8 is a multi-constituent time series plot displaying sodium and chloride concentrations. Results from this plot display a good correlation between sodium and chloride results. The high concentrations of sodium and chloride most often occur during winter months. The seasonal variation in sodium and chloride results is likely caused by road salt application, which subsequently dissolves and infiltrates into the shallow alluvial aquifer.

5.1.5 Boron Concentrations

Based on the EPRI (2011, 2012, 2017) reports, elevated concentrations in boron may indicate FGD impacts. Like chloride and sodium, boron is soluble, mobile, and conservative, and thus a good tracer for CCR related impacts. However, any increased boron concentrations associated with a release from a WFGD type impoundment would be expected to also contain increasing sulfate and calcium concentrations, as discussed in previous sections. If groundwater was impacted by the SCPC, current boron concentrations should be statistically elevated with respect to pre-CCR placement.

Figure 9 displays boron concentrations at UG-2 from prior to the receipt of CCR through the current CCR Rule sampling. This figure demonstrates that current boron concentrations are at similar levels to those from pre-CCR placement.

5.2 Hydrogeological Analysis of 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 in the direction of river flow and generally flow from the higher to the lower of the two rivers.

Although the movement of groundwater within the alluvial aquifer at the SEC is complex, the movement has been characterized by frequent groundwater elevation measurements and the generation of potentiometric surface maps generated from historical state UWL and CCR Rule groundwater sampling (Golder 2017 and Golder 2018). The data from these groundwater elevation measurements indicate that shallow alluvial aquifer groundwater in the vicinity of the SCPC typically flows toward the Missouri River to the south. However, temporary gradient reversals and near flat gradient conditions have been observed during high water conditions in the Missouri River.

Groundwater flow direction and magnitude were estimated for each of these events using the EPA's On-line Tool for Site Assessment (USEPA, 2016). Estimated results from this analysis are provided in Table 2. These results indicate that while groundwater flow direction can be variable, overall net groundwater flow is generally toward the Missouri River to the south at approximately 6 feet per year for the recent period of CCR Rule groundwater monitoring. Additionally, during temporary flow reversals, the estimated groundwater velocity near the SCPC typically diminishes (i.e. when groundwater does flow northerly towards the Mississippi River, it is generally at a slower velocity). As such, any groundwater impacts from SCPC should migrate to the south and not the north, where UG-2 is located.

5.3 Geochemical Modeling

In June 2006, temporary groundwater piezometers that were installed as part of the Detailed Site Investigation (DSI) were sampled for major cation and anion concentrations. These data are available in Appendix 13 of the DSI and the piezometer locations are provided in **Figure 1**. Additionally, during the detection monitoring event in November 2017, major cation and anion concentrations were collected from the CCR Rule monitoring network for SCPC. These data were used to compare current major ion chemistry with the chemistry from 2006, 4 years prior to placement of CCR in the UWL.

Table 3 contains the values of the major cations and anions from both the recent and historical sampling events. These data were used in the generation of the Stiff and Piper diagrams discussed below. While most of the numbers are similar between the two datasets, chloride and sodium values are significantly higher for some of the wells located near roads. As discussed above, these changes in groundwater chemistry are likely caused by the use of road salt on Highway 94 and are not a result of the SCPC or any other source of CCR.

5.3.1 Stiff Diagrams

Stiff diagrams visually display the major cation and anion data. **Figure 10**, displays the Stiff diagrams from the historical 2006 data, as well as the current SCPC CCR Rule monitoring data. Data from 2006 display a similar distribution to that of 2017 monitoring wells. The only major difference between the two sampling events is the increase in the Sodium + Potassium and chloride plots, causing a slightly different shape in monitoring wells UG-1A, UG-2, and UG-3 relative to piezometers PZ-4, PZ-21, and PZ-36. As discussed above, sodium and chloride concentrations are very seasonally dependent and are influenced by the use of road salt on the nearby Highway 94. Therefore, except for seasonal changes in chloride and sodium, overall groundwater chemistry at the UWL has remained similar since 2006, which is 4 years prior to CCR placement in the SCPC.

5.3.2 Piper Diagram

A Piper diagram is a graphical technique used to classify different groundwater chemistry. The same data used to generate the Stiff diagram are plotted on a ternary Piper diagram according to major cation and anion concentrations. In addition to showing instantaneous concentrations, Piper diagrams can be used to determine if

groundwater chemistry is changing, either spatially or temporally. **Figures 11** and **12** are Piper diagrams displaying data from both 2006 and 2017.

As shown by the similar placement on the Piper diagrams, the data from 2006 (**Figure 11**) display a similar distribution to that of 2017 (**Figure 12**). The only notable difference between the two sampling events is the placement of UG-1A, UG-2, and UG-3 relative to other wells. UG-1A, UG-2, and UG-3 plot slightly higher on the Sodium + Potassium and chloride axes, causing them to be slightly shifted. As discussed above, sodium and chloride concentrations are seasonally dependent and are influenced by the use of road salt on the nearby Highway 94. Except for seasonal differences in chloride and sodium, overall groundwater chemistry at the UWL has remained similar since 2006, which was 4 years prior to CCR placement in the SCPC.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCPC IMPACT

Based on the information presented in Section 5 above, the SSI for Fluoride at UG-2 was not caused by impacts from the SCPC. The SSI for fluoride appears to be caused by numerous factors, but is primarily caused by the following:

- A relatively low calculated UPL for the CCR Rule monitoring data, when compared to historical data for UG-2.
- Very low fluoride concentrations that are near the laboratory PQL threshold for the testing method accuracy.
- Natural spatial and temporal variability in the alluvial aquifer sampling results that are influenced by pre-existing low-level CCR impacts.

As required by the CCR Rule, 8 baseline samples were collected prior to the October 2017 deadline which were used to calculate the UPL for UG-2. According to the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA 2009), 8 samples is the minimum number of samples recommended in order to complete statistical tests and future data will be used to enlarge the dataset for UPL calculation. At the SCPC, previous data from State UWL monitoring show pre-existing low-level CCR impacts and put the SSI in context relative to historical groundwater conditions at the site.

As shown in Section 5, the SSI for fluoride is below historical results at UG-2. The 8 background events, all collected in a relatively short timeframe in accordance with the CCR Rule, had statistically lower results than typically found at UG-2. Therefore, the UPL calculated from those data only represent the lower range of values in the overall population. The SSI at UG-2 was caused by statistical variations in the alluvial aquifer and limited baseline data available for UPL calculations.

The comparison of key WFGD indicator parameters (sulfate, calcium, chloride, sodium, fluoride, and boron) between current groundwater conditions and those present prior to SCPC operations support the conclusion that the SCPC is not the source of the SSI. The data and analyses presented herein demonstrate that no significant change in groundwater conditions has occurred from SCPC operations.

Other supplemental lines of evidence also demonstrate that there are no impacts on groundwater from the SCPC. Hydrogeological analysis of groundwater flow since 2008 indicates that groundwater at the SCPC typically flows to the south. Therefore, impacts from the SCPC would likely be observed in the downgradient (DG) wells to the south of the SCPC instead of to the north. Geochemical comparisons also display that there has been no significant change in groundwater quality between pre-CCR conditions (2006) and present day sampling, except for seasonal changes in sodium and chloride concentrations caused by road salt usage on Highway 94. Further,

the construction of the SCPC, 2-feet of compacted clay overlain by a 80-mil HDPE liner, also limits the likelihood that the SSI is a result of impact from SCPC.

In summary, there are no indications to support migration of fluoride from the SCPC. Instead, the data indicate that the cause for the SSI is due to natural alluvial aquifer variability, laboratory method accuracy, and limited baseline data available for the calculation of the UPL. When a larger dataset is used, i.e. using the State UWL groundwater analysis data prior to SCPC operations to calculate a UPL for fluoride, the results from UG-2 do not result in a SSI.

7.0 REFERENCES

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Tables

Table 2
Generalized Hydraulic Properties of Uppermost Aquifer
SCPC - Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

State UWL or CCR Rule Sampling	Baseline Sampling Event Date	Average Groundwater Flow Direction (Azimuth)	Estimated Hydraulic Gradient (Feet/Foot)	Mean Hydraulic Conductivity (Feet/Day)	Mean Hydraulic Conductivity (cm/sec)	Estimated Effective Porosity	Estimated Groundwater Velocity (Feet/Day)
State UWL	6/27/2008	51.5	0.00010	16.27	5.7E-03	0.35	0.005
State UWL	8/27/2008	203.6	0.00074	16.27	5.7E-03	0.35	0.034
State UWL	11/4/2008	196.9	0.00044	16.27	5.7E-03	0.35	0.021
State UWL	2/4/2009	199.9	0.00082	16.27	5.7E-03	0.35	0.038
State UWL	5/6/2009	44.2	0.00050	16.27	5.7E-03	0.35	0.023
State UWL	7/15/2009	174.5	0.00007	16.27	5.7E-03	0.35	0.003
State UWL	11/11/2009	71.7	0.00017	16.27	5.7E-03	0.35	0.008
State UWL	2/11/2010	191.4	0.00027	16.27	5.7E-03	0.35	0.012
State UWL	5/18/2010	24.4	0.00068	16.27	5.7E-03	0.35	0.032
State UWL	8/17/2010	10.7	0.00014	16.27	5.7E-03	0.35	0.007
State UWL	11/9/2010	189.4	0.00036	16.27	5.7E-03	0.35	0.017
State UWL	2/8/2011	197.1	0.00082	16.27	5.7E-03	0.35	0.038
State UWL	5/18/2011	29.2	0.00017	16.27	5.7E-03	0.35	0.008
State UWL	11/1/2011	194.4	0.00059	16.27	5.7E-03	0.35	0.027
State UWL	2/21/2012	194.5	0.00065	16.27	5.7E-03	0.35	0.030
State UWL	5/23/2012	189.0	0.00028	16.27	5.7E-03	0.35	0.013
State UWL	8/1/2012	197.9	0.00086	16.27	5.7E-03	0.35	0.040
State UWL	11/17/2012	202.1	0.00110	16.27	5.7E-03	0.35	0.051
State UWL	2/5/2013	196.8	0.00118	16.27	5.7E-03	0.35	0.055
State UWL	5/29/2013	214.5	0.00009	16.27	5.7E-03	0.35	0.004
State UWL	8/14/2013	192.9	0.00027	16.27	5.7E-03	0.35	0.013
State UWL	11/13/2013	195.2	0.00082	16.27	5.7E-03	0.35	0.038
State UWL	2/12/2014	196.6	0.00110	16.27	5.7E-03	0.35	0.051
State UWL	5/6/2014	189.5	0.00048	16.27	5.7E-03	0.35	0.022
State UWL	8/12/2014	194.3	0.00060	16.27	5.7E-03	0.35	0.028
State UWL	11/12/2014	189.5	0.00046	16.27	5.7E-03	0.35	0.022
State UWL	2/24/2015	194.4	0.00080	16.27	5.7E-03	0.35	0.037
State UWL	5/12/2015	196.0	0.00047	16.27	5.7E-03	0.35	0.022
State UWL	8/4/2015	19.5	0.00033	16.27	5.7E-03	0.35	0.016
State UWL	11/4/2015	196.8	0.00077	16.27	5.7E-03	0.35	0.036
State UWL	2/11/2016	205.0	0.00028	16.27	5.7E-03	0.35	0.013
CCR Rule	5/9/2016	42.6	0.00034	16.27	5.7E-03	0.35	0.016
State UWL	5/23/2016	42.4	0.00025	16.27	5.7E-03	0.35	0.012
CCR Rule	6/13/2016	41.2	0.00035	16.27	5.7E-03	0.35	0.016
CCR Rule	7/5/2016	125.8	0.00017	16.27	5.7E-03	0.35	0.008
State UWL	8/9/2016	121.2	0.00009	16.27	5.7E-03	0.35	0.004
CCR Rule	9/14/2016	136.0	0.00017	16.27	5.7E-03	0.35	0.008
CCR Rule	11/7/2016	177.2	0.00060	16.27	5.7E-03	0.35	0.028
State UWL	11/9/2016	193.4	0.00052	16.27	5.7E-03	0.35	0.024
CCR Rule	1/3/2017	182.6	0.00088	16.27	5.7E-03	0.35	0.041
State UWL	2/1/2017	193.4	0.00060	16.27	5.7E-03	0.35	0.028
CCR Rule	3/8/2017	180.4	0.00074	16.27	5.7E-03	0.35	0.034
CCR Rule	6/5/2017	12.3	0.00041	16.27	5.7E-03	0.35	0.019
CCR Rule	11/13/2017	175.9	0.00062	16.27	5.7E-03	0.35	0.029
CCR Rule	1/8/2018	185.6	0.00095	16.27	5.7E-03	0.35	0.044

Estimated Results (USEPA Tool)	
Resultant Groundwater Flow Direction (Azimuth)	192
Estimated Annual Net Groundwater Movement (Feet/Year)	6

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

Notes:

1. Azimuth and Hydraulic Gradient calculated using the United States Environmental Protection Agency (USEPA) On-Line Tools for Site Assessment Calculation for Hydraulic Gradient (magnitude and direction) available at https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/gradient4plus-ns.html
2. Hydraulic conductivity value is the geometric mean of slug test results from table 3 of the SEC Detailed Site Investigation.
3. An effective porosity of 0.35 was used based on grain size distributions and published values (Fetter 2000, Cohen 1953, and Johnson 1967)
4. Azimuth is measured clockwise in degrees from north.
5. cm/sec - centimeters per second.
6. State UWL (Utility Waste Landfill) uses monitoring wells UG-1 through 4 and DG-1 through 12.
7. CCR (Coal Combustion Residuals) Rule uses monitoring well UG-1 through UG-3, DG-1 through DG-4, and TMW-1 through TMW-3.

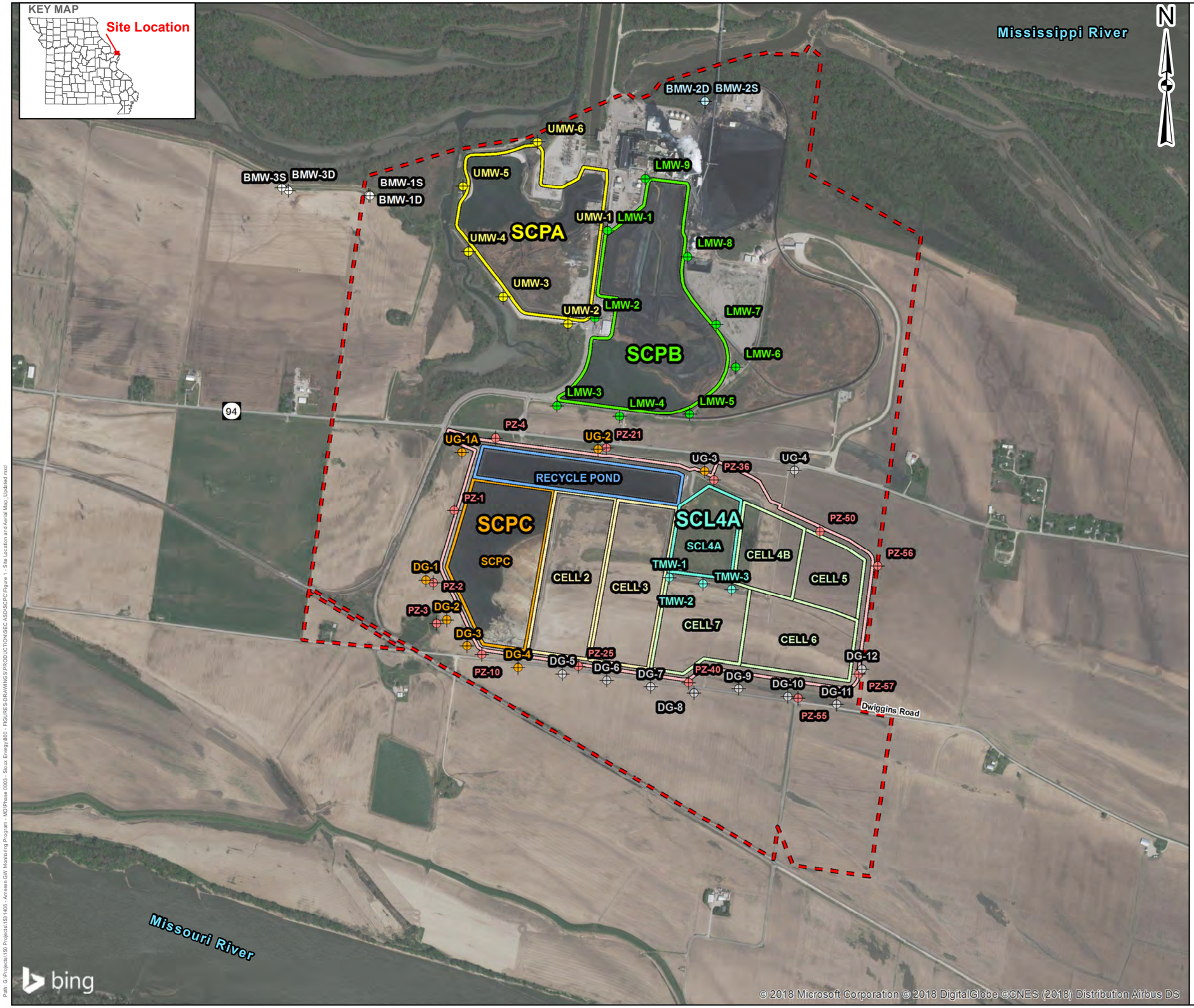
Table 3
Major Cation and Anion Concentrations
SCPC - Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

Monitoring Well ID	Total Sodium (mg/L)	Total Potassium (mg/L)	Total Calcium (mg/L)	Total Magnesium (mg/L)	Total Chloride (mg/L)	Total Sulfate (mg/L)	Total Alkalinity [(2)] (mg/L)
Detection Monitoring - November 2017							
S-BMW-1S*	4.85	0.395	156	30.9	7.7	41.4	448
S-BMW-3S*	4.91	0.664	128	23.8	10.5	28.2	377
S-DG-1	3.84	3.68	126	30.5	4.4	23	385
S-DG-2	3.82	6.81	128	26.6	4.1	36	369
S-DG-3	4.47	5.69	144	34.3	4.7	52.8	409
S-DG-4	19.9	7.46	129	42.8	43.5	51.6	416
S-TMW-1	2.9	4.51	92.2	16.1	2.9	39.8	283
S-TMW-2	3.6	5.02	117	20.8	3.3	31.4	323
S-TMW-3	5.74	6.26	137	24.5	1.7	59	381
S-UG-1A	25.8	10.7	148	34	79.1	56	374
S-UG-2	62.4	5.24	114	23.3	83.3	38.1	357
S-UG-3	32.4	5.82	126	23	70	45.6	334
Historical Data - June 2006							
PZ-1	5.2	4.1	140	38	11	69	480
PZ-2	3.8	2.8	120	32	36	6.6	420
PZ-3	5.4	5.2	140	27	12	53	440
PZ-4	16	4.5	140	35	13	220	320
PZ-10	3.4	3.9	99	31	4.6	43	370
PZ-21	8.0	2.9	130	26	25	100	350
PZ-25	4.2	4.9	120	38	19	29	470
PZ-36	7.2	4.2	110	22	21	34	310
PZ-40	3.2	4.0	120	21	1.7	33	370
PZ-50	3.4	3.8	97	24	18	43	290
PZ-55	3.9	4.5	120	24	6.1	52	370
PZ-56	4.4	4.5	110	22	25	49	340
PZ-57	4.8	4.4	120	24	4.0	42	370

Notes:
1) 2006 Historical Data from Appendix 13 of the Detailed Site Investigation (DSI).
2) Alkalinity is equal to Carbonate + Bicarbonate.
3) mg/L - milligrams per liter.

Prepared by: BCW
Checked by: MSG
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

Other Piezometers and Monitoring Wells

- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring
- Groundwater Elevation Piezometer
- 2006 Detailed Site Investigation Piezometer and Sample Locations

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).

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.
4.) 2006 PIEZOMETER AND SAMPLE LOCATIONS FROM APPENDIX 13 OF THE DETAILED GEOLOGIC AND HYDROLOGIC SITE INVESTIGATION REPORT

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	2018-03-06
PREPARED	RJF
DESIGN	JSI
REVIEW	JSI
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
1

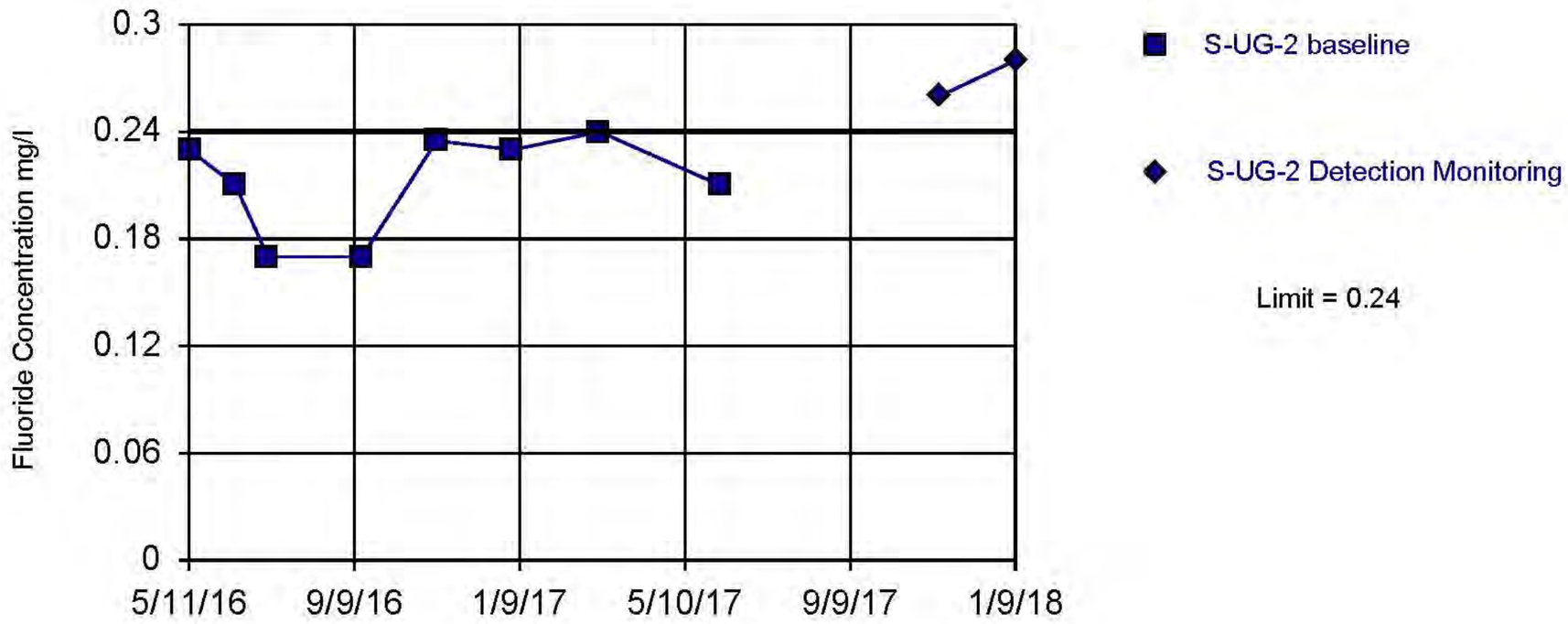
Path: G:\Projects\153 Projects\153-1406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\SCPC\Figure 1 - Site Location and Aerial Map_Updated.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 11in 0

Exceeds Limit

Prediction Limit

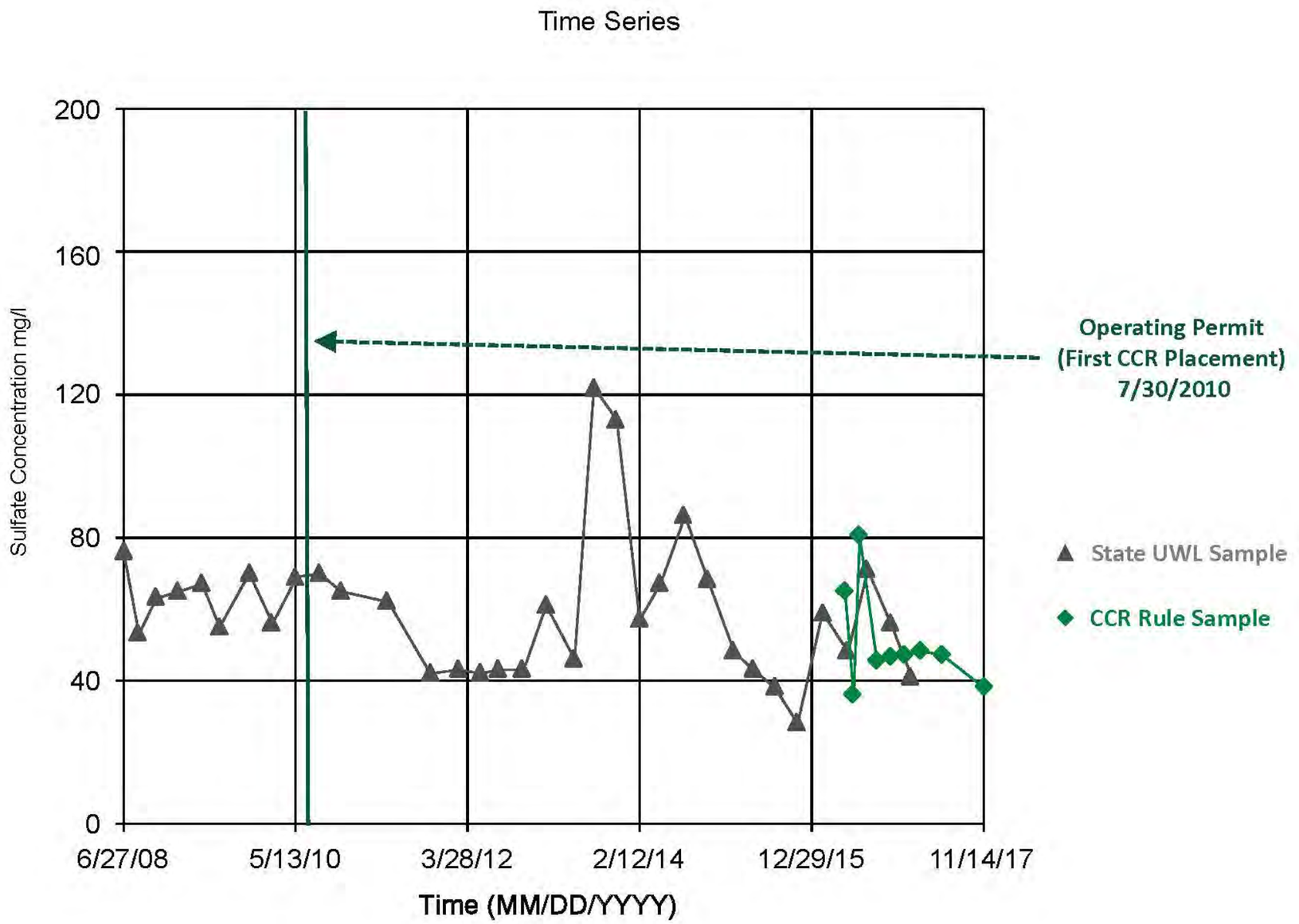
Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.1 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated.

Notes
1) mg/l – milligrams per liter.

CLIENT/PROJECT							TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER			**UG-2 Prediction Limit Calculation**		
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **2**

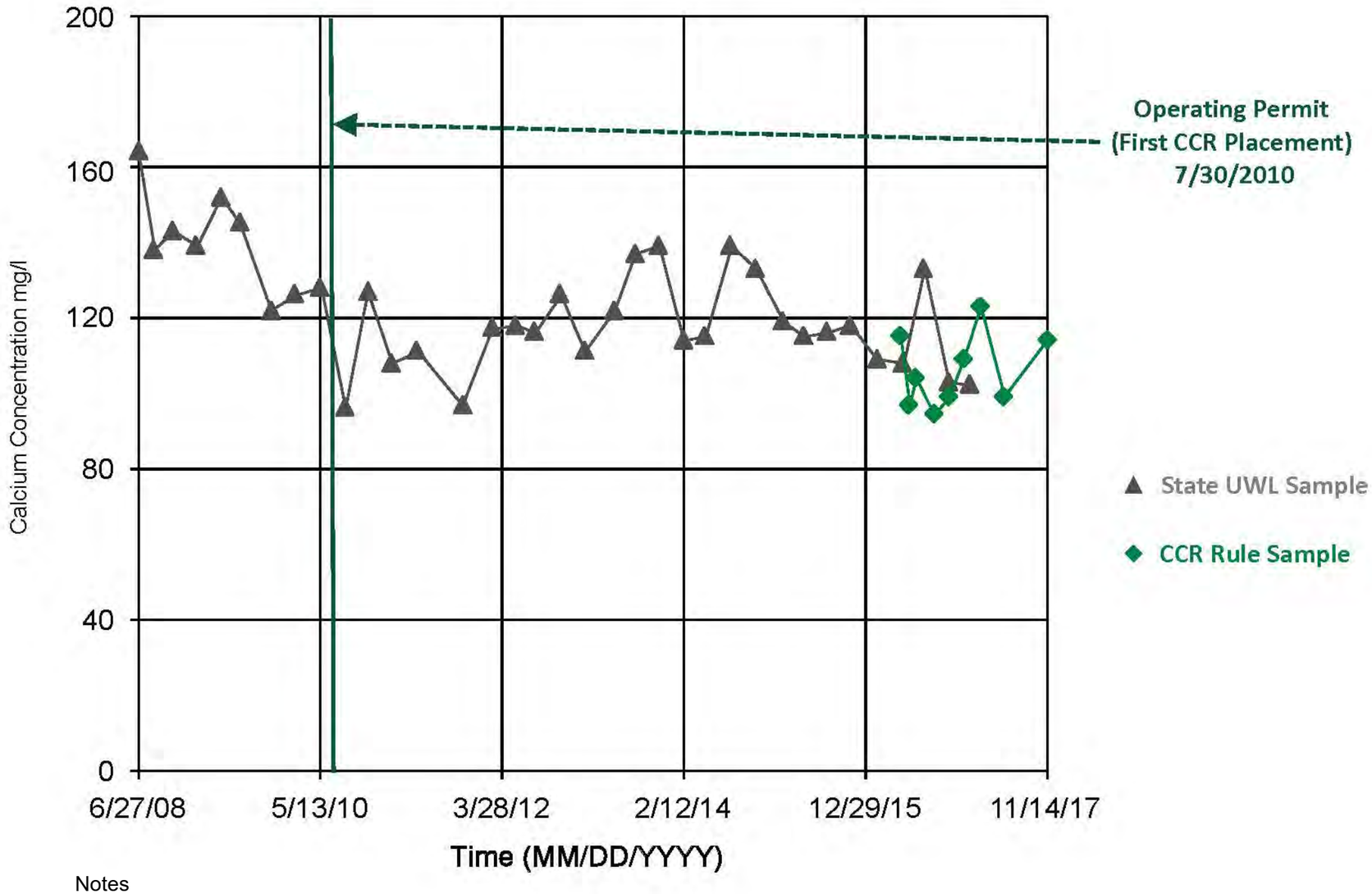


Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) mg/l – milligrams per liter.

CLIENT/PROJECT						TITLE				
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER		**UG-2 Time Series Plot for Sulfate**				
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **3**

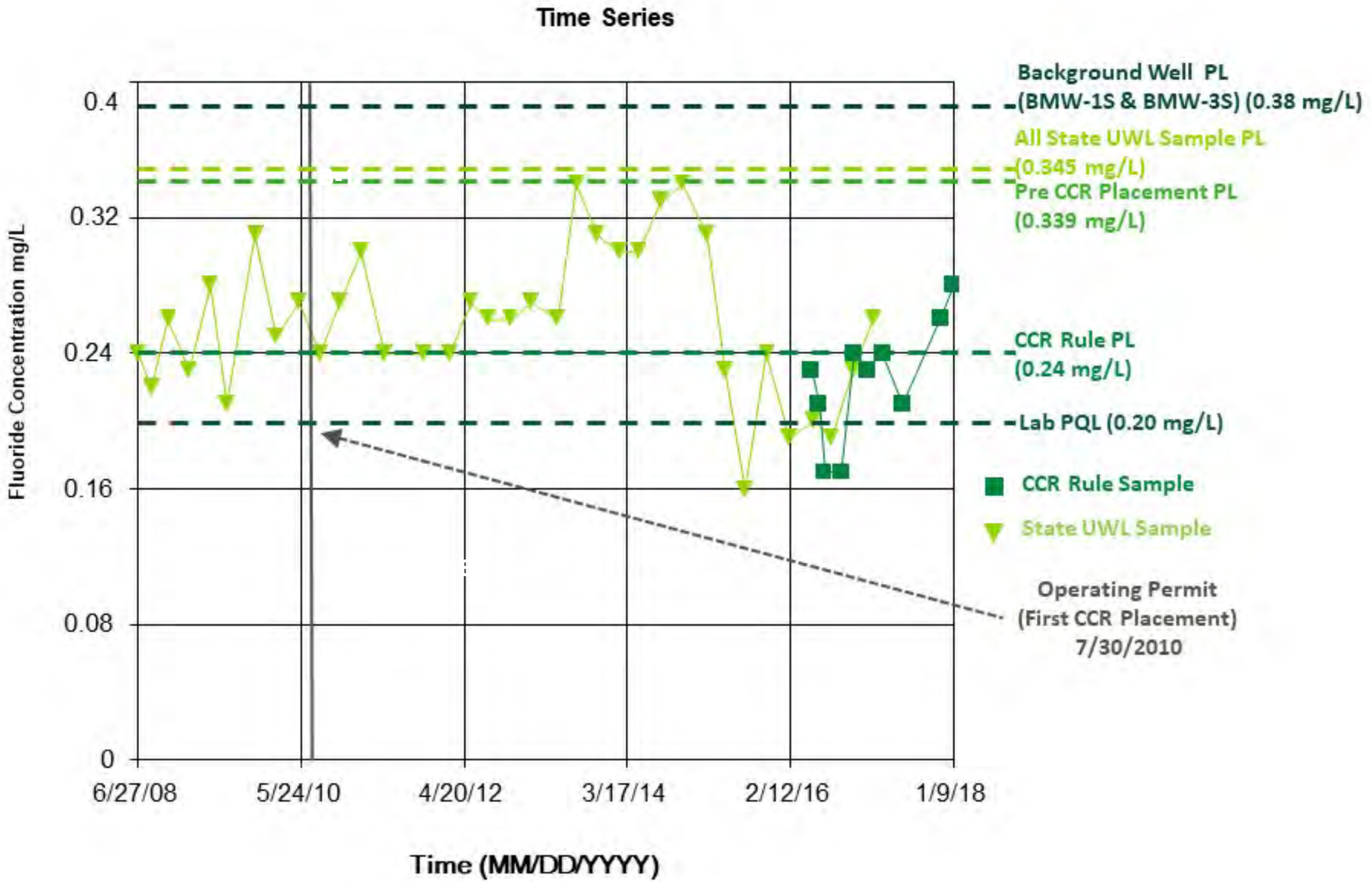
Time Series



Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) mg/l – milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **UG-2 Time Series Plot for Calcium**				
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **4**

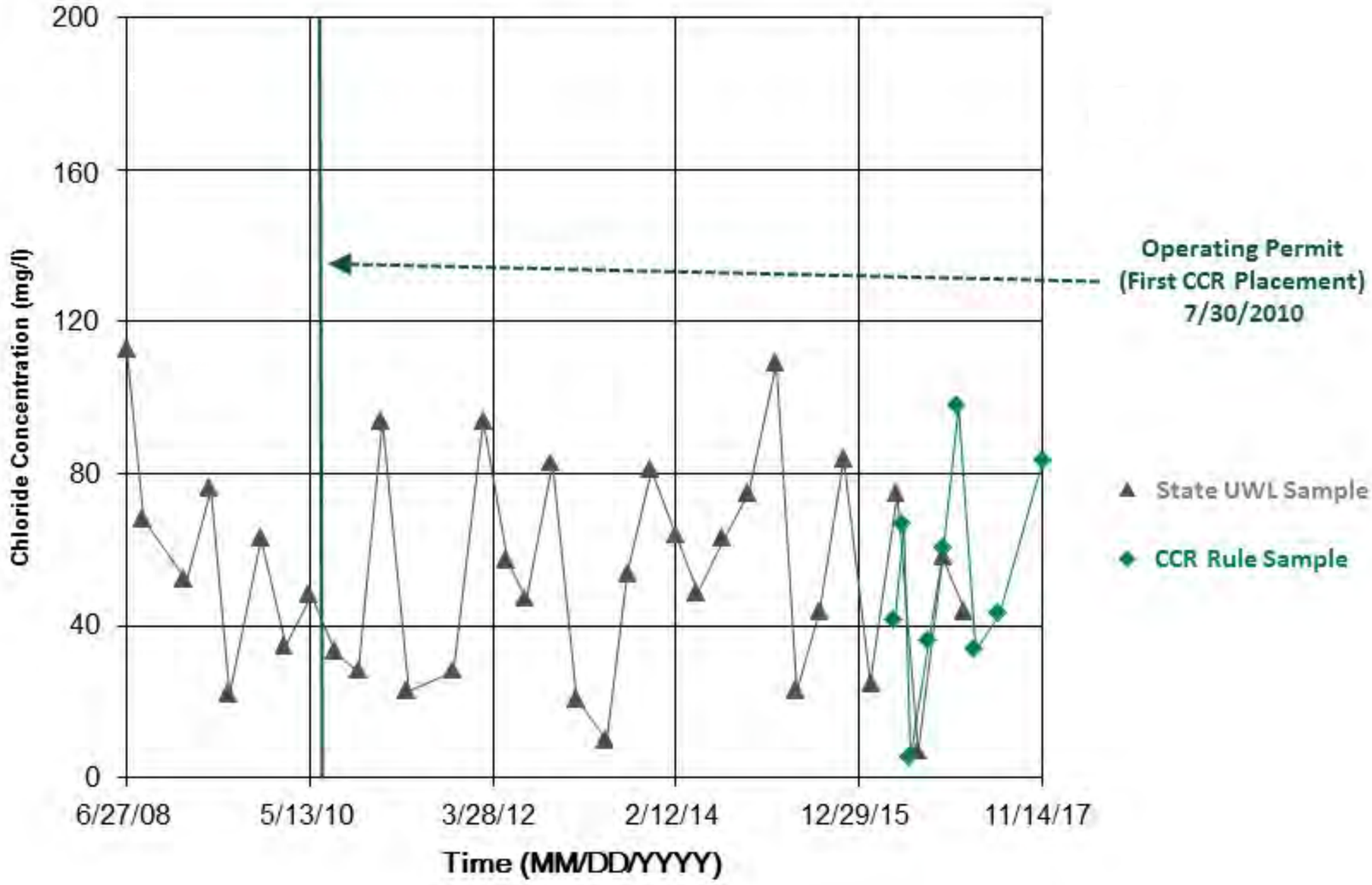


Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) PL – Prediction Limit. Prediction Limits are calculated using Sanitas Software.
5) mg/l – milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **UG-2 Time Series Plot for Fluoride**				
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **5**

Time Series

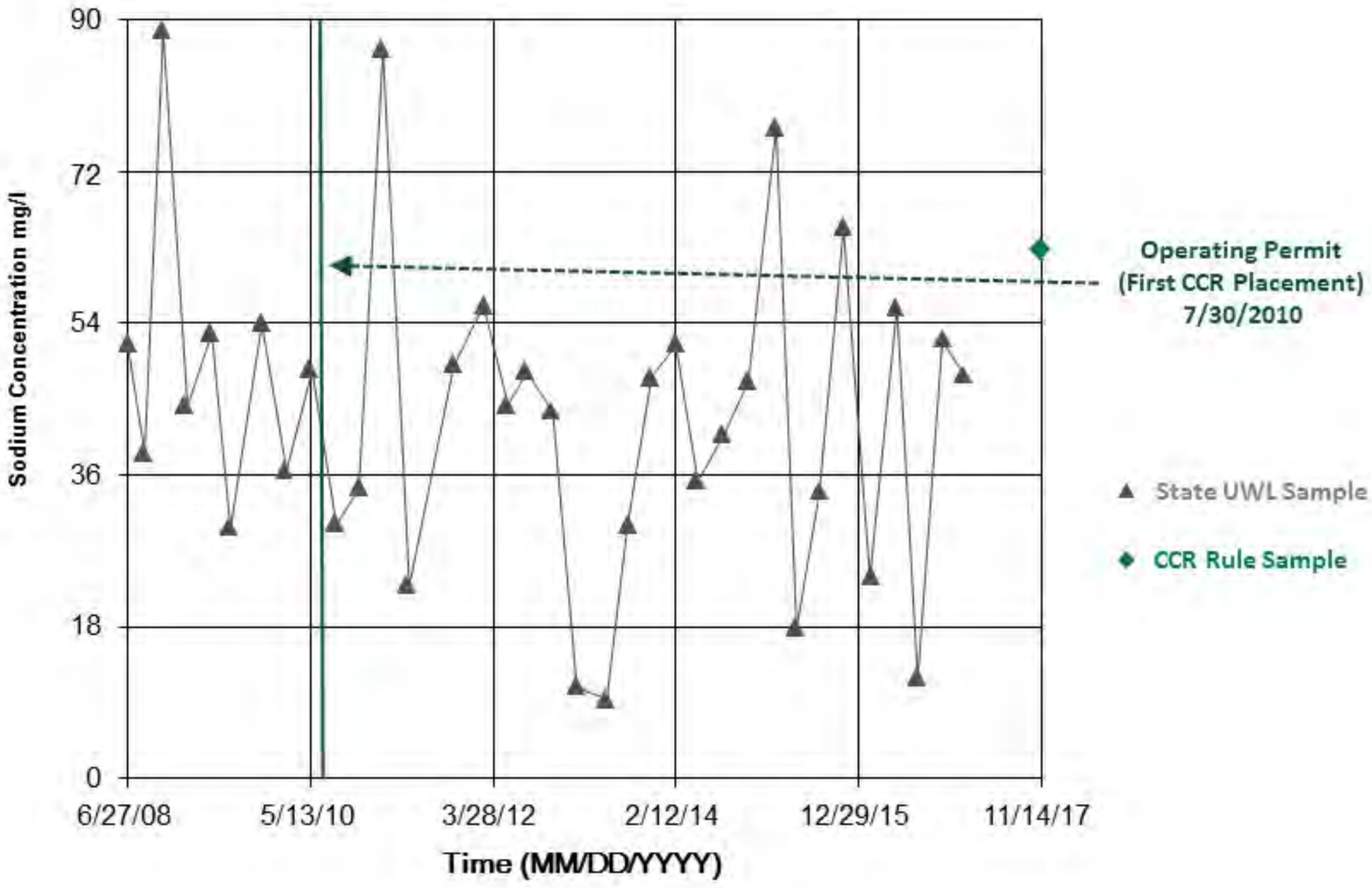


Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) mg/l – milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **UG-2 Time Series Plot for Chloride**				
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **6**

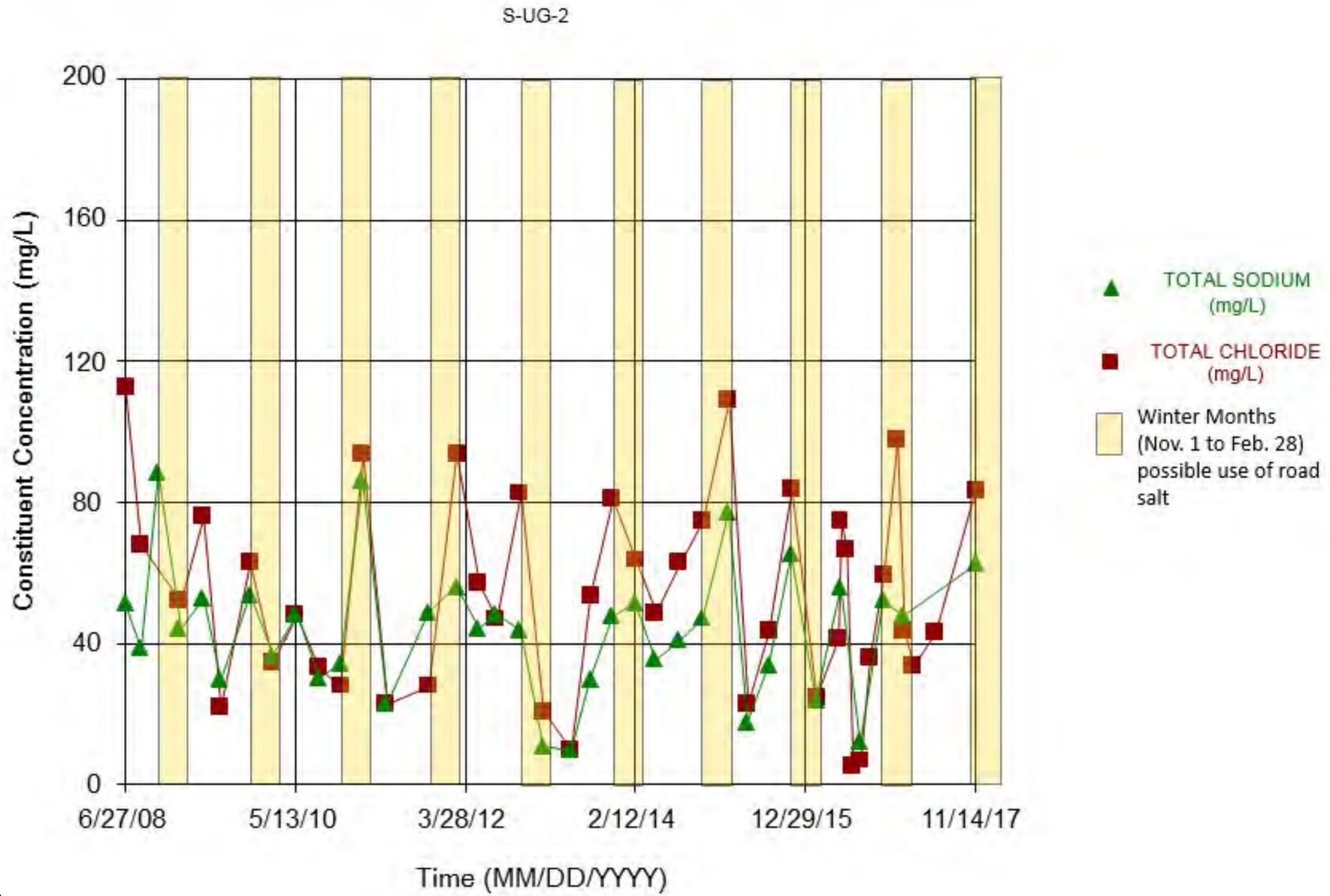
Time Series



Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) mg/l – milligrams per liter.

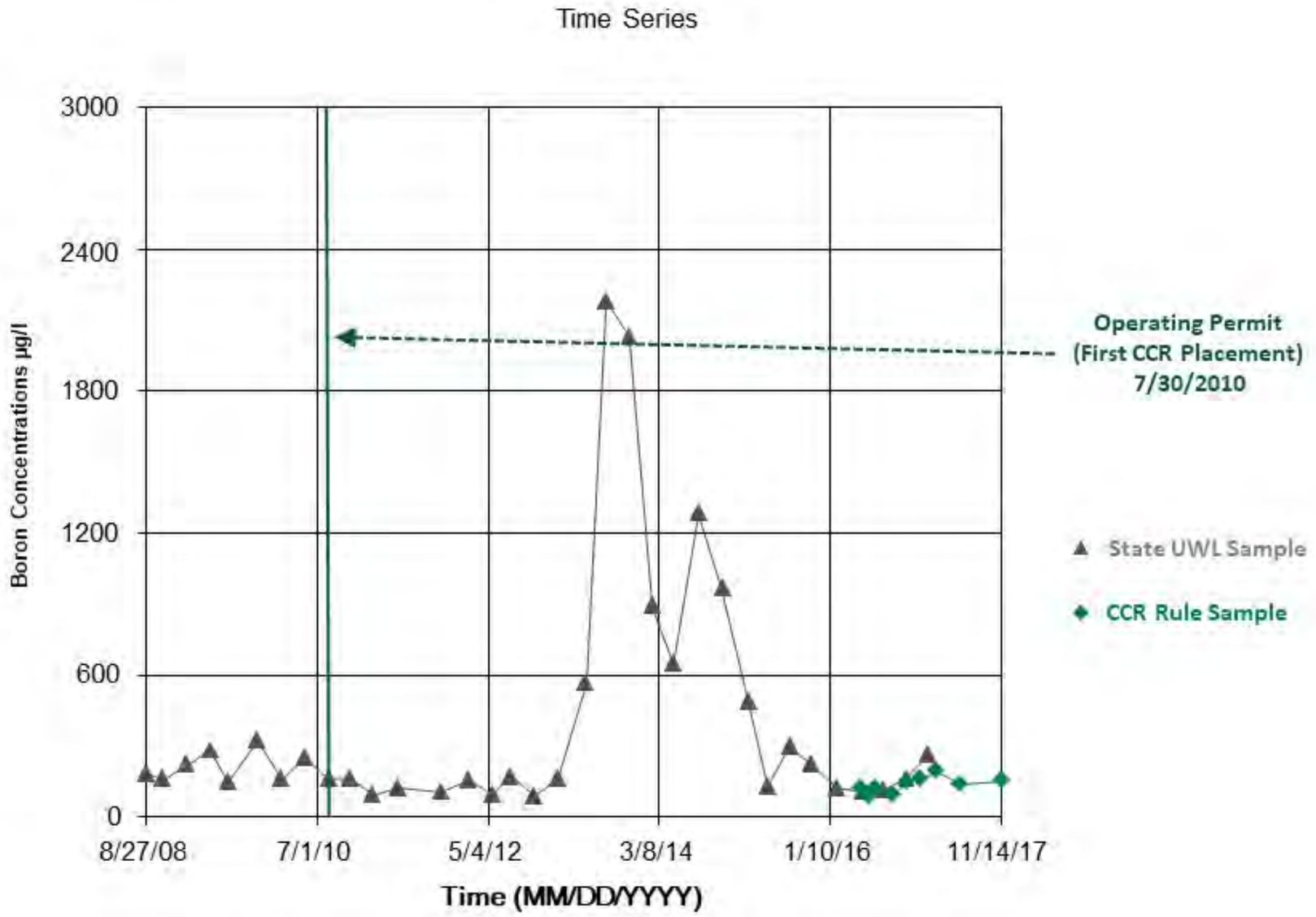
CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **UG-2 Time Series Plot for Sodium**				
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **7**



Notes

1) mg/l – milligram per liter.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER** Ameren				GOLDER			TITLE **UG-2 Time Series Plot Comparing Chloride and Sodium**			
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **8**



Notes

1) Operating Permit details available at https://dnr.mo.gov/env/swmp/facilities/facilities-amerenmosioux.htm.
2) UWL – Utility Waste Landfill.
3) CCR – Coal Combustion Residuals.
4) µg/l – microgram per liter.

CLIENT/PROJECT						TITLE				
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER		**UG-2 Time Series Plot for Boron**				
DRAWN	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
BCW	MSG	MNH	3/6/2018	N/A	N/A	1531406.0003K	N/A	N/A	N/A	**9**

KEY MAP

Site Location

SCPB

PZ-4

UG-1A

UG-2

PZ-21

UG-3

RECYCLE POND

PZ-36

94

PZ-1

SCL4A

PZ-50

SCPC

CELL 4B

CELL 2

CELL 3

CELL 5

PZ-56

TMW-1

TMW-2

TMW-3

PZ-2

DG-1

DG-2

CELL 7

CELL 6

PZ-3

DG-3

PZ-10

DG-4

PZ-25

PZ-40

PZ-57

PZ-55

Dwiggins Road

bing

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N

LEGEND

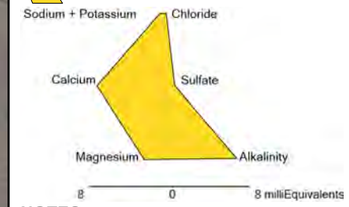
- Sioux Energy Center Property Boundary

Surface Impoundments

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

Utility Waste Landfill (UWL)

- Active Dry CCR Disposal Area
- Active WFGD Disposal Area
- Active Water Recycle Pond
- Proposed Dry CCR Disposal Area
- Proposed WFGD Disposal Area
- UWL Perimeter Fence
- Green Stiff Diagrams are from the November 2017 Detection Monitoring Event
- Yellow Stiff Diagrams are from the Historical 2006 Detailed Site Investigation Event



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.
4.) 2006 PIEZOMETER AND SAMPLE LOCATIONS FROM APPENDIX 13 OF THE DETAILED GEOLOGIC AND HYDROLOGIC SITE INVESTIGATION REPORT

0 250 500 1,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SPATIAL DISTRIBUTION OF STIFF DIAGRAMS

CONSULTANT
GOLDER

YYYY-MM-DD	2018-03-07
PREPARED	RJF
DESIGN	JSI
REVIEW	JSI/BCW
APPROVED	MNH

PROJECT No.
153-1406

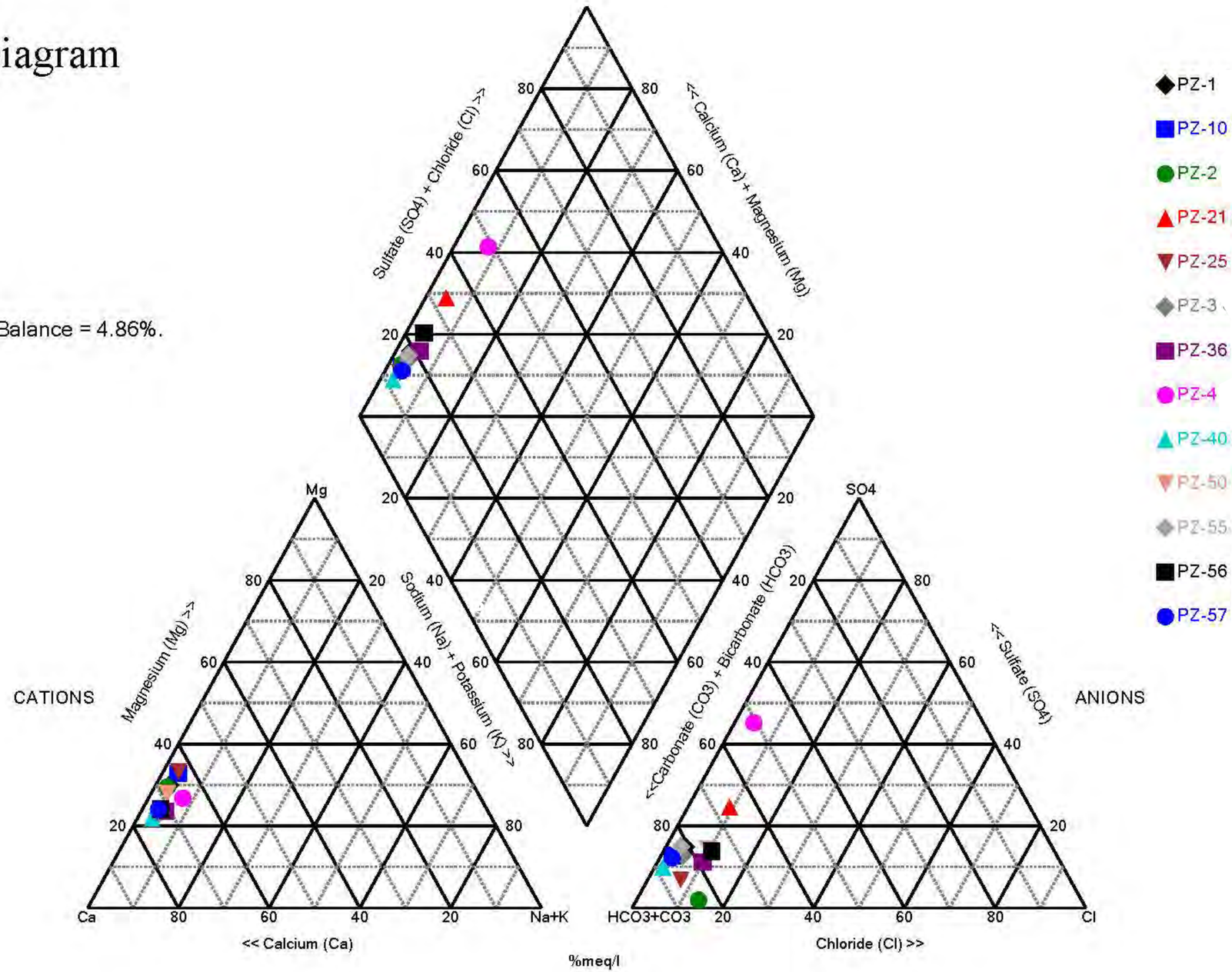
FIGURE
10

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 11in x 17in

Path: G:\Projects\153\Projects\153-1406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\9000 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\SCPC\Figure 10 - SCPC Stiff Diagrams.mxd

Piper Diagram

Cation-Anion Balance = 4.86%.



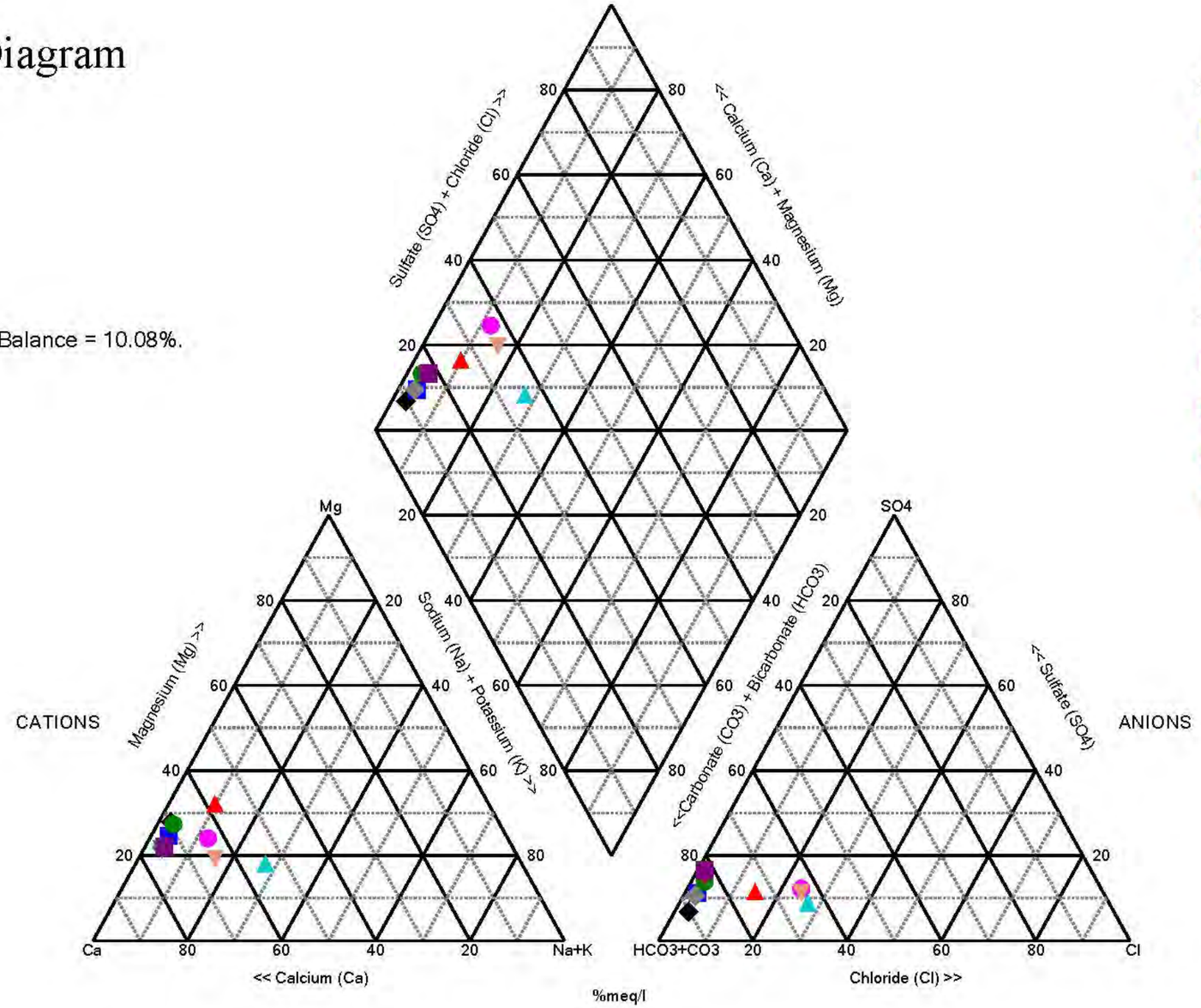
Notes

1) Data used to generate diagram is available in Table 3.
2) Piper diagram was generated using Sanitas software.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **June 2006 – Historical Piper Diagram**			
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **11**

Piper Diagram

Cation-Anion Balance = 10.08%.



Notes

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

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **November 2017 – Detection Monitoring Piper Diagram**			
DRAWN BCW	CHECKED MSG	REVIEWED MNH	DATE 3/6/2018	SCALE N/A	FILE NO. N/A	JOB NO. 1531406.0003K	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **12**

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