



2019 Annual Groundwater Monitoring and Corrective Action Report

RCPA Surface Impoundment, Rush Island Energy Center, Jefferson County, Missouri, USA

Submitted to:

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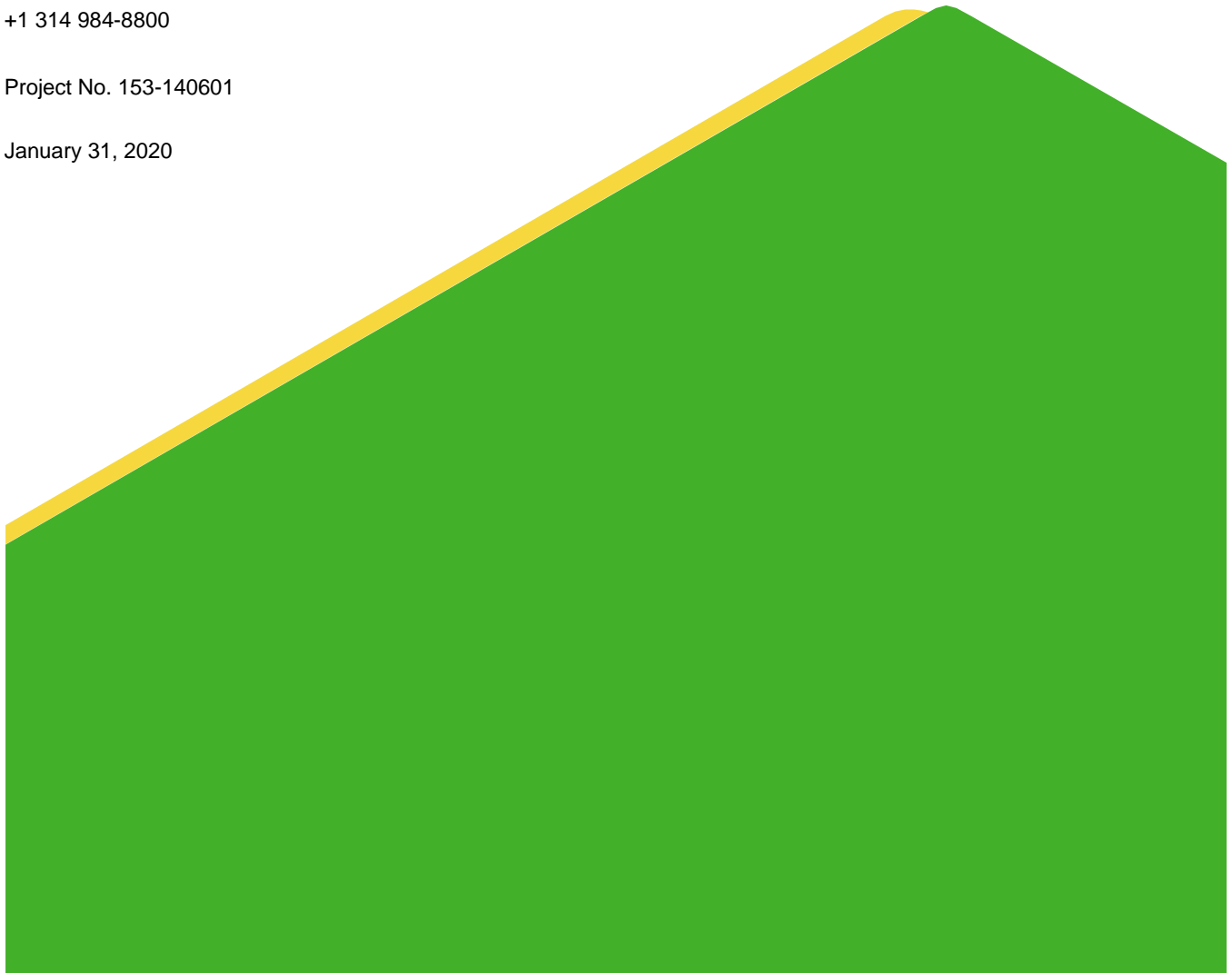


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1.0 INTRODUCTION

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

1.1 Overview of CCR Rule Activities Prior to 2019

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

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

The RCPA is currently in Corrective Action with Detection and Assessment Monitoring continuing concurrently. In 2019, Ameren Missouri completed a Corrective Measures Assessment (CMA). Due to the complexities of the site, the 60-day extension was used for the completion of the CMA. The CMA was placed on Ameren’s publicly available website (Ameren’s publicly available website is at: <https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion>) in May 2019 as required by the CCR Rule (§257.96(a)) and is provided in **Appendix A**. On May 28, 2019 Ameren held its public meeting on the findings of the CMA and accepted public comments. Ameren reviewed the comments and in August 2019 provided a response to the public comments, which is provided on Ameren’s publicly available website. After reviewing the options from the CMA and public comments, on August 30, 2019 Ameren selected a final remedy of source control through installation of a low permeability cover system and use of Monitored Natural Attenuation (MNA). As required by the CCR Rule (§257.97(a)), a report discussing this remedy selection as well as a certification by a Professional Engineer was placed in the operating record. After selecting a remedy, a Corrective Action Groundwater Monitoring Program was established within 90 days as required by the CCR Rule (§257.98(a)). Certifications of the Corrective Action Statistical Analysis Plan (SAP) and Groundwater Monitoring System (GMS) are provided on Ameren’s publicly available website. Additionally, Ameren began closure of the RCPA and placed a “Notification of Intent to Close a

CCR Unit and Certification for Final Cover Design System” onto its publicly available website. Detection and Assessment Monitoring continued on a semi-annual basis and the results are discussed in more detail below.

3.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

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

For the Detection and Assessment Groundwater Monitoring Network, all but two (2) monitoring wells are the same as in years past. Well construction diagrams for the previously used wells are provided in the 2017 Annual Report for this CCR Unit. MW-7(R) is a replacement well for MW-7 and is discussed in more detail below. P19I was added to the network to satisfy the requirements of §257.95(g)(1), which required at least one (1) additional monitoring well be installed at the downgradient facility boundary. The well construction diagrams for MW-7(R) and P19I are provided in **Appendix B** of this report.

Table 1 - RCPA Groundwater Monitoring Programs Monitoring Wells

Detection and Assessment Groundwater Monitoring Program Wells	Corrective Action Groundwater Monitoring Program Wells	
MW-B1	P05S	P21D
MW-B2	P10S	P22S
MW-1	P16S	P22D
MW-2	P17S	P29S
MW-3	P17I	P29D
MW-4	P17D	P30S
MW-5	P19S	P31S
MW-6	P19D	
MW-7 (R)	P21S	
P19I	P21I	

The Corrective Action Groundwater Monitoring Program consists of wells that have been used for different monitoring programs. Well construction diagrams for these are provided in **Appendix B**.

As a part of plant construction, several monitoring wells were abandoned on June 26-27, 2019 and October 2, 2019. MW-7 from the Detection and Assessment Groundwater Monitoring Network was abandoned as well as several piezometers (P03S, P03D, P08S, P08D, P13S, P13I, and P13D) which were used for the nature and extent investigation. Well abandonment records are provided in **Appendix C**.

MW-7(R) was installed on September 11, 2019 approximately 30 feet east of the initial MW-7. A summary of construction details for the replacement well is provided in **Table 2** and **Appendix B** of this report.

4.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the RCPA CCR Unit in 2019. **Table 3** provides a summary of the groundwater samples collected in 2019 including the number of samples, the date of the

sample collection, and the monitoring program for the samples. **Appendix D** provides laboratory analytical data for CCR Rule sampling events.

4.1 Detection Monitoring Program

A Detection Monitoring event was completed November 1-6, 2018. Verification sampling and the statistical analysis to evaluate for SSIs for the November 2018 event were not completed until 2019 and are included in this report. Detections of Appendix III analytes triggered a verification sampling event, which was completed on January 4, 2019. **Table 4** summarizes the results and the statistical analysis of the November 2018 Detection Monitoring event.

A Detection Monitoring event was completed July-September 2019, and testing was completed for all Appendix III analytes. Statistical analysis of the data determined that there were SSIs. Detections of Appendix III analytes triggered a verification sampling event, which was completed August 30, 2019 and October 17, 2019. **Table 5** summarizes the results and the statistical analysis of the July-September 2019 Detection Monitoring event. P19I was added to the Detection and Assessment Monitoring Well Network for this event.

As outlined in the Statistical Analysis Plan for this site, updates to the statistical limits are completed once four (4) to eight (8) new sample results are available. During the statistical analysis of the July-September 2019 sampling event, the statistical limits used to determine an SSI were updated according to the Statistical Analysis Plan.

A Detection Monitoring event was completed November 8-11, 2019 and testing was performed for all Appendix III analytes. Statistical analyses to evaluate for SSIs in the November 2019 data were not completed in 2019 and this statistical evaluation will be included in the 2020 Annual Report. **Table 6** summarizes the results of the November 2019 Detection Monitoring event.

4.2 Assessment Monitoring Program

An Assessment Monitoring event was completed November 1-6, 2018 and testing was completed for Appendix IV parameters that were detected during the April 2018 sampling event. The statistical evaluation for this event was completed in 2019 and therefore is included in this report. **Table 7** summarizes the results of the November 2018 Assessment Monitoring event. Based on the results from the analysis, there were no new constituents or monitoring wells at which a SSL was detected for the RCPA. The results from this analysis and a table that displays the site-specific GWPS are provided in **Appendix E**. The SSLs for the RCPA continue to be:

- Molybdenum at MW-2, MW-3 and MW-7
- Arsenic at MW-2, MW-3 and MW-7

An Assessment Monitoring event was completed July-September 2019, and testing was completed for all Appendix IV analytes. Statistical analysis of the data is provided in **Appendix F** and determined that there were no new SSLs. **Table 8** summarizes the results of the July-September 2019 Assessment Monitoring event. As mentioned above, P19I was added to the Detection and Assessment Monitoring Well Network for this event.

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

Since the July-September 2019 event was the first Assessment Monitoring sampling event for monitoring well P19I, resampling for all detected Appendix IV parameters was completed in October 2019 and the results for this sampling event are included in the July-September 2019 sampling results shown in **Table 8**.

On November 8-11, 2019, the November 2019 Assessment Monitoring event was completed. This sampling event analyzed the Appendix IV constituents detected in groundwater during the initial assessment monitoring event of 2019 (detected parameters from the July-September 2019 event). **Table 9** summarizes the results of the November 2019 Assessment Monitoring event; however, statistical analyses to evaluate for SSLs over GWPS were not completed in 2019. Results of the statistical evaluation will be included in the 2020 Annual Report.

Statistical evaluations to determine if there is a concentration at an SSL above the site GWPS at P19I were not completed in 2019. As outlined in the Statistical Analysis Plan for this site, a minimum of four (4) samples are required to complete an SSL statistical evaluation. Statistical analysis for these monitoring wells will begin with the analysis of the November 2019 data, and will be included in the 2020 Annual Report.

4.2.1 Nature and Extent Evaluation

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

4.3 Groundwater Elevation, Flow Rate and Direction

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

Groundwater elevations were used to generate potentiometric surface maps included in **Appendix H**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and influenced by seasonal changes in water level of the adjacent Mississippi River. 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. Overall, based on the potentiometric surface maps, a general flow direction from the west (bluffs area) to the east (Mississippi River) is observed under normal river conditions. However, during periods of high river levels, groundwater flow can temporarily reverse. During these times of high river stage and temporary flow direction changes, horizontal groundwater gradients generally decrease, and little net movement of groundwater occurs.

Groundwater flow direction and hydraulic gradient were estimated for the monitoring wells at the RIEC using commercially available software. Results from this assessment indicate that while groundwater flow direction is variable and gradients are relatively flat, the overall net groundwater flow at the RCPA was toward the northeast or towards the Mississippi River. Horizontal gradients calculated by the program range from 0.00004 to 0.002 feet/foot with an estimated net annual groundwater velocity of approximately 20 feet per year in the prevailing downgradient direction.

4.4 Sampling Issues

Detection and Assessment Monitoring as well as a second nature and extent sampling event for the RIEC was planned for May 2019. However, from approximately March to July 2019, some of the monitoring wells at the RIEC were under water due to flooding of the Mississippi River. This caused a delay in the planned sampling dates for the RCPA Detection and Assessment Monitoring, in addition to the nature and extent investigation. On

July 16, July 24 and August 15, 2019, Golder performed post-flood monitoring well inspections at the RIEC and found that the following monitoring wells had been impacted by the flood:

- | | | |
|--------|--------|--------|
| ■ P17S | ■ P21S | ■ P29D |
| ■ P19D | ■ P22D | ■ P29S |
| ■ P19S | ■ P22S | ■ P01S |

The monitoring wells that were impacted by the flood were all part of the nature and extent network and no monitoring wells used for Detection and Assessment Monitoring were impacted by the flooding. On July 24-25 and August 15, 2019, these monitoring wells were re-developed to remove floodwater impacts to the wells prior to any future groundwater elevation measurements or groundwater samples being collected. After successful re-development, these monitoring wells were returned to service.

As mentioned above, on June 26-27 and October 2, 2019 some monitoring wells were abandoned for plant construction purposes. Of these, 5 (five) monitoring wells were abandoned that were sampled during the initial nature and extent sampling event that were then unable to be sampled during the subsequent event. These monitoring wells include P08S, P08D, P13S, P13I and P13D. Additionally, as discussed above, MW-7 was abandoned and replaced by MW-7(R).

During the November 2019 sampling event, due to laboratory error thallium was analyzed and reported for MW-2, P19I and R-DUP-1 instead of lead. Lead is typically tested using EPA method 200.8, however, once the error had been discovered, the sample could not be re-run for method 200.8 by the laboratory. Instead, the laboratory was able to report the results using EPA method 200.7, which are provided in **Table 9**.

No other notable sampling issues were encountered in 2019.

5.0 ACTIVITIES PLANNED FOR 2020

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

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

Tables

Table 2
Summary of Well Construction Details
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

Monitoring Well ID	Installation Date	Location		Top of Casing Elevation	Ground Surface Elevation	Top of Screen Elevation	Base of Well	Total Depth
		Northing ¹	Easting ¹	(FT MSL) ²	(FT MSL) ²	(FT MSL) ²	(FT MSL) ²	(FT BGS) ³
CCR RULE COMPLIANCE NETWORK								
MW-1	10/31/2015	835384.2	889832.5	395.52	393.5	320.7	310.5	83.0
MW-2	11/1/2015	834261.5	890364.1	393.87	391.7	319.5	309.3	82.4
MW-3	10/31/2015	833178.4	890892.7	391.38	389.2	319.1	308.9	80.3
MW-4	10/30/2015	831647.5	890830.5	392.78	390.8	310.9	300.7	90.1
MW-5	10/29/2015	831994.9	889984.5	390.36	388.0	333.0	327.8	60.2
MW-6	10/28/2015	833111.0	888977.0	402.71	401.1	346.4	341.2	59.8
MW-7	10/28/2015	834476.8	888483.3	407.95	406.1	318.1	307.9	98.2
MW-7(R)	9/11/2019	834501.4	888496.4	408.22	406.0	318.7	308.6	97.4
MW-B1	10/28/2015	837602.1	887903.9	411.61	409.6	319.8	309.6	100.0
MW-B2	10/27/2015	837801.7	885337.2	397.85	395.9	318.3	308.1	87.9
P19I	12/10/2013	833911.3	890550.6	392.75	390.2	330.7	325.7	64.5
CORRECTIVE ACTION MONITORING WELL NETWORK								
P05S	12/5/2012	832317.6	889749.7	392.50	390.1	365.6	345.6	24.5
P10S	12/4/2012	834545.1	888099.0	407.23	404.8	375.8	355.8	49.0
P16S	12/6/2012	835092.8	889998.3	393.27	390.8	370.8	350.8	40.0
P17D	9/6/2013	834718.8	890158.3	395.56	392.6	267.3	262.3	130.3
P17I	12/10/2013	834744.2	890148.9	394.86	392.5	333.6	328.6	63.9
P17S	11/27/2012	834736.7	890152.8	394.65	392.5	375.5	355.5	37.0
P19D	12/10/2013	833915.6	890552.2	392.08	390.3	270.3	265.3	125.0
P19S	11/27/2012	833919.0	890546.4	393.31	390.6	368.6	348.6	42.0
P21D	12/9/2013	832902.9	891031.2	393.39	391.0	271.8	266.8	124.2
P21I	12/9/2013	832904.2	891027.0	393.53	391.2	333.4	328.4	62.8
P21S	11/28/2012	832898.0	891024.7	393.87	391.5	371.5	351.5	40.0
P22D	12/7/2013	832278.2	891018.7	393.76	391.6	286.6	281.6	110.0
P22S	11/29/2012	832277.0	891007.6	394.30	392.2	373.2	353.2	39.0
P29D	12/11/2013	837804.9	885389.1	398.27	396.2	300.9	295.9	100.3
P29S	1/17/2013	837797.9	885383.8	399.11	397.0	367.0	347.0	50.0
P30S	1/16/2013	836606.9	889007.8	407.75	408.0	368.0	348.0	60.0
P31S	12/10/2012	835629.4	887488.1	408.68	406.1	374.1	354.1	52.0

Notes:

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

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Table 3
Summary of Groundwater Sampling Dates
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

Groundwater Monitoring Wells	Date of Sample Collection					Total Number of Samples
	January 2019 - Verification Sampling	July-September 2019 - Assessment/ Detection Monitoring Sampling	July-August 2019 - Nature and Extent Sampling	September-October 2019 - Verification/ Assessment Monitoring Sampling	November 2019 - Assessment/ Detection Monitoring Sampling	
CCR Rule Compliance Monitoring Well Network						
MW-B1	-	7/29/2019	-	-	11/11/2019	2
MW-B2	-	7/29/2019	-	-	11/11/2019	2
MW-1	-	7/30/2019	-	-	11/11/2019	2
MW-2	-	7/30/2019	-	-	11/8/2019	2
MW-3	-	7/31/2019	-	-	11/11/2019	2
MW-4	1/4/2019	7/31/2019	-	-	11/11/2019	3
MW-5	-	7/31/2019	-	-	11/11/2019	2
MW-6	1/4/2019	7/31/2019	-	9/30/2019	11/11/2019	4
MW-7	1/4/2019	-	-	-	-	1
MW-7 (R)	-	9/13/2019	-	9/30/2019	11/11/2019	3
P19I	-	7/30/2019	-	10/17/2019	11/8/2019	3
Nature and Extent Investigation						
P01S	-	-	8/15/2019	-	-	1
P03D	-	-	7/31/2019	-	-	1
P03S	-	-	7/31/2019	-	-	1
P05I	-	-	7/30/2019	-	-	1
P05S	-	-	7/31/2019	-	-	1
P10S	-	-	7/30/2019	-	-	1
P17D	-	-	7/30/2019	-	-	1
P17I	-	-	7/30/2019	-	-	1
P17S	-	-	7/30/2019	-	-	1
P19D	-	-	7/30/2019	-	-	1
P19S	-	-	7/30/2019	-	-	1
P21D	-	-	7/31/2019	-	-	1
P21I	-	-	7/31/2019	-	-	1
P21S	-	-	7/31/2019	-	-	1
P22D	-	-	8/1/2019	-	-	1
P22I	-	-	7/31/2019	-	-	1
P22S	-	-	7/31/2019	-	-	1
P29D	-	-	7/30/2019	-	-	1
P29S	-	-	7/30/2019	-	-	1
P30S	-	-	7/31/2019	-	-	1
P31S	-	-	7/30/2019	-	-	1
Detection or Assessment Monitoring	Detection	Assessment/ Detection	Assessment	Assessment/ Detection	Assessment/ Detection	NA

Notes:

- 1.) Detection Monitoring Events tested for Appendix III Parameters.
- 2.) Verification Sampling Events tested for Appendix III Parameters with initial exceedances that have not already been verified
- 3.) Assessment Monitoring Events sampled for Appendix IV Parameters.
- 4.) "-" No sample collected.
- 5.) NA - Not Applicable.

Table 4
November 2018 Detection Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS						
			MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
November 2018 Detection Monitoring Event											
DATE	NA	NA	11/2/2018	11/6/2018	11/2/2018	11/5/2018	11/2/2018	11/1/2018	11/1/2018	11/6/2018	11/2/2018
pH	SU	6.25-7.12	7.04	7.22	9.73	12.59	9.96	7.34	6.66	7.11	7.30
BORON, TOTAL	µg/L	151	140	35.9 J	2,470	3,290	13,800	4,000	115	887	2,480
CALCIUM, TOTAL	µg/L	161,000	132,000	109,000	26,800	8,840	5,480	60,500	130,000	86,800	66,700
CHLORIDE, TOTAL	mg/L	60.6	40.7	40.2	21.4	23.4	30.5	20.9	7.4	6.3	14.6
FLUORIDE, TOTAL	mg/L	0.2283	ND	0.22	0.36	1.2	0.95	0.92	ND	0.26	0.33
SULFATE, TOTAL	mg/L	46.9	42.5	13.1	226	318 J	132	51.8	14.3	22.8	77.7
TOTAL DISSOLVED SOLIDS	mg/L	757	652	425	450	768	722	99.0 J	411	290	404
January 2019 Verification Sampling Event											
DATE	NA	NA						1/4/2019		1/4/2019	
pH	SU	6.25-7.12						7.15		7.14	
BORON, TOTAL	µg/L	151									
CALCIUM, TOTAL	µg/L	161,000									
CHLORIDE, TOTAL	mg/L	60.6								ND	
FLUORIDE, TOTAL	mg/L	0.2283									
SULFATE, TOTAL	mg/L	46.9									
TOTAL DISSOLVED SOLIDS	mg/L	757									

NOTES:

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

Table 5
July-September 2019 Detection Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	PREDICTION LIMITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
			MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7(R)	P19I
July-September 2019 Detection Monitoring Event												
DATE	NA	NA	7/29/2019	7/29/2019	7/30/2019	7/30/2019	7/31/2019	7/31/2019	7/31/2019	7/31/2019	9/13/2019	7/30/2019
pH	SU	6.244-7.486	6.00	7.06	8.73	10.53	9.77	7.19	7.15	6.89	6.83	10.70
BORON, TOTAL	µg/L	140.0	106	41.1 J	2,980	3,330	14,100	4,230	116	200	2,310	6,870
CALCIUM, TOTAL	µg/L	161,000	139,000	102,000	27,300	8,120	6,200	64,800	129,000	188,000	67,700	9,260
CHLORIDE, TOTAL	mg/L	66.36	64.7	28.1	22.5	23.1	30.1	22.1	7.00	22.2	68.3	24.2
FLUORIDE, TOTAL	mg/L	0.2332	0.18 J	0.22	0.86	1.5	0.96	0.88	0.15 J	0.25	0.19 J	0.93
SULFATE, TOTAL	mg/L	46.9	43.2	15.5	217	273	96.0	61.2	15.9	14.9	39.4	321
TOTAL DISSOLVED SOLIDS	mg/L	757	687	416	493	761	713	466	484	756	480	1,070
September-October Verification Sampling Event												
DATE	NA	NA								9/30/2019	9/30/2019	10/17/2019
pH	SU	6.244-7.486								7.00	6.95	10.79
BORON, TOTAL	µg/L	140.0									2,190	5,260
CALCIUM, TOTAL	µg/L	161,000								95,500		
CHLORIDE, TOTAL	mg/L	66.36									125	
FLUORIDE, TOTAL	mg/L	0.2332										1.0
SULFATE, TOTAL	mg/L	46.9										316
TOTAL DISSOLVED SOLIDS	mg/L	757										988

NOTES:

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

Table 6
November 2019 Detection Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7(R)	P19I
November 2019 Detection Monitoring Event											
DATE	NA	11/11/2019	11/11/2019	11/11/2019	11/8/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	11/8/2019
pH	SU	7.21	7.41	8.86	10.74	9.81	7.39	7.48	7.17	7.26	10.93
BORON, TOTAL	µg/L	104	39.1 J	3,170	3,760	13,000	3,580	109	1,490	2,610	5,710
CALCIUM, TOTAL	µg/L	133,000	106,000	27,200	9,000	5,420	78,200	139,000	92,600	71,400	7,960
CHLORIDE, TOTAL	mg/L	45.5	30.3	21.5	23.9	28.6	20.5	5.6	9.5	77.2	22.9
FLUORIDE, TOTAL	mg/L	0.19 J	0.18 J	0.74	1.0	1.1	0.75	0.16 J	0.20	0.29	1.6
SULFATE, TOTAL	mg/L	41.7	12.0	125 J	267	117	59.6	4.7	17.8	26.7	365
TOTAL DISSOLVED SOLIDS	mg/L	611	389	529	777	649	415	424	354	483	1,040

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.

Table 7
November 2018 Assessment Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS						
		MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Field Parameters										
DATE	NA	11/2/2018	11/6/2018	11/2/2018	11/5/2018	11/2/2018	11/1/2018	11/1/2018	11/6/2018	11/2/2018
DISSOLVED OXYGEN	mg/L	0.26	0.18	1.62	0.73	0.03	0.80	0.46	3.05	0.26
pH	SU	7.04	7.22	9.73	12.59	9.96	7.34	6.66	7.11	7.30
REDOX POTENTIAL	mV	-136.0	-122.0	47.6	-227.5	-218.3	-165.4	-102.8	108.8	-184.3
SPECIFIC CONDUCTIVITY	mS/cm	1.501	0.630	0.953	1.099	1.180	0.930	0.808	0.558	0.871
TURBIDITY	NTU	3.66	1.62	2.48	4.50	2.23	0.98	0.90	4.33	7.62
Appendix IV Parameters										
ANTIMONY, TOTAL	µg/L	ND	ND	0.55 J	3.8	0.15 J	ND	ND	ND	ND
ARSENIC, TOTAL	µg/L	24.8	2.2	10.1	197	79.7	6.3	3.6	ND	84.9
BARIUM, TOTAL	µg/L	432	415	15.1	9.5	12.1	237	378	105	280
LITHIUM, TOTAL	µg/L	60.2	14.3	ND	ND	ND	40.3	8.6 J	5.1 J	30.1
MOLYBDENUM, TOTAL	µg/L	ND	ND	102	170	736	89.6	ND	ND	162
RADIUM [226 + 228]	pCi/L	ND	ND	ND	ND	ND	ND	1.366	ND	1.426
SELENIUM, TOTAL	µg/L	ND	0.10 J	1.8	0.88 J	0.71 J	0.14 J	ND	ND	ND

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeter, and NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.
5. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
6. Statistical Analysis for the Assessment Monitoring data is provided in Appendix E.

Table 8
July-September 2019 Assessment Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS								
		MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7 (R)	P19I	P19I
Field Parameters												
DATE	NA	7/29/2019	7/29/2019	7/30/2019	7/30/2019	7/31/2019	7/31/2019	7/31/2019	7/31/2019	9/13/2019	7/30/2019	10/17/2019
DISSOLVED OXYGEN	mg/L	0.50	0.79	0.81	1.19	0.76	0.45	0.57	1.31	0.49	0.12	0.12
pH	SU	6.00	7.06	8.73	10.53	9.77	7.19	7.15	6.89	6.83	10.65	10.79
REDOX POTENTIAL	mV	-14.3	-90.0	-28.4	63.7	121.7	-127.3	-132.0	-95.5	-80.9	56.3	77.3
SPECIFIC CONDUCTIVITY	mS/cm	1.150	0.690	0.771	1.080	1.040	0.692	0.781	1.360	0.98	1.350	1.400
TURBIDITY	NTU	0.90	4.37	2.77	2.42	3.16	2.77	4.98	4.54	4.96	2.45	3.22
Appendix IV Parameters												
ANTIMONY, TOTAL	µg/L	ND	ND	ND	3.5	0.18 J	ND	ND	0.094 J	0.15 J	6.2	5.3
ARSENIC, TOTAL	µg/L	28.9	3.0	10.7	216	71.2	6.8	3.3	115	35.3	302	290
BARIUM, TOTAL	µg/L	439	377	16.4	9.1	13.4	246	367	589	236	18.2	14.2
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	0.32 J	ND	ND	0.40 J	ND	ND	-
CADMIUM, TOTAL	µg/L	ND	ND	0.052 J	0.29 J	0.41 J	0.061 J	ND	ND	ND	0.54	0.53
CHROMIUM, TOTAL	µg/L	ND	ND	ND	0.36 J	0.40 J	0.16 J	0.16 J	0.14 J	0.25 J	0.26 J	-
COBALT, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	2.3 J	1.2 J	ND	-
FLUORIDE, TOTAL	mg/L	0.18 J	0.22	0.86	1.5	0.96	0.88	0.15 J	0.25	0.19 J	0.93	1.0
LEAD, TOTAL	µg/L	ND	ND	ND	9.7 J	7.8 J	ND	ND	ND	ND	13.8	9.7 J
LITHIUM, TOTAL	µg/L	53.0	6.0 J	ND	ND	ND	45.2	6.8 J	13.6	61.8	15.5	12.3
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
MOLYBDENUM, TOTAL	µg/L	ND	ND	135	136	898	118	ND	5.3 J	74.4	402	302
RADIUM [226 + 228]	pCi/L	2.258	ND	ND	ND	ND	ND	ND	2.229	ND	ND	ND
SELENIUM, TOTAL	µg/L	ND	ND	0.70 J	1.4	0.73 J	0.17 J	ND	0.73 J	0.13 J	3.5	2.4
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeter and NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.
5. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
6. Statistical Analysis for the Assessment Monitoring data is provided in Appendix F.
7. "-" Not sampled.

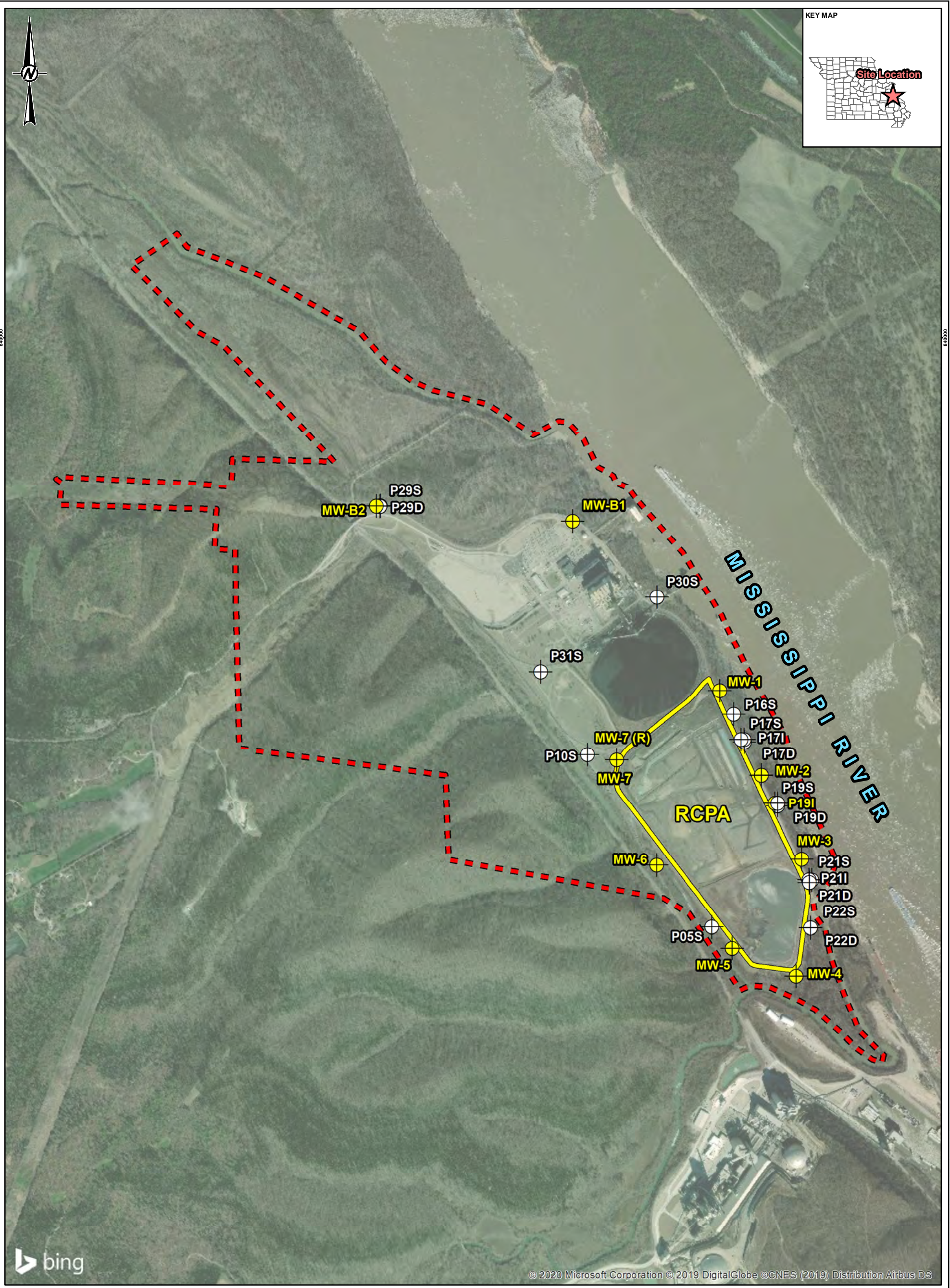
Table 9
November 2019 Assessment Monitoring Results
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		MW-B1	MW-B2	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7 (R)	P19I
Field Parameters											
Date	NA	11/11/2019	11/11/2019	11/11/2019	11/8/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	11/8/2019
Dissolved Oxygen	mg/L	0.38	0.75	0.16	0.15	0.40	0.12	0.24	0.66	0.19	0.16
pH	SU	7.21	7.41	8.86	10.74	9.81	7.39	7.48	7.17	7.26	10.93
Redox Potential	mV	-138.8	-182.3	-73.4	-175.0	-133.2	-174.1	-36.0	192.5	169.7	-181.0
Specific Conductivity	mS/cm	1.140	0.780	0.876	1.109	0.984	0.710	0.810	0.640	0.970	1.407
Turbidity	NTU	4.63	4.42	1.43	2.93	4.43	2.43	4.73	1.35	2.43	2.23
Appendix IV Parameters											
ANTIMONY, TOTAL	µg/L	ND	ND	0.59 J	3.5	0.11 J	ND	ND	ND	ND	5.0
ARSENIC, TOTAL	µg/L	27.1	3.1	12.6	236	49.1	10.3	2.6	2.1	18.5	287
BARIUM, TOTAL	µg/L	423	391	18.8	8.6	13.0	294	397	179	171	15.6
CADMIUM, TOTAL	µg/L	ND	0.047 J	0.065 J	0.31 J	0.54	0.048 J	ND	ND	0.076 J	0.56
FLUORIDE, TOTAL	mg/L	0.19 J	0.18 J	0.74	1.0	1.1	0.75	0.16 J	0.20	0.29	1.6
LEAD, TOTAL	µg/L	ND	ND	ND	11.0	4.9	ND	ND	ND	ND	17.2
LITHIUM, TOTAL	µg/L	48.6	ND	ND	ND	ND	33.6	ND	ND	47.8	13.5
MOLYBDENUM, TOTAL	µg/L	ND	ND	133	164	1,050	96.4	ND	ND	143	317
RADIUM [226 + 228]	pCi/L	1.944	ND	ND	1.421	ND	ND	ND	1.785 J	ND	ND
SELENIUM, TOTAL	µg/L	ND	ND	0.60 J	1.2 J	0.54 J	0.13 J	ND	0.17 J	0.10 J	2.3

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeter and NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.
5. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
6. Lead results for MW-2 and P19I use EPA method 200.7 instead of 200.8 due to laboratory error. More information is provided in the report.

Figures



LEGEND

- Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Monitoring Wells Used for RCPA CCR Rule Monitoring**
- RCPA Corrective Action Monitoring Well Network
- RCPA Detection/Assessment Monitoring Well Network

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

CLIENT
AMEREN MISSOURI
RUSH ISLAND ENERGY CENTER

CONSULTANT
 GOLDER

YYYY-MM-DD	2020-01-22
DESIGNED	JSI
PREPARED	EMS
REVIEWED	KAB
APPROVED	CMR

NOTE(S)
1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AERIAL MAP AND MONITORING WELL LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
153140601	1240	0	1

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

APPENDIX A

Corrective Measures Assessment and Certification



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

MEMORANDUM

April 2019
Project No. 132002

**SUBJECT: Demonstration for 60-Day Extension – Corrective Measures Assessment (CMA)
Coal Combustion Residual (CCR) Surface Impoundment (RCPA)
Ameren Missouri Rush Island Energy Center
Festus, Jefferson County, Missouri**

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

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

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

Signed:  _____

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

Professional Engineer's Seal



CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI RUSH ISLAND ENERGY CENTER
JEFFERSON COUNTY, MISSOURI

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Ameren Missouri
St. Louis, Missouri

May 2019



Overview

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

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

Ameren completed a detailed environmental evaluation of the RCPA and surrounding area, including voluntary, supplemental surface water sampling and bedrock sampling. Two risk evaluations (conducted in 2014 and 2018), were undertaken to identify whether current groundwater conditions pose an unacceptable risk to human health and the environment, and whether corrective measures mitigate such an unacceptable risk, if present. The risk evaluations concluded that there are **no adverse effects on human health or the environment currently or under reasonably anticipated future uses** from either surface water or groundwater due to CCR management practices at RIEC.

In performing this CMA, Haley & Aldrich considered the following: presence and distribution of arsenic and molybdenum, RCPA configuration, hydrogeologic setting, and the results of the detailed risk evaluation. Within the RCPA, CCR is managed in an impoundment that extends to a depth of approximately 100 feet (ft) below ground surface (bgs). Groundwater within the Mississippi River valley ranges in thickness from not present west of the energy center where bedrock bluffs are present, to greater than 100 feet thick beneath the eastern boundary of the RCPA. Although flow direction is influenced by the elevation of surface water in the Mississippi River, groundwater generally flows west to east beneath the RCPA, towards the Mississippi River.

To provide a comprehensive CMA, this effort included six CCR unit closure and groundwater remediation alternatives, including:

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

- Alternative 5: CIP with low permeability capping, HC of groundwater, ex-situ groundwater treatment, and subsurface barrier wall; and
- Alternative 6: Closure by removal (CBR) with MNA.

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

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

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

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

- **Cap Integrity and Hydrogeologic Conditions:** For all CIP alternatives, Ameren intends to install a synthetic cap and cover system that exceeds by two orders-of-magnitude the performance criteria set forth in the CCR Rule and is referred to in this CMA as a "low permeability cap." Vertical infiltration via precipitation is virtually eliminated following installation of the synthetic cap system. Modelling predicts that post-closure, 94% of groundwater travels horizontally around the CCR unit via a preferential pathway in the surrounding soils.
- **No Risk:** Risk assessment evaluations confirm that the RCPA, even prior to closure, presents **no unacceptable risk** to human health or the environment. In fact, concentration levels of arsenic and molybdenum would need to be **more than 50 and more than 10,000 times higher**, respectively, than currently measured levels before an adverse impact in the Mississippi River could occur. Therefore, since no adverse risk currently exists, implementation of any of the remedies considered will not result in a meaningful reduction in risk.
- **Groundwater Compliance:** Post-closure, and due to current geochemical conditions, arsenic and molybdenum concentrations are predicted to reduce below GWPS in eight and fourteen years, respectively. Based on laboratory testing, such timeframes could accelerate to four to ten years following in-situ treatment. See **Figures 4-2, 4-3**. Ameren has retained XDD Environmental (XDD), to evaluate and develop groundwater treatment methods to address both arsenic and molybdenum.
- **Excavation Timeframe:** As described in an Extraction & Transportation Study prepared by the Lochmueller Group, the excavation of, transportation to, and disposal of ponded ash at an off-site commercial landfill would require approximately 28 to 34 years to complete. As detailed in the report, there is simply a limit to how much material can be excavated and hauled away during a work day. See **Appendix C**. In addition, implementation of Alternative 6, CBR, would require the impoundment to remain open for decades while impacts to the community –through increased truck traffic and associated hazards – could increase dramatically.

- **Groundwater Treatment:** Laboratory testing performed by XDD has resulted in arsenic concentration decreases ranging from between 30 to 85% once pH levels within the groundwater are modified. Bench-scale testing and in-situ treatment evaluations for arsenic and molybdenum will be completed later this summer.

In accordance with §257.98, Ameren will implement a groundwater monitoring program to document the effectiveness of the selected remedial alternative. Corrective measures are considered complete when monitoring reflects groundwater downgradient of the RCPA has fallen to below Appendix IV GWPS for three consecutive years. USEPA is in the process of modifying certain CCR Rule requirements and, depending upon the nature of such changes, assessments made herein could be modified or supplemented to reflect such future regulatory revisions. See *Federal Register* (March 15, 2018; 83 FR 11584).

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List of Acronyms and Abbreviations

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

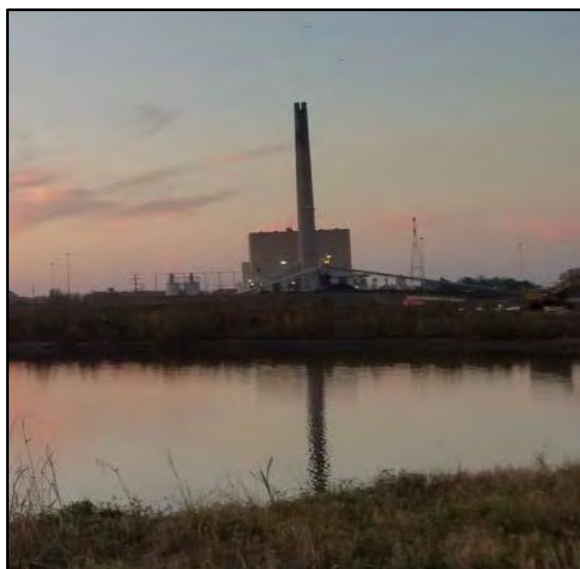
1. Introduction

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

This CMA includes a summary of the results of groundwater and site investigations at the RIEC. Groundwater impacted by the RCPA exceeds statistically-derived GWPS for only two constituents: arsenic and molybdenum at only three monitoring locations. Of these parameters, USEPA has developed drinking water standards only for arsenic. This report evaluates potential corrective measures to address these limited exceedances of the GWPS.

1.1 FACILITY DESCRIPTION/BACKGROUND

The RIEC property encompasses approximately 960-acres and manages CCR in an on-site surface impoundment located in the south-southeast portion of the Site (**Figure 1-1**). The RCPA was constructed in the mid-1970s, concurrent with development of the RIEC Site. Native soil from designated borrow areas and shallow excavations at the Site were used to build the earthen berms that encircle the RCPA. The surface impoundment was constructed by excavating alluvial deposits, which were used as fill material for the power block footprint and construction of related power plant structures.



Rush Island Energy Center

Historically, RIEC utilized the RCPA to actively manage approximately 65,000+/- tons of bottom ash and 150,000+/- tons of fly ash produced annually. Active wet sluicing of CCR to the RCPA terminated in 2018 following the facility's conversion to dry ash handling. All standing surface waters will be drained from the pond by June 2019, as required by the facility's Missouri Water Operating Permit. The estimated volume of CCR currently within the limits of the RCPA is approximately 12.7 million cubic yards (MM CY).

1.2 SITE CHARACTERIZATION WORK SUMMARY

Extensive subsurface investigations have occurred pursuant to Missouri's utility and solid waste landfill requirements as well as the CCR Rule. A Detailed Site Investigation (DSI) Report prepared by Natural Resource Technology in September 2015 delineated the site-specific geology and hydrogeology to support the development of a hydrogeologic Conceptual Site Model (CSM). The DSI also incorporated the findings of various historical investigation activities at the RIEC including:

- Soil borings and sampling;
- Geotechnical testing;
- Rock coring;
- Downhole geophysics;
- Packer testing;
- Well and piezometer installation;
- Slug testing;
- Groundwater sampling; and
- Borehole abandonment.

The CSM has been further enhanced with ongoing CCR groundwater monitoring and supplemental subsurface investigation activities performed by Golder Associates Inc. (Golder). Findings from these extensive and updated series of geologic, geotechnical, and hydrogeologic investigations (over a period of the last 15 years) have produced a robust CSM that supports the CMA activities discussed in this report.

1.3 GROUNDWATER MONITORING

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

Monitoring wells were installed in October and November 2015 to support compliance with the CCR Rule (see insert plan map showing CCR well locations for the RCPA). The CCR groundwater monitoring network includes two background wells (MW-B1 and MW-B2) in areas unaffected by the CCR unit and seven downgradient monitoring wells (MW-1 through MW-7) located around the perimeter of the RCPA. In general, the monitoring wells are screened in the alluvial aquifer zone near the base elevation of the RCPA.

CCR Rule Monitoring Constituents			
Appendix III	Boron	Appendix IV	Antimony
	Calcium		Arsenic
	Chloride		Barium
	Fluoride		Beryllium
	Sulfate		Cadmium
	pH		Chromium
	Tot. Dissolved Solids		Cobalt
	Fluoride		
	Lead		
	Lithium		
	Mercury		
	Molybdenum		
	Selenium		
	Thallium		
	Radium 226 & 228		

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

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



Groundwater Monitoring Well Locations
Image from Figure 2, Groundwater Monitoring Plan (Golder 2017)

1.4 CORRECTIVE MEASURES ASSESSMENT PROCESS

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

1.5 RISK REDUCTION AND REMEDY

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

(1)(i) Magnitude of reduction of existing risks;

(1)(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;

(1)(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminant;

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

(4) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy¹;

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

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

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

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

2. Groundwater Conceptual Site Model

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

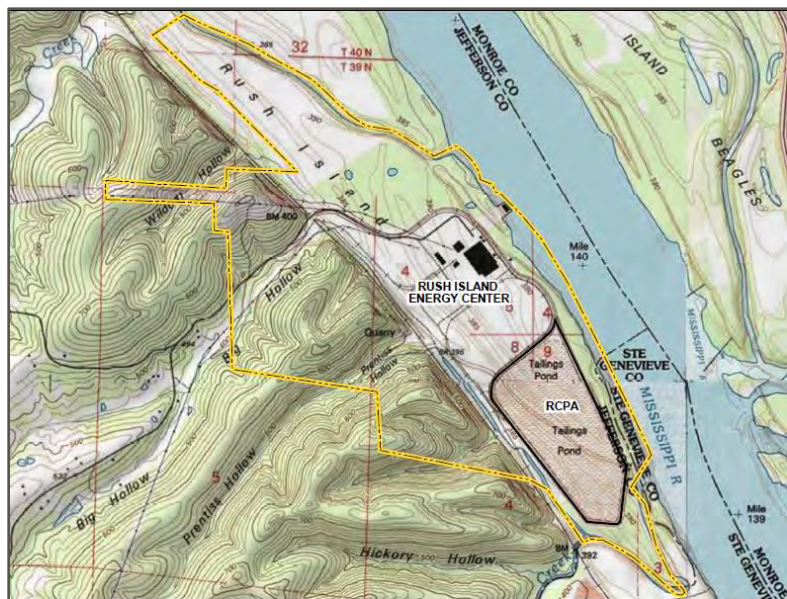
2.1 SITE SETTING

The RIEC Site is located in Jefferson County and adjacent to the Mississippi River. The area around the facility is sparsely populated with residential homes located in the bluffs area located to the west and an industrial facility located to the south. Residences within the bluffs area draw water from private supply wells drilled deep into the bedrock aquifer.

A contiguous strip of forested area runs between the RCPA and the Mississippi River, which can be inundated during high river water levels. The Isle du Bois Creek is located approximately 100 ft from the southern toe of the RCPA perimeter dike. The western side of the Site is bounded by a small drainage creek that is approximately 100 to 300 ft west of the RCPA.

2.2 SITE TOPOGRAPHY

Ground surface elevation increases from roughly 385 ft above mean sea level (AMSL) along bottomlands at the river's edge to approximately 410 ft AMSL along embankments above the river, including the impoundment perimeter berms, railroad embankments, and the platform on which the power plant was constructed. The site is bounded to the west by bedrock bluffs that rise some 300-ft above the elevation of the site. The intermittent streams and creeks that cut valleys in the bluffs enter the floodplain through water gaps eroded in the bedrock hills at elevations 390 to 400 ft AMSL.



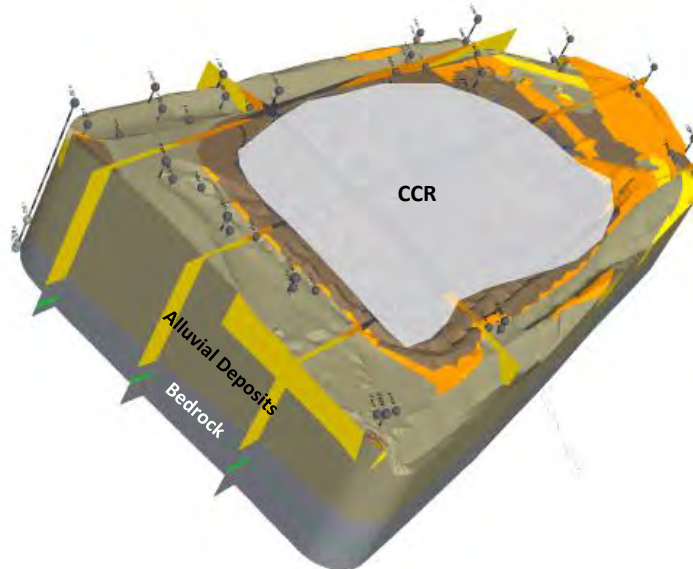
Topographic Map

2.3 GEOLOGY AND HYDROGEOLOGY

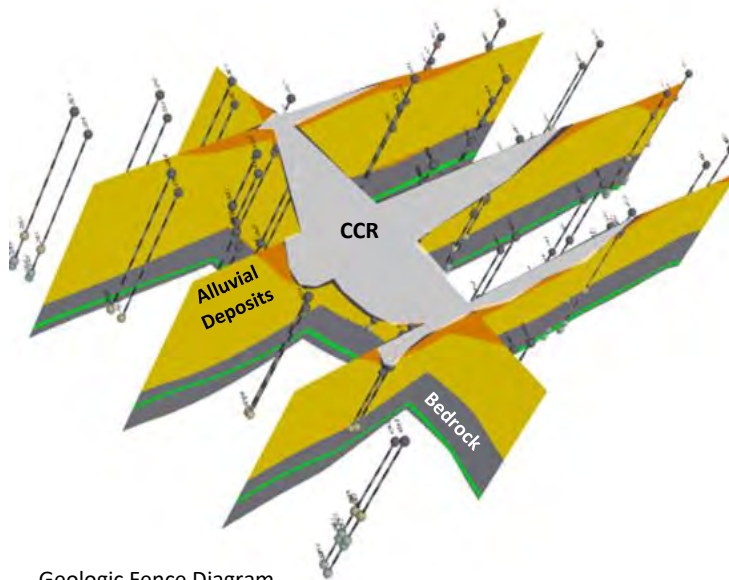
The geology immediately surrounding the Site is comprised of two distinctly different geological terrains; (1) alluvial deposits and (2) sedimentary bedrock formations. Most of the Site, including all the power plant infrastructure and the RCPA, lies within the Mississippi River Valley on floodplain and alluvial soil deposits.

The alluvial deposits are typically comprised of sands and gravels with lesser amounts of silts and clays, with an overall fining upward sequence. The depth of the alluvial deposits near the RCPA ranges from approximately 50 to 150 ft+/- bgs, approximately 255 to 330+/- ft AMSL.

The alluvial deposits are underlain by bedrock within the lower part of the Ordovician-aged Plattin group. This bedrock unit is comprised of massive, gray to brown, micritic, fossiliferous limestone with shale interbeds. The depth to bedrock typically increases towards the Mississippi River and bedrock beneath the RCPA dips towards the east-northeast. The Plattin group is stratigraphically underlain by the Joachim Dolomite. The higher portions of the bluffs to the west of the Site are comprised of Mississippian-age limestone and shales, which are exposed along the eastern portions of the bluffs.



Generalized 3-Dimensional Model of Geologic Conditions



Geologic Fence Diagram

The alluvial aquifer is the primary water-bearing unit at the RIEC. The bottom of this aquifer is defined by the presence of low hydraulic conductivity bedrock. Across the Site, the alluvial aquifer extends to depths of up to 150 ft bgs. Historically, ponded water levels in the surface impoundment above created

a localized “mounding” effect inside the footprint of the RCPA, resulting in radial groundwater flow both downward (vertically) and outward (horizontally) from the RCPA.

Horizontal hydraulic gradients in the alluvial aquifer are typically low and flat and are dependent on river water levels. Groundwater flow direction and hydraulic 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). Horizontal gradients calculated by the program ranged from 0.0001 to 0.0015 ft/ft with an estimated net annual groundwater velocity of approximately 34 ft per year under current conditions².

Vertical hydraulic gradients reflect low downward gradients, with groundwater elevations between the shallow and intermediate/deep groundwater monitoring zones typically differing less than 0.01 ft. This illustrates that the shallow and deeper zones are interconnected, however, the majority of groundwater flow in the alluvium is lateral/horizontal.

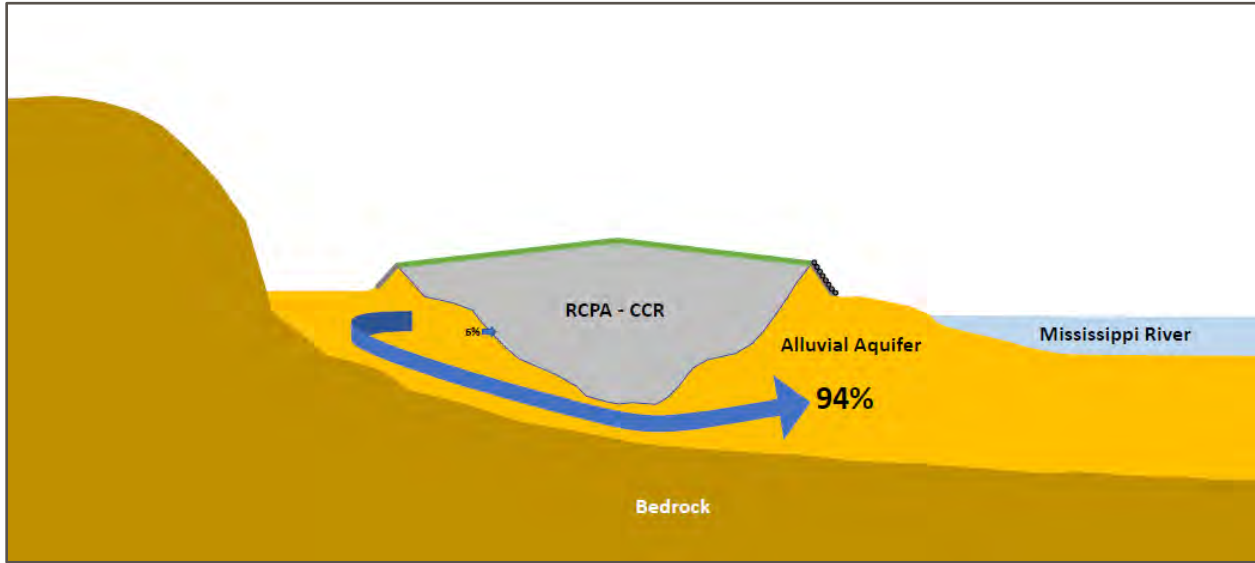


Groundwater Flow Map- November 1, 2018
Image from Figure C3, 2018 Annual Groundwater Monitoring and
Corrective Action Report (Golder 2019)

Groundwater flow modeling completed by Golder evaluated the flux of groundwater passing through the CCR, following closure and dewatering of the RCPA. As shown in the figure on the following page, the model results indicated 94% of groundwater moving laterally through the alluvial aquifer preferentially flows under (and around) the RCPA, due to the notably lower horizontal hydraulic conductivity of the CCR.

² 2018 Annual Groundwater Monitoring and Corrective Action Report, RCPA Surface Impoundment, RIEC, Jefferson County, Missouri (Golder 2019)

Groundwater Preferentially Flows Under/Around the RCPA



Mississippi River levels typically rise from low water conditions in fall and winter to seasonal high-water levels in spring and summer. Mississippi River levels in excess of 385 ft AMSL will reach ground surface at the base of the RCPA perimeter berms. The drainage swale on the west side of the Site (formerly the course of Saline Creek) captures runoff from intermittent streams that drain Prentiss Hollow and Big Hollow and directs surface water south to Isle du Bois Creek. Surface water flow in the swale is intermittent. Mississippi River elevations above 380 ft AMSL will begin to flood the mouth of Isle du Bois Creek and the swale. Flow reversals in Isle du Bois Creek and the west swale are common, and the swale is often slow to recede after a flooding event. Under normal aquifer conditions, groundwater flow in the aquifer is eastward toward the Mississippi River.

2.4 GROUNDWATER PROTECTION STANDARDS

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

Groundwater results were compared to the site-specific GWPS. As shown on **Figure 2-1**, statistically significant levels (SSL) above the GWPS are limited to three monitoring wells (MW-2, MW-3, and MW-7) for arsenic and molybdenum only.

Parameter	Site GWPS	Units
Antimony	6	µg/L
Arsenic	30	µg/L
Barium	2000	µg/L
Beryllium	4	µg/L
Cadmium	5	µg/L
Chromium	100	µg/L
Cobalt	6	µg/L
Fluoride	4	mg/l
Lead	15	µg/L
Lithium	64.7	µg/L
Mercury	2	µg/L
Molybdenum	100	µg/L
Radium 226+228	5	pCi/L
Selenium	50	µg/L
Thallium	2	µg/L

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

2.5 NATURE AND EXTENT OF GROUNDWATER IMPACTS

Ameren initiated a nature and extent (N&E) investigation as required by the CCR Rule in 2018 by evaluating existing piezometers and monitoring wells (N&E wells) that previously installed near the RCPA (**Figure 2-2**). The N&E wells are screened in three different, generalized zones of the alluvial aquifer: shallow zone, middle/intermediate zone, and deep zone. Well screen lengths range from 5 to 20 ft long and total depths range from approximately 25 to 143 ft bgs.

Analytical results from the N&E wells indicate that arsenic concentrations are limited in their extent and diminish at depth in the alluvial aquifer. Arsenic concentrations from the N&E wells are similar to Assessment Monitoring results in the shallow to intermediate depths and decrease to less than the GWPS and the Maximum Contaminant Level (MCL) in the deep alluvial aquifer well groundwater samples.

Results from the N&E wells indicate that molybdenum concentrations in the alluvial aquifer are also limited in areal extent and are below the GWPS along the west and south side of the RCPA, with similar concentrations to Assessment Monitoring results along the northern and eastern sides of the basin. Concentrations of molybdenum are highest in the intermediate and deep alluvial aquifer well groundwater samples.

The extent of the arsenic and molybdenum concentrations are limited to the alluvial aquifer and do not extend into the bedrock beneath and adjacent to the RCPA or to off-site bedrock wells installed previously by Ameren. Results from the N&E wells were used to develop corrective measures alternatives.

2.6 SURFACE WATER SAMPLING

The limited elevated levels of arsenic or molybdenum have not adversely impacted surface waters. Prior to the CCR Rule, Ameren voluntarily collected samples of surface water from the Mississippi River and Isle du Bois Creek to evaluate whether ash management operations at the RIEC have impacted these the two adjacent surface water bodies.

Golder collected surface water samples from six locations in the Mississippi River in April 2014 and 12 locations in May 2018. At each sample location, samples were collected near the surface of the river. Where the depth of water was greater than four feet, a second sample was collected mid-depth in the river. Surface water samples were also collected by Golder from nine locations in Isle du Bois Creek in April 2014 and May 2018. These locations are shown on **Figure 2-3**.

Samples were analyzed for the same Appendix III and Appendix IV constituents listed in **Section 1.3**, with the exception of radium (all CCR monitoring well data are below the GWPS for radium). There are no analytical results for the Mississippi River that are above drinking water screening levels³.

Sample results were also compared to human health and ecological risk-based screening levels. The screening levels and comparison of the surface water results to the screening levels are provided in **Appendix A** and are more fully explained in **Section 3**.

³ Similarly, while arsenic concentrations in the river are slightly above the human health recreational screening levels, the concentrations are statistically **no different** in upstream and downstream samples indicating that the facility is not the source of the arsenic detected in the river. The data for Isle du Bois Creek are similar.

In summary, the results of this investigation demonstrate that the Mississippi River and Isle du Bois Creek sampling do not show evidence of impact of constituents derived from the RCPA.

2.7 BEDROCK GROUNDWATER INVESTIGATION

To address potential community concerns, Ameren installed an off-site well network to evaluate water quality within the bedrock aquifer and confirm groundwater flow direction. In 2014, Golder installed three monitoring wells (TBM-1 through TBM-3) with screened intervals in bedrock at similar depths to residential water wells closest to the RIEC property boundary (west of the RIEC). **Figure 2-4** shows the locations of the bedrock monitoring wells and residential water wells within a one-mile radius of the RIEC along with an illustration of the groundwater flow. Based on the groundwater measurements, the groundwater flow in this area demonstrates that residential wells are located upgradient of the RCPA and thus cannot be impacted by the RCPA. In fact, sampling results indicated that the bedrock groundwater upon which residents rely fully complies with federal and state drinking water standards. Furthermore, the bedrock aquifer underlying the alluvial aquifer at the RIEC has not been impacted by CCR.

3. Risk Assessment and Exposure Evaluation

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

- August 2014: Groundwater and Surface Water Data Demonstrate No Off-Site Impact from Rush Island Energy Center. Available at: <https://www.ameren.com/-/media/corporate-site/files/environment/reports/rushislandreport.ashx?la=en&hash=B0C49A936DE7E3119F6FAD36EDF9F26287EFEE9F>
- February 2018: Human Health and Ecological Assessment of the Rush Island Energy Center. Available at: <https://www.ameren.com/-/media/corporate-site/files/environment/ccr-rule/2017/groundwater-monitoring/rush-island-haley-aldrich-report.ashx?la=en&hash=B27EDADC095FE0E08073B8158F50EB8B97019D8A>

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

3.1 APPROACH

The risk evaluation provided in the 2014 and 2018 risk assessment reports evaluated the environmental setting of the RIEC, which has been in operation for over 40 years, including its location and ash management operations at the facility. Golder provided information on groundwater location and direction, the rate(s) of groundwater flow, and where waterbodies may intercept groundwater flow.

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

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

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

Risk-based screening levels are designed to provide a conservative estimate of the concentration to which a receptor (human or ecological) can be exposed without experiencing adverse health effects. Due to the conservative methods used to derive risk-based screening levels, it can be assumed with reasonable certainty that concentrations below screening levels will not result in adverse health effects, and that no further evaluation is necessary. Concentrations above conservative risk-based screening levels do not necessarily indicate that a potential risk exists but indicate that further evaluation may be warranted.

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

3.2 CONCEPTUAL SITE MODEL

There are no on-site users of alluvial groundwater adjacent to the RCPA. As documented in the 2014 and 2018 risk assessment reports, there are approximately 16 private wells recorded within a one-mile radius of the facility, and all are located west and upgradient of the facility. There are **no users** of groundwater impacted by molybdenum, arsenic or any other CCR constituent in the vicinity of the RIEC ash management area and sampling results from the off-site network demonstrate that bedrock groundwater fully complies with federal and state drinking water standards.

3.3 RESULTS

3.3.1 Alluvial Aquifer

A summary of the screening results is presented in the table below:

Table: Assessment Monitoring Reflects High Percentage Compliance

	Rush Island Energy Center RCPA – Shallow Alluvial Aquifer
Percent of Assessment Monitoring Parameter Compliance	96%
Percent of Assessment Monitoring Parameter Results Requiring Corrective Action (Constituents)	4% Molybdenum Arsenic

The striking aspect of the analysis is how few CCR monitoring well results are above a conservative GWPS based on MCLs, health-based GWPS, or background levels, given that the wells are located directly adjacent to and at the base of the ash management area, and the facility has been in operation for over 40 years. Note that out of the 1773 groundwater analyses conducted for the RCPA, only 71 results are above the GWPS. Put another way, approximately 96% of the groundwater results for the CCR Rule monitoring wells located at the edge of the RCPA are below the GWPS.

3.3.2 Surface Water

There are no analytical results for the Mississippi River that are above drinking water screening levels. Similarly, while arsenic concentrations in the river are slightly above the human health recreational screening levels, the concentrations are statistically **no different** in upstream and downstream samples indicating that the facility is not the source of the arsenic detected in the river. The data for Isle du Bois Creek are similar.

Thus, the Mississippi River and Isle du Bois Creek sampling results do not show evidence of impact of constituents derived from the RCPA.

3.3.3 National Pollutant Discharge Elimination System Outfall

The outfall for the RCPA impoundment is identified as 002 and, shown on **Figure 2-3**, is located near where Isle du Bois Creek meets the Mississippi River. This is a permitted outfall under the National Pollutant Discharge Elimination System program. The outfall effluent water is tested for toxicity on a periodic basis as required by the permit. The biological toxicity testing results for Outfall 002 at the RCPA show no evidence of aquatic toxicity in the outfall effluent.

3.3.4 Off-Site Bedrock Groundwater

The deep groundwater at locations west of the Site is upgradient of the RIEC, as shown on **Figure 2-4**. All results meet drinking water standards and do not show evidence of impact from coal ash. This confirms that the coal ash management practices at the RIEC have not had an impact on groundwater used as a source of drinking water.

3.4 CONCLUSION

The sampling results for the Mississippi River and Isle du Bois creek are important. Although groundwater at the edge of the impoundment shows that two constituents in some wells are above the GWPS, only 4% of the results are above a GWPS, and the adjacent surface water bodies do not show evidence of impact of constituents derived from the RCPA. This is important because the absence of concentrations above risk-based screening levels means that there is not a significant pathway of exposure.

Impacts to groundwater do not mean that surface waters are impaired. The degree of interface between groundwater and surface waters is variable and complex and dependent upon a variety of factors including gradient and flow rate. It is possible, however, to determine the maximum concentration level that would need to be present on-site in groundwater and still be protective of the surface water environment, assuming gradient and flow rates are such that groundwater flows into the surface water. Groundwater and surface waters flow at very different rates and volumes. The Mississippi River is the largest river system in North America and as groundwater at the facility flows into the river, it is diluted by more than 100,000 times.

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

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

	Estimated Dilution Factor for Mississippi River	100,000			
Constituents*	Lowest of the Human Health and Ecological Screening Levels (mg/L)	Groundwater Risk-Based Screening Level (mg/L)**	Maximum RIEC Groundwater Concentration (mg/L)		Ratio Between Groundwater Screening Level and the Maximum RIEC Groundwater Concentration
Arsenic	0.00014	14	0.257	R-MW-2	>50
Molybdenum	0.1	10000	0.943	R-MW-3	>10,000

*A dilution factor is not directly applicable to pH, thus it is not included in this analysis.

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

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

The table identifies the maximum groundwater concentration of arsenic and of molybdenum detected in the RCPA monitoring wells. The comparison between the target levels and the maximum concentrations indicates that there is a wide margin of safety between the two values. This margin is shown in the last column of the table. To illustrate, concentration levels of arsenic and molybdenum would need to be **more than 50 and more than 10,000 times higher**, respectively, than currently measured levels before an adverse impact in the river could occur.

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

3.4.1 Trace Elements in Coal Ash

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

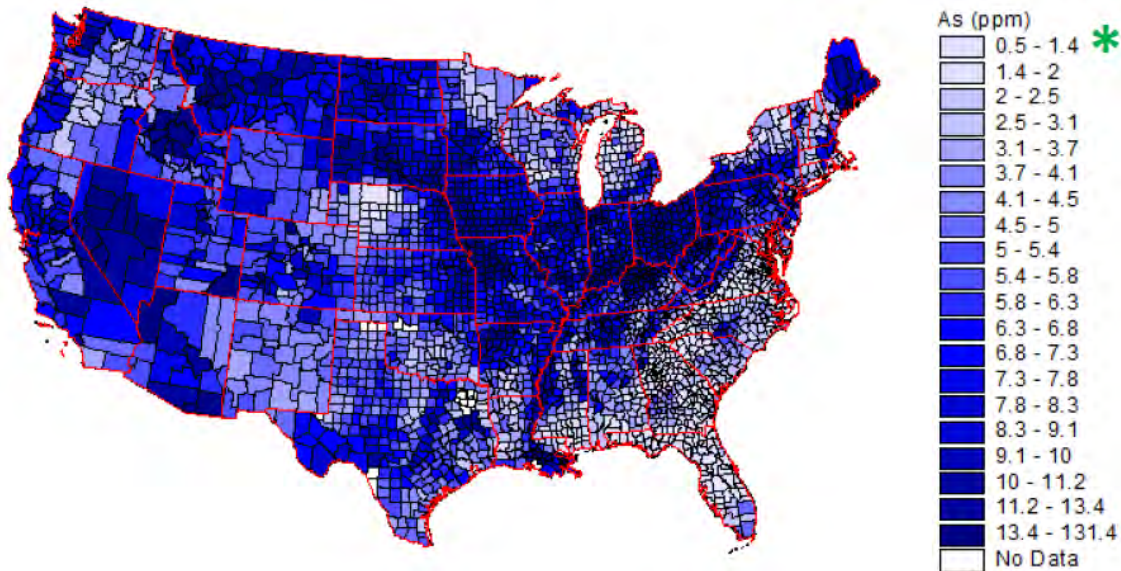
- 1 penny in a large container holding \$10,000 worth of pennies, or
- 1 second in 11.5 days, or
- 1 inch in 15.8 miles

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

3.4.2 Arsenic

Arsenic is present in soils across the U.S. The USGS map of arsenic in surface soils in the U.S. is shown below.

Arsenic is Present in our Natural Environment – Background Levels in Soils in the U.S.



Source: USGS. 2013. National Geochemical Survey. <http://mrddata.usgs.gov/geochem/doc/averages/countydata.htm>

* The USEPA regional screening level for arsenic in residential soil at a one in one million risk level is 0.61 mg/kg (USEPA, 2018a). Thus, the arsenic concentration in the majority of the soils in the U.S. are above the one in one million risk level.

Because arsenic is naturally present in soils and rocks, it is also naturally present in our groundwaters and surface waters. Just as for soil, there are background levels of constituents in groundwater. Constituent concentrations in groundwater that is upgradient of a source represent background conditions. To demonstrate a release to groundwater by a source, concentrations downgradient of the source must be greater than the background/upgradient concentrations for a consistent period of time. Thus, it is not surprising that arsenic is present in both of the CCR background wells for the RCPA.

3.4.3 Molybdenum

Haley & Aldrich has prepared a fact sheet (**Appendix B**) that provides information on molybdenum so that the groundwater data can be considered in context. There is no public exposure to groundwater at the RIEC and concentration levels of molybdenum in adjacent surface waters are all well below health-based regulatory standards.

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

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

The UL for molybdenum set by the NAS is 2 mg/day. This level is based on an evaluation of the potential toxicity of molybdenum at high levels of intake. Based on the UL, a safe drinking water level for molybdenum is 0.6 mg/L or 600 ug/L, or six-times higher than the level set by USEPA of 0.1 mg/L or 100 ug/L in the CCR Rule. This difference serves to underscore the conservatism of the USEPA value when evaluating groundwater under the CCR Rule. As reflected in the chart, over 90% of the GW results across all four energy centers and all but **11 samples** at Rush Island are within the standard the National Academy of Science developed for vitamins and supplements.

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

Notes:

mg/L - milligrams per liter.

(a) - Drinking water-based on GWPS specified in the CCR Rule.

(b) - Alternative health-protective drinking water screening level based on the NAS review of molybdenum.

3.5 EVALUATION OF RISK IN THE CORRECTIVE MEASURES ASSESSMENT

In summary, there are no adverse impacts resulting from coal ash management practices at the RIEC on human health or the environment from either surface water or groundwater uses. There are no users of groundwater impacted by CCR near RCPA. In fact, as described above, concentrations of arsenic and molybdenum detected in the groundwater would need to be more than **50 and more than 10,000 times higher**, respectively, before such an unacceptable risk could exist under current and reasonably anticipated future uses.

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

4. Corrective Measures Alternatives

4.1 CORRECTIVE MEASURES ASSESSMENT GOALS

The overall goal of this CMA is to identify and evaluate the appropriateness of potential corrective measures to prevent further releases of Appendix IV constituents above their GWPS, to remediate releases of Appendix IV constituents detected during groundwater monitoring above their GWPS that have already occurred, and to restore groundwater in the affected area to conditions that are below the GWPS for these Appendix IV constituents. The corrective measures evaluation that is discussed below and subsequent sections provides an analysis of the effectiveness of six potential corrective measures in meeting the requirements and objectives of remedies as described under §257.97 (also shown graphically on **Figure 4-1**). This assessment also meets the requirements promulgated in §257.96 which require the assessment to evaluate:

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

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

4.2 GROUNDWATER MODELING

Modeling is an analytical tool used to create estimates based on computer-simulated conditions. Groundwater flow and geochemical modeling⁴ performed by Golder evaluated the hydrogeologic and geochemical conditions at the RCPA.

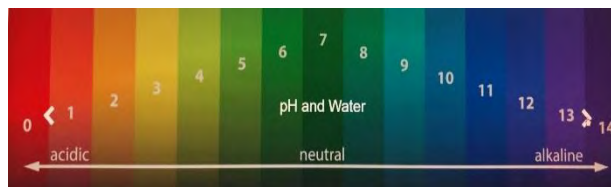
Golder evaluated the fate and transport of arsenic and molybdenum through a geochemical modeling that used PHAST V.3, a program developed by the USGS that simulates multicomponent reactive transport in three-dimensional groundwater flow systems. The geochemical reactions in PHAST, including attenuation mechanisms such as mineral precipitation and sorption of constituents to the aquifer matrix, are simulated using the geochemical model, PHREEQC, which is an integral component of PHAST.

4.3 GROUNDWATER TREATMENT EVALUATION

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

⁴ Groundwater flow modeling was performed using MODFLOW 2000 supported by Groundwater Vistas as the graphical user interface.

chemical reaction that attenuates metals through precipitation or sorption. Chemical precipitation is an available and demonstrated groundwater treatment technology recognized by USEPA⁵. Groundwater geochemistry (including oxidation reduction potential (ORP)) can greatly impact metals mobility at a site, where some metal compounds may be more soluble under highly oxidative (positive ORP) conditions while others are more soluble under reduced conditions (negative ORP). Also, the solubilities of many metal compounds are highly dependent on pH. For example, iron is more soluble under acidic conditions (pH less than 6), while arsenic is more soluble under extremely acidic (pH < 2) or extremely alkaline (pH > 9) conditions. This is an important consideration when evaluating remedial approaches for arsenic and molybdenum in groundwater. Field monitoring data collected from groundwater monitoring wells associated with the RCPA showed a positive ORP (129 millivolts) and an elevated pH (11 pH units).



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

Ameren has retained XDD Environmental (XDD) to research and develop appropriate treatment options for molybdenum and arsenic and is performing bench-scale treatability studies to demonstrate the effectiveness of treatment options on site-specific soils and groundwater. Treatment options under evaluation include pH stabilization and the application of the following treatment reagents: calcium polysulfide, dissolved iron, zero valent iron (ZVI), granulated activated carbon, phosphate and nutrient amendments and potential combination of these reagents.

4.3.1 Arsenic Treatment

Reduction in arsenic concentrations ranging from approximately 30 to 85% were measured in laboratory testing following the adjustment of pH. Based on those results, in-situ treatment for arsenic may be feasible for groundwater immediately downgradient from the RCPA. Underlying conditions that may be supportive of arsenic treatment are described below.

Based on measured dissolved oxygen and iron concentrations in site groundwater, the saturated zone is characterized as a mild iron-reducing condition with both ferric Fe(III) and ferrous Fe(II) iron present in groundwater. The alluvial soil beneath the site appears to be rich in iron; the metal extraction results indicate that the iron concentrations in soil are generally between 5 and 20 grams per liter (i.e., 0.5% - 2% weight of solids; Golder 2019). The observed dissolved oxygen concentrations range from approximately 0.5 mg/L to 3 mg/L, indicating that suboxic and micro-aerobic conditions are present in groundwater, which is consistent with the mild iron-reducing conditions based on the dissolved iron data. Based on the foregoing, an arsenic-specific treatment option would be to introduce a mild acid or alkaline solution into the groundwater and subsurface alluvial soils to alter pH levels. Further, treatment options such as adding additional iron or oxygen sources to enhance precipitation, co-precipitation and sorption are being evaluated.

4.3.2 Chemistry and Precipitation: Molybdenum

As a preliminary step in the treatment option evaluation, XDD evaluated the effects of altering the pH in bench-scale reactors containing site soil and groundwater. Because the sample from RIEC well MW-2

⁵ EPA, "Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments; Part 7 of 10", SE05958A6, p. 7-20.

had a high pH (greater than 10), the tests were conducted at lower pH values (pH 10, 9, 8, and 7). The RIEC pH testing showed minor effects on the molybdenum concentration in groundwater (though arsenic was greatly reduced by 85% at pH 7). These preliminary pH adjustment results suggest that creating a pH condition of 6 *may* aid in the reduction of molybdenum and arsenic in groundwater so additional testing of the RIEC groundwater and soils at pH 6 is currently underway and will be completed this summer. However, any treatment method to reduce the groundwater concentration of molybdenum needs to avoid altering conditions to a point where other metals of concern dissolve to concentrations above the applicable site action levels.

Precipitation, occurring in the form of a low solubility metal compound, is a preferred approach to reduce metals concentrations in groundwater to below action levels due to the stability of the formed precipitant. The possible molybdenum species formed under varying ORP and pH conditions in typical groundwaters include:

- Molybdenum dioxide;
- Hydroxy(oxido)dioxomolybdenum;
- Molybdate;
- Trimolybdenum octaoxide; and
- Molybdenum disulfide.

Molybdenum disulfide is a solid/precipitant form of molybdenum that can occur at mildly reducing and oxidizing conditions over a wide pH range. However, while this can be promoted to occur in-situ through both biological (biotic) and non-biological (abiotic) processes, the resulting molybdenum concentrations in groundwater may exceed a low action level of 0.1 mg/L; therefore, additional co-precipitation and sorption of molybdenum are being considered in an overall remedial approach to meet the site-specific action level or at sites with concentrations just below the applicable action level.

4.3.3 Additional Treatment of Molybdenum through Co-Precipitation and/ or Sorption

Available research findings describing in-situ reduction in dissolved molybdenum concentrations in groundwater has focused on sorption processes (Pare, 2014; EPRI, 2011; Goldemun and Robb, 2018; Morrison et al., 2006; Bellantoni, 2014). Of those studies, a majority have evaluated ZVI as a media to promote both sorption and precipitation of the molybdenum. Other research also suggests bioremediation can be used to promote the sorption and precipitation processes (Goldemun and Robb, 2018). Both processes create iron compounds that can act to co-precipitate and/or sorb the molybdenum or promote the formation of molybdenum disulfide (if sulfate is present in the groundwater, which is the case for RIEC). Groundwater at RIEC is deficient in dissolved iron and iron supplementation is being evaluated as a component of an overall remedial approach. Treatability studies using the above technologies are underway.

4.4 CORRECTIVE MEASURES ALTERNATIVES

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

1. Be protective of human health and the environment;
2. Attain the GWPS;

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

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

The remedial alternatives presented below contemplate both CIP (Alternatives 1 through 5) and CBR (Alternative 6) of the RCPA. Both closure methods are expressly authorized under the CCR Rule. Ameren has submitted engineering drawings and closure plans with state (Missouri Department of Natural Resources) and local (Jefferson County) regulatory agencies and is currently in the process of closing the RCPA in place.

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

The RCPA would be closed in place with a low-permeability, synthetic cap to reduce infiltration of surface water to groundwater thereby isolating source material. This cap selection exceeds regulatory requirements by more than two orders of magnitude ($<1 \times 10^{-7}$ centimeters per second (cm/sec) planned versus 1×10^{-5} cm/sec required by the CCR Rule). Over time, depletion of COCs in CCR would allow the concentration of COCs in downgradient groundwater to decline and overall groundwater concentrations of COCs to attenuate. Geochemical modeling described in **Section 4.2** above predicts the limited concentrations of arsenic and molybdenum that are above the GWPS would be reduced to below the standards in 7 to 8 years for arsenic and 12 to 14 years for molybdenum.

CIP can be completed safely, in compliance with applicable federal and state regulations, and be protective of public health and the environment. In general, CIP consists of installing a cap/cover designed to significantly reduce infiltration from surface water or rainwater, resist erosion, contain CCR materials, and prevent exposures to CCR. For this alternative, Ameren would install a cover system with a permeability that is 100 times lower than what the CCR Rule requires thus further reducing infiltration. At the RIEC, CIP construction activities will take approximately 18-24 months and are expected to be completed in 2020. By using a synthetic cap at RIEC, Ameren will reduce the amount of soil needed for closure with corresponding reduction in external truck traffic and use of public roadways.

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

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

The geochemical modeling performed by Golder indicates that capping and CIP of the RCPA would result in a lowering of concentrations of arsenic and molybdenum in groundwater, thereby supporting MNA is viable and appropriate. Using the geometric mean to characterize the source area, simulated concentrations of arsenic and molybdenum are predicted to decrease to below GWPSs (0.03 mg/l for arsenic and 0.1 mg/l for molybdenum) following capping and closure.

Geochemical model results indicate a pronounced reduction in arsenic concentrations post-closure. The model results predict concentrations of arsenic are expected to decline to below the target level of 0.03 mg/l in 7 to 8 years.

Geochemical model results for molybdenum predict a pronounced reduction in concentrations during the 14-year period following capping and closure. This reduction in concentrations is attributable solely to dilution and mixing through hydrodynamic dispersion. The model results predict a reduction of molybdenum to below the target level of 0.1 mg/l in 12 to 14 years. Predicted results will be verified and calibrated based on post-closure groundwater sampling.

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

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

In-situ stabilization of the RCPA is predicted to take several years to complete, depending on the availability of specialized contractors and equipment. Implementation of ISS will require a detailed design effort with bench scale testing to determine the appropriate amendment mix. Pilot testing will be needed to verify the ability of equipment to solidify material at depth. ISS has not been commonly used to stabilize entire ash units as part of a closure strategy. Changes to groundwater chemistry relative to the mobility of Appendix IV constituents following completion of ISS, where large volumes of amendments (typically Portland cement) are added to the subsurface, are unknown and would require pilot testing.

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

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

Similar to Alternative 1, the RCPA would be CIP with a low-permeability ($<1 \times 10^{-7}$ cm/sec) cap to reduce infiltration of surface water to groundwater and to isolate source material. COCs would be addressed

through in-situ injection of groundwater amendments downgradient of the RCPA, or through the installation of a permeable reactive barrier (PRB). Over time, leaching and depletion of COCs in CCR in contact with groundwater would allow the concentration of COCs to attenuate and active remediation (injections or PRB replenishment) could cease.

Following the installation of the low-permeability cover and in-situ treatment system (via a trench or injection wells), Ameren would implement post-closure care activities that include periodic amendment injections or periodic replenishment of the treatment reagents within the PRB, long-term groundwater sampling to monitor treatment system performance, and cover system maintenance. Based upon laboratory testing performed by XDD, the timeline for in-situ treatment is expected to be less than Alternative 1 as shown on **Figures 4-2 and 4-3**.

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

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

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

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

Once implemented, leaching and depletion of COCs in CCR in contact with groundwater would allow the concentration of COCs to attenuate and pumping would cease over time. The timeline for active treatment is expected to be comparable to Alternatives 1 and 3 because treatment would continue until source concentrations attenuate to levels less than the GWPS. With active groundwater pumping along the boundary of the RCPA, such process creates waste stream that must be permitted and managed prior to discharge back into the Mississippi River.

Following the installation of the low-permeability cover, groundwater pumping well network, and ex-situ treatment system, Ameren would implement post-closure care activities that includes operation and maintenance of the HC system, long-term groundwater sampling to monitor HC system performance, and cover system maintenance. Future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.5 Alternative 5 – CIP with Capping and Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment and Barrier Wall

The configuration of this alternative would be identical to Alternative 4, with the addition of a low-permeability barrier wall between the pumping wells and the Mississippi River. The purpose of the wall is to reduce the flux of groundwater moving downgradient west to east from the RCPA and minimize the intake of groundwater from the east during groundwater pumping, therefore improving the pumping efficiency of the HC system. Approvals and permitting would be required for the barrier wall installation adjacent to the Mississippi River in addition to permits required for discharge of the treated groundwater.

Similar to Alternative 4, implementation of a large-scale HC system will require a detailed design effort with bench scale testing to verify groundwater treatment. Pilot testing, such as long-duration pumping tests and additional groundwater modeling, will be needed to verify the hydraulic capture zone. A detailed design will also be required for the deep barrier wall, given the target depth and horizontal length of the wall. Implementation of the barrier wall and HC system will be particularly challenging given the proximity of the Mississippi River and limited work area. Installation of the barrier wall would also likely require extensive permitting.

Once implemented, the timeline for active treatment is expected to be comparable to Alternatives 1, 3, and 4, as treatment would continue until groundwater concentrations attenuate to levels less than the GWPS.

Following the installation of the low-permeability cover, subsurface barrier wall, groundwater pumping well network, and ex-situ treatment system, Ameren would implement post-closure care activities that includes operation and maintenance of the HC system, long-term groundwater sampling to monitor HC system performance, and cover system maintenance. No ongoing maintenance would be required for the subsurface barrier wall. Future development of the capped surface could be used for solar photovoltaic arrays or other site staging/ancillary operational needs.

4.4.6 Alternative 6 – Closure by Removal with Monitored Natural Attenuation

This alternative consists of removal of RCPA contents followed by natural attenuation of the CCR COCs in groundwater. While this alternative would eliminate (through removal) the source, it takes decades to implement during which time the RCPA would remain open and the ponded ash subject to ongoing infiltration for the duration of the removal activities. As with Alternatives 1, 2, and 3 concentrations of COCs in downgradient groundwater would decline via natural attenuation processes.

There are several potential community impacts, safety concerns and challenges associated with the CBR alternative. Given the magnitude of the total estimated haul tonnage (21.6 MM tons)⁶ alone with the travel distance required to transport the CCR to one or more landfills, injuries and fatalities would be likely. A study completed by the Lochmueller Group (Lochmueller) (**Appendix C**) estimated that if 200 truckloads per day (**one every 2.5 minutes**), hauled excavated material off-site to a commercial landfill, it would take approximately 28 to 34 years to complete the project. The Lochmueller report details various considerations that could impact the overall project. In addition, several of the roads which connect the RIEC to Highway 61 are not suitable for the volume of truck traffic anticipated. The existing

⁶ The estimated volume of CCR in the RCPA is approximately 12.7 MM CY. The excavation and disposal tonnage cited here includes the conversion factor for cubic yards to tons plus bulking and stabilization additions as required to achieve complete removal in the CBR approach.

asphalt pavement would not likely withstand the effects of this heavy truck traffic. Improvements to these roads would likely be necessary before large-scale removal of ash could begin and would result in additional traffic flow disruptions due to road construction activities and delay in implementation of this alternative.

Excavated materials from the RCPA would not be suitable for beneficial use applications, due to chemical reactions that occurred during the placement of class C fly ash via wet sluicing. Traditional beneficial use applications for class C fly ash, such as replacement for cement in the production of ready-mix concrete and concrete related products require the materials to be capable of reacting chemically to produce cementitious bonds. The capability to produce these chemical reactions have been expended with the wet-sluicing process of CCR into RCPA. In contrast, the chemistry of class F fly ash, produced at other utility sites, does not react with sluice water to create cementitious bonds, and thus may be suitable for recovery and processing for use in ready mix concrete and concrete related products⁷.

Technical and logistical challenges of implementing a large-scale ash removal project also need to be considered (removal of CCR over 100-ft deep adjacent to the Mississippi River). Removal activities will be difficult and require full-time dewatering, implementation of CCR stabilization methods and temporary staging/stockpiling of material for drying prior to transportation off-site; these considerations will affect productivity and increase removal duration. Excavation and construction safety during the removal duration is another major concern due to heavy equipment (bulldozers, excavators, front end loaders, off-road trucks) and dump truck operation within the active RIEC site. Additional community impacts associated with the use of heavy equipment and truck traffic are also a consideration for this alternative.

⁷ Information provided by Ameren technical staff, April 29, 2019.

5. Comparison of Corrective Measures Alternatives

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

5.1 EVALUATION CRITERIA

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

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

Public input and feedback will be considered following a public information session.

5.2 COMPARISON OF ALTERNATIVES

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

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

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

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

5.2.1.1 *Magnitude of reduction of existing risks*

As summarized in **Section 3**, no unacceptable risk to human health and the environment exist under the current configuration of the RCPA. Therefore, none of the remedial alternatives will reduce risk posed by Appendix IV constituents in groundwater because no such adverse risk exists. However, other types of risks can be posed by the various remedial alternatives considered here. The remedial alternative that poses the lowest risk to human health and the environment is Alternative 1 (CIP with MNA) because it involves the least amount of construction, operations and maintenance activities and associated impacts. Alternative 6 (CBR with MNA) has the highest risk to human health and the environment related to excessive and prolonged truck traffic, which increases the likelihood of roadway accidents during the estimated 28 to 34 years needed to complete the CBR project. Construction and

material transportation will also be required for Alternative 2 (CIP with ISS) during the process of solidifying the CCR, and during construction of the barrier wall included with Alternative 5 (CIP with HC and barrier). Aside from the cap construction, only minor construction will be required for Alternatives 3 (CIP with in-situ) and 4 (CIP with HC) during treatment system installation.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria i) Magnitude of reduction of risks						

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

Alternative 6 (CBR with MNA), has the lowest long-term residual risk in that removal of the source material reduces the likelihood of future releases to groundwater. However, implementation of this alternative takes approximately 28 to 34 years during which time the source material (ash) is not controlled, thereby increasing the likelihood of further releases during the implementation period relative to the other alternatives. For Alternatives 1 through 5, the RCPA would be CIP with the installation of a low permeability ($<1 \times 10^{-7}$ cm/s) cap that would significantly reduce the infiltration of precipitation into the RCPA. The source remains in place with Alternatives 1 through 5, although dissolved phase COCs to groundwater are addressed through MNA. Additionally, COCs in groundwater are not significant because they do not threaten human health or the environment even under current conditions. Alternatives 3, 4, and 5 also provide further protection from future releases with in-situ treatment and hydraulic controls, respectively, at the RCPA boundaries. A low risk for further releases exists with Alternative 2 (CIP with ISS) when completed, however implementation will require several years to complete with the potential for ongoing releases during construction. The likelihood of a further release during the ISS construction period is high, relative to the other CIP alternatives.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria ii) Magnitude of residual risk in terms of likelihood of further release						

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

Alternative 1 (CIP with MNA) is the most favorable alternative with respect to this criterion because it requires the least amount of long-term management and involves no mechanical systems as part of the remedy. Alternative 6 (CBR with MNA) is least favorable because the remedy takes 28 to 34 years to complete and is logistically complex with transportation and coordination with off-site disposers (commercial landfills). The remaining alternatives fall between Alternatives 1 and 6 because they involve more intensive systems to implement and/or maintain throughout their remediation life cycle.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria iii) Type and degree of long-term management required						

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

The highest short-term impact posed to the community or environment would be during implementation of Alternative 6 (CBR with MNA) followed by Alternative 2 (CIP with ISS), making these alternatives least favorable. Environmental impacts include noise and emissions from heavy equipment, the potential for a release during excavation and dewatering, and fugitive dust emissions. Community impacts include general impacts to the community due to increased truck traffic on public roads during the entire project duration, along with an increased potential for traffic accidents and fatalities, noise, and truck emissions.

For Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier) risk to the community during construction is considered the same and would be minimal compared to the other alternatives. Periodic sampling of the monitoring well network to verify treatment system effectiveness will pose no risk to the community.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria iv) Short term risk to community or environment during implementation						

5.2.1.5 Time until full protection is achieved

There is currently no unacceptable risk to human health and the environment associated with groundwater at the RCPA; therefore, protection is already achieved. Based upon modeling, Alternatives 1 (CIP with MNA), 4 (CIP with HC), and 5 (CIP with HC and barrier) source depletion and natural attenuation reduces COCs to concentrations less than GWPS in approximately 12 to 14 years (see **Figures 4-2 and 4-3**). With in-situ groundwater treatment, such time is reduced to four and ten years. Alternative 3 (CIP with in-situ treatment) takes the least amount of time to reduce COCs to concentrations to less than GWPS. Alternatives 4 and 5 also have the potential to reduce concentrations in a similar timeframe as Alternative 3. These alternatives are favorable given the reasonable timeframe.

Alternative 6 (CBR with MNA) is expected to take between 28 to 34 years for construction followed by several years of groundwater monitoring to verify natural attenuation of the groundwater plume, which makes this alternative not only unfavorable but will not achieve compliance with the CCR Rule closure time mandates. The period for construction is limited mainly by the amount of material that can be excavated and hauled during a work day, probable road improvements, disposal facility capacity, and the large volume of ash contained within the RCPA.

Implementation of Alternative 2 (CIP with ISS) would require extensive engineering analysis and field testing. Assuming such studies confirm the viability of ISS technology at the RIEC and equipment availability, field implementation could take approximately five years to complete followed by five years of groundwater monitoring to verify natural attenuation of the groundwater plume. Including a five-year time horizon for planning and regulatory approvals, the total timeframe until achieving the GWPS for this alternative – at least 10 to 15 years – is comparable to the timeframe estimated for the alternatives (1, 3, 4, and 5) that include CIP.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria v) Time until full protection is achieved	Yellow	Yellow	Light Green	Light Green	Light Green	Red

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

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier) all have similar, minimal potential for exposure of humans and environmental receptors during regrading and cap construction; monitoring well system installation; and installation of the in-situ treatment system, HC system, or subsurface barrier wall construction. Alternative 1 (CIP with MNA) is the most favorable alternative since, aside from capping, no additional contact with CCR or impacted groundwater would be needed. Alternative 3 (CIP with in-situ treatment) is also favorable because treatment occurs below ground and no waste stream is generated.

Alternatives 2 (CIP with ISS) and 6 (CBR with MNA) have moderate and high potential for exposure, respectively, which makes them the least favorable remedy for this criterion. A high potential for exposure exists during the excavation and transport of the CCR over local roadways if Alternative 6 is implemented. A moderate potential to exposure exists during ISS construction (Alternative 2), if some CCR needs to be disposed off-site as part of the preliminary removal effort prior to ISS implementation.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria vi) Potential for exposure of humans and environmental receptors to remaining wastes	Light Green	Red	Light Green	Yellow	Yellow	Red

5.2.1.7 Long-term reliability of the engineering and institutional controls

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier) are all expected to have high long-term reliability, as capping and long-term monitoring are common methods for long-term waste management. HC and ex-situ treatment (Alternatives 4 and 5) are considered reliable, proven technologies and would have high long-term reliability. However, implementation of alternatives 2-5 will require bench scale and pilot scale testing to confirm treatability of arsenic and molybdenum or engineering studies and design. Of the CIP alternatives, Alternative 1 (CIP with MNA) is considered the most favorable because no additional ongoing Operations and Maintenance (O&M) would be needed, other than periodic groundwater sampling and verification of decreasing concentrations.

For Alternatives 1 through 5, which include CIP, institutional controls such as the recording of an environmental covenant restricting the use of groundwater can easily be implemented because the RCPA is located on property owned by Ameren.

With Alternative 6 (CBR with MNA) no additional engineering and institutional controls are anticipated because CCR will have been removed. Alternative 2 (CIP with ISS) is also expected to have a high long-term reliability because the CCR would be isolated within the ISS monolith.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria vii) Long-term reliability of engineering and institutional controls						

5.2.1.8 Potential need for replacement of the remedy

Closure in place of the RCPA with ISS and closure by removal are both considered permanent and can be effective in appropriate circumstances. Detailed engineering assessments would need to be completed before the viability of such approaches could be considered at a site such as the RCPA given its depth, volume and narrow location immediately adjacent to the river. Field pilot testing would be needed for ISS to confirm the ability of equipment to reach the bottom of CCR. From the perspective of needing to replace the remedy, source removal (Alternative 6) is permanent.

Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier) are expected to have permanent closures with capping in place. Should monitoring results indicate that the selected remedial alternative is not effective at reducing the concentration of COCs over time, alternate and/or additional active remedial methods for groundwater may be considered.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 1 - Subcriteria viii) Potential need for replacement of the remedy						

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

The graphic below provides a summary of the long- and short-term effectiveness and protectiveness of the potential remedy, along with the degree of certainty that the remedy will prove successful. Alternative 1 (CIP with MNA) is the most favorable, while Alternative 6 (CBR with MNA) is the least favorable. Alternative 1 is expected to be effective both short- and long-term and does not include additional treatment technology aside from MNA. Alternative 3 (CIP with in-situ treatment) is comparable to Alternative 1 because it has a shorter potential timeframe to meet the GWPS despite requiring treatment. Alternative 6 (CBR with MNA) will require a lengthy construction period, and therefore not effective in the short-term.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
CATEGORY 1 Long- and Short Term Effectiveness, Protectiveness, and Certainty of Success						

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

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

5.2.2.1 *The extent to which containment practices will reduce further releases*

For remedial Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier) installation of the low permeability cap will reduce the infiltration of surface water into the RCPA and decrease the flux of COCs passing from impounded ash porewater to groundwater over time. Groundwater mounding, and associated outward hydraulic gradient, present at the RCPA during operation is expected to dissipate after closure. Alternative 5 is considered the most favorable because three treatment technologies (HC, ex-situ treatment, and a barrier wall) will be implemented to limit down-gradient migration of COCs in groundwater.

Under Alternatives 2 (CIP with ISS) and 6 (CBR with MNA), no further releases are anticipated following removal or stabilization of the CCR material. However, the implementation of each alternative is anticipated to require multiple years to complete (approximately 5 and 28 to 34 years for Alternatives 2 and 6, respectively) with MNA monitoring following completion of construction. During the period of construction for Alternatives 2 and 6, there would be no source control of the Appendix IV constituents.

For Alternatives 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier), additional containment or treatment practices (in-situ treatment and HC with ex-situ treatment) will address COCs in groundwater migrating downgradient from the RCPA, achieving the performance criteria at the waste boundary. Alternative 1 will not have an additional containment technology beyond natural attenuation but is expected to reduce the concentrations below the GWPS in 12 to 14 years. Alternative 3, in-situ treatment, relies on the natural hydraulic gradient to move contaminants through the treatment zone and would be expected to operate for the shortest duration although, depending upon the treatment train, may present other complications.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 2 - Subcriteria i) Extent to which containment practices will reduce further releases						

5.2.2.2 *The extent to which treatment technologies may be used*

No groundwater treatment technologies, other than natural attenuation, will be used for Alternatives 1 and 6. There would be no ongoing operation and maintenance of a treatment technology, other than periodic groundwater monitoring. Alternative 1 relies only on low-permeability capping, and therefore is the most favorable. Alternative 2 (CIP with ISS) uses solidification of the CCR below the water table to address COCs in groundwater.

Alternative 3 will use one additional technology, in-situ treatment, while Alternatives 4 and 5 will use two additional technologies, HC and ex-situ treatment, for an estimated period of less than 15 years. The operation of an ex-situ treatment system would likely create a secondary waste stream, such as concentrated reject water (RO) requiring off-site disposal, or depleted resin (ion exchange) requiring regeneration or off-site disposal. Alternative 5 is the least favorable because this alternative also includes the installation of a subsurface barrier wall, in addition to HC and ex-situ treatment.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 2 - Subcriteria ii) Extent to which treatment technologies may be used						

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

The graphic below provides a summary of the effectiveness of the remedial alternatives to control the source to reduce further releases. Alternatives 1 (CIP with MNA) and 3 (CIP with in-situ treatment) are the most favorable, while Alternatives 2 (CIP with ISS) and 4 (CIP with HC) are the least favorable.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
CATEGORY 2 Effectiveness in controlling the source to reduce further releases						

5.2.3 The Ease or Difficulty of Implementing a Potential Remedy

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

5.2.3.1 Degree of difficulty associated with constructing the technology

CIP with a low permeability cap will be straightforward and can be implemented with common construction methods for Alternatives 1 (CIP with MNA), 3 (CIP with in-situ treatment), 4 (CIP with HC), and 5 (CIP with HC and barrier). No construction difficulties are anticipated if Alternatives 1, 3, and 4 are implemented. Specialty equipment or contractors are not required. Alternative 3 may be slightly more difficult to implement should a subsurface trench be required for a permeable barrier. A specialty contractor will likely be needed to complete the low-permeability barrier wall for Alternative 5 since the wall will fully penetrate the alluvial aquifer. For Alternative 1, no additional treatment technology is needed other than monitoring wells for groundwater monitoring.

Alternatives 2 (CIP with ISS) and 6 (CBR with MNA) will be difficult to implement due to technical and logistical challenges. Alternative 6 will include a deep excavation below the water table, ongoing excavation dewatering, and the transportation of 21 MM tons of CCR over local roadways. Under Alternative 2, the successful completion of ISS to target depths will be technically challenging and will require field pilot testing to confirm equipment reach. Alternatives 2 and 6 will both include large-scale construction, specialty equipment and contractors, long project durations, and significant technical challenges.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 3 - Subcriteria i) Degree of difficulty associated with constructing the technology						

5.2.3.2 Expected operational reliability of the technologies

Alternative 1 (CIP with MNA) is considered the most favorable from an operational perspective because capping with MNA has a proven track record and requires limited O&M. While alternative 2 (CIP with ISS) is a proven technology and isolates the ponded material, pilot testing would be required to ensure ISS will be able to solidify CCR at depth. Alternatives 3, 4, and 5 are expected to be reliable, but will utilize additional groundwater treatment technologies. Alternative 6, CBR with MNA is considered a reliable alternative as all CCR material would be removed, although implementation would be challenging.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 3 - Subcriteria ii) Expected operational reliability of the technologies						

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

Alternative 1 (CIP with MNA) is the most favorable since the implementation of the remedy is straightforward and only includes capping and MNA. Alternatives 2 (CIP with ISS) and 6 (CBR with MNA) will require extensive permitting for large-scale construction whereas the permitting is expected to be straightforward for CIP Alternatives 1, 3, and 4. Additional approval and permitting may be required for Alternative 3 (CIP with in-situ treatment) because this alternative may include subsurface treatment via groundwater amendment or PRB, and permitting would likely be required for Alternatives 4 and 5 for the discharge of treated groundwater. Additional approval and permitting will also be required for Alternative 5, which includes the construction of a subsurface barrier wall adjacent to the Mississippi River.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 3 - Subcriteria iii) Need to coordinate with and obtain necessary approvals and permits from other agencies						

5.2.3.4 Availability of necessary equipment and specialists

Alternative 1 (CIP with MNA) is the most favorable since specialty equipment and specialists will not be required to implement the MNA remedy. Alternatives 2 (CIP with ISS) and 6 (CBR with MNA) are the least favorable since both will require specialty remediation contractors to implement full removal or ISS, respectively, which will include large-scale construction dewatering and effluent management and treatment, deep excavations below the water table, transportation of material to off-site disposal facilities, and implementation of ISS at depth (for Alternative 2 only). Specialty equipment will likely be required to install the low permeability barrier wall under Alternative 5.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 3 - Subcriteria iv) Availability of necessary equipment and specialists						

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

To evaluate the CBR alternative (Alternative 6), a transportation study completed by Lochmueller. In that study, four landfills were identified within 80 miles that could potentially receive CCR for disposal. The closest landfill is approximately 35 miles from RIEC and, based on calculations by Lochmueller, could receive approximately 80% of the CCR. The additional 20% of CCR to be disposed under Alternative 6 could be sent to one of the other three landfills, located approximately 67 to 80 miles from RIEC. Actual disposal capacity, any local zoning or other restrictions and synchronization with current customer base all require further confirmation for Alternative 6. Because of these considerations, Alternative 6 (CBR with MNA) is the least favorable alternative under this criterion.

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

Because the RCPA will be CIP for Alternatives 1, 3, 4, and 5, treatment, storage, and disposal services for CCR material will not be needed. Temporary stockpiling of CCR during RCPA regrading and capping can be completed within the current boundaries of the ash unit. Alternative 1 is the most favorable alternative since no active treatment is included. For Alternatives 4 and 5, the ex-situ treatment system may generate a concentrated waste stream which would likely require off-site transportation and disposal that the other alternatives would not require.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
Category 3 - Subcriteria v) Available capacity and location of needed treatment, storage, and disposal services						

5.2.3.6 Ease or difficulty of implementation summary

The graphic below provides a summary of the ease or difficulty that will be needed to implement each alternative. Alternatives 1 (CIP with MNA) and 3 (CIP with in-situ treatment) are the most favorable, while Alternatives 2 (CIP with ISS) and 6 (CBR with MNA) are the least favorable.

	Alternative 1 CIP with Cap & MNA	Alternative 2 CIP with Cap, ISS, & MNA	Alternative 3 CIP with Cap & In-Situ GW Treatment	Alternative 4 CIP with Cap & Hydraulic Containment	Alternative 5 CIP with Cap & Hydraulic Containment & Barrier Wall	Alternative 6 CBR with MNA
CATEGORY 3 Ease of implementation						

6. Summary

This Corrective Measures Assessment has evaluated the following alternatives:

- Alternative 1 – Closure in Place (CIP) with Capping and Monitored Natural Attenuation
- Alternative 2 – CIP with In-Situ Stabilization, Capping and MNA
- Alternative 3 – CIP with Capping and In-Situ Groundwater Treatment
- Alternative 4 – CIP with Capping and Hydraulic Containment Through Groundwater Pumping and Ex-situ Treatment
- Alternative 5 – CIP with Capping and Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment and Barrier Wall
- Alternative 6 – Closure by Removal with Monitored Natural Attenuation

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

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

In addition, in accordance with §257.97(c), each of the alternatives has been evaluated in the context of the following balancing criteria:

- The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of eight factors.
- The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the extent to which containment practices will reduce further releases and the extent to which treatment technologies may be used.
- The ease or difficulty of implementing a potential remedy(s) based on consideration of five types of factors

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

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TABLES

TABLE I
GROUNDWATER ANALYTICAL RESULTS - APPENDIX IV CONSTITUENTS
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI RUSH ISLAND ENERGY CENTER - FESTUS, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony Total	Arsenic Total	Barium Total	Beryllium Total	Cadmium Total	Chromium Total	Fluoride Total	Cobalt Total	Lead Total	Lithium Total	Mercury Total	Molybdenum Total	Selenium Total	Thallium Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	30	2000	4	5	100	4	6	15	64.7	2	100	50	2
R-MW-1	3/10/2016	0.65 J	5.8	33	1 U	0.5 U	0.42 J	0.11 J	5 U	5 U	10 U	0.2 U	69.8	8.1	1 U
	5/2/2016	0.75 J	9.7	21.3	1 U	0.5 U	0.38 J	0.26	5 U	5 U	10 U	0.2 U	73.1	10.2	1 U
	7/25/2016	1	9.3	15.1	1 U	0.5 U	1.4	0.4	5 U	5 U	10 U	0.2 U	57.7	12.7	1 U
	9/7/2016	0.8 J	13.1	12.6	1 U	0.052 J	1 U	0.37	5 U	5 U	10 U	0.2 U	42.8	4.5	1 U
	11/16/2016	0.84 J	12	15.5	1 U	0.045 J	1 U	0.22	5 U	5 U	10 U	0.045 J	32.6	3.8	1 U
	1/19/2017	0.87 J	9.4	18.1	1 U	0.5 U	0.46 J	0.16 J	5 U	5 U	10 U	0.2 U	32.8	3.4	0.12 J
	3/6/2017	0.88 J	12.8	19.2	1 U	0.5 U	2.2	0.24	0.86 J	5 U	10 U	0.2 U	40	3.5	1 U
	6/8/2017	0.73 J	8.9	16.9	1 U	0.5 U	1 U	0.11 J	5 U	5 U	10 U	0.052 J	36.3	1.7	0.11 J
	4/3/2018	1.2	20.8	16.0	1 U	0.5 U	0.086 J	0.51	5 U	10 U	10 U	0.2 U	52.4	6.0	1 U
	5/24/2018	0.95 J	17.1	17.0				0.39			10 U		54	4.1	
11/2/2018	0.55 J	10.1	15.1	1 U	0.039 J	1 U	0.36	0.92 J	10 U	10 U		102	1.8	1 U	
R-MW-2	3/10/2016	5.4	257	26.2	1 U	0.26 J	1.1	0.61	5 U	14.4	10 U	0.2 U	150	1.1	1 U
	5/2/2016	5.2	231	18.8	1 U	0.25 J	0.95 J	0.91	5 U	8.8	10 U	0.2 U	173	2.1	1 U
	7/26/2016	5	238	17	1 U	0.26 J	0.96 J	0.85	5 U	10.2	10 U	0.2 U	197	1.5	1 U
	9/6/2016	5.4	250	13.7	1 U	0.31 J	1.2	0.89	5 U	17.7	10 U	0.2 U	183	2.2	1 U
	11/16/2016	6.4	257	10.4	1 U	0.28 J	0.58 J	0.95	5 U	4.5 J	10 U	0.058 J	201	1.6	1 U
	1/19/2017	4.6	224	12.2	1 U	0.14 J	0.86 J	1.2	5 U	9.7	10 U	0.2 U	160	1.1	1 U
	3/6/2017	4.6	217	12	0.23 J	0.2 J	0.94 J	1.3	5 U	9.6	3.5 J	0.2 U	168	1.6	1 U
	6/8/2017	5.1	242	11	1 U	0.22 J	0.42 J	1.1	5 U	7	10 U	0.055 J	174	1.2	0.054 J
	4/2/2018	4.7	232	10.2	1 U	0.5 U	0.61 J	0.76	5 U	7.3 J	10 U	0.2 U	156	2.8	1 U
	5/24/2018	4	211	10				0.82			10 U		202	0.84 J	
11/5/2018	3.8	197	9.5	1 U	0.26 J	1 U	1.2	5 U	6.2 J	10 U		170	0.88 J	1 U	
R-MW-3	3/10/2016	0.16 J	16.8	21	1 U	0.5 U	1	0.78	5 U	5.9	10 U	0.2 U	943	0.66 J	1 U
	5/2/2016	0.098 J	36.2	18.3	1 U	0.5 U	1.4	0.8	5 U	6.2	10 U	0.2 U	826	0.6 J	1 U
	7/25/2016	0.13 J	64	16	1 U	0.5 U	1.5	0.74	5 U	3.4 J	10 U	0.2 U	811	0.7 J	1 U
	9/6/2016	0.12 J	74.3	15.3	1 U	0.13 J	1.9	0.63	5 U	4.2 J	10 U	0.2 U	804	0.66 J	1 U
	11/16/2016	0.32 J	28.6	19.7	1 U	0.5 U	0.89 J	0.8	5 U	6.4	10 U	0.046 J	869	0.66 J	1 U
	1/19/2017	0.22 J	72	16.3	1 U	0.5 U	0.8 J	0.82	5 U	5.3	10 U	0.2 U	697	0.55 J	1 U
	3/6/2017	0.13 J	80	15	0.26 J	0.5 U	0.92 J	0.81	5 U	4.9 J	10 U	0.2 U	753	0.57 J	1 U
	6/8/2017	0.15 J	85.6	14.5	1 U	0.049 J	0.47 J	0.8	5 U	3.8 J	10 U	0.054 J	676	0.73 J	0.097 J
	4/2/2018	1 U	86.1	14.2	1 U	0.5 U	0.49 J	0.86	5 U	4.0 J	10 U	0.2 U	655	1 U	1 U
	5/24/2018	1 U	96.6	13.2				0.78			10 U		759	0.59 J	
11/2/2018	0.15 J	79.7	12.1	1 U	0.33 J	1 U	0.95	5 U	4.6 J	10 U		736	0.71 J	1 U	
R-MW-4	3/11/2016	1 U	10.3	314	1 U	0.5 U	0.83 J	0.87	5 U	3.1 J	45.8	0.2 U	96.2	1 U	1 U
	5/3/2016	0.12 J	9	275	1 U	0.5 U	0.51 J	0.81	5 U	2.7 J	41.4	0.2 U	91.4	1 U	1 U
	7/25/2016	1 U	7.2	256	1 U	0.5 U	0.66 J	0.75	5 U	5 U	43.1	0.2 U	95.9	1 U	1 U
	9/6/2016	1 U	7.4	268	1 U	0.048 J	0.86 J	0.73	5 U	5 U	44.8	0.2 U	105	0.24 J	1 U
	11/16/2016	0.18 J	6.4	256	1 U	0.032 J	0.57 J	0.8	5 U	5 U	39.9	0.044 J	109	1 U	1 U
	1/19/2017	0.11 J	6.7	280	1 U	0.5 U	0.41 J	0.82	5 U	5 U	44.6	0.2 U	96.5	0.12 J	1 U
	3/6/2017	0.029 J	6.8	286	1 U	0.5 U	1.6	0.81	0.82 J	5 U	45.7	0.2 U	103	0.12 J	1 U
	6/8/2017	0.034 J	6	254	1 U	0.031 J	0.14 J	0.87	0.73 J	5 U	44.1	0.05 J	133	0.11 J	0.04 J
	4/2/2018	1 U	6.7	266	1 U	0.5 U	0.24 J	0.79	5 U	10 U	39.6	0.2 U	80.8	1 U	1 U
	5/24/2018	1 U	7.2	283				0.79			47.8		90	1 U	
11/1/2018	1 U	6.3	237	1 U	0.5 U	1 U	0.92	0.96 J	10 U	40.3		89.6	0.14 J	1 U	
R-MW-5	3/11/2016	1 U	5.2	452	1 U	0.5 U	0.55 J	0.1 J	0.84 J	5 U	5.5 J	0.2 U	1 J	1 U	1 U
	5/3/2016	1 U	3.6	395	1 U	0.5 U	0.38 J	0.19 J	5 U	5 U	10 U	0.2 U	0.74 J	1 U	1 U
	7/25/2016	1 U	4.1	383	1 U	0.5 U	1.1	0.12 J	0.93 J	5 U	6.5 J	0.2 U	0.79 J	1 U	1 U
	9/6/2016	1 U	4.1	391	1 U	0.051 J	1.4	0.18 J	5 U	5 U	6.3 J	0.2 U	0.88 J	1 U	1 U
	11/16/2016	0.2 J	4.3	392	1 U	0.048 J	0.51 J	0.14 J	5 U	5 U	10 U	0.041 J	1.5 J	1 U	1 U
	1/19/2017	0.11 J	4.3	413	1 U	0.5 U	0.52 J	0.12 J	5 U	3 J	10 U	0.2 U	0.86 J	1 U	1 U
	3/6/2017	1 U	4.8	384	0.2 J	0.5 U	0.58 J	0.14 J	5 U	3 J	5 J	0.2 U	20 U	1 U	1 U
	6/8/2017	0.048 J	5.1	374	1 U	0.5 U	0.47 J	0.11 J	5 U	5 U	10 U	0.054 J	1.4 J	1 U	1 U
	4/2/2018	1 U	3.6	378	1 U	0.5 U	0.34 J	0.15 J	5 U	10 U	10 U	0.2 U	20 U	1 U	1 U
	5/24/2018	1 U	3.8	371				0.16 J			5.3 J		20 U	1 U	
11/1/2018	1 U	3.6	378	1 U	0.5 U	0.15 J	0.2 U	5 U	10 U	8.6 J		20 U	1 U	1 U	
R-MW-6	3/11/2016	1 U	0.58 J	132	1 U	0.5 U	0.86 J	0.18 J	5 U	3.2 J	10 U	0.2 U	1.6 J	0.26 J	1 U
	5/2/2016	0.071 J	0.14 J	105	1 U	0.5 U	0.73 J	0.22	5 U	5 U	10 U	0.2 U	1.9 J	0.38 J	1 U
	7/25/2016	0.14 J	0.62 J	119	1 U	0.5 U	1.7	0.15 J	5 U	5 U	10 U	0.2 U	1.5 J	0.7 J	1 U
	9/7/2016	0.1 J	0.97 J	252	1 U	0.052 J	1.1	0.14 J	5 U	5 U	10 U	0.2 U	1.5 J	0.42 J	1 U
	11/16/2016	0.22 J	0.75 J	166	1 U	0.048 J	0.6 J	0.23	5 U	5 U	10 U	0.044 J	1 J	0.25 J	1 U
	1/19/2017	0.14 J	0.5 J	190	1 U	0.5 U	0.46 J	0.24	5 U	2.6 J	7 J	0.2 U	1.6 J	0.24 J	0.09 J
	3/6/2017	0.05 J	0.51 J	144	0.48 J	0.5 U	0.6 J	0.24	5 U	5 U	5.3 J	0.2 U	2.4 J	0.25 J	1 U
	6/8/2017	0.16 J	0.61 J	101	1 U	0.5 U	0.19 J	0.16 J	0.88 J	5 U	10 U	0.2 U	2.5 J	0.72 J	1 U
	4/2/2018	1 U	0.38 J	169	1 U	0.5 U	1 U	0.26	5 U	10 U	10 U	0.2 U	2.3 J	1 U	1 U
	5/25/2018	1 U	1 U	123				0.22			10 U		1.5 J	1 U	
11/6/2018	1 U	1 U	105	1 U	0.5 U	1 U	0.26	5 U	10 U	5.1 J		20 U	1 U	1 U	

TABLE I
GROUNDWATER ANALYTICAL RESULTS - APPENDIX IV CONSTITUENTS
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI RUSH ISLAND ENERGY CENTER - FESTUS, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony Total	Arsenic Total	Barium Total	Beryllium Total	Cadmium Total	Chromium Total	Fluoride Total	Cobalt Total	Lead Total	Lithium Total	Mercury Total	Molybdenum Total	Selenium Total	Thallium Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	30	2000	4	5	100	4	6	15	64.7	2	100	50	2
R-MW-7	3/10/2016	0.55 J	34.5	308	1 U	0.5 U	0.56 J	0.31	5 U	3.7 J	34.7	0.2 U	170	1 U	1 U
	5/3/2016	1 U	76.3	286	1 U	0.5 U	0.41 J	0.36	5 U	5 U	31.6	0.2 U	171	1 U	1 U
	7/25/2016	1 U	91.8	287	1 U	0.5 U	0.7 J	0.29	5 U	5 U	34.4	0.2 U	185	1 U	1 U
	9/7/2016	1 U	96.3	285	1 U	0.061 J	2.1	0.27	5 U	5 U	32.4	0.2 U	188	1 U	1 U
	11/16/2016	0.24 J	90.7	284	1 U	0.041 J	0.48 J	0.32	5 U	5 U	29.2	0.056 J	162	1 U	1 U
	1/19/2017	0.14 J	96.6	328	1 U	0.5 U	0.27 J	0.31	5 U	5 U	38.7	0.2 U	180	1 U	0.063 J
	3/6/2017	0.029 J	92.3	308	0.21 J	0.5 U	4.8	0.35	5 U	5 U	35.5	0.2 U	196	1 U	1 U
	6/8/2017	0.086 J	105	289	1 U	0.024 J	0.14 J	0.28	5 U	5 U	28.9	0.2 U	152	0.097 J	1 U
	4/2/2018	1 U	90.8	307	1 U	0.5 U	0.15 J	0.36	5 U	10 U	33.4	0.2 U	190	1 U	1 U
	5/25/2018	1 U	91.6	305				0.35			35.1		187	1 U	
11/2/2018	1 U	84.9	280	1.2 J	0.065 J	1 U	0.33	1.4 J	10 U	30.1		162	1 U	1 U	
R-MW-B1	3/10/2016	0.065 J	27.7	551	0.42 J	0.5 U	0.44 J	0.1 J	5 U	3.1 J	64.2	0.2 U	0.97 J	1 U	1 U
	5/2/2016	1 U	19.4	488	1 U	0.5 U	1 U	0.2	5 U	5 U	62.9	0.2 U	0.54 J	1 U	1 U
	7/25/2016	1 U	24.3	496	1 U	0.5 U	1.8	0.14 J	5 U	5 U	62.9	0.2 U	0.55 J	1 U	1 U
	9/6/2016	1 U	22.6	490	1 U	0.049 J	1.4	0.098 J	5 U	3.1 J	61.5	0.2 U	20 U	1 U	1 U
	11/16/2016	0.19 J	30	464	1 U	0.046 J	0.38 J	0.14 J	5 U	5 U	54.7	0.045 J	20 U	1 U	1 U
	1/19/2017	0.13 J	24.3	556	1 U	0.5 U	0.24 J	0.11 J	5 U	5 U	64.7	0.2 U	1.9 J	1 U	0.071 J
	3/6/2017	0.028 J	23.4	514	1 U	0.5 U	2	0.16 J	5 U	5 U	64.4	0.2 U	1.5 J	1 U	1 U
	6/8/2017	1 U	29.5	477	1 U	0.5 U	0.06 J	0.11 J	5 U	5 U	55.6	0.051 J	1.9 J	1 U	1 U
	4/3/2018	1 U	24.3	494	1 U	0.5 U	0.087 J	0.15 J	5 U	10 U	61.1	0.2 U	20 U	1 U	1 U
	5/24/2018	1 U	20.4	456				0.16 J			61.9		20 U	1 U	
11/2/2018	1 U	24.8	432	1 U	0.5 U	1 U	0.2 U	5 U	10 U	60.2		20 U	1 U	1 U	
R-MW-B2	3/11/2016	0.077 J	2.6	434	1 U	0.5 U	0.82 J	0.13 J	5 U	5 U	9.6 J	0.2 U	1.2 J	1 U	1 U
	5/2/2016	1 U	2.6	398	1 U	0.5 U	0.42 J	0.21	5 U	2.9 J	10.8	0.2 U	1 J	1 U	1 U
	7/26/2016	1 U	2.8	382	1 U	0.5 U	0.6 J	0.14 J	5 U	5 U	9.6 J	0.2 U	0.94 J	1 U	1 U
	9/6/2016	1 U	3.1	407	1 U	0.044 J	1.8		5 U	5 U	9.8 J	0.2 U	0.82 J	1 U	1 U
	10/13/2016							0.19 J							
	11/16/2016	0.19 J	3.6	405	1 U	0.048 J	1 U	0.18 J	5 U	5 U	5.5 J	0.044 J	0.57 J	1 U	1 U
	1/19/2017	0.11 J	3.7	448	1 U	0.5 U	0.42 J	0.15 J	5 U	5 U	9.7 J	0.2 U	0.98 J	1 U	1 U
	3/6/2017	1 U	3	450	0.25 J	0.5 U	0.55 J	0.17 J	5 U	5 U	11.8	0.2 U	20 U	1 U	1 U
	6/8/2017	1 U	3.2	435	1 U	0.5 U	0.15 J	0.15 J	5 U	2.8 J	7.1 J	0.05 J	20 U	1 U	1 U
	4/2/2018	1 U	1.9	430	1 U	0.5 U	0.15 J	0.18 J	5 U	10 U	9.6 J	0.2 U	20 U	1 U	1 U
5/24/2018	1 U	2.1	419				0.18 J			9.3 J		20 U	1 U		
11/6/2018	1 U	2.2	415	1 U	0.5 U	1 U	0.22	5 U	10 U	14.3		20 U	0.1 J	1 U	
R-P-01S	11/1/2018	1 U	19.6	290	1 U	0.5 U	0.11 J	0.23	1.9 J	10 U	27.8	0.2 U	20 U	0.31 J	1 U
R-P-03D	11/5/2018	1 U	0.57 J	471	1 U	0.5 U	1 U	0.2 U	3.7 J	10 U	25.5	0.2 U	20 U	1 U	1 U
R-P-03S	11/5/2018	1 U	239	253	1 U	0.5 U	1 U	0.21	5 U	10 U	10.4	0.2 U	5.1 J	0.2 J	1 U
R-P-05I	11/1/2018	1 U	4.8	526	1 U	0.5 U	0.1 J	0.25	1 J	10 U	10 U	0.2 U	20 U	1 U	1 U
R-P-05S	11/1/2018	1 U	149	157	1 U	0.5 U	0.37 J	0.36	5 U	10 U	17.6	0.2 U	10.6 J	0.22 J	1 U
R-P-08D	11/5/2018	1 U	1.5	99	1 U	0.5 U	1 U	0.29	5 U	10 U	8.7 J	0.2 U	43.6	1 U	1 U
R-P-08S	11/5/2018	1 U	209	220	1 U	0.5 U	1 U	0.45	5 U	10 U	15.7	0.2 U	21.5	0.22 J	1 U
R-P-10S	11/5/2018	0.99 J	11.4	89.2	1 U	0.084 J	1 U	0.53	5 U	10 U	10.4	0.2 U	150	0.2 J	1 U
R-P-13D	11/5/2018	1 U	0.29 J	86.6	1 U	0.40 J	1 U	0.32	5 U	10 U	78.7	0.2 U	1300	0.13 J	1 U
R-P-13I	11/5/2018	1 U	23.6	46.9	1 U	0.096 J	1 U	1.1	5 U	10 U	12	0.2 U	203	0.34 J	1 U
R-P-13S	11/5/2018	0.11 J	0.78 J	67.7	1 U	0.061 J	1 U	0.4	5 U	10 U	39.1	0.2 U	35.1	0.089 J	1 U
R-P-17D	11/5/2018	1 U	1.3	117	1 U	0.23 J	1 U	0.58	5 U	10 U	41.4	0.2 U	732	0.24 J	1 U
R-P-17I	11/2/2018	0.90 J	107	13	1 U	1.1	1.4	2.1	5 U	31.2	10 U	0.2 U	100	6.5	1 U
R-P-17S	11/2/2018	0.24 J	38	57.3	1 U	0.064 J	1 U	1.5	5 U	10 U	21.4	0.2 U	125	0.52 J	1 U
R-P-19D	11/5/2018	0.086 J	0.71 J	121	1 U	0.34 J	1 U	1.3	5 U	10 U	24.5	0.2 U	1040	0.30 J	1 U
R-P-19I	11/5/2018	6.4	293	15.9	1 U	0.59	1 U	1.4	5 U	12.5	16.1	0.2 U	368	3.4	1 U
R-P-19S	11/5/2018	0.096 J	37.3	260	1 U	0.5 U	1 U	0.41	5 U	10 U	42.1	0.2 U	26	0.15 J	1 U

TABLE I
GROUNDWATER ANALYTICAL RESULTS - APPENDIX IV CONSTITUENTS
CORRECTIVE MEASURES ASSESSMENT
AMEREN MISSOURI RUSH ISLAND ENERGY CENTER - FESTUS, MISSOURI

Monitoring Well ID	Date Sampled	Constituents													
		Antimony Total	Arsenic Total	Barium Total	Beryllium Total	Cadmium Total	Chromium Total	Fluoride Total	Cobalt Total	Lead Total	Lithium Total	Mercury Total	Molybdenum Total	Selenium Total	Thallium Total
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Site GWPS	6	30	2000	4	5	100	4	6	15	64.7	2	100	50	2
R-P-21D	11/2/2018	1 U	0.56 J	44.1	1 U	0.14 J	1 U	1.7	5 U	10 U	49.8	0.2 U	422	0.23 J	1 U
R-P-21I	11/2/2018	1 U	4.9	33.4	1 U	0.063 J	1 U	1.3	5 U	10 U	18.4	0.2 U	61.2	0.61 J	1 U
R-P-21S	11/2/2018	1 U	14	279	0.24 J	0.5 U	1 U	0.41	5 U	10 U	20.6	0.2 U	5.5 J	0.21 J	1 U
R-P-22D	11/2/2018	0.10 J	12.6	69.4	1 U	0.15 J	1.1 J	2.2	5 U	10 U	20.5	0.2 U	343	0.77 J	1 U
R-P-22I	11/2/2018	1 U	9.7	116	1 U	0.036 J	1 U	0.82	5 U	10 U	23.2	0.2 U	33.8	0.087 J	1 U
R-P-22S	11/1/2018	0.096 J	0.81 J	119	1 U	0.070 J	0.078 J	0.51	1.4 J	10 U	36.6	0.2 U	13.5 J	0.20 J	1 U
R-P-29D	11/6/2018	1 U	1.1	152	1 U	0.5 U	1 U	0.28	5 U	10 U	47.9	0.2 U	1.6 J	0.091 J	1 U
R-P-29S	11/6/2018	0.093 J	51.7	335	1 U	0.057 J	1 U	0.26	1.4 J	10 U	11.1	0.2 U	1.1 J	0.17 J	1 U
	12/6/2018	1 U	49	384	0.25 J	0.053 J	0.14 J	0.2 U	1.7 J	10 U	17	0.2 U	1.8 J	0.12 J	1 U
R-P-30S	11/5/2018	0.12 J	1.1	110	1 U	0.058 J	1 U	0.26	5 U	10 U	47.7	0.2 U	1.3 J	0.32 J	1 U
R-P-31S	11/6/2018	1 U	15.6	141	1 U	0.037 J	1 U	0.39	5 U	10 U	8.3 J	0.2 U	7.8 J	0.14 J	1 U

Notes:

49 Bold denotes concentration exceeding the GWPS

Blank cells - Constituent not included in this analysis.

mg/L - milligrams per liter.

ug/L - micrograms per liter.

GWPS - Groundwater Protection Standard.

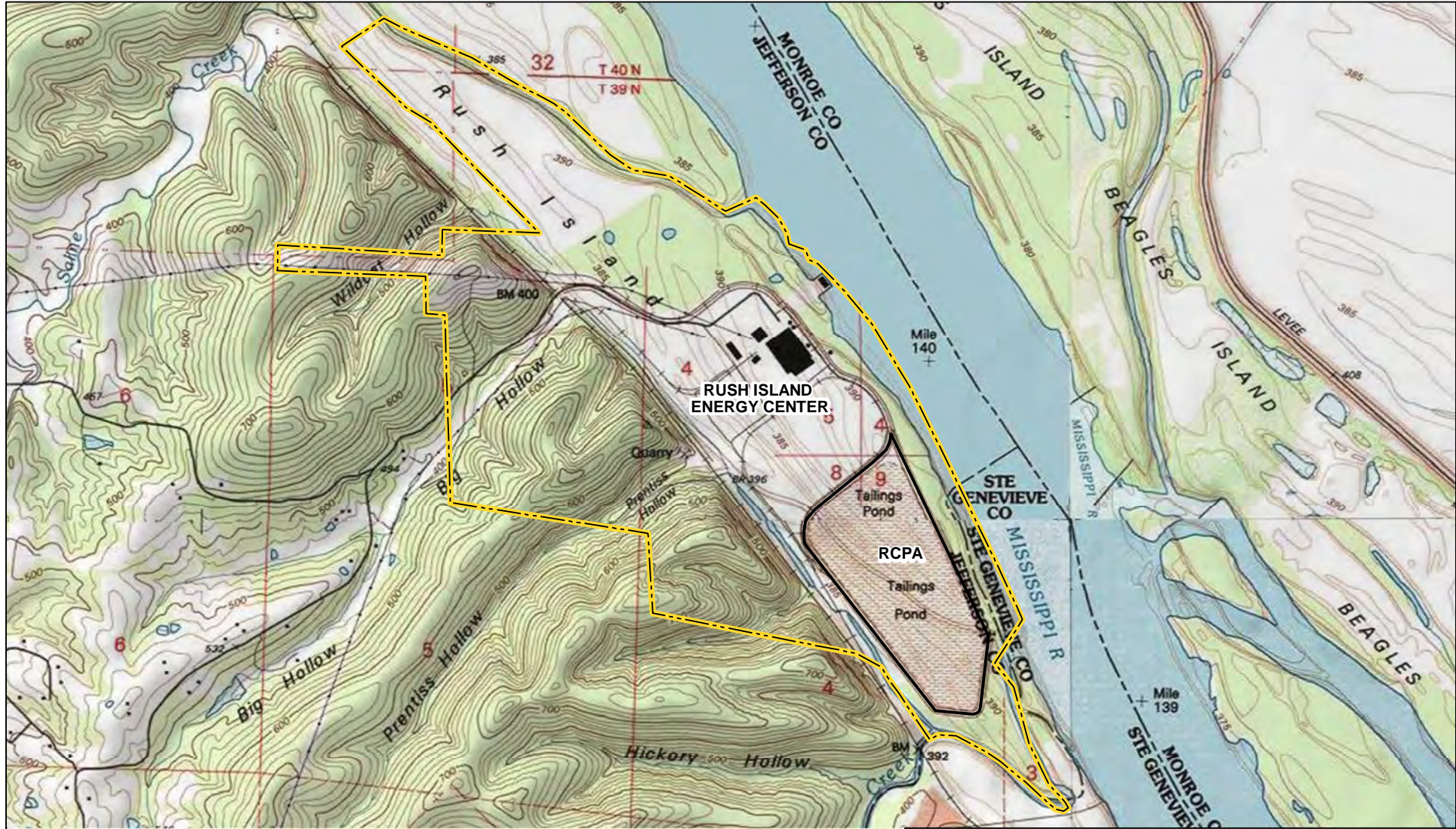
Qualifiers:

J - Value is estimated.



U - Constituent was not detected, value is the reporting limit.

Site GWPS is either the MCL/Health Based GWPS or based on background levels (calculated as described in the Statistical Analysis Plan for Assessment Monitoring), whichever is higher.
 GWPS and background values calculated using baseline sampling results from monitoring wells MW-B1 and MW-B2.

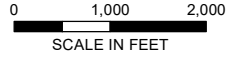
FIGURES



LEGEND

-  RCPA SURFACE IMPOUNDMENT
-  RUSH ISLAND ENERGY CENTER PROPERTY BOUNDARY

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



CORRECTIVE MEASURES ASSESSMENT
 AMEREN MISSOURI RUSH ISLAND ENERGY CENTER
 FESTUS, MISSOURI

SITE LOCATION MAP

APRIL 2019

FIGURE 1-1

VARI, KATALIN
 \\HALEYALDRICH.COM\SHARE\CLE_COMMON\PROJECTS\128530_AMEREN RUSH ISLAND POND CLOSURE\CAD\FIGURES\CORRECTIVE MEASURES\132002-007 FIG 2-1 MW LOC.DWG
 Layout: FIGURE 2-1
 Printed: 4/9/2019 10:02:35 AM

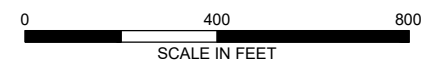


LEGEND

- AMEREN PROPERTY LINE
- LIMITS OF RCPA SURFACE IMPOUNDMENT
- ⊙ CCR MONITORING WELL LOCATION
- As ARSENIC CONCENTRATION ABOVE GWPS
- Mo MOLYBDENUM CONCENTRATION ABOVE GWPS

NOTES

1. AERIAL IMAGE FROM GOOGLE EARTH PRO DATED 12 OCTOBER 2015.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE
3. CCR = COAL COMBUSTION RESIDUALS
4. GWPS = GROUNDWATER PROTECTION STANDARDS
5. REFER TO TABLE I FOR GROUNDWATER ANALYTICAL RESULTS.
6. NATURE AND EXTENT WELLS WILL BE ADDED FOLLOWING COMPLETION OF STATISTICAL ANALYSIS.



CORRECTIVE MEASURES ASSESSMENT
 AMEREN RUSH ISLAND ENERGY CENTER
 FESTUS, MISSOURI

MONITORING WELL LOCATIONS WITH STATISTICALLY SIGNIFICANT LEVELS ABOVE GWPS

SCALE: AS SHOWN
 MAY 2019

FIGURE 2-1

VARI, KATALIN
 \\HALEYALDRICH.COM\SHARE\CLE_COMMON\PROJECTS\129530_AMEREN RUSH ISLAND POND CLOSURE\CAD\FIGURES\CORRECTIVE MEASURES\132002-007 FIG 2-2 SITE.DWG
 Layout: FIGURE 2-2
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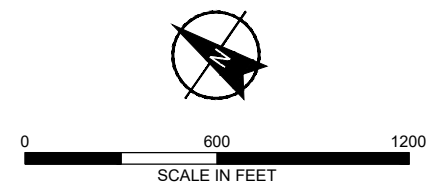


LEGEND

- AMEREN PROPERTY LINE
- LIMITS OF RCPA SURFACE IMPOUNDMENT
- CCR MONITORING WELL LOCATION
- NATURE AND EXTENT MONITORING WELL LOCATION

NOTES

1. AERIAL IMAGE FROM GOOGLE EARTH PRO DATED 12 OCTOBER 2015.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE
3. CCR = COAL COMBUSTION RESIDUALS



HALEY ALDRICH CORRECTIVE MEASURES ASSESSMENT
 AMEREN RUSH ISLAND ENERGY CENTER
 FESTUS, MISSOURI

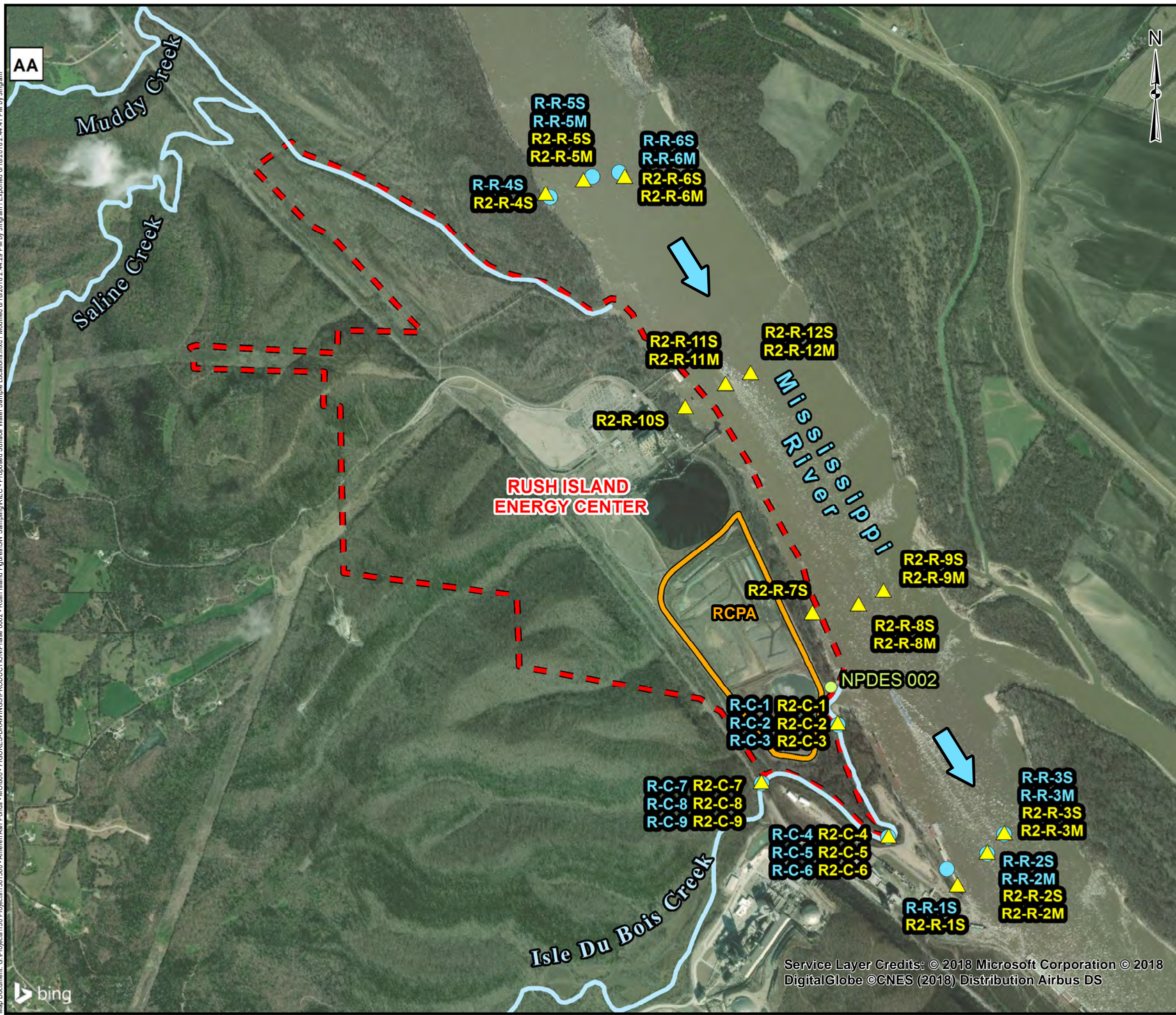
SITE FEATURES

SCALE: AS SHOWN

MAY 2019

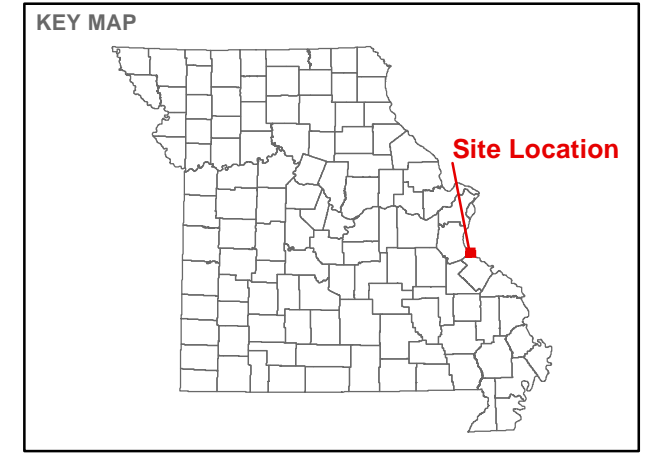
FIGURE 2-2

Map Document: G:\Projects\1301560 - Ameren Ash Ponds - MO\800 - FIGURES-DRAWINGS\PRODUCTION\Phase 0002 - Rush Island Energy Center\SW Sampling\RIEC - Proposed Surface Water Sample Locations.mxd / Modified 6/18/2018 2:44:29 PM by J Ingram / Exported 6/18/2018 2:44:41 PM by J Ingram



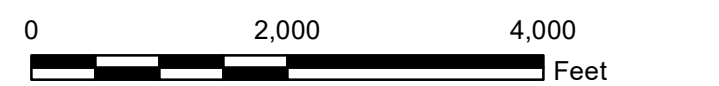
LEGEND

- Approximate Rush Island Property Boundary
- RCPA Surface Impoundment
- Ameren NPDES Outfall
- April 2014 Surface Water Sample
- May 2018 Surface Water Sample
- Surface Water Flow Direction



- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) SAMPLE LOCATIONS BASED ON HANDHELD TRIMBLE GPS MEASUREMENTS. SAMPLE LOCATION REPRESENTS CENTERPOINT BETWEEN SAMPLE STARTING AND ENDING LOCATION.
 - 3.) NPDES - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM.
 - 4.) PREFIX R- USED FOR SAMPLES COLLECTED IN APRIL 2014 AND R2- USED FOR SAMPLES COLLECTED IN MAY 2018.

- REFERENCES**
- 1.) AMEREN, 2012. AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
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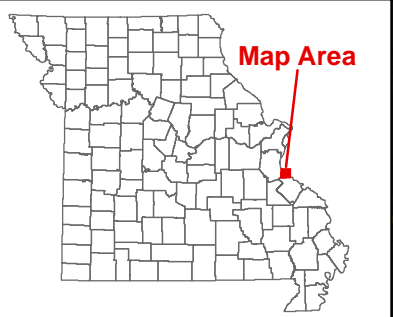
PROJECT
 AMEREN HYDROGEOLOGICAL CONSULTING

TITLE
**SURFACE WATER SAMPLE LOCATIONS
 RUSH ISLAND ENERGY CENTER**

CONSULTANT	YYYY-MM-DD	2018-05-29
	PREPARED	JS
	DESIGN	JSI
	REVIEW	JSI
	APPROVED	MNH

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TITLE BEDROCK GROUNDWATER SAMPLING LOCATIONS AND GROUNDWATER FLOW DIRECTION

LEGEND

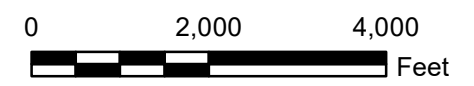
- Rush Island Property Boundary
- Approximate 1-Mile Radius
- Non-Community Public Well
- Private Well
- TBW-1** Groundwater Sampling Location with Groundwater Elevation (WE) and Ground Surface (GS) Elevation (Feet Above MSL)
- Groundwater Potentiometric Surface Contour (Feet Above MSL) (Dashed Where Inferred)
- Groundwater Flow Direction

NOTES

- 1.) All boundaries and locations are approximate.
- 2.) Well locations were surveyed by Zahner & Associates.
- 3.) Groundwater elevations measured on June 9th, 2014 by Golder.
- 4.) MSL - mean sea level.
- 5.) WE - groundwater elevation (feet above MSL).
- 6.) GS - ground surface elevation (feet above MSL).
- 7.) Ft - feet.
- 8.) See Figure 3 and Table 2 for more information on the wells within approximately 1-mile of the Rush Island Energy Center.
- 9.) Wells outside of the approximate 1-mile radius and those outside of Missouri are not shown.

REFERENCES

- 1.) Ameren, 2012. Ameren Missouri Rush Island Energy Center, Rush Island Property Control Map, January 2012.
- 2.) CARES. 2013. Public Drinking Water System Reports. Center for Applied Research and Environmental Systems.
- 3.) MDNR. 2013a. Missouri Well Information Management System (WIMS), Wellhead Protection Program. Missouri Department of Natural Resources.
- 4.) MDNR. 2013b. Geologic Well Logs of Missouri, Water Resource Center. Missouri Department of Natural Resources.
- 5.) MDNR, 2014a. Geosciences Technical Resource Assessment Tool (GeoSTRAT). Missouri Department of Natural Resources.
- 6.) MEGA. 2007. Missouri Environmental Geology Atlas. A Collection of Statewide Geographic Information System Data.
- 7.) MSDIS. 2013. Missouri Spatial Data Information Service.
- 8.) COORDINATE SYSTEM: NAD 1983 StatePlane Missouri East FIPS 2401 Feet.



August 2014

PROJECT

AMEREN MISSOURI RUSH ISLAND ENERGY CENTER
JEFFERSON COUNTY, MISSOURI

PROJECT No. 130-1560			Figure_10(6-9-14).mxd	
DESIGN	-	-	SCALE:	AS SHOWN
GIS	JSI	6/10/2014	REV. 1	
CHECK	LAB	6/10/2014	FIGURE 2-4	
REVIEW	MNH	6/15/2014		

Map Document: G:\Projects\130 Projects\1301560 - Ameren Ash Ponds - MO800 - FIGURES-DRAWINGS\PRODUCTION\Phase 0002 - Rush Island Figures\Figure_10\Figure_10(6-9-14).mxd / Modified 7/9/2014 10:01:58 AM by Jngram / Exported 8/14/2014 2:45:36 PM by Jngram

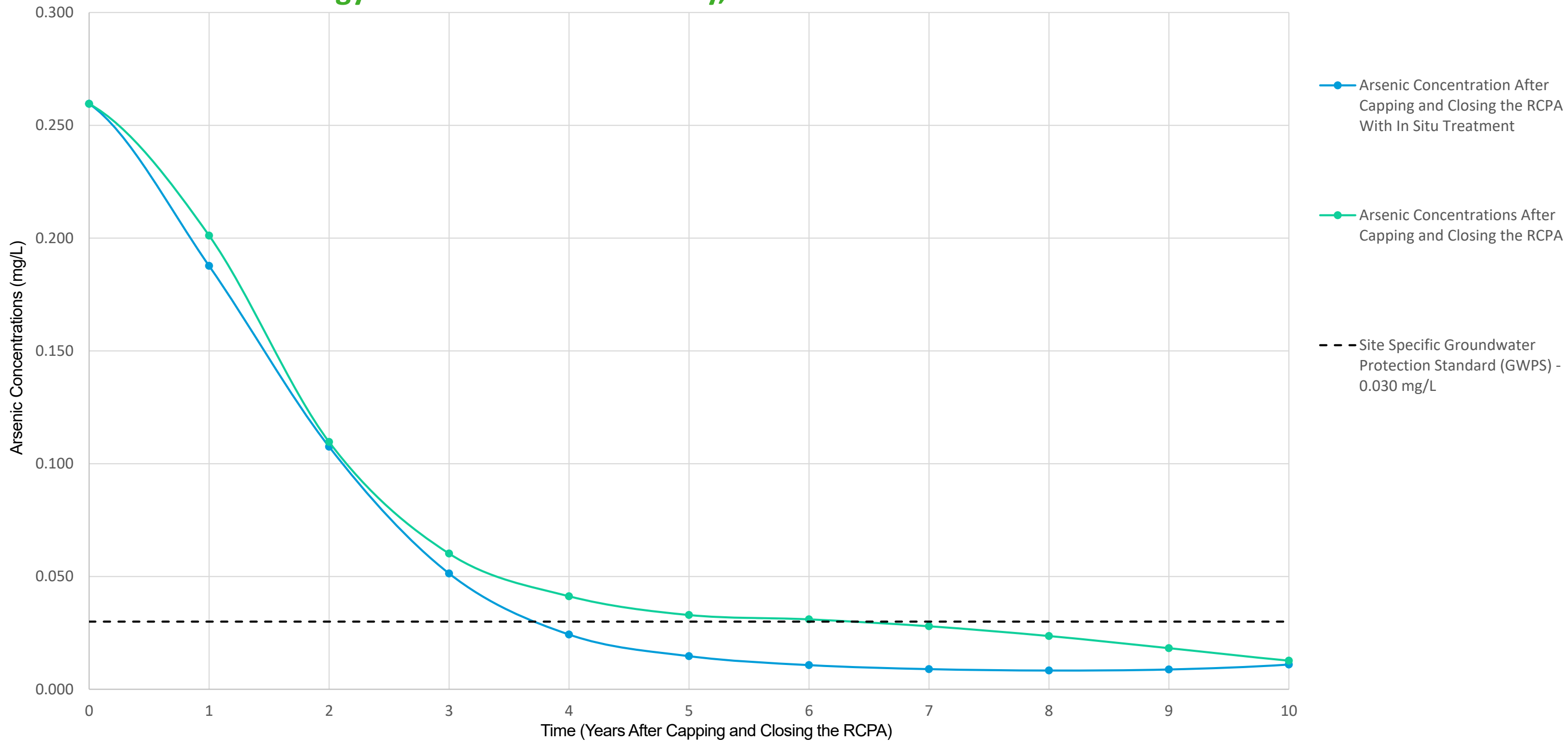
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 4-1
REMEDIAL ALTERNATIVE ROADMAP
CORRECTIVE MEASURES ASSESSMENT
RUSH ISLAND SURFACE IMPOUNDMENT (RCPA)
RUSH ISLAND ENERGY CENTER - JEFFERSON COUNTY, MISSOURI

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

Modeled Arsenic Concentrations After Capping and Closing the RCPA

Rush Island Energy Center – Jefferson County, Missouri



NOTE(S)
 1.) mg/L – Milligrams per liter
 2.) GWPS – Groundwater Protection Standard. This is a site specific value.
 3.) Concentrations are representative of the intermediate zone of the alluvial aquifer at CCR Rule Monitoring Well MW-2.

CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER

CONSULTANT

YYYY-MM-DD
 2019-04-26

PREPARED
 JSI

DESIGN
 JSI

REVIEW
 EMS

APPROVED
 KB

PROJECT
 GROUNDWATER MONITORING PROGRAM

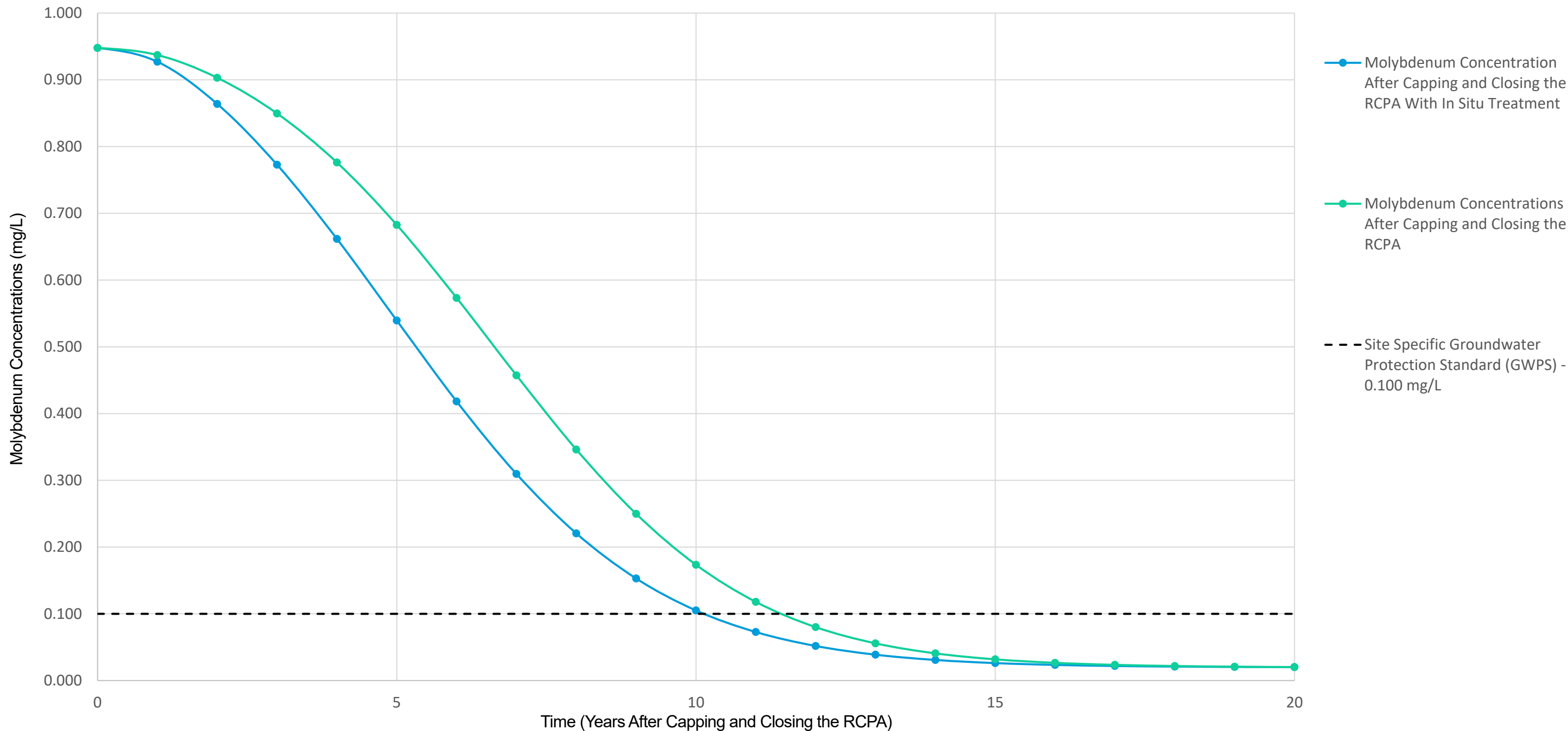
TITLE
Modeled Arsenic Concentrations After Capping and Closing the RCPA

PROJECT No.
153-140601

Figure 4-2

Modeled Molybdenum Concentrations After Capping and Closing the RCPA

Rush Island Energy Center – Jefferson County, Missouri



NOTE(S)
 1.) mg/L – Milligrams per liter
 2.) GWPS – Groundwater Protection Standard. This is a site specific value.
 3.) Concentrations are representative of the intermediate zone of the alluvial aquifer at CCR Rule Monitoring Well MW-3.

CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER

CONSULTANT

YYYY-MM-DD	2019-04-26
PREPARED	JSI
DESIGN	JSI
REVIEW	EMS
APPROVED	KB

PROJECT
 GROUNDWATER MONITORING PROGRAM

TITLE
Modeled Molybdenum Concentrations After Capping and Closing the RCPA

PROJECT No.
153-140601

Figure 4-3

APPENDIX A

Surface Water Screening Tables

TABLES

1	HUMAN HEALTH SCREENING LEVELS
2	ECOLOGICAL SCREENING LEVELS - MISSISSIPPI RIVER
3	ECOLOGICAL SCREENING LEVELS - ISLE DU BOIS CREEK
4	SUMMARY OF SCREENING RESULTS
5a	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
5b	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
5c	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
5d	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
6a	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
6b	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
6c	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
6d	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
7a	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
7b	COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
7c	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER TOTAL (UNFILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
7d	COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER DISSOLVED (FILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
8a	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS

Appendix A
Rush Island Energy Center Surface Water Screening Tables – TOC

8b	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
8c	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
8d	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS
9a	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
9b	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
9c	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
9d	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO HUMAN HEALTH RECREATIONAL USE SCREENING LEVEL
10a	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
10b	COMPARISON OF MAY 2018 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
10c	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER TOTAL (UNFILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS
10d	COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER DISSOLVED (FILTERED) RESULTS TO ECOLOGICAL USE SCREENING LEVELS

TABLE 1
HUMAN HEALTH SCREENING LEVELS
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

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

Notes:

AWQC - Ambient Water Quality Criteria. NA - not available.

CASRN - Chemical Abstracts Service Registry Number.

GWPS - Groundwater Protection Standard. RSL - Risk-based Screening Levels (USEPA).

HI - Hazard Index (noncancer child). TR - Target Risk (carcinogenic).

MCL - Maximum Contaminant Level. USEPA - United States Environmental Protection Agency.

mg/L - milligram per liter.

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

**TABLE 2
ECOLOGICAL SCREENING LEVELS - MISSISSIPPI RIVER
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI**

Constituent	CASRN	Federal Water Quality Criteria (mg/L)				Federal Water Quality Criteria (mg/L)			
		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Acute (a)		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Chronic (a)		Site-Specific USEPA Aquatic Life AWQC - 2014 Hardness Data Freshwater Acute (b)		Site-Specific USEPA Aquatic Life AWQC - 2014 Hardness Data Freshwater Chronic (b)	
		Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	0.34	0.34	0.15	0.15	0.34	0.34	0.15	0.15
Barium	7440-39-3	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	7440-41-7	NA	NA	NA	NA	NA	NA	NA	NA
Boron	7440-42-8	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	0.0047 (c)	0.0043 (d)	0.0017 (c)	0.0014 (d)	0.0041 (f)	0.0037 (g)	0.0015 (f)	0.0013 (g)
Calcium	7440-70-2	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	16887-00-6	860	NA	230	NA	860	NA	230	NA
Chromium	7440-47-3	3.9 (e,c)	1.2 (e,d)	0.18 (e,c)	0.16 (e,d)	3.4 (e,f)	1.1 (e,g)	0.16 (e,f)	0.14 (e,g)
Cobalt	7440-48-4	NA	NA	NA	NA	NA	NA	NA	NA
Fluoride	16984-48-8	NA	NA	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	0.27 (c)	0.18 (d)	0.010 (c)	0.0068 (d)	0.22 (f)	0.15 (g)	0.0085 (f)	0.0058 (g)
Lithium	7439-93-2	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	7439-97-6	0.0016	0.0014	0.001	0.00077	0.0016	0.0014	0.00091	0.00077
Molybdenum	7439-98-7	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	7782-49-2	NA	NA	3.1	NA	NA	NA	3.1	NA
Sulfate	14808-79-8	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	TDS	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

AWQC - USEPA Ambient Water Quality Criteria.

CASRN - Chemical Abstracts Service Registry Number.

CMC - Criterion Maximum Concentration.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness using hardness data collected in May 2018 - see note (c).

USEPA provides AWQC for both total and dissolved results.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness using hardness data collected in April 2014 - see note (f).

USEPA provides AWQC for both total and dissolved results.

(c) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 254 mg/L as CaCO₃ used.

(d) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value for the Mississippi River of 254 mg/L as CaCO₃ used.

(e) - Value for trivalent chromium used.

(f) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 217 mg/L as CaCO₃ used.

(g) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value for the Mississippi River of 217 mg/L as CaCO₃ used.

**TABLE 3
ECOLOGICAL SCREENING LEVELS - ISLE DU BOIS CREEK
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI**

Constituent	CASRN	Federal Water Quality Criteria (mg/L)				Federal Water Quality Criteria (mg/L)			
		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Acute (a)		Site-Specific USEPA Aquatic Life AWQC - 2018 Hardness Data Freshwater Chronic (a)		Site-Specific USEPA Aquatic Life AWQC - 2014 Hardness Data Freshwater Acute (b)		Site-Specific USEPA Aquatic Life AWQC - 2014 Hardness Data Freshwater Chronic (b)	
		Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	0.34	0.34	0.15	0.15	0.34	0.34	0.15	0.15
Barium	7440-39-3	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	7440-41-7	NA	NA	NA	NA	NA	NA	NA	NA
Boron	7440-42-8	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	0.0044 (c)	0.0040 (d)	0.0016 (c)	0.0014 (d)	0.0051 (f)	0.0046 (g)	0.0018 (f)	0.0015 (g)
Calcium	7440-70-2	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	16887-00-6	860	NA	230	NA	860	NA	230	NA
Chromium	7440-47-3	3.7 (e,c)	1.2 (e,d)	0.18 (e,c)	0.15 (e,d)	4.1 (e,f)	1.3 (e,g)	0.20 (e,f)	0.17 (e,g)
Cobalt	7440-48-4	NA	NA	NA	NA	NA	NA	NA	NA
Fluoride	16984-48-8	NA	NA	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	0.25 (c)	0.16 (d)	0.010 (c)	0.0064 (d)	0.29 (f)	0.19 (g)	0.011 (f)	0.0074 (g)
Lithium	7439-93-2	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	7439-97-6	0.0016	0.0014	0.001	0.00077	0.0016	0.0014	0.00091	0.00077
Molybdenum	7439-98-7	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	7782-49-2	NA	NA	3.1	NA	NA	NA	3.1	NA
Sulfate	14808-79-8	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	TDS	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

AWQC - USEPA Ambient Water Quality Criteria.

CASRN - Chemical Abstracts Service Registry Number.

CMC - Criterion Maximum Concentration.

(a) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness using hardness data collected in May 2018 - see note (c).

USEPA provides AWQC for both total and dissolved results.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness using hardness data collected in April 2014 - see note (f).

USEPA provides AWQC for both total and dissolved results.

(c) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value collected in May 2018 for Isle Du Bois Creek of 238 mg/L as CaCO3 used.

(d) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value collected in May 2018 for the Isle Du Bois Creek of 238 mg/L as CaCO3 used.

(e) - Value for trivalent chromium used.

(f) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value collected in April 2014 for the Isle Du Bois Creek of 273 mg/L as CaCO3 used.

(g) - Hardness dependent value for total metals adjusted for dissolved fraction. Site-specific total recoverable mean hardness value collected in April 2014 for the Isle Du Bois Creek of 273 mg/L as CaCO3 used.

TABLE 4
SUMMARY OF SCREENING RESULTS
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	Mississippi River - Human Health Drinking Water						Mississippi River - Human Health Recreational						
	Dissolved			Total			Dissolved			Total			
	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	
Antimony													
Arsenic							9 : 9 100%	5 : 5 100%	15 : 15 100%	10 : 10 100%	4 : 5 80%	14 : 15 93%	
Barium													
Beryllium													
Boron													
Cadmium													
Calcium													
Chloride													
Chromium													
Cobalt													
Fluoride													
Lead													
Lithium													
Mercury													
Molybdenum													
pH	3 : 5 60%		4 : 5 80%	3 : 5 60%		4 : 5 80%							
Selenium													
Sulfate													
Thallium													
TDS													
Radium 226/228													

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

TABLE 4
SUMMARY OF SCREENING RESULTS
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	Mississippi River - Ecological						Isle Du Bois Creek - Human Health Drinking Water					
	Dissolved			Total			Dissolved			Total		
	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic												
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead									1 : 6	17%		
Lithium												
Mercury												
Molybdenum												
pH	1 : 5	20%		1 : 5	20%							
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

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

TABLE 4
SUMMARY OF SCREENING RESULTS
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	Isle Du Bois Creek - Human Health Recreational						Isle Du Bois Creek - Ecological					
	Dissolved			Total			Dissolved			Total		
	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream	Upstream	Adjacent	Downstream
Antimony												
Arsenic	3 : 6 50%	3 : 6 50%	3 : 6 50%	6 : 6 100%	5 : 6 83%	6 : 6 100%						
Barium												
Beryllium												
Boron												
Cadmium												
Calcium												
Chloride												
Chromium												
Cobalt												
Fluoride												
Lead												
Lithium												
Mercury												
Molybdenum												
pH												
Selenium												
Sulfate												
Thallium												
TDS												
Radium 226/228												

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

TABLE 5a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS -
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006																				
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0031	0.003	0.0029	0.0027	0.0019	0.0042 J	0.0041		0.0034	0.003	0.0044	0.003	0.003	0.0032	0.0029	0.003	0.146	0.0028	0.0027	0.0024
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.164	0.143	0.149	0.13	0.125	0.157	0.153	0.154	0.126	0.116	0.132	0.134	0.133	0.115	0.103	0.128	0.125	0.135	0.117	
Beryllium	7440-41-7	mg/L	0.004	NA	0.025	0.004	0.00037 J	0.00022 J	0.00019 J	0.00024 J	0.00038 J	0.0003 J	0.00037 J	0.00034 J	0.00024 J	0.00041 J	0.00028 J	0.00028 J	0.00028 J	0.0004 J	0.00032 J	0.00017 J	0.00041 J	0.00038 J	0.00019 J	0.00043 J
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0603 J	0.0556 J	0.0564 J	0.0448 J	0.0447 J	0.0591 J	0.0552 J	0.0565 J	0.0441 J	0.0392 J	0.0569 J	0.0522 J	0.0562 J	0.0409 J	0.0392 J	0.0595 J	0.0548 J	0.0536 J	0.0495 J	0.0436 J
Cadmium	7440-43-9	mg/L	0.005	NA	0.0092	0.005											0.00057 J								0.00081 J	
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	65.4	64.7	63.8	60	58.9	64.6	63.5	62.9	59.4	56	64.5	62.6	63.7	55.8	56	63.7	62.7	62.9	60	58.8
Chloride	16887-00-6	mg/L	NA	250	NA	250	23.8	24.2	24.5	26.7	27.5	23.8	24.5	24.5	27.2	28.4	23.7	25.5	25.2	28.1	28.4	23.7	24.8	24.8	26.5	27
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1	0.006	0.0033 J	0.0045 J	0.0046 J	0.0039 J	0.0056	0.0059	0.0044 J	0.004 J	0.0041 J	0.0016 J	0.0031 J	0.0027 J	0.0044 J	0.0013 J	0.0013 J	0.0048 J	0.0049 J	0.0024 J	0.0024 J
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.0031 J	0.0025 J	0.0024 J	0.003 J	0.0019 J	0.0026 J	0.0036 J	0.0028 J	0.0027 J	0.0018 J	0.0012 J	0.0023 J	0.0024 J	0.0019 J	0.0021 J	0.0013 J	0.0028 J	0.0015 J	0.0025 J	0.0015 J
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.25	0.25	0.25	0.21	0.21	0.25	0.26	0.24	0.26	0.24	0.3	0.22	0.24	0.21	0.2	0.24	0.25	0.25	0.21	0.21
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015	0.0067 J	0.0051 J	0.0045 J	0.0031 J	0.0039 J	0.0067 J	0.0046 J	0.0045 J	0.0045 J	0.0032 J	0.0068 J	0.0068 J	0.004 J	0.004 J	0.0013 J	0.0056 J	0.0041 J	0.006 J	0.0041 J	
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0262	0.0217	0.0245	0.0168	0.0151	0.0258	0.0223	0.0224	0.0146	0.0152	0.0233	0.0197	0.0211	0.0131	0.0103	0.0214	0.0206	0.0169	0.0161	0.0147
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0021 J	0.0016 J	0.0012 J	0.0013 J	0.0015 J	0.0017 J	0.0019 J	0.0018 J	0.0018 J	0.0014 J	0.0015 J	0.0016 J	0.0019 J	0.0013 J	0.0011 J	0.0019 J	0.0014 J	0.001 J	0.0016 J	0.0015 J
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05																				
Sulfate	14808-79-8	mg/L	NA	250	NA	250	103	97.1	97.2	66.9	64.1	103	93.3	99.7	70.7	59.5	109	81.4	84.5	55.2	53.8	103	90.1	89.5	71.5	68.3
Thallium	7440-28-0	mg/L	0.002	NA	0.0002	0.002											0.00011 J									
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	271	267	264	247	244	268	261	259	245	232	265	258	261	231	231	264	260	257	249	242
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	232	371	374	336	346	381	363	382	337	307	404	376	361	330	319	378	363	324	326	328

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

Detected Concentration > Selected Drinking Water Screening Level.

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

TABLE 5b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS -
TO HUMAH HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
			Antimony*	7440-36-0	mg/L		0.006	NA	0.0078	0.006																
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0023																			
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0942	0.0913	0.0951	0.0832	0.0772	0.095	0.0922	0.0919	0.0756	0.0741	0.0953	0.0888	0.092	0.0735	0.0744	0.0949	0.09	0.088	0.0775	0.0862
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004																				
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0584 J	0.0531 J	0.0536 J	0.0464 J	0.041 J	0.0548 J	0.0536 J	0.0534 J	0.0368 J	0.0385 J	0.0541 J	0.0489 J	0.0542 J	0.0368 J	0.0374 J	0.0557 J	0.053 J	0.051 J	0.0411 J	0.0434 J
Cadmium	7440-43-9	mg/L	0.005	NA	0.0092	0.005																				
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	59.6	57.9	59.3	55.5	53.5	59.4	58.6	58.9	53.3	52.2	59.7	58.1	58.9	53	52.1	59.7	58.7	57.5	53.9	54.9
Chromium*	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1																				
Cobalt*	7440-48-4	mg/L	NA	NA	0.006	0.006																				
Lead*	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015																				
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04	0.0209	0.0195	0.021	0.0139	0.012	0.021	0.0216	0.0194	0.0122	0.0116	0.0214	0.0169	0.0209	0.0083 J	0.0102	0.0194	0.0189	0.019	0.0131	0.0141
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0016 J	0.0018 J	0.0022 J	0.0013 J	0.0013 J	0.0019 J	0.0016 J	0.0016 J	0.0013 J	0.0013 J	0.0014 J	0.0015 J	0.0015 J	0.0012 J	0.0015 J	0.0013 J	0.0016 J	0.0014 J	0.0011 J	0.0012 J
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05																				
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002																				

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

Detected Concentration > Selected Drinking Water Screening Level.

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

TABLE 5c
COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN, MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (j)	Mississippi River													
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		Upstream					Downstream								
							RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M				
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006														
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0021	0.0019	0.0025	0.0023	0.0021	0.0028	0.0021	0.0024	0.0024	0.0024	0.0022			
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.104	0.102	0.101	0.0931	0.0932	0.1	0.099	0.0947	0.0801	0.0911				
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004														
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0553	0.0532	0.0532	0.0471	0.0468	0.0543	0.0515	0.0487	0.0418	0.0437				
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005														
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	56.4	54.3	55.2	54	53.6	53.5	54.1	53.7	52.9	53.7				
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (h)	0.1	0.0027	0.0027	0.0026	0.0029	0.0031	0.0022	0.0032	0.0034	0.0021	0.0035				
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.0023	0.0024	0.0026	0.0024	0.0025	0.0023	0.0028	0.0024	0.0021	0.0026				
Fluoride	16984-48-8	mg/L	4	2	0.8	4				0.58										
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015	0.0025	0.0024	0.0025	0.0026	0.0022	0.0025	0.0025	0.0024	0.0022	0.0022				
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (f)	0.002														
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1														
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05	0.00088	0.00097	0.0011	0.00079	0.00083	0.001	0.00098	0.00079	0.00077	0.00069				
Sulfate	14808-79-8	mg/L	NA	250	NA	250	79	73.8	73.2	60.3	59.3	75.5	70.6	63.9	44.1	47				
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002														
pH (d)	NA	SU	NA	6.5-8.5	NA	NA	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93				
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	226	216	220	216	215	214	217	215	213	218				

Notes:

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

Detected Concentration > Selected Drinking Water Screening Level

- (a) - Surface water samples collected in April 2014.
- (b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
<http://water.epa.gov/drink/contaminants/index.cfm>
- (c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
- (d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.
- (e) - The drinking water standard or MCL for chromium is based on total chromium.
- (f) - The tapwater RSL for mercury is based on mercuric chloride.
- (g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
- (h) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
- (i) - Selected Drinking Water Screening Level uses the following hierarchy:
 Federal USEPA MCL for Drinking Water.
 Federal USEPA SMCL for Drinking Water.
 Federal November 2018 USEPA Tapwater RSL.

TABLE 5d
COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS
(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN, MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (i)	Mississippi River										
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		Upstream					Downstream					
							RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M	
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006											
Arsenic	7440-38-2	mg/L	0.01	NA	0.00052	0.01	0.001	0.0015	0.0012	0.0013	0.0014	0.0015	0.0011	0.0012	0.0012	0.0011	0.0011
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0776	0.0796	0.0745	0.0677	0.0698	0.078	0.073	0.0662	0.0602	0.0611	0.0611
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004											
Boron	7440-42-8	mg/L	NA	NA	4	4	0.053	0.0511	0.0502	0.0449	0.0476	0.0527	0.0499	0.0442	0.0405	0.0412	0.0412
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005											
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	52.5	52.6	52.1	52	51.7	52.5	52.4	51.3	50.9	51	51
Chromium*	7440-47-3	mg/L	0.1 (e)	NA	22 (h)	0.1											
Cobalt*	7440-48-4	mg/L	NA	NA	0.006	0.006											
Fluoride	16984-48-8	mg/L	4	2	0.8	4	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015		0.00049									
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (f)	0.002											
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0018					0.0019		0.0017			
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05	0.00093	0.00079	0.00084	0.00069	0.00073	0.00087	0.00075	0.00085	0.0008	0.00079	0.00079
Sulfate	14808-79-8	mg/L	NA	250	NA	250	--	--	--	--	--	--	--	--	--	--	--
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002											
pH (d)	NA	SU	NA	6.5-8.5	NA	NA	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93	8.93
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--

Notes:

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

 Detected Concentration > Selected Drinking Water Screening Level.

- (a) - Surface water samples collected in April 2014.
- (b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
<http://water.epa.gov/drink/contaminants/index.cfm>
- (c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
- (d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.
- (e) - The drinking water standard or MCL for chromium is based on total chromium.
- (f) - The tapwater RSL for mercury is based on mercuric chloride.
- (g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
- (h) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
- (i) - Selected Drinking Water Screening Level uses the following hierarchy:
 Federal USEPA MCL for Drinking Water.
 Federal USEPA SMCL for Drinking Water.
 Federal November 2018 USEPA Tapwater RSL.

TABLE 6a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS -
TO HUMAN HEALTH AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			AWQC (b)	R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0031	0.003	0.0029	0.0027	0.0019	0.0042 J	0.0041		0.0034	0.003	0.0044	0.003	0.003	0.0032	0.0029	0.003		0.0028	0.0027	0.0024
Barium	7440-39-3	mg/L	NA	0.164	0.143	0.149	0.13	0.125	0.157	0.153	0.154	0.126	0.116	0.132	0.134	0.133	0.115	0.103	0.128	0.146	0.125	0.135	0.117
Beryllium	7440-41-7	mg/L	NA	0.00037 J	0.00022 J	0.00019 J	0.00024 J	0.00038 J	0.0003 J	0.00037 J	0.00034 J	0.00024 J	0.00041 J	0.00028 J	0.00028 J	0.0004 J	0.00032 J	0.00017 J	0.00041 J	0.00038 J	0.00019 J	0.00043 J	0.00032 J
Boron	7440-42-8	mg/L	NA	0.0603 J	0.0556 J	0.0564 J	0.0448 J	0.0447 J	0.0591 J	0.0552 J	0.0565 J	0.0441 J	0.0392 J	0.0569 J	0.0522 J	0.0562 J	0.0409 J	0.0392 J	0.0595 J	0.0548 J	0.0536 J	0.0495 J	0.0436 J
Cadmium	7440-43-9	mg/L	NA											0.00057 J								0.00081 J	
Calcium	7440-70-2	mg/L	NA	65.4	64.7	63.8	60	58.9	64.6	63.5	62.9	59.4	56	64.5	62.6	63.7	55.8	56	63.7	62.7	62.9	60	58.8
Chloride	16897-00-6	mg/L	NA	23.8	24.2	24.5	26.7	27.5	23.8	24.5	24.5	27.2	28.4	23.7	25.5	25.2	28.1	28.4	23.7	24.8	24.8	26.5	27
Chromium	7440-47-3	mg/L	NA	0.006	0.0033 J	0.0045 J	0.0046 J	0.0039 J	0.0056	0.0059	0.0044 J	0.004 J	0.0041 J	0.0016 J	0.0031 J	0.0027 J	0.0044 J	0.0019 J	0.0013 J	0.0048 J	0.0048 J	0.0049 J	0.0024 J
Cobalt	7440-48-4	mg/L	NA	0.0031 J	0.0025 J	0.0024 J	0.003 J	0.0019 J	0.0026 J	0.0036 J	0.0028 J	0.0027 J	0.0018 J	0.0012 J	0.0023 J	0.0024 J	0.0019 J	0.0021 J	0.0013 J	0.0028 J	0.0015 J	0.0025 J	0.0015 J
Fluoride	16984-48-8	mg/L	NA	0.25	0.25	0.25	0.21	0.21	0.25	0.26	0.24	0.26	0.24	0.3	0.22	0.24	0.21	0.2	0.24	0.25	0.25	0.21	0.21
Lead	7439-92-1	mg/L	NA	0.0067 J	0.0051 J	0.0045 J	0.0031 J	0.0039 J	0.0067 J	0.0046 J	0.0045 J	0.0045 J	0.0032 J	0.0068 J	0.0068 J	0.004 J	0.004 J	0.0056 J	0.0041 J	0.0056 J	0.0041 J	0.006 J	0.0041 J
Lithium	7439-93-2	mg/L	NA	0.0262	0.0217	0.0245	0.0168	0.0151	0.0258	0.0223	0.0224	0.0146	0.0152	0.0233	0.0197	0.0211	0.0131	0.0103	0.0214	0.0206	0.0169	0.0161	0.0147
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0021 J	0.0016 J	0.0012 J	0.0013 J	0.0015 J	0.0017 J	0.0019 J	0.0018 J	0.0018 J	0.0014 J	0.0015 J	0.0016 J	0.0019 J	0.0013 J	0.0011 J	0.0019 J	0.0014 J	0.001 J	0.0016 J	0.0015 J
Selenium*	7782-49-2	mg/L	4.2																				
Sulfate	14808-79-8	mg/L	NA	103	97.1	97.2	66.9	64.1	103	93.3	99.7	70.7	59.5	109	81.4	84.5	55.2	53.8	103	90.1	89.5	71.5	68.3
Thallium	7440-28-0	mg/L	0.00047											0.00011 J									
Total Hardness as CaCO3	471-34-1	mg/L	NA	271	267	264	247	244	268	261	259	245	232	265	261	231	231	264	260	257	249	242	242
Total Dissolved Solids	TDS	mg/L	NA	232	371	374	336	346	381	363	382	337	307	404	376	361	330	319	378	363	324	326	328

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

Detected Concentration > AWQC.

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

TABLE 6b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS -
TO HUMAN HEALTH AWQC SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			AWQC (b)	R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
Antimony*	7440-36-0	mg/L	0.64																				
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0023	0.0913	0.0022	0.0019	0.0018	0.0021	0.0022	0.0021	0.0017	0.0017	0.0024	0.0021	0.0021	0.0016	0.0016	0.0023	0.0022	0.0021	0.0019	0.0017
Barium	7440-39-3	mg/L	NA	0.0942	0.0913	0.0951	0.0832	0.0772	0.095	0.0922	0.0919	0.0756	0.0741	0.0953	0.0888	0.092	0.0735	0.0744	0.0949	0.09	0.088	0.0775	0.0862
Beryllium*	7440-41-7	mg/L	NA																				
Boron	7440-42-8	mg/L	NA	0.0584 J	0.0531 J	0.0536 J	0.0464 J	0.041 J	0.0548 J	0.0536 J	0.0534 J	0.0368 J	0.0385 J	0.0541 J	0.0489 J	0.0542 J	0.0368 J	0.0374 J	0.0557 J	0.053 J	0.051 J	0.0411 J	0.0434 J
Cadmium	7440-43-9	mg/L	NA			0.00054 J																	
Calcium	7440-70-2	mg/L	NA	59.6	57.9	59.3	55.5	53.5	59.4	58.6	58.9	53.3	52.2	59.7	58.1	58.9	53	52.1	59.7	58.7	57.5	53.9	54.9
Chromium*	7440-47-3	mg/L	NA																				
Cobalt*	7440-48-4	mg/L	NA																				
Lead*	7439-92-1	mg/L	NA																				
Lithium	7439-93-2	mg/L	NA	0.0209	0.0195	0.021	0.0139	0.012	0.021	0.0216	0.0194	0.0122	0.0116	0.0214	0.0169	0.0209	0.0083 J	0.0102	0.0194	0.0189	0.019	0.0131	0.0141
Mercury*	7439-97-6	mg/L	NA																				
Molybdenum	7439-98-7	mg/L	NA	0.0016 J	0.0018 J	0.0022 J	0.0013 J	0.0013 J	0.0019 J	0.0016 J	0.0016 J	0.0013 J	0.0013 J	0.0014 J	0.0015 J	0.0015 J	0.0012 J	0.0015 J	0.0013 J	0.0016 J	0.0014 J	0.0011 J	0.0012 J
Selenium*	7782-49-2	mg/L	4.2																				
Thallium*	7440-28-0	mg/L	0.00047																				

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

Detected Concentration > AWQC.

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

TABLE 6c
COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS
(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN, MISSOURI

Constituent	CAS	Units	USEPA AWQC (b)	Mississippi River										
				Upstream					Downstream					
				RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M	
Antimony*	7440-36-0	mg/L	0.64											
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0021	0.0019	0.0025	0.0023	0.0021	0.0028	0.0021	0.0024	0.0024	0.0022	
Barium	7440-39-3	mg/L	NA	0.104	0.102	0.101	0.0931	0.0932	0.1	0.099	0.0947	0.0801	0.0911	
Beryllium*	7440-41-7	mg/L	NA											
Boron	7440-42-8	mg/L	NA	0.0553	0.0532	0.0532	0.0471	0.0468	0.0543	0.0515	0.0487	0.0418	0.0437	
Cadmium*	7440-43-9	mg/L	NA											
Calcium	7440-70-2	mg/L	NA	56.4	54.3	55.2	54	53.6	53.5	54.1	53.7	52.9	53.7	
Chromium	7440-47-3	mg/L	NA	0.0027	0.0027	0.0026	0.0029	0.0031	0.0022	0.0032	0.0034	0.0021	0.0035	
Cobalt	7440-48-4	mg/L	NA	0.0023	0.0024	0.0026	0.0024	0.0025	0.0023	0.0028	0.0024	0.0021	0.0026	
Fluoride*	16984-48-8	mg/L	NA				0.58							
Lead	7439-92-1	mg/L	NA	0.0025	0.0024	0.0025	0.0026	0.0022	0.0025	0.0025	0.0024	0.0022	0.0022	
Mercury*	7439-97-6	mg/L	NA											
Molybdenum	7439-98-7	mg/L	NA											
Selenium	7782-49-2	mg/L	4.2	0.00088	0.00097	0.0011	0.00079	0.00083	0.001	0.00098	0.00079	0.00077	0.00069	
Sulfate	14808-79-8	mg/L	NA	79	73.8	73.2	60.3	59.3	75.5	70.6	63.9	44.1	47	
Thallium*	7440-28-0	mg/L	0.00047											
pH (d)	NA	SU	NA	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93	
Total Hardness as CaCO3	471-34-1	mg/L	NA	226	216	220	216	215	214	217	215	213	218	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

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

(d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.

TABLE 6d
COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO AWQC SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN, MISSOURI

Constituent	CAS	Units	USEPA AWQC (b)	Mississippi River										
				Upstream					Downstream					
				RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M	
Antimony*	7440-36-0	mg/L	0.64											
Arsenic*	7440-38-2	mg/L	0.00014 (c)	0.001	0.0015	0.0012	0.0013	0.0014	0.0015	0.0011	0.0012	0.0012	0.0011	
Barium	7440-39-3	mg/L	NA	0.0776	0.0796	0.0745	0.0677	0.0698	0.078	0.073	0.0662	0.0602	0.0611	
Beryllium*	7440-41-7	mg/L	NA											
Boron	7440-42-8	mg/L	NA	0.053	0.0511	0.0502	0.0449	0.0476	0.0527	0.0499	0.0442	0.0405	0.0412	
Cadmium*	7440-43-9	mg/L	NA											
Calcium	7440-70-2	mg/L	NA	52.5	52.6	52.1	52	51.7	52.5	52.4	51.3	50.9	51	
Chromium	7440-47-3	mg/L	NA											
Cobalt*	7440-48-4	mg/L	NA											
Fluoride	16984-48-8	mg/L	NA	--	--	--	--	--	--	--	--	--	--	
Lead*	7439-92-1	mg/L	NA		0.00049									
Mercury*	7439-97-6	mg/L	NA											
Molybdenum	7439-98-7	mg/L	NA	0.0018					0.0019		0.0017			
Selenium	7782-49-2	mg/L	4.2	0.00093	0.00079	0.00084	0.00069	0.00073	0.00087	0.00075	0.00085	0.0008	0.00079	
Sulfate	14808-79-8	mg/L	NA	--	--	--	--	--	--	--	--	--	--	
Thallium*	7440-28-0	mg/L	0.00047											
pH (d)	NA	SU	NA	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93	
Total Hardness as CaCO3	471-34-1	mg/L	NA	--	--	--	--	--	--	--	--	--	--	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

Detected Concentration > AWQC.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

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

(d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.

TABLE 7a
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS
TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
Antimony*	7440-36-0	mg/L	NA	NA																				
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0031	0.003	0.0029	0.0027	0.0019	0.0042 J	0.0041		0.0034	0.003	0.0044	0.003	0.0032	0.0029	0.003	0.146	0.0028	0.0027	0.0024	
Barium	7440-39-3	mg/L	NA	NA	0.164	0.143	0.149	0.13	0.125	0.157	0.153		0.126	0.116	0.132	0.134	0.133	0.115	0.103	0.128	0.125	0.135	0.117	
Beryllium	7440-41-7	mg/L	NA	NA	0.00037 J	0.00022 J	0.00019 J	0.00024 J	0.00038 J	0.0003 J	0.00037 J	0.00034 J	0.00024 J	0.00041 J	0.00028 J	0.00028 J	0.0004 J	0.00032 J	0.00017 J	0.00041 J	0.00038 J	0.00019 J	0.00032 J	
Boron	7440-42-8	mg/L	NA	NA	0.0603 J	0.0556 J	0.0564 J	0.0448 J	0.0447 J	0.0591 J	0.0552 J	0.0565 J	0.0441 J	0.0392 J	0.0569 J	0.0522 J	0.0562 J	0.0409 J	0.0392 J	0.0595 J	0.0548 J	0.0536 J	0.0495 J	
Cadmium	7440-43-9	mg/L	0.0047 (d)	0.0017 (d)											0.00057 J							0.00081 J		
Calcium	7440-70-2	mg/L	NA	NA	65.4	64.7	63.8	60	58.9	64.6	63.5	62.9	59.4	56	64.5	62.6	63.7	55.8	56	63.7	62.7	62.9	60	
Chloride	16887-00-6	mg/L	860	230	23.8	24.2	24.5	26.7	27.5	23.8	24.5	24.5	27.2	28.4	23.7	25.5	25.2	28.1	28.4	23.7	24.8	24.8	26.5	
Chromium	7440-47-3	mg/L	3.87 (c,d)	0.185 (c,d)	0.006	0.0033 J	0.0045 J	0.0046 J	0.0039 J	0.0056	0.0059	0.0044 J	0.004 J	0.0041 J	0.0016 J	0.0031 J	0.0027 J	0.0044 J		0.0013 J	0.0048 J		0.0049 J	
Cobalt	7440-48-4	mg/L	NA	NA	0.0031 J	0.0025 J	0.0024 J	0.003 J	0.0019 J	0.0026 J	0.0036 J	0.0028 J	0.0027 J	0.0018 J	0.0012 J	0.0023 J	0.0024 J	0.0019 J	0.0021 J	0.0013 J	0.0028 J	0.0015 J	0.0025 J	
Fluoride	16984-48-8	mg/L	NA	NA	0.25	0.25	0.25	0.21	0.21	0.25	0.26	0.24	0.26	0.24	0.3	0.22	0.24	0.21	0.2	0.24	0.25	0.25	0.21	
Lead	7439-92-1	mg/L	0.26805 (d)	0.010 (d)	0.0067 J	0.0051 J	0.0045 J	0.0031 J	0.0039 J	0.0067 J	0.0046 J		0.0045 J	0.0032 J		0.0068 J		0.004 J		0.0056 J	0.0041 J	0.006 J	0.0041 J	
Lithium	7439-93-2	mg/L	NA	NA	0.0262	0.0217	0.0245	0.0168	0.0151	0.0258	0.0223	0.0224	0.0146	0.0152	0.0233	0.0197	0.0211	0.0131	0.0103	0.0214	0.0206	0.0169	0.0161	
Mercury*	7439-97-6	mg/L	0.00165	0.001																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0021 J	0.0016 J	0.0012 J	0.0013 J	0.0015 J	0.0017 J	0.0019 J	0.0018 J	0.0018 J	0.0014 J	0.0015 J	0.0016 J	0.0019 J	0.0013 J	0.0011 J	0.0019 J	0.0014 J	0.001 J	0.0016 J	
Selenium*	7782-49-2	mg/L	NA	3.1																				
Sulfate	14808-79-8	mg/L	NA	NA	103	97.1	97.2	66.9	64.1	103	93.3	99.7	70.7	59.5	109	81.4	84.5	55.2	53.8	103	90.1	89.5	71.5	
Thallium	7440-28-0	mg/L	NA	NA											0.00011 J									
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	271	267	264	247	244	268	261	259	245	232	265	258	261	231	231	264	260	257	249	
Total Dissolved Solids	TDS	mg/L	NA	NA	232	371	374	336	346	381	363	382	337	307	404	376	361	330	319	378	363	324	326	

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

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

- (a) - Surface water samples collected in May 2018.
- (b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>
Total values provided. Values adjusted for site-specific hardness - see note (d).
USEPA provides AWQC for both total and dissolved results.
- (c) - Value for trivalent chromium used.
- (d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 254 mg/L as CaCO3 used.

TABLE 7b
COMPARISON OF MAY 2018 MISSISSIPPI RIVER SURFACE WATER RESULTS -
TO ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a) RUSH
ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River Upstream					Mississippi River Adjacent					Mississippi River Downstream					Mississippi River Further Downstream				
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	R2-R-4S	R2-R-5M	R2-R-5S	R2-R-6M	R2-R-6S	R2-R-10S	R2-R-11M	R2-R-11S	R2-R-12M	R2-R-12S	R2-R-7S	R2-R-8M	R2-R-8S	R2-R-9M	R2-R-9S	R2-R-1S	R2-R-2M	R2-R-2S	R2-R-3M	R2-R-3S
			Antimony*	7440-36-0	mg/L	NA	NA																	
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0023		0.0022	0.0019	0.0018	0.0021	0.0022	0.0021	0.0017	0.0017	0.0024	0.0021	0.0021	0.0016	0.0016	0.0023	0.0022	0.0021	0.0017	
Barium	7440-39-3	mg/L	NA	NA	0.0942	0.0913	0.0951	0.0832	0.0772	0.095	0.0922	0.0919	0.0756	0.0741	0.0953	0.0888	0.092	0.0735	0.0744	0.0949	0.09	0.088	0.0775	
Beryllium*	7440-41-7	mg/L	NA	NA																				
Boron	7440-42-8	mg/L	NA	NA	0.0584 J	0.0531 J	0.0536 J	0.0464 J	0.041 J	0.0548 J	0.0536 J	0.0534 J	0.0368 J	0.0385 J	0.0541 J	0.0489 J	0.0542 J	0.0368 J	0.0374 J	0.0557 J	0.053 J	0.051 J	0.0411 J	
Cadmium	7440-43-9	mg/L	0.0043 (d)	0.0014 (d)																				
Calcium	7440-70-2	mg/L	NA	NA	59.6	57.9	59.3	55.5	53.5	59.4	58.6	58.9	53.3	52.2	59.7	58.1	58.9	53	52.1	59.7	58.7	57.5	53.9	
Chromium*	7440-47-3	mg/L	1.22 (c,d)	0.16 (c,d)																				
Cobalt*	7440-48-4	mg/L	NA	NA																				
Lead*	7439-92-1	mg/L	0.176 (d)	0.0068 (d)																				
Lithium	7439-93-2	mg/L	NA	NA	0.0209	0.0195	0.021	0.0139	0.012	0.021	0.0216	0.0194	0.0122	0.0116	0.0214	0.0169	0.0209	0.0083 J	0.0102	0.0194	0.0189	0.019	0.0131	
Mercury*	7439-97-6	mg/L	0.0014	0.00077																				
Molybdenum	7439-98-7	mg/L	NA	NA	0.0016 J	0.0018 J	0.0022 J	0.0013 J	0.0013 J	0.0019 J	0.0016 J	0.0016 J	0.0013 J	0.0013 J	0.0014 J	0.0015 J	0.0015 J	0.0012 J	0.0015 J	0.0013 J	0.0016 J	0.0014 J	0.0011 J	
Selenium*	7782-49-2	mg/L	NA	NA																				
Thallium*	7440-28-0	mg/L	NA	NA																				

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

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

- (a) - Surface water samples collected in May 2018.
- (b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.
<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>
 Total values provided. Values adjusted for site-specific hardness - see note (d). USEPA provides AWQC for both total and dissolved results.
- (c) - Value for trivalent chromium used.
- (d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for the Mississippi River of 254 mg/L as CaCO3 used.

TABLE 7c

COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS

(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality		Mississippi River									
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	River Upstream					River Downstream				
					RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M
Antimony*	7440-36-0	mg/L	NA	NA	0.0021	0.0019	0.0025	0.0023	0.0021	0.0028	0.0021	0.0024	0.0024	0.0022
Arsenic	7440-38-2	mg/L	0.34	0.15	0.104	0.102	0.101	0.0931	0.0932	0.1	0.099	0.0947	0.0801	0.0911
Barium	7440-39-3	mg/L	NA	NA										
Beryllium*	7440-41-7	mg/L	NA	NA										
Boron	7440-42-8	mg/L	NA	NA	0.0553	0.0532	0.0532	0.0471	0.0468	0.0543	0.0515	0.0487	0.0418	0.0437
Cadmium*	7440-43-9	mg/L	0.0041 (e)	0.0015 (e)										
Calcium	7440-70-2	mg/L	NA	NA	56.4	54.3	55.2	54	53.6	53.5	54.1	53.7	52.9	53.7
Chromium	7440-47-3	mg/L	3.4 (d,e)	0.16 (d,e)	0.0027	0.0027	0.0026	0.0029	0.0031	0.0022	0.0032	0.0034	0.0021	0.0035
Cobalt	7440-48-4	mg/L	NA	NA	0.0023	0.0024	0.0026	0.0024	0.0025	0.0023	0.0028	0.0024	0.0021	0.0026
Fluoride	16984-48-8	mg/L	NA	NA				0.58						
Lead	7439-92-1	mg/L	0.22 (e)	0.0085 (e)	0.0025	0.0024	0.0025	0.0026	0.0022	0.0025	0.0025	0.0024	0.0022	0.0022
Mercury*	7439-97-6	mg/L	0.0016	0.00091										
Molybdenum	7439-98-7	mg/L	NA	NA										
Selenium	7782-49-2	mg/L	NA	3.1	0.00088	0.00097	0.0011	0.00079	0.00083	0.001	0.00098	0.00079	0.00077	0.00069
Sulfate	14808-79-8	mg/L	NA	NA	79	73.8	73.2	60.3	59.3	75.5	70.6	63.9	44.1	47
Thallium*	7440-28-0	mg/L	NA	NA										
pH (c)	NA	SU	NA	6.5-9	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	226	216	220	216	215	214	217	215	213	218

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

AWQC - USEPA Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.

Detected Concentration > USEPA Aquatic Life AWQC Chronic, or pH is outside the AWQC Chronic pH range..
Detected Concentration > USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness - see note (e).

USEPA provides AWQC for both total and dissolved results.

(c) - pH values were obtained and recorded at the time of sample collection. Data for pH was not provided by the laboratory.

(d) - Value for trivalent chromium used.

(e) - Hardness dependent value for total metals and sulfate. Site-specific total recoverable mean hardness value for the Mississippi River of 217 mg/L as CaCO3 used.

TABLE 7d

COMPARISON OF APRIL 2014 MISSISSIPPI RIVER SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS

(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Mississippi River										
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	River Upstream					River Downstream					
					RI-R-4S	RI-R-5S	RI-R-5M	RI-R-6S	RI-R-6M	RI-R-1S	RI-R-2S	RI-R-2M	RI-R-3S	RI-R-3M	
Antimony*	7440-36-0	mg/L	NA	NA											
Arsenic	7440-38-2	mg/L	0.34	0.15	0.001	0.0015	0.0012	0.0013	0.0014	0.0015	0.0011	0.0012	0.0012	0.0011	
Barium	7440-39-3	mg/L	NA	NA	0.0776	0.0796	0.0745	0.0677	0.0698	0.078	0.073	0.0662	0.0602	0.0611	
Beryllium*	7440-41-7	mg/L	NA	NA											
Boron	7440-42-8	mg/L	NA	NA	0.053	0.0511	0.0502	0.0449	0.0476	0.0527	0.0499	0.0442	0.0405	0.0412	
Cadmium*	7440-43-9	mg/L	0.0037 (e)	0.0013 (e)											
Calcium	7440-70-2	mg/L	NA	NA	52.5	52.6	52.1	52	51.7	52.5	52.4	51.3	50.9	51	
Chromium*	7440-47-3	mg/L	1.1 (d,e)	0.14 (d,e)											
Cobalt*	7440-48-4	mg/L	NA	NA											
Fluoride	16984-48-8	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	--	
Lead	7439-92-1	mg/L	0.15 (e)	0.0058 (e)		0.00049									
Mercury*	7439-97-6	mg/L	0.0014	0.00077											
Molybdenum	7439-98-7	mg/L	NA	NA	0.0018					0.0019		0.0017			
Selenium	7782-49-2	mg/L	NA	NA	0.00093	0.00079	0.00084	0.00069	0.00073	0.00087	0.00075	0.00085	0.0008	0.00079	
Sulfate	14808-79-8	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	--	
Thallium*	7440-28-0	mg/L	NA	NA											
pH (c)	NA	SU	NA	6.5-9	6.14	7.59	8.88	8.33	8.76	8.58	8.56	8.88	7.78	8.93	
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	--	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - USEPA Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.

Detected Concentration > USEPA Aquatic Life AWQC Chronic, or pH is outside the AWQC Chronic pH range..

Detected Concentration > USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness - see note (e).

USEPA provides AWQC for both total and dissolved results.

(c) - pH values were obtained and recorded at the time of sample collection. Data for pH was not provided by the laboratory.

(d) - Value for trivalent chromium used.

(e) - Hardness dependent value for total metals and sulfate. Site-specific total recoverable mean hardness value for the Mississippi River of 217 mg/L as CaCO3 used.

TABLE 8a
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek Downstream		
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S
			Antimony*	7440-36-0	mg/L		0.006	NA	0.0078	0.006					
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0014	0.0016	0.0014	0.0019	0.0019	0.0019	0.002	0.002	0.0019
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0923	0.0934	0.0927	0.0969	0.101	0.0961	0.0988	0.0965	0.0974
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004									
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0329 J	0.0312 J	0.0318 J	0.04 J	0.0405 J	0.0375 J	0.0447 J	0.0433 J	0.043 J
Cadmium	7440-43-9	mg/L	0.005	NA	0.0092	0.005		0.00046 J				0.00067 J	0.00059 J	0.0005 J	0.0005 J
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	58.5	57.7	58.4	56.7	58	56.6	55.3	55.4	56.4
Chloride	16887-00-6	mg/L	NA	250	NA	250	18.6	19.9	19.8	19.7	19.5	19.4	19	19.2	18.8
Chromium*	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1									
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006							0.00097 J	0.00092 J	
Fluoride	16984-48-8	mg/L	4	2	0.8	4	0.19 J	0.19 J	0.18 J	0.21	0.24	0.21	0.25	0.25	0.24
Lead*	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015									
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04				0.005 J	0.0063 J	0.0054 J	0.0084 J	0.0086 J	0.0092 J
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (i)	0.002									
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1	0.0012 J	0.0011 J	0.0011 J	0.0012 J	0.0016 J	0.0011 J	0.0014 J	0.0018 J	0.0016 J
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05									
Sulfate	14808-79-8	mg/L	NA	250	NA	250	47.8	47.8	47.9	56.7	56.2	55.5	65.4	65	63.3
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002									
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	248	245	247	235	241	236	229	231	234
Total Dissolved Solids	TDS	mg/L	NA	500	NA	500	324	337	334	344	348	334	341	334	340

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

Detected Concentration > Selected Drinking Water Screening Level.

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

TABLE 8b
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO HUMAN HEALTH DRINKING WATER SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (h)	Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek Downstream		
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006									
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0014	0.0014	0.0015	0.0018	0.0013	0.0013	0.0018	0.0019	0.0016
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.094	0.0942	0.0902	0.0904	0.0982	0.0952	0.0847	0.0852	0.0846
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004									
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0335 J	0.034 J	0.0329 J	0.0386 J	0.0423 J	0.042 J	0.0407 J	0.0411 J	0.0357 J
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005									
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	65.5	66	62.7	59.3	62.4	60.8	55.6	56.5	59.3
Chromium*	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1									
Cobalt*	7440-48-4	mg/L	NA	NA	0.006	0.006									
Lead*	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015									
Lithium	7439-93-2	mg/L	NA	NA	0.04	0.04					0.0057 J	0.0052 J	0.258 J		
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (d)	0.002									
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1					0.0015 J	0.0017 J			
Selenium*	7782-49-2	mg/L	0.05	NA	0.1	0.05									
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002									

Notes:

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

Detected Concentration > Selected Drinking Water Screening Level.

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

TABLE 8c
COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS
(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (j)	Isle de Bois Creek									
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		Creek Upstream			Creek Adjacent			Creek Downstream			
							RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006										
Arsenic	7440-38-2	mg/L	0.01	NA	0.000052	0.01	0.0011	0.00079	0.0012	0.00091	0.0012		0.0015	0.0017	0.0013	
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0999	0.0919	0.0938	0.0909	0.0935	0.091	0.107	0.0957	0.0987	
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004										
Boron	7440-42-8	mg/L	NA	NA	4	4	0.0208	0.0195	0.0189	0.036	0.0366	0.0343	0.0395	0.039	0.0391	
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005										
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	70.3	65.8	66	67	66.7	66.5	67.1	65.6	65.8	
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1	0.0021	0.0017	0.0018			0.002	0.0033	0.0016	0.002	
Cobalt	7440-48-4	mg/L	NA	NA	0.006	0.006	0.0023	0.0019	0.0019	0.0017	0.0018	0.002				
Fluoride*	16984-48-8	mg/L	4	2	0.8	4										
Lead	7439-92-1	mg/L	0.015 (g)	NA	0.015	0.015	0.002	0.0016	0.0016	0.0013	0.0013	0.0012	0.0027	0.002	0.002	
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (i)	0.002										
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1							0.002	0.0018		
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05	0.00067									
Sulfate	14808-79-8	mg/L	NA	250	NA	250	43.2	42.4	43.7	41.7	40.8	41.9	40.5	40.2	41.1	
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002										
pH (d)	NA	SU	NA	6.5-8.5	NA	NA	7.65	8.08	7.42	7.35	7.38	7.43	7.89	7.48	7.42	
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	286	273	275	273	272	271	273	265	267	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- Constituent not included in this analysis.

CAS - Chemical Abstracts Service.

MCL - Maximum Contaminant Level.

mg/L - milligrams per liter.

NA - Not Available.

RSL - Regional Screening Level.

SU - Standard Units.

SMCL - Secondary Maximum Contaminant Level.

USEPA - United States Environmental Protection Agency.

Detected Concentration > Selected Drinking Water Screening Level.

(a) - Surface water samples collected in April 2014.

(b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
<http://water.epa.gov/drink/contaminants/index.cfm>

(c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm

(d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.

(e) - The drinking water standard or MCL for chromium is based on total chromium.

(f) - The tapwater RSL for mercury is based on mercuric chloride.

(g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.

(h) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.

(i) - Selected Drinking Water Screening Level uses the following hierarchy:

Federal USEPA MCL for Drinking Water.

Federal USEPA SMCL for Drinking Water.

Federal November 2018 USEPA Tapwater RSL.

TABLE 8d
COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Screening Levels			Selected Drinking Water Screening Level (j)	Isle du Bois Creek									
			USEPA MCLs (b)	USEPA SMCLs (b)	USEPA Tapwater RSLs (c)		Creek Upstream			Creek Adjacent			Creek Downstream			
							RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	0.006	NA	0.0078	0.006										
Arsenic*	7440-38-2	mg/L	0.01	NA	0.000052	0.01										
Barium	7440-39-3	mg/L	2	NA	3.8	2	0.0845	0.0813	0.0829	0.0818	0.0827	0.0821	0.0863	0.0854	0.0868	
Beryllium*	7440-41-7	mg/L	0.004	NA	0.025	0.004										
Boron	7440-42-8	mg/L	NA	NA	4	4	0.019	0.0172	0.018	0.0351	0.0348	0.0334	0.0368	0.0375	0.0374	
Cadmium*	7440-43-9	mg/L	0.005	NA	0.0092	0.005										
Calcium	7440-70-2	mg/L	NA	NA	NA	NA	67.4	64.4	65.6	66	67.5	66.7	67	66.7	68.1	
Chromium	7440-47-3	mg/L	0.1 (e)	NA	22 (f)	0.1					0.0021					
Cobalt*	7440-48-4	mg/L	NA	NA	0.006	0.006										
Fluoride	16984-48-8	mg/L	4	2	0.8	4	--	--	--	--	--	--	--	--	--	--
Lead*	7439-92-1	mg/L	0.015 (a)	NA	0.015	0.015										
Mercury*	7439-97-6	mg/L	0.002	NA	0.0057 (i)	0.002										
Molybdenum	7439-98-7	mg/L	NA	NA	0.1	0.1							0.004	0.0021		
Selenium	7782-49-2	mg/L	0.05	NA	0.1	0.05	0.00058									
Sulfate	14808-79-8	mg/L	NA	250	NA	250	--	--	--	--	--	--	--	--	--	--
Thallium*	7440-28-0	mg/L	0.002	NA	0.0002	0.002										
pH (d)	NA	SU	NA	6.5-8.5	NA	NA	7.65	8.08	7.42	7.35	7.38	7.43	7.89	7.48	7.42	
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--	--

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

Detected Concentration > Selected Drinking Water Screening Level.

- (a) - Surface water samples collected in April 2014.
- (b) - USEPA 2018 Edition of the Drinking Water Standards and Health Advisories. Spring 2018.
<http://water.epa.gov/drink/contaminants/index.cfm>
- (c) - USEPA Regional Screening Levels (November 2018). Values for tapwater.
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm
- (d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.
- (e) - The drinking water standard or MCL for chromium is based on total chromium.
- (f) - The tapwater RSL for mercury is based on mercuric chloride.
- (g) - The Action Level presented is recommended in the USEPA Drinking Water Standards.
- (h) - Value for trivalent chromium used. USEPA provides a screening level for hexavalent chromium that is not a drinking water standard, the basis of which has been questioned by USEPA's Science Advisory Board.
- (i) - Selected Drinking Water Screening Level uses the following hierarchy:
Federal USEPA MCL for Drinking Water.
Federal USEPA SMCL for Drinking Water.
Federal November 2018 USEPA Tapwater RSL.

TABLE 9a
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO HUMAN HEALTH AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek Downstream		
			AWQC (b)	R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S
			0.64									
Antimony*	7440-36-0	mg/L	0.64									
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0014	0.0016	0.0014	0.0019	0.0019	0.0019	0.002	0.002	0.0019
Barium	7440-39-3	mg/L	NA	0.0923	0.0934	0.0927	0.0969	0.101	0.0961	0.0988	0.0965	0.0974
Beryllium*	7440-41-7	mg/L	NA									
Boron	7440-42-8	mg/L	NA	0.0329 J	0.0312 J	0.0318 J	0.04 J	0.0405 J	0.0375 J	0.0447 J	0.0433 J	0.043 J
Cadmium	7440-43-9	mg/L	NA		0.00046 J				0.00067 J		0.00059 J	0.0005 J
Calcium	7440-70-2	mg/L	NA	58.5	57.7	58.4	56.7	58	56.6	55.3	55.4	56.4
Chloride	16887-00-6	mg/L	NA	18.6	19.9	19.8	19.7	19.5	19.4	19	19.2	18.8
Chromium*	7440-47-3	mg/L	NA									
Cobalt	7440-48-4	mg/L	NA							0.00097 J	0.00092 J	
Fluoride	16984-48-8	mg/L	NA	0.19 J	0.19 J	0.18 J	0.21	0.24	0.21	0.25	0.25	0.24
Lead*	7439-92-1	mg/L	NA									
Lithium	7439-93-2	mg/L	NA				0.005 J	0.0063 J	0.0054 J	0.0084 J	0.0086 J	0.0092 J
Mercury*	7439-97-6	mg/L	NA									
Molybdenum	7439-98-7	mg/L	NA	0.0012 J	0.0011 J	0.0011 J	0.0012 J	0.0016 J	0.0011 J	0.0014 J	0.0018 J	0.0016 J
Selenium*	7782-49-2	mg/L	4.2									
Sulfate	14808-79-8	mg/L	NA	47.8	47.8	47.9	56.7	56.2	55.5	65.4	65	63.3
Thallium*	7440-28-0	mg/L	0.00047									
Total Hardness as CaCO3	471-34-1	mg/L	NA	248	245	247	235	241	236	229	231	234
Total Dissolved Solids	TDS	mg/L	NA	324	337	334	344	348	334	341	334	340

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

Detected Concentration > AWQC.

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

TABLE 9b
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO AWQC SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA	Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek Downstream		
			AWQC (b)	R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S
			0.64									
Antimony*	7440-36-0	mg/L	0.00014 (c)	0.0014	0.0014	0.0015	0.0018	0.0013	0.0013	0.0018	0.0019	0.0016
Arsenic	7440-38-2	mg/L	NA	0.094	0.0942	0.0902	0.0904	0.0982	0.0952	0.0847	0.0852	0.0846
Barium	7440-39-3	mg/L	NA									
Beryllium*	7440-41-7	mg/L	NA									
Boron	7440-42-8	mg/L	NA	0.0335 J	0.034 J	0.0329 J	0.0386 J	0.0423 J	0.042 J	0.0407 J	0.0411 J	0.0357 J
Cadmium*	7440-43-9	mg/L	NA									
Calcium	7440-70-2	mg/L	NA	65.5	66	62.7	59.3	62.4	60.8	55.6	56.5	59.3
Chromium*	7440-47-3	mg/L	NA									
Cobalt*	7440-48-4	mg/L	NA									
Lead*	7439-92-1	mg/L	NA									
Lithium	7439-93-2	mg/L	NA					0.0057 J	0.0052 J	0.258 J		
Mercury*	7439-97-6	mg/L	NA									
Molybdenum	7439-98-7	mg/L	NA					0.0015 J	0.0017 J			
Selenium*	7782-49-2	mg/L	4.2									
Thallium*	7440-28-0	mg/L	0.00047									

Notes:

Blank cells - Non-detect value.

J - Estimated value.

* - Constituent was not detected in any samples.

mg/L - milligrams per liter.

AWQC - Ambient Water Quality Criteria.

NA - Not Available.

CAS - Chemical Abstracts Service.

USEPA - United States Environmental Protection Agency.

 Detected Concentration > AWQC.

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

(b) - USEPA National Recommended Water Quality Criteria.

USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

USEPA AWQC Human Health for the Consumption of Organism Only

apply to total concentrations.

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

TABLE 9c
COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO AWQC SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA AWQC (b)	Isle de Bois Creek									
				Creek Upstream			Creek Adjacent			Creek Downstream			
				RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	0.64										
Arsenic	7440-38-2	mg/L	0.00014 (c)	0.0011	0.00079	0.0012	0.00091	0.0012			0.0015	0.0017	0.0013
Barium	7440-39-3	mg/L	NA	0.0999	0.0919	0.0938	0.0909	0.0935	0.091		0.107	0.0957	0.0987
Beryllium*	7440-41-7	mg/L	NA										
Boron	7440-42-8	mg/L	NA	0.0208	0.0195	0.0189	0.036	0.0366	0.0343		0.0395	0.039	0.0391
Cadmium*	7440-43-9	mg/L	NA										
Calcium	7440-70-2	mg/L	NA	70.3	65.8	66	67	66.7	66.5		67.1	65.6	65.8
Chromium	7440-47-3	mg/L	NA	0.0021	0.0017	0.0018					0.002	0.0033	0.0016
Cobalt	7440-48-4	mg/L	NA	0.0023	0.0019	0.0019	0.0017	0.0018	0.002				
Fluoride*	16984-48-8	mg/L	NA										
Lead	7439-92-1	mg/L	NA	0.002	0.0016	0.0016	0.0013	0.0013	0.0012		0.0027	0.002	0.002
Mercury*	7439-97-6	mg/L	NA										
Molybdenum	7439-98-7	mg/L	NA								0.002	0.0018	
Selenium	7782-49-2	mg/L	4.2	0.00067									
Sulfate	14808-79-8	mg/L	NA	43.2	42.4	43.7	41.7	40.8	41.9		40.5	40.2	41.1
Thallium*	7440-28-0	mg/L	0.00047										
pH (d)	NA	SU	NA	7.65	8.08	7.42	7.35	7.38	7.43		7.89	7.48	7.42
Total Hardness as CaCO3	471-34-1	mg/L	NA	286	273	275	273	272	271		273	265	267

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

USEPA AWQC Human Health for the Consumption of Organism Only apply to total concentrations.

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

(d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.

TABLE 9d
COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO AWQC SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS
(a) RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	USEPA AWQC (b)	Isle du Bois Creek									
				Creek Upstream			Creek Adjacent			Creek Downstream			
				RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	0.64										
Arsenic*	7440-38-2	mg/L	0.00014 (c)										
Barium	7440-39-3	mg/L	NA	0.0845	0.0813	0.0829	0.0818	0.0827	0.0821	0.0863	0.0854	0.0868	
Beryllium*	7440-41-7	mg/L	NA										
Boron	7440-42-8	mg/L	NA	0.019	0.0172	0.018	0.0351	0.0348	0.0334	0.0368	0.0375	0.0374	
Cadmium*	7440-43-9	mg/L	NA										
Calcium	7440-70-2	mg/L	NA	67.4	64.4	65.6	66	67.5	66.7	67	66.7	68.1	
Chromium	7440-47-3	mg/L	NA					0.0021					
Cobalt*	7440-48-4	mg/L	NA										
Fluoride	16984-48-8	mg/L	NA	--	--	--	--	--	--	--	--	--	
Lead*	7439-92-1	mg/L	NA										
Mercury*	7439-97-6	mg/L	NA										
Molybdenum	7439-98-7	mg/L	NA							0.004	0.0021		
Selenium	7782-49-2	mg/L	4.2	0.00058									
Sulfate	14808-79-8	mg/L	NA	--	--	--	--	--	--	--	--	--	
Thallium*	7440-28-0	mg/L	0.00047										
pH (d)	NA	SU	NA	7.65	8.08	7.42	7.35	7.38	7.43	7.89	7.48	7.42	
Total Hardness as CaCO3	471-34-1	mg/L	NA	--	--	--	--	--	--	--	--	--	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.

Detected Concentration > AWQC.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

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

(d) - pH values were obtained during the field sampling event and were recorded at the time of sample collection. Data for pH was not provided by the laboratory.

TABLE 10a
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek			
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S	
Antimony*	7440-36-0	mg/L	NA	NA										
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0014	0.0016	0.0014	0.0019	0.0019	0.0019	0.002	0.002	0.0019	
Barium	7440-39-3	mg/L	NA	NA	0.0923	0.0934	0.0927	0.0969	0.101	0.0961	0.0988	0.0965	0.0974	
Beryllium*	7440-41-7	mg/L	NA	NA										
Boron	7440-42-8	mg/L	NA	NA	0.0329 J	0.0312 J	0.0318 J	0.04 J	0.0405 J	0.0375 J	0.0447 J	0.0433 J	0.043 J	
Cadmium	7440-43-9	mg/L	0.0044 (d)	0.0016 (d)		0.00046 J				0.00067 J		0.00059 J	0.0005 J	
Calcium	7440-70-2	mg/L	NA	NA	58.5	57.7	58.4	56.7	58	56.6	55.3	55.4	56.4	
Chloride	16887-00-6	mg/L	860	230	18.6	19.9	19.8	19.7	19.5	19.4	19	19.2	18.8	
Chromium*	7440-47-3	mg/L	3.7 (c,d)	0.176 (c,d)										
Cobalt	7440-48-4	mg/L	NA	NA							0.00097 J	0.00092 J		
Fluoride	16984-48-8	mg/L	NA	NA	0.19 J	0.19 J	0.18 J	0.21	0.24	0.21	0.25	0.25	0.24	
Lead*	7439-92-1	mg/L	0.25 (d)	0.010 (d)										
Lithium	7439-93-2	mg/L	NA	NA				0.005 J	0.0063 J	0.0054 J	0.0084 J	0.0086 J	0.0092 J	
Mercury*	7439-97-6	mg/L	0.0016	0.001										
Molybdenum	7439-98-7	mg/L	NA	NA	0.0012 J	0.0011 J	0.0011 J	0.0012 J	0.0016 J	0.0011 J	0.0014 J	0.0018 J	0.0016 J	
Selenium*	7782-49-2	mg/L	NA	3.1										
Sulfate	14808-79-8	mg/L	NA	NA	47.8	47.8	47.9	56.7	56.2	55.5	65.4	65	63.3	
Thallium*	7440-28-0	mg/L	NA	NA										
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	248	245	247	235	241	236	229	231	234	
Total Dissolved Solids	TDS	mg/L	NA	NA	324	337	334	344	348	334	341	334	340	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

AWQC - USEPA Ambient Water Quality Criteria.


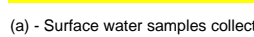
CAS - Chemical Abstracts Service.

J - Estimated value.

mg/L - milligrams per liter.

NA - Not Available.

USEPA - United States Environmental Protection Agency.

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


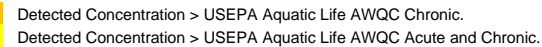
- (a) - Surface water samples collected in May 2018.
- (b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>
 Total values provided. Values adjusted for site-specific hardness - see note (d).
 USEPA provides AWQC for both total and dissolved results.
- (c) - Value for trivalent chromium used.
- (d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Isle Du Bois Creek of 238 mg/L as CaCO3 used.

TABLE 10b
COMPARISON OF MAY 2018 ISLE DU BOIS CREEK CREEK SURFACE WATER RESULTS -
TO ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a) RUSH
ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Isle Du Bois Creek Upstream			Isle Du Bois Creek Adjacent			Isle Du Bois Creek Downstream		
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	R2-C-7S	R2-C-8S	R2-C-9S	R2-C-4S	R2-C-5S	R2-C-6S	R2-C-1S	R2-C-2S	R2-C-3S
Antimony*	7440-36-0	mg/L	NA	NA									
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0014	0.0014	0.0015	0.0018	0.0013	0.0013	0.0018	0.0019	0.0016
Barium	7440-39-3	mg/L	NA	NA	0.094	0.0942	0.0902	0.0904	0.0982	0.0952	0.0847	0.0852	0.0846
Beryllium*	7440-41-7	mg/L	NA	NA									
Boron	7440-42-8	mg/L	NA	NA	0.0335 J	0.034 J	0.0329 J	0.0386 J	0.0423 J	0.042 J	0.0407 J	0.0411 J	0.0357 J
Cadmium*	7440-43-9	mg/L	0.0040 (d)	0.0014 (d)									
Calcium	7440-70-2	mg/L	NA	NA	65.5	66	62.7	59.3	62.4	60.8	55.6	56.5	59.3
Chromium*	7440-47-3	mg/L	1.16 (c,d)	0.15 (c,d)									
Cobalt*	7440-48-4	mg/L	NA	NA									
Lead*	7439-92-1	mg/L	0.164 (d)	0.0064 (d)									
Lithium	7439-93-2	mg/L	NA	NA					0.0057 J	0.0052 J	0.258 J		
Mercury*	7439-97-6	mg/L	0.0014	0.00077									
Molybdenum	7439-98-7	mg/L	NA	NA					0.0015 J	0.0017 J			
Selenium*	7782-49-2	mg/L	NA	NA									
Thallium*	7440-28-0	mg/L	NA	NA									

Notes:

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

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

- (a) - Surface water samples collected in May 2018.
- (b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology. <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>
Total values provided. Values adjusted for site-specific hardness - see note (d). USEPA provides AWQC for both total and dissolved results.
- (c) - Value for trivalent chromium used.
- (d) - Hardness dependent value for total metals. Site-specific total recoverable mean hardness value for Isle Du Bois Creek of 238 mg/L as CaCO3 used.

TABLE 10c

COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - TOTAL (UNFILTERED) SAMPLE RESULTS (a)
 RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
 AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Isle Du Bois Creek									
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	Creek Upstream			Creek Adjacent			Creek Downstream			
					RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	NA	NA										
Arsenic	7440-38-2	mg/L	0.34	0.15	0.0011	0.00079	0.0012	0.00091	0.0012			0.0015	0.0017	0.0013
Barium	7440-39-3	mg/L	NA	NA	0.0999	0.0919	0.0938	0.0909	0.0935	0.091		0.107	0.0957	0.0987
Beryllium*	7440-41-7	mg/L	NA	NA										
Boron	7440-42-8	mg/L	NA	NA	0.0208	0.0195	0.0189	0.036	0.0366	0.0343		0.0395	0.039	0.0391
Cadmium*	7440-43-9	mg/L	0.0051 (e)	0.0018 (e)										
Calcium	7440-70-2	mg/L	NA	NA	70.3	65.8	66	67	66.7	66.5		67.1	65.6	65.8
Chromium	7440-47-3	mg/L	4.1 (d,e)	0.20 (d,e)	0.0021	0.0017	0.0018			0.002		0.0033	0.0016	0.002
Cobalt	7440-48-4	mg/L	NA	NA	0.0023	0.0019	0.0019	0.0017	0.0018	0.002				
Fluoride*	16984-48-8	mg/L	NA	NA										
Lead	7439-92-1	mg/L	0.29 (e)	0.011 (e)	0.002	0.0016	0.0016	0.0013	0.0013	0.0012		0.0027	0.002	0.002
Mercury*	7439-97-6	mg/L	0.0016	0.00091										
Molybdenum	7439-98-7	mg/L	NA	NA								0.002	0.0018	
Selenium	7782-49-2	mg/L	NA	3.1	0.00067									
Sulfate	14808-79-8	mg/L	NA	NA	43.2	42.4	43.7	41.7	40.8	41.9		40.5	40.2	41.1
Thallium*	7440-28-0	mg/L	NA	NA										
pH (c)	NA	SU	NA	6.5-9	7.65	8.08	7.42	7.35	7.38	7.43		7.89	7.48	7.42
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	286	273	275	273	272	271		273	265	267

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

NA - Not Available.



AWQC - USEPA Ambient Water Quality Criteria.

SU - Standard Units.

CAS - Chemical Abstracts Service.

USEPA - United States Environmental Protection Agency.

mg/L - milligrams per liter.

 Detected Concentration > USEPA Aquatic Life AWQC Chronic, or pH is outside the AWQC Chronic pH range..
 Detected Concentration > USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness - see note (e).

USEPA provides AWQC for both total and dissolved results.

(c) - pH values were obtained and recorded at the time of sample collection. Data for pH was not provided by the laboratory.

(d) - Value for trivalent chromium used.

(e) - Hardness dependent value for total metals and sulfate. Site-specific total recoverable mean hardness value for the Isle Du Bois Creek of 273 mg/L as CaCO3 used.

TABLE 10d

COMPARISON OF APRIL 2014 ISLE DU BOIS CREEK SURFACE WATER RESULTS TO ECOLOGICAL SCREENING LEVELS - DISSOLVED (FILTERED) SAMPLE RESULTS (a)
 RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, FESTUS, MO
 AMEREN MISSOURI

Constituent	CAS	Units	Federal Water Quality Criteria		Isle Du Bois Creek									
			USEPA Aquatic Life AWQC Freshwater Acute (b)	USEPA Aquatic Life AWQC Freshwater Chronic (b)	Creek Upstream			Creek Adjacent			Creek Downstream			
					RI-C-7	RI-C-8	RI-C-9	RI-C-4	RI-C-5	RI-C-6	RI-C-1	RI-C-2	RI-C-3	
Antimony*	7440-36-0	mg/L	NA	NA										
Arsenic*	7440-38-2	mg/L	0.34	0.15										
Barium	7440-39-3	mg/L	NA	NA	0.0845	0.0813	0.0829	0.0818	0.0827	0.0821	0.0863	0.0854	0.0868	
Beryllium*	7440-41-7	mg/L	NA	NA										
Boron	7440-42-8	mg/L	NA	NA	0.019	0.0172	0.018	0.0351	0.0348	0.0334	0.0368	0.0375	0.0374	
Cadmium*	7440-43-9	mg/L	0.0046 (e)	0.0015 (e)										
Calcium	7440-70-2	mg/L	NA	NA	67.4	64.4	65.6	66	67.5	66.7	67	66.7	68.1	
Chromium	7440-47-3	mg/L	1.3 (d,e)	0.17 (d,e)					0.0021					
Cobalt*	7440-48-4	mg/L	NA	NA										
Fluoride	16984-48-8	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	
Lead*	7439-92-1	mg/L	0.19 (e)	0.0074 (e)										
Mercury*	7439-97-6	mg/L	0.0014	0.00077										
Molybdenum	7439-98-7	mg/L	NA	NA							0.004	0.0021		
Selenium	7782-49-2	mg/L	NA	NA	0.00058									
Sulfate	14808-79-8	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	
Thallium*	7440-28-0	mg/L	NA	NA										
pH (h)	NA	SU	NA	6.5-9	7.65	8.08	7.42	7.35	7.38	7.43	7.89	7.48	7.42	
Total Hardness as CaCO3	471-34-1	mg/L	NA	NA	--	--	--	--	--	--	--	--	--	

Notes:

Blank cells - Non-detect value.

* Constituent was not detected in any samples.

-- - Constituent not included in this analysis.

AWQC - USEPA Ambient Water Quality Criteria.

CAS - Chemical Abstracts Service.

mg/L - milligrams per liter.

NA - Not Available.

SU - Standard Units.

USEPA - United States Environmental Protection Agency.



Detected Concentration > USEPA Aquatic Life AWQC Chronic, or pH is outside the AWQC Chronic pH range..

Detected Concentration > USEPA Aquatic Life AWQC Acute and Chronic.

(a) - Surface water samples collected in April 2014.

(b) - USEPA National Recommended Water Quality Criteria. USEPA Office of Water and Office of Science and Technology.

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

Total values provided. Values adjusted for site-specific hardness - see note (e).

USEPA provides AWQC for both total and dissolved results.

(c) - pH values were obtained and recorded at the time of sample collection. Data for pH was not provided by the laboratory.

(d) - Value for trivalent chromium used.

(e) - Hardness dependent value for total metals and sulfate. Site-specific total recoverable mean hardness value for the Isle Du Bois Creek of 273 mg/L as CaCO3 used.

APPENDIX B

What You Need to Know About Molybdenum

WHAT YOU NEED TO KNOW ABOUT MOLYBDENUM

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

SOURCES OF INFORMATION ON MOLYBDENUM

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

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

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

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

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

Molybdenum in Our Natural Environment

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

Molybdenum in Our Diet

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

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

Molybdenum for Health

How Much Do You Need - Daily Allowance:

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

How Much is Too Much - Upper Limits:

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

The UL for molybdenum set by the NAS is 2 mg/day. This level is based on an evaluation of the potential toxicity of molybdenum at high levels of intake. The most sensitive effect in the literature is associated with reproductive outcomes in rats, and the study was used to develop an oral toxicity value for humans of 0.03 milligrams of molybdenum ingested per day per kilogram of body weight (mg/kg-day). This value is used with an average adult body weight of 68-70 kg (154 lbs) to set the UL¹.

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

USEPA'S ORAL TOXICITY VALUE FOR MOLYBDENUM

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

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

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

MOLYBDENUM UNDER THE CCR RULE

When the CCR Rule was published in 2015, groundwater standards were provided only for those Appendix IV constituents that have primary drinking water standards published by the USEPA under the Safe Drinking Water Act – values known as MCLs or maximum contaminant levels. Molybdenum does not have an MCL². In a subsequent 2018 CCR rule-making, USEPA designated a health-based groundwater protection standard for molybdenum of 0.1 mg/L or 100 ug/L. That is the value used to evaluate groundwater at the Ameren facilities. This level is very conservative and could be much higher and still protective of human health, as described above. [Note that in its March 3, 2019 report the Environmental Integrity Project used a screening level for molybdenum of 0.04 mg/L (or 40 ug/L), which is not the level USEPA has required in the CCR Rule.]

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

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

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

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

WHAT THIS MEANS FOR THE AMEREN ENERGY CENTERS

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

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

Notes:

mg/L - milligrams per liter.

(a) - Drinking water-based groundwater protection standard specified in the Coal Combustion Residuals Rule.

(b) - Alternative health-protective drinking water screening level based on the National Academy of Sciences review of molybdenum.

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

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

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

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APPENDIX C

Extraction & Transportation Study

APRIL 29, 2019

EXTRACTION & TRANSPORTATION STUDY: Rush Island Ash Pond Closure Assessment

**Rush Island Site
Jefferson County, Missouri**

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Introduction

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

Extraction & Stabilization

Description of Method

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

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

Dry Extraction:

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

Partially Wet Extraction:

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

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

Fully Submerged Extraction:

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

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

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

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

Site Restoration:

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

Extraction and Stabilization Impacts

Safety

Accidents

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

Exposure

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

Environment

Floodplain

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

River Embankment

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

Emissions

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

Fugitive Ash Particulate

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

Capital Projects

Onsite Access Roads

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

Geotube Staging Areas

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

Water Treatment Facilities

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

Loading Areas

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

Restoration of Former Ash Ponds

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

Transportation & Disposal

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

Modal Options (Truck, Rail, Barge)

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

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

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

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

Truck Hauling

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

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

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

Table 1: Transportation Haul Summary

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

*Measured from the decision to begin extraction until fully removed

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

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

Landfill Options

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

Table 2: Preferred Landfill Locations

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

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

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

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

Transportation Route

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

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

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

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

Transportation Impacts

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

Traffic Flow

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

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

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

Safety & Environment

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

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

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

Pavement

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

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

Conclusion

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

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

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

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

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

Costs in 2019 Dollars

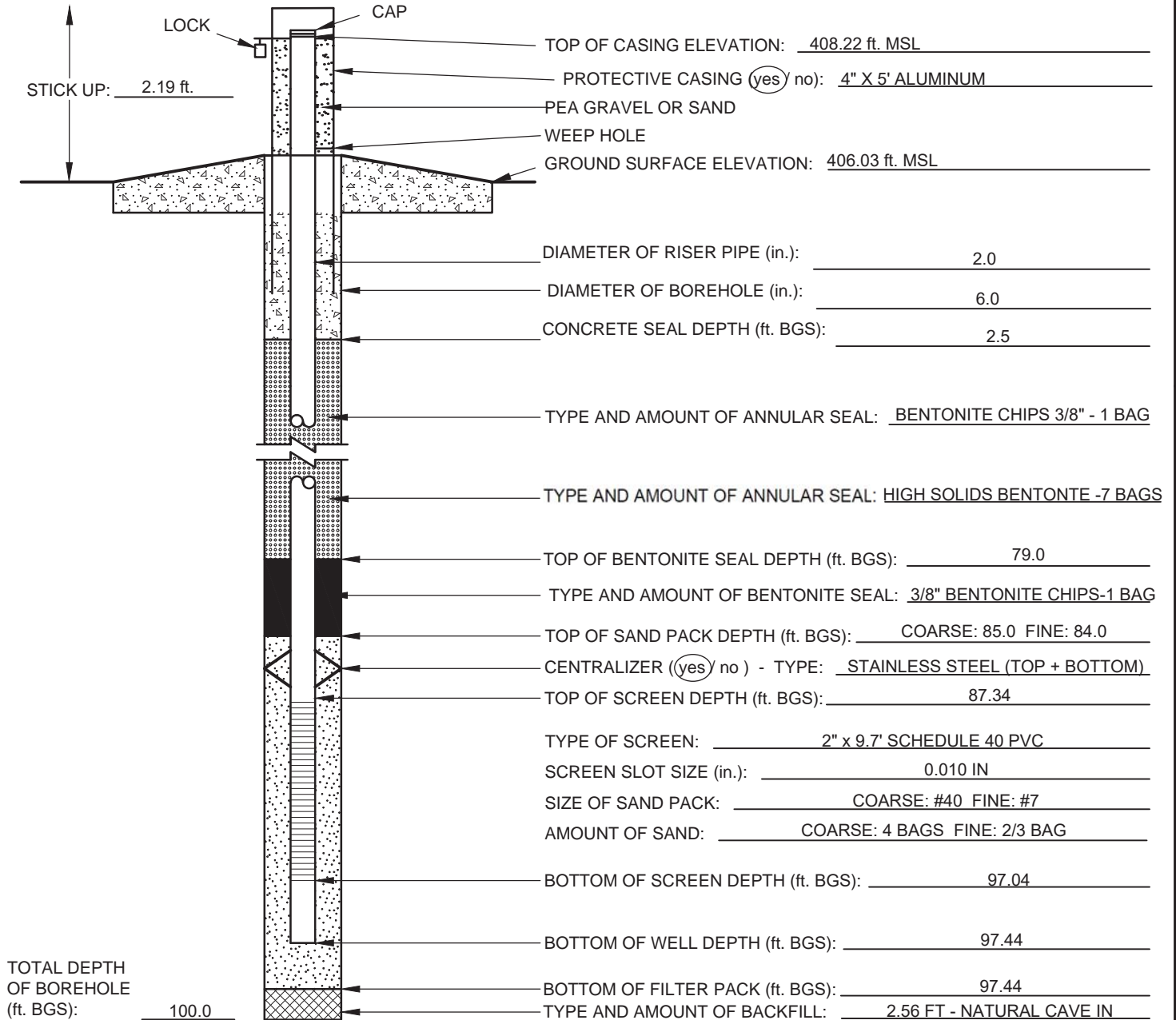
APPENDIX B

Well Construction Diagrams



ABOVE GROUND MONITORING WELL CONSTRUCTION LOG MW-7(R)

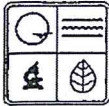
PROJECT NAME: AMEREN CCR GW MONITORING		PROJECT NUMBER: 153140601.0002
SITE NAME: RUSH ISLAND ENERGY CENTER		LOCATION: 30FT EAST OF MW-7
CLIENT: AMEREN MISSOURI		SURFACE ELEVATION: 406.03
GEOLOGIST: E. SCHNEIDER	NORTHING: 834501.42	EASTING: 888496.44
DRILLER: T. SCHMALFELDT	STATIC WATER LEVEL: 30.06 FT BTOC	COMPLETION DATE: 9/11/2019
DRILLING COMPANY: CASCADE		DRILLING METHODS: SONIC



ADDITIONAL NOTES: FT BGS = FEET BELOW GROUND SURFACE. FT MSL = FEET ABOVE MEAN SEA LEVEL.
 300 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL SURVEYED BY ZAHNER AND ASSOCIATES, INC ON SEPTEMBER 30, 2019.
 FT BTOC=FEET BELOW TOP OF CASING. RED FLINT SAND & GRAVEL FILTER, AQUAGUARD, AND BENTONITE BAGS WEIGH 50 LBS EACH.

CHECKED BY: R. FELDMANN
 DATE CHECKED: 1/15/2020

PREPARED BY: E. SCHNEIDER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P01S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 28.8	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN LENGTH <u>1</u> FT		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> <u>7</u> <u>0.27</u> LONG. <u>90</u> <u>15</u> <u>15.91</u>	
ANNULAR SEAL LENGTH <u>12</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL.		SECONDARY FILTER PACK LENGTH <u>1</u> FT.		DEPTH TO TOP OF PRIMARY FILTER PACK <u>16</u> FT.		LENGTH OF PRIMARY FILTER PACK <u>21.5</u> FT.		SMALLEST _____ LARGEST <u>SE</u> _____ SECTION <u>4</u> TOWNSHIP <u>39</u> NORTH RANGE <u>7</u> <input checked="" type="checkbox"/> EAST <input type="checkbox"/> WEST	
MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>18.9</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED	
SCREEN SCREEN DIAMETER <u>2.07</u> IN SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN DEPTH TO TOP <u>17</u> FT		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>		DEPTH TO TOP OF PRIMARY FILTER PACK <u>16</u> FT.		LENGTH OF PRIMARY FILTER PACK <u>21.5</u> FT.		TOTAL DEPTH: <u>37.5</u>	

FOR Cased Wells, submit additional as built diagrams showing well construction details including type & size of all casing, hole diameter & grout used

SIGNATURE (PRIMARY CONTRACTOR) <i>Troy Hill</i>	PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 12/03/2012	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>[Signature]</i>	PERMIT NUMBER 001192-M	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P03D	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 30.57	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER	LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>02.90</u> " LONG. <u>90</u> ° <u>15</u> ' <u>22.02</u> "																			
ANNULAR SEAL LENGTH <u>59</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>71.4</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>40</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST																				
SECONDARY FILTER PACK LENGTH <u>3</u> FT.		BENTONITE SEAL LENGTH <u>4</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCS <input type="checkbox"/> PESTICIDES/HERBICIDES																				
DEPTH TO TOP OF PRIMARY FILTER PACK <u>67</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>69.1</u> FT.		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH																				
LENGTH OF PRIMARY FILTER PACK <u>8</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		DEPTH TO FORMATION DESCRIPTION <table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>60</td> <td>0</td> <td>BLIND DRILL</td> </tr> <tr> <td>71.5</td> <td>60</td> <td>SP</td> </tr> <tr> <td>72.5</td> <td>71.5</td> <td>SW</td> </tr> <tr> <td>74</td> <td>72.5</td> <td>WOOD DEBRIS</td> </tr> <tr> <td>75</td> <td>74</td> <td>LIMESTONE</td> </tr> </tbody> </table>	DEPTH		FORMATION DESCRIPTION	TO	FROM	60	0	BLIND DRILL	71.5	60	SP	72.5	71.5	SW	74	72.5	WOOD DEBRIS	75	74	LIMESTONE
DEPTH		FORMATION DESCRIPTION																						
TO	FROM																							
60	0	BLIND DRILL																						
71.5	60	SP																						
72.5	71.5	SW																						
74	72.5	WOOD DEBRIS																						
75	74	LIMESTONE																						
TOTAL DEPTH:				75																				

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.		
SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/11/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
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C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	ENTERED	
APPROVED BY	ROUTE	
Ph1	Ph2	Ph3

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P03S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 31	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> . <u>7</u> . <u>2.94</u> . LONG. <u>90</u> . <u>15</u> . <u>22.24</u> .	
ANNULAR SEAL LENGTH <u>24</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT-SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG <u>14</u> GAL				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>31.2</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		SMALLEST _____ LARGEST _____ SECTION <u>4</u> TOWNSHIP <u>39</u> NORTH RANGE <u>7</u> <input checked="" type="checkbox"/> EAST <input type="checkbox"/> WEST	
SECONDARY FILTER PACK LENGTH <u>1</u> FT		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER _____		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVCCS <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>28</u> FT		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>29</u> FT		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>		DEPTH TO TOP OF FORMATION DESCRIPTION		FORMATION DESCRIPTION	
LENGTH OF PRIMARY FILTER PACK <u>21</u> FT		TOTAL DEPTH: <u>49</u>		TO 2 3 6 16 20 42 49		FROM 0 2 3 6 16 20 42		CL SP CL/ML CL/ML/SM/SP SP/SP-SM CL/ML/SC/SM SP	

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR) <i>Kevin Gerhardt</i>	PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 11-29-2012
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER) <i>[Signature]</i>	PERMIT NUMBER 004499	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
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STATE WELL NUMBER	APPROVED BY	
ENTERED	Ph1	Ph2 Ph3
ROUTE		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P051	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 28.23	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>08.93</u> " LONG. <u>90</u> ° <u>15</u> ' <u>29.68</u> "																		
ANNULAR SEAL LENGTH <u>44</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>58.3</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>40</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES																		
SECONDARY FILTER PACK LENGTH <u>2</u> FT.				BENTONITE SEAL LENGTH <u>6</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>0</td> <td>BLIND DRILL</td> </tr> <tr> <td>61.5</td> <td>50</td> <td>SP</td> </tr> <tr> <td>62</td> <td>61.5</td> <td>LIMESTONE</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>62</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	50	0	BLIND DRILL	61.5	50	SP	62	61.5	LIMESTONE	TOTAL DEPTH:
DEPTH		FORMATION DESCRIPTION																								
TO	FROM																									
50	0	BLIND DRILL																								
61.5	50	SP																								
62	61.5	LIMESTONE																								
TOTAL DEPTH:		62																								
DEPTH TO TOP OF PRIMARY FILTER PACK <u>53</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>56.1</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>																						

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.			
SIGNATURE (PRIMARY CONTRACTOR)		PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/12/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)		PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE) APPRENTICE PERMIT NUMBER



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ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri	CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604	CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P05S	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 29.9

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN. DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN. LENGTH <u>1</u> FT. SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____		LOCATION OF WELL (DIMS FORMAT ONLY) LAT. <u>38</u> <u>7</u> <u>9.15</u> LONG. <u>90</u> <u>15</u> <u>29.76</u> SMALLEST _____ LARGEST <u>SE</u> SECTION <u>4</u> TOWNSHIP <u>39</u> NORTH RANGE <u>7</u> <input checked="" type="checkbox"/> EAST <input type="checkbox"/> WEST MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH																														
ANNULAR SEAL LENGTH <u>19</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>27.0</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u> MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER _____																														
SECONDARY FILTER PACK LENGTH <u>1</u> FT DEPTH TO TOP OF PRIMARY FILTER PACK <u>24.5</u> FT LENGTH OF PRIMARY FILTER PACK <u>22</u> FT		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>24.5</u> FT. SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>																														
		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>0</td> <td>CL</td> </tr> <tr> <td>17</td> <td>9</td> <td>ML/SM</td> </tr> <tr> <td>19</td> <td>17</td> <td>ML/SM</td> </tr> <tr> <td>26</td> <td>19</td> <td>SP</td> </tr> <tr> <td>36</td> <td>26</td> <td>CL/SC/SM</td> </tr> <tr> <td>43</td> <td>37</td> <td>SP</td> </tr> <tr> <td>45</td> <td>43</td> <td>CL/ML</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>45</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	9	0	CL	17	9	ML/SM	19	17	ML/SM	26	19	SP	36	26	CL/SC/SM	43	37	SP	45	43	CL/ML	TOTAL DEPTH:		45
DEPTH		FORMATION DESCRIPTION																														
TO	FROM																															
9	0	CL																														
17	9	ML/SM																														
19	17	ML/SM																														
26	19	SP																														
36	26	CL/SC/SM																														
43	37	SP																														
45	43	CL/ML																														
TOTAL DEPTH:		45																														

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR) <i>Kevin Gerhardt</i>	PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 12/05/2012
---	---------------------------	--

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER) <i>[Signature]</i>	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
--	-------------------------	---------------------------	--------------------------



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	Ph1	Ph2 Ph3
APPROVED BY		ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P08D		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 42.96		

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER	LOCATION OF WELL (DM/S FORMAT ONLY) LAT. <u>38</u> - <u>07</u> - <u>22.72</u> LONG. <u>90</u> - <u>15</u> - <u>42.66</u>												
ANNULAR SEAL LENGTH <u>60</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL				SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC	SMALLEST _____% LARGEST _____% SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST												
SECONDARY FILTER PACK LENGTH <u>2.5</u> FT.		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>72.8</u> FT. DIAMETER OF DRILL HOLE <u>8.3</u> IN. WEIGHT OR SDR# <u>40</u>		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES													
DEPTH TO TOP OF PRIMARY FILTER PACK <u>69</u> FT.		BENTONITE SEAL LENGTH <u>5.5</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH													
LENGTH OF PRIMARY FILTER PACK <u>6</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>8.3</u> IN. DEPTH TO TOP <u>70.0</u> FT.		DEPTH <table border="1"> <thead> <tr> <th>TO</th> <th>FROM</th> <th>FORMATION DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>66</td> <td>0</td> <td>BLIND DRILL</td> </tr> <tr> <td>75</td> <td>66</td> <td>SP</td> </tr> <tr> <td>76</td> <td>75</td> <td>LIMESTONE</td> </tr> </tbody> </table>		TO	FROM	FORMATION DESCRIPTION	66	0	BLIND DRILL	75	66	SP	76	75	LIMESTONE
TO	FROM	FORMATION DESCRIPTION															
66	0	BLIND DRILL															
75	66	SP															
76	75	LIMESTONE															
SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		TOTAL DEPTH:		76													

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR) <i>Jason Friedrich</i>	PERMIT NUMBER 006093-M	DATE WELL DRILLING WAS COMPLETED 12/11/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>Matthew C. Berger</i>	PERMIT NUMBER 1503 M	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER

MO 700-1410 (07-11)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTACTOR PINK/OWNER

RETURN WHITE COPY WITH APPROPRIATE FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEY, WELLHEAD PROTECTION SECTION, PO BOX 250, ROLLA, MO 65402 573-368-2165



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	ENTERED	
APPROVED BY	ROUTE	
Ph1	Ph2	Ph3

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P08S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 41.5		

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN LENGTH <u>1</u> FT		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> <u>7</u> <u>22.77</u> LONG <u>90</u> <u>15</u> <u>42.71</u>	
ANNULAR SEAL LENGTH <u>33.5</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>42.8</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST	
SECONDARY FILTER PACK LENGTH <u>2</u> FT		BENTONITE SEAL LENGTH <u>2.5</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVCS <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>39</u> FT		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>40</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>		DEPTH TO TOP OF FORMATION DESCRIPTION		FORMATION DESCRIPTION	
LENGTH OF PRIMARY FILTER PACK <u>21</u> FT		TOTAL DEPTH:		61		TO FROM		SP-SM/SP CL/ML/SC/SM SP CL/ML SP	

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING HOLE DIAMETER & GROUT USED

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 11/30/2012	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P10S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 31	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (DIMS FORMAT ONLY) LAT <u>38</u> <u>7</u> <u>31.22</u> LONG <u>90</u> <u>15</u> <u>50.34</u>	
ANNULAR SEAL LENGTH <u>23.7</u> FT <input type="checkbox"/> SLURRY <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL				SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH	
SECONDARY FILTER PACK LENGTH <u>1.3</u> FT		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>31.4</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		DEPTH TO FROM 6 0 14 6 32 14 35 32 41 35 43 41 44 43 55 44		FORMATION DESCRIPTION SP SP ML/SM SP SM SP SM SP	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>28</u> FT		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN DEPTH TO TOP <u>29</u> FT		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		TOTAL DEPTH: 55			
LENGTH OF PRIMARY FILTER PACK <u>21</u> FT		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>							

FOR CASED WELLS SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/04/2012	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004499	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

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C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

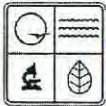
INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P13S	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 53.3	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN. LENGTH <u>1</u> FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____	LOCATION OF WELL (DIMS FORMAT ONLY) LAT. <u>38</u> <u>7</u> <u>35.74</u> - LONG. <u>90</u> <u>15</u> <u>37.70</u> - SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST																		
ANNULAR SEAL LENGTH <u>32</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT-SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>39.4</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES																			
SECONDARY FILTER PACK LENGTH <u>1</u> FT.		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER _____		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH																			
DEPTH TO TOP OF PRIMARY FILTER PACK <u>36</u> FT.		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		DEPTH <table border="1"> <thead> <tr> <th>TO</th> <th>FROM</th> <th>FORMATION DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>0</td> <td>SC/SM/SP</td> </tr> <tr> <td>26</td> <td>17</td> <td>CL/SC</td> </tr> <tr> <td>41</td> <td>26</td> <td>CL/ML/SM</td> </tr> <tr> <td>57.5</td> <td>41</td> <td>SP</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>57.5</td> </tr> </tbody> </table>		TO	FROM	FORMATION DESCRIPTION	17	0	SC/SM/SP	26	17	CL/SC	41	26	CL/ML/SM	57.5	41	SP	TOTAL DEPTH:		57.5
TO	FROM	FORMATION DESCRIPTION																					
17	0	SC/SM/SP																					
26	17	CL/SC																					
41	26	CL/ML/SM																					
57.5	41	SP																					
TOTAL DEPTH:		57.5																					
LENGTH OF PRIMARY FILTER PACK <u>21.5</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>37</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>																			

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED

SIGNATURE (PRIMARY CONTRACTOR) <i>[Signature]</i>	PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 12/11/2012	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>[Signature]</i>	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
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C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	ENTERED	
APPROVED BY	ROUTE	
Ph1	Ph2	Ph3

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center				WELL NUMBER P131	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 50.14	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>35.64</u> " LONG. <u>90</u> ° <u>15</u> ' <u>37.67</u> "	
ANNULAR SEAL LENGTH <u>67</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL				SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES	
SECONDARY FILTER PACK LENGTH <u>2.5</u> FT.		BENTONITE SEAL LENGTH <u>3</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		DEPTH TO TOP OF PRIMARY FILTER PACK <u>73.5</u> FT.	
LENGTH OF PRIMARY FILTER PACK <u>7.5</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>76</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		TOTAL DEPTH: <u>81</u>		FORMATION DESCRIPTION 42 - 0 ML;CL 81 - 42 SP	

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006092-M	DATE WELL DRILLING WAS COMPLETED 12/07/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.		
STATE WELL NUMBER	REVENUE NO.	
ENTERED	APPROVED BY	ROUTE
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P13D	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 49.98	

SURFACE COMPLETION		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED		SURFACE COMPLETION GROUT		LOCATION OF WELL (D/M/S FORMAT ONLY)	
TYPE	LENGTH AND DIAMETER OF SURFACE COMPLETION	DIAMETER	DEPTH	<input checked="" type="checkbox"/> CONCRETE			LAT. <u>38</u> ° <u>07</u> ' <u>35.62</u> "
<input checked="" type="checkbox"/> ABOVE GROUND	LENGTH <u>5</u> FT.	DIAMETER <u>24</u> IN.	LENGTH <u>1</u> FT.	<input type="checkbox"/> OTHER			LONG. <u>90</u> ° <u>15</u> ' <u>37.73</u> "
<input type="checkbox"/> FLUSH MOUNT	DIAMETER <u>4</u> IN.					SMALLEST _____ LARGEST _____	
<input checked="" type="checkbox"/> LOCKING CAP							SECTION _____ TOWNSHIP _____ NORTH
<input checked="" type="checkbox"/> WEEP HOLE							RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST
ANNULAR SEAL				MONITORING FOR: (CHECK ALL THAT APPLY)			
LENGTH <u>128</u> FT.							<input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY
<input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS							<input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC
<input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR							<input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES
<input type="checkbox"/> CEMENT/SLURRY							PROPOSED USE OF WELL
IF CEMENT/BENTONITE MIX:							<input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION
BAGS OF CEMENT USED _____							<input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE
% OF BENTONITE USED _____							<input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL
WATER USED/BAG _____ GAL.							<input type="checkbox"/> DIRECT PUSH
SECONDARY FILTER PACK				DEPTH			
LENGTH <u>2.5</u> FT.					TO	FROM	FORMATION DESCRIPTION
DEPTH TO TOP OF PRIMARY FILTER PACK <u>135.5</u> FT.				42 0 ML;CL			
LENGTH OF PRIMARY FILTER PACK <u>9.5</u> FT.				86 42 SP			
				92 86 ML			
				143 92 SP			
				145 143 LIMESTONE			
				TOTAL DEPTH:		145	

ELEVATION 408.52 FT.

129 129

133 133

135.5 138

145 143

RISER
RISER PIPE DIAMETER 1.94 IN.
RISER PIPE LENGTH 140 FT.
DIAMETER OF DRILL HOLE 6 IN.
WEIGHT OR SDR# 80

MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER _____

BENTONITE SEAL
LENGTH 4
 CHIPS PELLETS GRANULAR
 SLURRY
 SATURATED ZONE HYDRATED

SCREEN
SCREEN DIAMETER 1.94 IN.
SCREEN LENGTH 5 FT.
DIAMETER OF DRILL HOLE 6 IN.
DEPTH TO TOP 138 FT.

SCREEN MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER pre-pack

MO 780-1415 (7-11)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTACTOR PINK/OWNER
RETURN WHITE COPY WITH APPROPRIATE FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEY, WELLHEAD PROTECTION SECTION, PO BOX 250, ROLLA, MO 65402 573-368-2165



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
MONITORING WELL
CERTIFICATION RECORD

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.	
ENTERED	APPROVED BY	ROUTE
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY CNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P17D	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 34.98	

SURFACE COMPLETION TYPE		LENGTH AND DIAMETER OF SURFACE COMPLETION	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED	SURFACE COMPLETION GROUT	LOCATION OF WELL (D/M/S FORMAT ONLY)
<input checked="" type="checkbox"/> ABOVE GROUND	<input type="checkbox"/> FLUSH MOUNT	LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.	DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.	<input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER	LAT. <u>38</u> - <u>07</u> - <u>32.882</u> LONG. <u>90</u> - <u>15</u> - <u>24.56</u>
<input checked="" type="checkbox"/> LOCKING CAP	<input type="checkbox"/> WEEP HOLE				SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST
MONITORING FOR: (CHECK ALL THAT APPLY)					
ANNULAR SEAL		RISER			PROPOSED USE OF WELL
LENGTH <u>116</u> FT.	<input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY	RISER PIPE DIAMETER <u>1.94</u> IN. RISER PIPE LENGTH <u>128</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>80</u>	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		<input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH
IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.		BENTONITE SEAL		DEPTH	
SECONDARY FILTER PACK LENGTH <u>1</u> FT.		LENGTH <u>2</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		TO FROM FORMATION DESCRIPTION	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>120</u> FT.		SCREEN		19.8 0 SP, CL, ML, SM	
LENGTH OF PRIMARY FILTER PACK <u>14.2</u> FT.		SCREEN DIAMETER <u>1.94</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>8.3</u> IN. DEPTH TO TOP <u>125</u> FT.		43.5 19.8 SP, CL	
		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		133 43.5 SP	
				134.2 133 LIMESTONE	
				TOTAL DEPTH: <u>134.2</u>	

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR) <i>Jason Friedrich</i>	PERMIT NUMBER <u>6012-M</u>	DATE WELL DRILLING WAS COMPLETED 09/06/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>Matthew A. Cooper</i>	PERMIT NUMBER <u>1503 M</u>	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.	
ENTERED Ph1 Ph2 Ph3	APPROVED BY	ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P171	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 34.27	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>33.133</u> " LONG. <u>90</u> ° <u>15</u> ' <u>24.68</u> "																										
ANNULAR SEAL LENGTH <u>48</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>61.3</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>40</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES																										
SECONDARY FILTER PACK LENGTH <u>3.5</u> FT.				BENTONITE SEAL LENGTH <u>4</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>19.8</td> <td>0</td> <td>SP;CL;ML;SM</td> </tr> <tr> <td>43.5</td> <td>19.8</td> <td>SP;CL</td> </tr> <tr> <td>55</td> <td>43.5</td> <td>SP</td> </tr> <tr> <td>58</td> <td>55</td> <td>SP-SM</td> </tr> <tr> <td>65</td> <td>58</td> <td>SP</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>65</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	19.8	0	SP;CL;ML;SM	43.5	19.8	SP;CL	55	43.5	SP	58	55	SP-SM	65	58	SP	TOTAL DEPTH:		65
DEPTH				FORMATION DESCRIPTION																														
TO	FROM																																	
19.8	0	SP;CL;ML;SM																																
43.5	19.8	SP;CL																																
55	43.5	SP																																
58	55	SP-SM																																
65	58	SP																																
TOTAL DEPTH:		65																																
DEPTH TO TOP OF PRIMARY FILTER PACK <u>56.5</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>58.9</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>																														
LENGTH OF PRIMARY FILTER PACK <u>8.5</u> FT.																																		

FOR Cased Wells, submit additional as built diagrams showing well construction details including type & size of all casing, hole diameter & grout used.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/10/2013
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REFERENCE NO.		CHECK NO.	
C.R. NO.		REVENUE NO.	
STATE WELL NUMBER		APPROVED BY	
ENTERED		ROUTE	
Ph1	Ph2	Ph3	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P17S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 34	

SURFACE COMPLETION		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED		SURFACE COMPLETION GROUT		LOCATION OF WELL (D/M/S FORMAT ONLY)	
TYPE		LENGTH AND DIAMETER OF SURFACE COMPLETION		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED		SURFACE COMPLETION GROUT	
<input checked="" type="checkbox"/> ABOVE GROUND		LENGTH <u>5</u> FT		DIAMETER <u>9</u> IN.		<input checked="" type="checkbox"/> CONCRETE	
<input type="checkbox"/> FLUSH MOUNT		DIAMETER <u>4</u> IN.		LENGTH <u>1</u> FT		<input type="checkbox"/> OTHER _____	
<input checked="" type="checkbox"/> LOCKING CAP						LAT. <u>38</u> <u>7</u> <u>33.06</u>	
<input checked="" type="checkbox"/> WEEP HOLE						LONG <u>90</u> <u>15</u> <u>24.64</u>	
ANNULAR SEAL		SURFACE COMPLETION		RISER		SMALLEST _____ LARGEST _____	
LENGTH <u>11</u> FT		<input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		RISER PIPE DIAMETER <u>2.07</u> IN.		SECTION _____ TOWNSHIP _____ NORTH	
<input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS				RISER PIPE LENGTH <u>19.2</u> FT.		RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST	
<input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR				DIAMETER OF DRILL HOLE <u>9</u> IN.		MONITORING FOR: (CHECK ALL THAT APPLY)	
<input type="checkbox"/> CEMENT SLURRY				WEIGHT OR SDR# <u>40</u>		<input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY	
IF CEMENT/BENTONITE MIX:				MATERIAL		<input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC	
BAGS OF CEMENT USED _____				<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)		<input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES	
% OF BENTONITE USED <u>30</u>				<input type="checkbox"/> OTHER _____		PROPOSED USE OF WELL	
WATER USED/BAG <u>14</u> GAL						<input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION	
SECONDARY FILTER PACK		BENTONITE SEAL		SCREEN		<input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE	
LENGTH <u>2</u> FT		LENGTH <u>2</u>		SCREEN DIAMETER <u>2.07</u> IN		<input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>16</u> FT.		<input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR		SCREEN LENGTH <u>20</u> FT		<input type="checkbox"/> DIRECT PUSH	
LENGTH OF PRIMARY FILTER PACK <u>24</u> FT		<input type="checkbox"/> SLURRY		DIAMETER OF DRILL HOLE <u>9</u> IN		DEPTH	
		<input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		DEPTH TO TOP <u>17</u> FT		TO FROM FORMATION DESCRIPTION	
				SCREEN MATERIAL		13 0 SM	
				<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)		14 13 CL	
				<input type="checkbox"/> OTHER <u>0.010-in. slot</u>		24 14 SP	
						35 24 SP	
						36 35 CL	
						40 36 SP	
						TOTAL DEPTH: 40	

FOR CASED WELLS SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 11/27/2012
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	<input type="checkbox"/> PUMP INSTALLED
			APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri	CONTACT NAME Jason Frierdich		VARIANCE GRANTED BY DNR
OWNER ADDRESS 3700 S. Lindbergh Blvd	CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P19D	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 32.00

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>24.93</u> " LONG. <u>90</u> ° <u>15</u> ' <u>19.66</u> "																																		
ANNULAR SEAL LENGTH _____ FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.				RISER RISER PIPE DIAMETER <u>1.94</u> IN. RISER PIPE LENGTH <u>122</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>80</u>		SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST																																		
SECONDARY FILTER PACK LENGTH <u>2.5</u> FT.		BENTONITE SEAL LENGTH <u>6</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH																																		
DEPTH TO TOP OF PRIMARY FILTER PACK <u>117.5</u> FT.		SCREEN SCREEN DIAMETER <u>1.94</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>120</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>17.5</td> <td>0</td> <td>CL/ML;ML</td> </tr> <tr> <td>20</td> <td>17.5</td> <td>SP</td> </tr> <tr> <td>21.4</td> <td>20</td> <td>ML/CL</td> </tr> <tr> <td>35</td> <td>21.4</td> <td>SP;SP-SM;SM</td> </tr> <tr> <td>36.5</td> <td>35</td> <td>ML;CL/ML</td> </tr> <tr> <td>43</td> <td>36.5</td> <td>SM;SP</td> </tr> <tr> <td>46.7</td> <td>43</td> <td>CL</td> </tr> <tr> <td>126</td> <td>46.7</td> <td>SP</td> </tr> <tr> <td>127</td> <td>126</td> <td>LIMESTONE</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>127</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	17.5	0	CL/ML;ML	20	17.5	SP	21.4	20	ML/CL	35	21.4	SP;SP-SM;SM	36.5	35	ML;CL/ML	43	36.5	SM;SP	46.7	43	CL	126	46.7	SP	127	126	LIMESTONE	TOTAL DEPTH:		127
DEPTH		FORMATION DESCRIPTION																																								
TO	FROM																																									
17.5	0	CL/ML;ML																																								
20	17.5	SP																																								
21.4	20	ML/CL																																								
35	21.4	SP;SP-SM;SM																																								
36.5	35	ML;CL/ML																																								
43	36.5	SM;SP																																								
46.7	43	CL																																								
126	46.7	SP																																								
127	126	LIMESTONE																																								
TOTAL DEPTH:		127																																								

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/09/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	ENTERED	APPROVED BY
	Ph1 Ph2 Ph3	ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR						
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS						
OWNER NAME Ameren Missouri			CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER	
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P191		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus		STATIC WATER LEVEL 31.66	
SURFACE COMPLETION				LOCATION OF WELL (D/M/S FORMAT ONLY)		
TYPE		LENGTH AND DIAMETER OF SURFACE COMPLETION		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED		SURFACE COMPLETION GROUT
<input checked="" type="checkbox"/> ABOVE GROUND		LENGTH <u>5</u> FT.		DIAMETER <u>24</u> IN.		<input checked="" type="checkbox"/> CONCRETE
<input type="checkbox"/> FLUSH MOUNT		DIAMETER <u>4</u> IN.		LENGTH <u>1</u> FT.		<input type="checkbox"/> OTHER _____
<input checked="" type="checkbox"/> LOCKING CAP		ELEVATION <u>390.24</u> FT.		ANNULAR SEAL		LENGTH <u>49</u> FT.
<input checked="" type="checkbox"/> WEEP HOLE		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> CEMENT/SLURRY
		ANNULAR SEAL		LENGTH <u>49</u> FT.		IF CEMENT/BENTONITE MIX:
		ANNULAR SEAL		LENGTH <u>49</u> FT.		BAGS OF CEMENT USED _____
		ANNULAR SEAL		LENGTH <u>49</u> FT.		% OF BENTONITE USED _____
		ANNULAR SEAL		LENGTH <u>49</u> FT.		WATER USED/BAG _____ GAL.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SECONDARY FILTER PACK
		ANNULAR SEAL		LENGTH <u>49</u> FT.		LENGTH <u>2</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		DEPTH TO TOP OF PRIMARY
		ANNULAR SEAL		LENGTH <u>49</u> FT.		FILTER PACK <u>57</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		LENGTH OF PRIMARY FILTER
		ANNULAR SEAL		LENGTH <u>49</u> FT.		PACK <u>8</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		RISER
		ANNULAR SEAL		LENGTH <u>49</u> FT.		RISER PIPE DIAMETER <u>2.07</u> IN.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		RISER PIPE LENGTH <u>62</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		DIAMETER OF DRILL HOLE <u>6</u> IN.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		WEIGHT OR SDR# <u>40</u>
		ANNULAR SEAL		LENGTH <u>49</u> FT.		MATERIAL
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> OTHER _____
		ANNULAR SEAL		LENGTH <u>49</u> FT.		BENTONITE SEAL
		ANNULAR SEAL		LENGTH <u>49</u> FT.		LENGTH <u>5</u>
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> SLURRY
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SCREEN
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SCREEN DIAMETER <u>2.07</u> IN.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SCREEN LENGTH <u>5</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		DIAMETER OF DRILL HOLE <u>6</u> IN.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		DEPTH TO TOP <u>59.5</u> FT.
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SCREEN MATERIAL
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)
		ANNULAR SEAL		LENGTH <u>49</u> FT.		<input type="checkbox"/> OTHER <u>pre-pack</u>
		ANNULAR SEAL		LENGTH <u>49</u> FT.		FORMATION DESCRIPTION
		ANNULAR SEAL		LENGTH <u>49</u> FT.		CL/ML; ML
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SP
		ANNULAR SEAL		LENGTH <u>49</u> FT.		ML/CL
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SP;SP-SM;SM
		ANNULAR SEAL		LENGTH <u>49</u> FT.		ML;CL/ML
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SM;SP
		ANNULAR SEAL		LENGTH <u>49</u> FT.		CL
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SP
		ANNULAR SEAL		LENGTH <u>49</u> FT.		ML
		ANNULAR SEAL		LENGTH <u>49</u> FT.		SP
		ANNULAR SEAL		LENGTH <u>49</u> FT.		TOTAL DEPTH: 65
FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.						
SIGNATURE (PRIMARY CONTRACTOR)			PERMIT NUMBER 006011-M		DATE WELL DRILLING WAS COMPLETED 12/09/2013	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. <input type="checkbox"/> PUMP INSTALLED						
SIGNATURE (WELL DRILLER)			PERMIT NUMBER 004484-M		SIGNATURE (OF APPRENTICE)	
					APPRENTICE PERMIT NUMBER	



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR		
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS		
OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		VARIANCE GRANTED BY DNR NUMBER
CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P19S
SITE ADDRESS 100 Big Hollow Road		CITY Festus
		COUNTY Jefferson
		STATIC WATER LEVEL 33
SURFACE COMPLETION		
TYPE	LENGTH AND DIAMETER OF SURFACE COMPLETION	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED
<input checked="" type="checkbox"/> ABOVE GROUND	LENGTH <u>5</u> FT.	DIAMETER <u>9</u> IN.
<input type="checkbox"/> FLUSH MOUNT	DIAMETER <u>4</u> IN.	LENGTH <u>1</u> FT.
<input checked="" type="checkbox"/> LOCKING CAP		SURFACE COMPLETION GROUT
<input checked="" type="checkbox"/> WEEP HOLE		<input checked="" type="checkbox"/> CONCRETE
		<input type="checkbox"/> OTHER
ANNULAR SEAL		SURFACE COMPLETION
LENGTH <u>14</u> FT.		<input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC
<input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS		RISER
<input type="checkbox"/> PELETS <input type="checkbox"/> GRANULAR		RISER PIPE DIAMETER <u>2.07</u> IN.
<input type="checkbox"/> CEMENT-SLURRY		RISER PIPE LENGTH <u>22.7</u> FT.
IF CEMENT/BENTONITE MIX:		DIAMETER OF DRILL HOLE <u>9</u> IN.
BAGS OF CEMENT USED		WEIGHT OR SDR# <u>40</u>
% OF BENTONITE USED <u>30</u>		MATERIAL
WATER USED/BAG <u>14</u> GAL		<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)
		<input type="checkbox"/> OTHER
SECONDARY FILTER PACK		BENTONITE SEAL
LENGTH <u>2</u> FT.		LENGTH <u>3</u>
		<input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR
DEPTH TO TOP OF PRIMARY FILTER PACK <u>20</u> FT.		<input type="checkbox"/> SLURRY
		<input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED
LENGTH OF PRIMARY FILTER PACK <u>23</u> FT.		SCREEN
		SCREEN DIAMETER <u>2.07</u> IN.
		SCREEN LENGTH <u>20</u> FT.
		DIAMETER OF DRILL HOLE <u>9</u> IN.
		DEPTH TO TOP <u>22</u> FT.
		SCREEN MATERIAL
		<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC)
		<input type="checkbox"/> OTHER 0.010-in. slot
ELEVATION <u>390.44</u> FT.		LOCATION OF WELL (D/M/S FORMAT ONLY)
		LAT <u>38</u> <u>7</u> <u>24.96</u>
		LONG <u>90</u> <u>15</u> <u>19.74</u>
		SMALLEST _____ LARGEST _____
		SECTION _____ TOWNSHIP _____ NORTH
		RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST
		MONITORING FOR: (CHECK ALL THAT APPLY)
		<input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY
		<input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC
		<input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES
		PROPOSED USE OF WELL
		<input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION
		<input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE
		<input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL
		<input type="checkbox"/> DIRECT PUSH
		DEPTH
		TO FROM FORMATION DESCRIPTION
		14 0 SP-SM/SP
		15 14 SC/SM
		22 15 SP-SM/SP
		23 22 CL
		34 23 SP
		35 34 CL/SC/SM
		41 35 SP
		43 41 CL
		TOTAL DEPTH: <u>43</u>
FOR CASED WELLS SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED		
SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 11/28/2012
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER

MO 2007-115 (07-11) DISTRIBUTION: WHITE/DIVISION CANARY/CONTACTOR PINK/OWNER
RETURN WHITE COPY WITH APPROPRIATE FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEY,
WELLHEAD PROTECTION SECTION, PO BOX 250, ROLLA, MO 65402 573-368-2165



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	ENTERED	
APPROVED BY	Ph1	Ph2 Ph3
ROUTE		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri	CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR
OWNER ADDRESS 3700 S. Lindbergh Blvd	CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P21D	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 33.05

SURFACE COMPLETION

TYPE
 ABOVE GROUND
 FLUSH MOUNT

LENGTH AND DIAMETER OF SURFACE COMPLETION
 LENGTH 5 FT.
 DIAMETER 4 IN.

DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED
 DIAMETER 24 IN.
 LENGTH 1 FT.

SURFACE COMPLETION GROUT
 CONCRETE
 OTHER _____

LOCKING CAP
 WEEP HOLE

ELEVATION 391.04 FT.

ANNULAR SEAL
 LENGTH 111 FT.
 SLURRY CHIPS
 PELLETS GRANULAR
 CEMENT/SLURRY
 IF CEMENT/BENTONITE MIX:
 BAGS OF CEMENT USED _____
 % OF BENTONITE USED _____
 WATER USED/BAG _____ GAL.

SECONDARY FILTER PACK
 LENGTH 2 FT.

DEPTH TO TOP OF PRIMARY FILTER PACK 117 FT.

LENGTH OF PRIMARY FILTER PACK 7.5 FT.

RISER
 RISER PIPE DIAMETER 1.94 IN.
 RISER PIPE LENGTH 122 FT.
 DIAMETER OF DRILL HOLE 6 IN.
 WEIGHT OR SDR# 80

MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER _____

BENTONITE SEAL
 LENGTH 3
 CHIPS PELLETS GRANULAR
 SLURRY
 SATURATED ZONE HYDRATED

SCREEN
 SCREEN DIAMETER 1.94 IN.
 SCREEN LENGTH 5 FT.
 DIAMETER OF DRILL HOLE 6 IN.
 DEPTH TO TOP 119 FT.

SCREEN MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER pre-pack

LOCATION OF WELL (D/M/S FORMAT ONLY)
 LAT. 38 ° 07 ' 14.91 "
 LONG. 90 ° 15 ' 13.70 "

SMALLEST _____ LARGEST _____
 SECTION _____ TOWNSHIP _____ NORTH
 RANGE _____ EAST WEST

MONITORING FOR: (CHECK ALL THAT APPLY)
 RADIONUCLIDES PETROLEUM PRODUCTS ONLY
 EXPLOSIVES METALS VOC
 SVOCs PESTICIDES/HERBICIDES

PROPOSED USE OF WELL
 GAS MIGRATION WELL OBSERVATION
 EXTRACTION WELL OPEN HOLE
 PIEZOMETERS INJECTION WELL
 DIRECT PUSH

DEPTH		FORMATION DESCRIPTION
TO	FROM	
24	0	ML;CL
38	24	SP
39	38	CL
44.5	39	SP
45.5	44.5	CL
48.5	45.5	SP
49	48.5	CL
124	49	SP
125	124	LIMESTONE
TOTAL DEPTH:		125

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/09/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



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 GEOLOGICAL SURVEY PROGRAM
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STATE WELL NUMBER	APPROVED BY	
ENTERED	ROUTE	
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Frierdich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P211	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 33.13	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>14.92</u> " LONG. <u>90</u> ° <u>15</u> ' <u>13.75</u> "																																	
ANNULAR SEAL LENGTH <u>51</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>60.1</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>40</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES																																	
SECONDARY FILTER PACK LENGTH <u>1</u> FT.				BENTONITE SEAL LENGTH <u>3</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>0</td> <td>ML;CL</td> </tr> <tr> <td>38</td> <td>24</td> <td>SP</td> </tr> <tr> <td>39</td> <td>38</td> <td>CL</td> </tr> <tr> <td>44.5</td> <td>39</td> <td>SP</td> </tr> <tr> <td>45.5</td> <td>44.5</td> <td>CL</td> </tr> <tr> <td>48.5</td> <td>45.5</td> <td>SP</td> </tr> <tr> <td>49</td> <td>48.5</td> <td>CL</td> </tr> <tr> <td>65</td> <td>49</td> <td>SP</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>65</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	24	0	ML;CL	38	24	SP	39	38	CL	44.5	39	SP	45.5	44.5	CL	48.5	45.5	SP	49	48.5	CL	65	49	SP	TOTAL DEPTH:
DEPTH		FORMATION DESCRIPTION																																							
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45.5	44.5	CL																																							
48.5	45.5	SP																																							
49	48.5	CL																																							
65	49	SP																																							
TOTAL DEPTH:		65																																							
DEPTH TO TOP OF PRIMARY FILTER PACK <u>56</u> FT.		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>57.8</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>																																					

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.			
SIGNATURE (PRIMARY CONTRACTOR)		PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/09/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)		PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)
			APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	Ph1	Ph2 Ph3
ROUTE		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR			
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS			
OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P21S	ZIP CODE 63127
SITE ADDRESS 100 Big Hollow Road		CITY Festus	COUNTY Jefferson
SURFACE COMPLETION TYPE		LOCATION OF WELL (DIM'S FORMAT ONLY)	
<input checked="" type="checkbox"/> ABOVE GROUND	LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.	LAT. <u>38</u> ° <u>7</u> ' <u>14.86</u> "	
<input type="checkbox"/> FLUSH MOUNT	DIAMETER <u>4</u> IN.	LONG. <u>90</u> ° <u>15</u> ' <u>13.78</u> "	
<input checked="" type="checkbox"/> LOCKING CAP	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN. LENGTH <u>1</u> FT.	SMALLEST _____ LARGEST _____	
<input checked="" type="checkbox"/> WEEP HOLE	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____	SECTION _____ TOWNSHIP _____ NORTH RANGE _____ EAST WEST	
ELEVATION <u>391.30</u> FT.	ANNULAR SEAL LENGTH <u>15</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL	MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES	
SECONDARY FILTER PACK LENGTH <u>1</u> FT.	DEPTH TO TOP OF PRIMARY FILTER PACK <u>19</u> FT.	PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH	
LENGTH OF PRIMARY FILTER PACK <u>21</u> FT.	SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>20</u> FT.	FORMATION DESCRIPTION	
	SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>	BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED	
		TOTAL DEPTH: <u>40</u>	
FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED			
SIGNATURE (PRIMARY CONTRACTOR) <i>Tommy H. O'Connell</i>		PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 11/28/2012
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>[Signature]</i>		PERMIT NUMBER 004499	SIGNATURE (OF APPRENTICE) APPRENTICE PERMIT NUMBER

MO 780-1415 (07-11)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTACTOR PINK/OWNER
 RETURN WHITE COPY WITH APPROPRIATE FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEY,
 WELLHEAD PROTECTION SECTION, PO BOX 250, ROLLA, MO 65402 573-368-2165



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	ROUTE	
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri	CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR
OWNER ADDRESS 3700 S. Lindbergh Blvd	CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P22D	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 33.50

SURFACE COMPLETION

TYPE
 ABOVE GROUND
 FLUSH MOUNT

LENGTH AND DIAMETER OF SURFACE COMPLETION
 LENGTH 5 FT.
 DIAMETER 4 IN.

DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED
 DIAMETER 24 IN.
 LENGTH 1 FT.

SURFACE COMPLETION GROUT
 CONCRETE
 OTHER _____

LOCKING CAP
 WEEP HOLE

ELEVATION 391.63 FT.

ANNULAR SEAL
 LENGTH 95 FT.
 SLURRY CHIPS
 PELLETS GRANULAR
 CEMENT/SLURRY
 IF CEMENT/BENTONITE MIX:
 BAGS OF CEMENT USED _____
 % OF BENTONITE USED _____
 WATER USED/BAG _____ GAL

SECONDARY FILTER PACK
 LENGTH 2 FT.

DEPTH TO TOP OF PRIMARY FILTER PACK 102.5 FT.

LENGTH OF PRIMARY FILTER PACK 7.5 FT.

RISER
 RISER PIPE DIAMETER 1.94 IN.
 RISER PIPE LENGTH 107 FT.
 DIAMETER OF DRILL HOLE 6 IN.
 WEIGHT OR SDR# 80

MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER _____

BENTONITE SEAL
 LENGTH 4.5
 CHIPS PELLETS GRANULAR
 SLURRY
 SATURATED ZONE HYDRATED

SCREEN
 SCREEN DIAMETER 1.94 IN.
 SCREEN LENGTH 5 FT.
 DIAMETER OF DRILL HOLE 6 IN.
 DEPTH TO TOP 105 FT.

SCREEN MATERIAL
 STEEL THERMOPLASTIC (PVC)
 OTHER pre-pack

LOCATION OF WELL (D/M/S FORMAT ONLY)
 LAT. 38 ° 07 ' 08.73 "
 LONG. 90 ° 15 ' 13.88 "

SMALLEST _____ LARGEST _____
 SECTION _____ TOWNSHIP _____ NORTH
 RANGE _____ EAST WEST

MONITORING FOR: (CHECK ALL THAT APPLY)
 RADIONUCLIDES PETROLEUM PRODUCTS ONLY
 EXPLOSIVES METALS VOC
 SVCCS PESTICIDES/HERBICIDES

PROPOSED USE OF WELL
 GAS MIGRATION WELL OBSERVATION
 EXTRACTION WELL OPEN HOLE
 PIEZOMETERS INJECTION WELL
 DIRECT PUSH

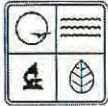
DEPTH		FORMATION DESCRIPTION
TO	FROM	
15.5	0	SM;SP-SM;s(ML)
28	15.5	CL;SM;ML
110	28	SP
TOTAL DEPTH:		110

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006092-M	DATE WELL DRILLING WAS COMPLETED 12/07/2013
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	ROUTE	
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri	CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR
OWNER ADDRESS 3700 S. Lindbergh Blvd	CITY Saint Louis	STATE MO	ZIP CODE 63127
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P221	COUNTY Jefferson
SITE ADDRESS 100 Big Hollow Road		CITY Festus	STATIC WATER LEVEL 33.31

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>07</u> ' <u>08.67</u> " LONG. <u>90</u> ° <u>15</u> ' <u>13.89</u> "													
ANNULAR SEAL LENGTH <u>51</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>60.9</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>40</u>		SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST													
SECONDARY FILTER PACK LENGTH <u>2</u> FT.		BENTONITE SEAL LENGTH <u>4</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>59</u> FT.		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVCCS <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH													
DEPTH TO TOP OF PRIMARY FILTER PACK <u>57</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>15.5</td> <td>0</td> <td>SM;SP-SM;s(ML)</td> </tr> <tr> <td>28</td> <td>15.5</td> <td>CL;SM;ML</td> </tr> <tr> <td>65</td> <td>28</td> <td>SP</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	15.5	0	SM;SP-SM;s(ML)	28	15.5	CL;SM;ML	65	28	SP	TOTAL DEPTH: <u>65</u>	
DEPTH		FORMATION DESCRIPTION																			
TO	FROM																				
15.5	0	SM;SP-SM;s(ML)																			
28	15.5	CL;SM;ML																			
65	28	SP																			

FOR CASED WELLS, SUBMIT ADDITIONAL AS-BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006092-M	DATE WELL DRILLING WAS COMPLETED 12/08/2013
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLERY)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	ROUTE	
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P22S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 33.8	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> <u>7</u> <u>8.72</u> - LONG. <u>90</u> <u>15</u> <u>14.02</u> -																
ANNULAR SEAL LENGTH <u>13</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL				RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>21.2</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		SURFACE COMPLETION <input checked="" type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOS VES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCS <input type="checkbox"/> PESTICIDES/HERBICIDES																
SECONDARY FILTER PACK LENGTH <u>1.5</u> FT		BENTONITE SEAL LENGTH <u>2.5</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		DEPTH <table border="1"> <thead> <tr> <th>TO</th> <th>FROM</th> <th>FORMATION DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>19</td> <td>0</td> <td>SP-SM</td> </tr> <tr> <td>25</td> <td>19</td> <td>SM</td> </tr> <tr> <td>28</td> <td>25</td> <td>SP</td> </tr> <tr> <td>41</td> <td>28</td> <td>SP</td> </tr> </tbody> </table>		TO	FROM	FORMATION DESCRIPTION	19	0	SP-SM	25	19	SM	28	25	SP	41	28	SP
TO	FROM	FORMATION DESCRIPTION																						
19	0	SP-SM																						
25	19	SM																						
28	25	SP																						
41	28	SP																						
DEPTH TO TOP OF PRIMARY FILTER PACK <u>18</u> FT		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>19</u> FT		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>		TOTAL DEPTH: <u>41</u>		LENGTH OF PRIMARY FILTER PACK <u>23</u> FT																

FOR CASED WELLS SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 11/29/2012
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER)	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
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MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

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REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED Ph1 Ph2 Ph3	ROUTE	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Jason Friedrich		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindbergh Blvd		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P29D	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 37.76	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN. LENGTH <u>1</u> FT.		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>08</u> ' <u>03.51</u> " LONG. <u>90</u> ° <u>16</u> ' <u>24.16</u> "																														
ANNULAR SEAL LENGTH <u>85</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL				RISER RISER PIPE DIAMETER <u>1.94</u> IN. RISER PIPE LENGTH <u>97.3</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. WEIGHT OR SDR# <u>80</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCS <input type="checkbox"/> PESTICIDES/HERBICIDES																														
SECONDARY FILTER PACK LENGTH <u>2</u> FT.		BENTONITE SEAL LENGTH <u>5</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER _____		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH		<table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>0</td> <td>BLIND DRILL</td> </tr> <tr> <td>52</td> <td>50</td> <td>SP-SM</td> </tr> <tr> <td>57</td> <td>52</td> <td>SP</td> </tr> <tr> <td>58.5</td> <td>57</td> <td>CL</td> </tr> <tr> <td>60</td> <td>58.5</td> <td>SP/CL</td> </tr> <tr> <td>99.5</td> <td>60</td> <td>SP</td> </tr> <tr> <td>105</td> <td>99.5</td> <td>LIMESTONE</td> </tr> <tr> <td colspan="2">TOTAL DEPTH:</td> <td>105</td> </tr> </tbody> </table>		DEPTH		FORMATION DESCRIPTION	TO	FROM	50	0	BLIND DRILL	52	50	SP-SM	57	52	SP	58.5	57	CL	60	58.5	SP/CL	99.5	60	SP	105	99.5	LIMESTONE	TOTAL DEPTH:		105
DEPTH		FORMATION DESCRIPTION																																				
TO	FROM																																					
50	0	BLIND DRILL																																				
52	50	SP-SM																																				
57	52	SP																																				
58.5	57	CL																																				
60	58.5	SP/CL																																				
99.5	60	SP																																				
105	99.5	LIMESTONE																																				
TOTAL DEPTH:		105																																				
DEPTH TO TOP OF PRIMARY FILTER PACK <u>93</u> FT.		SCREEN SCREEN DIAMETER <u>1.94</u> IN. SCREEN LENGTH <u>5</u> FT. DIAMETER OF DRILL HOLE <u>6</u> IN. DEPTH TO TOP <u>95.3</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input type="checkbox"/> THERMOPLASTIC (PVC) <input checked="" type="checkbox"/> OTHER <u>pre-pack</u>																																		
LENGTH OF PRIMARY FILTER PACK <u>12</u> FT.																																						

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006011-M	DATE WELL DRILLING WAS COMPLETED 12/11/2013
--------------------------------	----------------------------------	--

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS. PUMP INSTALLED

SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004484-M	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER
--------------------------	----------------------------------	---------------------------	--------------------------



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
 CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	REVENUE NO.	
STATE WELL NUMBER	APPROVED BY	
ENTERED	RCUTE	
Ph1 Ph2 Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
 NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P29S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 38.6	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT. DIAMETER <u>4</u> IN.		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>12</u> IN. LENGTH <u>2</u> FT		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER		LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> . <u>08</u> . <u>03.44</u> LONG <u>90</u> . <u>16</u> . <u>24.23</u>	
ANNULAR SEAL LENGTH <u>24</u> FT. <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>32.1</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SD# <u>40</u>		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH	
SECONDARY FILTER PACK LENGTH <u>None</u> FT		BENTONITE SEAL LENGTH <u>2</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>30</u> FT.		DEPTH TO FROM FORMATION DESCRIPTION 0 12 Hydroexcavate 22 17 OL 27 22 SM 39 27 SP 39.5 39 OH 43 39.5 SM 50 43 SP		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>pre-pack</u>	
DEPTH TO TOP OF PRIMARY FILTER PACK <u>28</u> FT		LENGTH OF PRIMARY FILTER PACK <u>22</u> FT.		TOTAL DEPTH: <u>50</u>					

FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER 006021-M	DATE WELL DRILLING WAS COMPLETED 01/17/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS		<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)	PERMIT NUMBER 004499	SIGNATURE (OF APPRENTICE)
		APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY			DATE RECEIVED	
REFERENCE NO.			CHECK NO.	
C.R. NO.			REVENUE NO.	
STATE WELL NUMBER			APPROVED BY	
ENTERED			ROUTE	
Ph1	Ph2	Ph3		

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	
SITE NAME Ameren Missouri Rush Island Energy Center		WELL NUMBER P30S		COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road		CITY Festus		STATIC WATER LEVEL 50.9	

SURFACE COMPLETION TYPE <input type="checkbox"/> ABOVE GROUND <input checked="" type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input type="checkbox"/> WEEP HOLE ELEVATION <u>407.86</u> FT		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>1</u> FT DIAMETER <u>8</u> IN		DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>24</u> IN LENGTH <u>1</u> FT		SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____		LOCATION OF WELL (DIMS FORMAT ONLY) LAT <u>38</u> <u>07</u> <u>51.58</u> LONG <u>90</u> <u>15</u> <u>38.90</u>																				
ANNULAR SEAL LENGTH <u>35</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT/SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL		SECONDARY FILTER PACK LENGTH <u>None</u> FT		RISER RISER PIPE DIAMETER <u>2.07</u> IN RISER PIPE LENGTH <u>39.8</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN WEIGHT OR SDR# <u>40</u>		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH																				
DEPTH TO TOP OF PRIMARY FILTER PACK <u>38</u> FT		LENGTH OF PRIMARY FILTER PACK <u>22</u> FT		MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER _____		BENTONITE SEAL LENGTH <u>2</u> <input type="checkbox"/> CHIPS <input checked="" type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input type="checkbox"/> SATURATED ZONE <input checked="" type="checkbox"/> HYDRATED		SCREEN SCREEN DIAMETER <u>2.07</u> IN SCREEN LENGTH <u>20</u> FT DIAMETER OF DRILL HOLE <u>9</u> IN DEPTH TO TOP <u>40</u> FT																				
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DEPTH		FORMATION DESCRIPTION																										
TO	FROM																											
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13.5	12	Ash																										
17	13.5	SP																										
22	17	SM																										
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FOR CASED WELLS, SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED			
SIGNATURE (PRIMARY CONTRACTOR)		PERMIT NUMBER 006021-M	DATE WELL DRILLING WAS COMPLETED 01/16/2013
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER)		PERMIT NUMBER 004499	SIGNATURE (OF APPRENTICE) APPRENTICE PERMIT NUMBER



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REFERENCE NO.	CHECK NO.	
C.R. NO.	STATE WELL NUMBER	
ENTERED		APPROVED BY
Ph1	Ph2	Ph3
REVENUE NO.		ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR
NOTE: THIS FORM IS NOT TO BE USED FOR NESTED WELLS

OWNER NAME Ameren Missouri		CONTACT NAME Kevin Gerhardt		VARIANCE GRANTED BY DNR	
OWNER ADDRESS 3700 S. Lindberg Blvd, Mail Code F-604		CITY Saint Louis	STATE MO	ZIP CODE 63127	NUMBER
SITE NAME Ameren Missouri Rush Island Energy Center			WELL NUMBER P31S	COUNTY Jefferson	
SITE ADDRESS 100 Big Hollow Road			CITY Festus	STATIC WATER LEVEL 8.0	

SURFACE COMPLETION TYPE <input checked="" type="checkbox"/> ABOVE GROUND <input type="checkbox"/> FLUSH MOUNT <input checked="" type="checkbox"/> LOCKING CAP <input checked="" type="checkbox"/> WEEP HOLE		LENGTH AND DIAMETER OF SURFACE COMPLETION LENGTH <u>5</u> FT DIAMETER <u>4</u> IN	DIAMETER AND DEPTH OF THE HOLE SURFACE COMPLETION WAS PLACED DIAMETER <u>9</u> IN LENGTH <u>1</u> FT	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER _____	LOCATION OF WELL (D/M/S FORMAT ONLY) LAT. <u>38</u> ° <u>7</u> ' <u>41.95</u> " LONG. <u>90</u> ° <u>15</u> ' <u>57.96</u> "										
ANNULAR SEAL LENGTH <u>24</u> FT <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> CEMENT SLURRY IF CEMENT/BENTONITE MIX: BAGS OF CEMENT USED _____ % OF BENTONITE USED <u>30</u> WATER USED/BAG <u>14</u> GAL		RISER RISER PIPE DIAMETER <u>2.07</u> IN. RISER PIPE LENGTH <u>34.6</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. WEIGHT OR SDR# <u>40</u>		SMALLEST _____ LARGEST _____ SECTION _____ TOWNSHIP _____ NORTH RANGE _____ <input type="checkbox"/> EAST <input type="checkbox"/> WEST											
SECONDARY FILTER PACK LENGTH <u>NONE</u> FT		BENTONITE SEAL LENGTH <u>2</u> <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> PELLETS <input type="checkbox"/> GRANULAR <input type="checkbox"/> SLURRY <input checked="" type="checkbox"/> SATURATED ZONE <input type="checkbox"/> HYDRATED		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input type="checkbox"/> VOC <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES											
DEPTH TO TOP OF PRIMARY FILTER PACK <u>27</u> FT		SCREEN SCREEN DIAMETER <u>2.07</u> IN. SCREEN LENGTH <u>20</u> FT. DIAMETER OF DRILL HOLE <u>9</u> IN. DEPTH TO TOP <u>32</u> FT.		PROPOSED USE OF WELL <input type="checkbox"/> GAS MIGRATION WELL <input type="checkbox"/> OBSERVATION <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> OPEN HOLE <input checked="" type="checkbox"/> PIEZOMETERS <input type="checkbox"/> INJECTION WELL <input type="checkbox"/> DIRECT PUSH											
LENGTH OF PRIMARY FILTER PACK <u>25.5</u> FT.		SCREEN MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER <u>0.010-in. slot</u>		FORMATION DESCRIPTION <table border="1"> <thead> <tr> <th colspan="2">DEPTH</th> <th rowspan="2">FORMATION DESCRIPTION</th> </tr> <tr> <th>TO</th> <th>FROM</th> </tr> </thead> <tbody> <tr> <td>41</td> <td>0</td> <td>SP</td> </tr> <tr> <td>55</td> <td>41</td> <td>SP</td> </tr> </tbody> </table>	DEPTH		FORMATION DESCRIPTION	TO	FROM	41	0	SP	55	41	SP
DEPTH		FORMATION DESCRIPTION													
TO	FROM														
41	0	SP													
55	41	SP													
FOR CASED WELLS, SUBMIT ADDITIONAL AS BLDG. DRAWINGS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE & SIZE OF ALL CASING, HOLE DIAMETER & GROUT USED.		TOTAL DEPTH: <u>55</u>													

SIGNATURE (PRIMARY CONTRACTOR) <i>[Signature]</i>	PERMIT NUMBER 006012-M	DATE WELL DRILLING WAS COMPLETED 12/10/2012	
I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.			<input type="checkbox"/> PUMP INSTALLED
SIGNATURE (WELL DRILLER) <i>[Signature]</i>	PERMIT NUMBER 001192	SIGNATURE (OF APPRENTICE)	APPRENTICE PERMIT NUMBER

APPENDIX C

Well Abandonment Records



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00547344	01/09/2020	
CR NO		CHECK NO.	6004
		TRANSMITTAL NO.	010920
STATE WELL NUMBER		APPROVED BY	
ENTERED NRROBEC		ROUTE	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 S LINDBERG MAIL CODE F604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P03D		DATE	
LOCATION OF WELL	DRILL AREA	SMALLEST		LARGEST	
LAT. <u>38° 7' 0.0"</u>	Code Description not found	<u>1/4</u>		<u>1/4</u>	
LONG. <u>90° 15' 0.0"</u>	COUNTY	Sec. <u> </u>		Township <u> </u> North Range. <u> </u>	
		JEFFERSON			

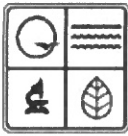
PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
		5.7	
<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)	
DEPTH OF THE WELL	LENGTH OF RISER	QUANTITY	DEPTH
76.5 FT.	0.0 FT.		
SCREEN/RISER DIAMETER	WELL SCREEN AND RISER REMOVED?	TYPE OF FILL MATERIAL	
0.0 IN.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER	
PUMP AND SAMPLING EQUIPMENT REMOVED?	CASING REMOVED?	AMOUNT OF FILL USED	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	<input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS	
		total BORING(S)	total FT.
GROUT INSTALLATION METHOD	GROUT MATERIAL USED	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE?	TOTAL NUMBER OF BAGS OF GROUT USED
<input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	5.0 <input checked="" type="checkbox"/> Hydrated to Saturation	2.0
			POUNDS OF GROUT PER BAG 50
DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED	FINISHED SURFACE MATERIAL	SURFACE MATERIAL LENGTH
10/02/2019	11/26/2019	<input type="checkbox"/> Soil <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	2.0 IN.
REMARKS		REASON FOR ABANDONMENT	

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 11/26/2019
PERMIT NUMBER x 001560	DATE 11/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, P.O. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00547347	01/09/2020	
CR NO		CHECK NO.	6004
		TRANSMITTAL NO.	010920
STATE WELL NUMBER		APPROVED BY	
ENTERED NRROBEC		ROUTE	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 S LINDBERG MAIL CODE F604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P03S	DATE		REFERENCE NUMBER OF ORIGINAL WELL (IF KNOWN)
LOCATION OF WELL	DRILL AREA	SMALLEST LARGEST			
LAT. <u>38</u> ° <u>7</u> ' <u>0.0</u> "	Code Description not found	<u>1/4</u> <u>1/4</u> <u>1/4</u>			
LONG. <u>90</u> ° <u>15</u> ' <u>0.0</u> "	COUNTY	Sec. Township _____ North Range. _____			
	JEFFERSON				

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
		7.3	
<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)	
DEPTH OF THE WELL 51.7 FT.		LENGTH OF RISER 0.0 FT.	Boring Diameter: IN.
SCREEN/RISER DIAMETER 0.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	QUANTITY	DEPTH
PUMP AND SAMPLING EQUIPMENT REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> No		
			TYPE OF FILL MATERIAL <input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER
		total BORING(S)	total FT.
GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation	TOTAL NUMBER OF BAGS OF GROUT USED 1.5 POUNDS OF GROUT PER BAG 50
DATE 1st WELL PLUGGED 10/02/2019	DATE LAST WELL PLUGGED 11/26/2019	FINISHED SURFACE MATERIAL <input type="checkbox"/> Soil <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	SURFACE MATERIAL LENGTH 2.0 IN.
REMARKS		REASON FOR ABANDONMENT	
I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.			
SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY		SIGNATURE (CONTRACTOR) x JERRY HANCOCK	
PERMIT NUMBER x 001560	DATE 11/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER 004497
			DATE 11/26/2019

REMIT TO: WELL INSTALLATION SECTION, P.O. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523081	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052443	APPROVED BY	
ENTERED NRSMITK4		DATE APPROVED	07/23/2019
		ROUTE	
		PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER MW 7	DATE		REFERENCE NUMBER OF ORIGINAL WELL (IF KNOWN)
LOCATION OF WELL	DRILL AREA	SMALLEST LARGEST _____ 1/4 _____ 1/4 _____ NW 1/4 Sec. _____ 4 Township _____ 39 North Range. _____ 7 E			
LAT. <u>38</u> ° <u>7</u> ' <u>31.14</u> "					
LONG. <u>90</u> ° <u>15</u> ' <u>45.17</u> "	COUNTY JEFFERSON				

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
JASON DRABEK	10/28/2015	8.0	

<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.
DEPTH OF THE WELL 96.6 FT.	LENGTH OF RISER 94.0 FT.	QUANTITY	DEPTH	TYPE OF FILL MATERIAL
SCREEN/RISER DIAMETER 2.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER
PUMP AND SAMPLING EQUIPMENT REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No			AMOUNT OF FILL USED <input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS
		total BORING(S)	total FT.	DEPTH TO TOP OF FILL FT

GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation	TOTAL NUMBER OF BAGS OF GROUT USED 1.3 POUNDS OF GROUT PER BAG 50
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DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED 06/27/2019	FINISHED SURFACE MATERIAL <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	SURFACE MATERIAL LENGTH 3.0 IN.
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REMARKS	REASON FOR ABANDONMENT

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 06/27/2019
PERMIT NUMBER x 001560	DATE 06/27/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
BORING PLUGGING REGISTRATION REPORT

FOR OFFICE USE ONLY	
REF NO. 523081	DATE RECEIVED JUN 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. B052443	REVENUE NO. 071819

ROUTE RD 03	APPROVED ~	DATE 7/23/19	ENTERED KKK
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OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE MO
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center		DNR/EPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)	
VARIANCE NUMBER (IF ISSUED)		PERMIT NUMBER 001560-WPM	
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly		Section 256.607(3), RSMo, requires all primary contractors to comply with all rules and regulations promulgated pursuant to Sections 256.600 to 256.640 RSMo.	

LOCATION INFORMATION			
Latitude 38 ° 7 ' 31.14 "	Longitude 90 ° 15 ' 45.17 "	COUNTY Jefferson	Section 4 Township 39 N Range 7 E W

MONITORING WELL INFORMATION					
DATE WELL PLUGGED 6/27/2019	ORIGINAL DRILLER (IF KNOWN) Jason Drabek	DATE ORIGINALLY DRILLED (IF KNOWN) 10/28/2015	REFERENCE NUMBER (IF KNOWN) 00512534	WELL NUMBER MW-7	
DEPTH OF WELL 96.6 ft.	STATIC WATER LEVEL 8.00 ft.	LENGTH OF RISER AND SCREEN 94.0 ft.	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Removed)	PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
			CASING REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION				
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS
				AVERAGE DEPTH OF ALL WELLS/BORINGS
				DATE FIRST WELL/BORING WAS PLUGGED
				DATE LAST WELL/BORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 96.6 ft.	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) _____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)					
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT <input type="checkbox"/> Type I <input type="checkbox"/> Type III BENTONITE <input checked="" type="checkbox"/> Chips <input type="checkbox"/> Pellets <input type="checkbox"/> Other <input type="checkbox"/> Granular <input type="checkbox"/> Slurry	NUMBER OF SACKS OF GROUT USED 1.25 LBS PER SACK 50	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES			

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR Jerry Hancock <i>Jerry Hancock</i>	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523091	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052433	APPROVED BY	
		DATE APPROVED	07/23/2019
ENTERED NRSMTK4		ROUTE	
		PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P08S	DATE		
LOCATION OF WELL	DRILL AREA	SMALLEST LARGEST			
LAT. 38° 7' 22.8"		1/4 1/4 SE 1/4			
LONG. 90° 15' 42.7"	COUNTY JEFFERSON	Sec. 4 Township 39 North Range. 7 E			

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
JAMES MCDONALD	11/30/2012	6.02	

<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.
DEPTH OF THE WELL 60.2 FT.	LENGTH OF RISER 62.8 FT.	QUANTITY	DEPTH	TYPE OF FILL MATERIAL
SCREEN/RISER DIAMETER 2.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER
PUMP AND SAMPLING EQUIPMENT REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No			AMOUNT OF FILL USED <input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS
		total BORING(S)	total FT.	DEPTH TO TOP OF FILL FT.

GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation	TOTAL NUMBER OF BAGS OF GROUT USED 1.5 POUNDS OF GROUT PER BAG 50
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DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED 06/26/2019	FINISHED SURFACE MATERIAL <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	SURFACE MATERIAL LENGTH 3.0 IN.
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REMARKS	REASON FOR ABANDONMENT

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 06/26/2019
PERMIT NUMBER x 001560	DATE 06/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
 BORING PLUGGING REGISTRATION REPORT**

FOR OFFICE USE ONLY	
REF NO. 523091	DATE RECEIVED JUL 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. 8052433	REVENUE NO. 011819

ROUTE RD-3	APPROVED <i>[Signature]</i>	DATE 7/23/19	ENTERED KKK
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OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE MO
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center		DNR/EPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)	
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly		PERMIT NUMBER 001560-WPM	
Section 256.607(3), RSMo, requires all primary contractors to comply with all rules and regulations promulgated pursuant to Sections 256.600 to 256.640 RSMo.			

LOCATION INFORMATION			
Latitude 38 ° 7 ' 22.80 "	COUNTY Jefferson		SE ¼
Longitude 90 ° 15 ' 42.70 "	Section 4 Township 39 N Range 7		<input checked="" type="checkbox"/> E <input type="checkbox"/> W

MONITORING WELL INFORMATION					
DATE WELL PLUGGED 6/26/2019	ORIGINAL DRILLER (IF KNOWN) James McDonald		DATE ORIGINALLY DRILLED (IF KNOWN) 11/30/2012	REFERENCE NUMBER (IF KNOWN) 00481763	WELL NUMBER P08S
DEPTH OF WELL 60.2 ft.	STATIC WATER LEVEL 6.02 ft.	LENGTH OF RISER AND SCREEN 62.8 ft.	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input type="checkbox"/> Yes <input type="checkbox"/> No (Removed)	PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
CASING REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A					

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION				
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS
				AVERAGE DEPTH OF ALL WELLS/BORINGS
				DATE FIRST WELL/BORING WAS PLUGGED
				DATE LAST WELL/BORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 60.2 ft.	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) _____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)					
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT <input type="checkbox"/> Type I <input type="checkbox"/> Type III BENTONITE <input checked="" type="checkbox"/> Chlgir <input type="checkbox"/> Pellets <input type="checkbox"/> Other	NUMBER OF SACKS OF GROUT USED 1.5 LBS PER SACK 50	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES			

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR Jerry Hancock <i>[Signature]</i>	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523092	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052432	APPROVED BY	
		DATE APPROVED	07/23/2019
ENTERED NRSMTK4		ROUTE	
		PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P08D		DATE	
LOCATION OF WELL	DRILL AREA	SMALLEST		LARGEST	
LAT. 38° 7' 22.7"		1/4		1/4 SW 1/4	
LONG. 90° 15' 42.7"	COUNTY JEFFERSON	Sec. 4 Township		39 North Range. 7 E	

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN) JAMES MCDONALD	DATE ORIGINALLY DRILLED 12/11/2012	STATIC WATER LEVEL 3.53	Driller Notes		
<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.	
DEPTH OF THE WELL 75.3 FT.	LENGTH OF RISER 77.8 FT.	QUANTITY	DEPTH	TYPE OF FILL MATERIAL	
SCREEN/RISER DIAMETER 2.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER	
PUMP AND SAMPLING EQUIPMENT REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> No			AMOUNT OF FILL USED <input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS	
		total BORING(S)	total FT.	DEPTH TO TOP OF FILL FT.	
GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation		TOTAL NUMBER OF BAGS OF GROUT USED 2.0 POUNDS OF GROUT PER BAG 50	
DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED 06/26/2019	FINISHED SURFACE MATERIAL <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER		SURFACE MATERIAL LENGTH 3.0 IN.	
REMARKS		REASON FOR ABANDONMENT			
I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.					
SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY		SIGNATURE (CONTRACTOR) x JERRY HANCOCK		PERMIT NUMBER 004497	DATE 06/26/2019
PERMIT NUMBER x 001560		DATE 06/26/2019	SIGNATURE (APPRENTICE) x		PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
BORING PLUGGING REGISTRATION REPORT

FOR OFFICE USE ONLY	
REF NO. 523092	DATE RECEIVED JUL 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. B052432	REVENUE NO. 071819

ROUTE 203	APPROVED [Signature]	DATE 7/25/19	ENTERED KKK	STATE CERT NO. B052432	REVENUE NO. 071819
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OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE MO
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center		DNR/EPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)	
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly		PERMIT NUMBER 001560-WPM	Section 256.607(3), RSMo, requires all primary contractors to comply with all rules and regulations promulgated pursuant to Sections 256.600 to 256.640 RSMo.

LOCATION INFORMATION			
Latitude 38 . 7 . 22.70	COUNTY Jefferson	Section 4 Township 39 N Range 7 <input checked="" type="checkbox"/> E <input type="checkbox"/> W	
Longitude 90 . 15 . 42.70			

MONITORING WELL INFORMATION						
DATE WELL PLUGGED 6/26/2019	ORIGINAL DRILLER (IF KNOWN) James McDonald		DATE ORIGINALLY DRILLED (IF KNOWN) 12/11/2012	REFERENCE NUMBER (IF KNOWN) 00492831	WELL NUMBER P08D	
DEPTH OF WELL 75.3 ft.	STATIC WATER LEVEL 3.53 ft.	LENGTH OF RISER AND SCREEN 77.8 ft.	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Removed)	PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	CASING REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION				
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS
				AVERAGE DEPTH OF ALL WELLS/BORINGS
				DATE FIRST WELL/BORING WAS PLUGGED
				DATE LAST WELL/BORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 75.3 ft.	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input checked="" type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) _____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input checked="" type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)					
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT <input type="checkbox"/> Type I <input type="checkbox"/> Type III BENTONITE <input checked="" type="checkbox"/> Chips <input type="checkbox"/> Pellets <input type="checkbox"/> Other	NUMBER OF SACKS OF GROUT USED 2 LBS PER SACK 50	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES			

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR Jerry Hancock [Signature]	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE

MO-780-2161 (06-19) SEND COMPLETED FORM ALONG WITH \$50 REGISTRATION FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, MISSOURI GEOLOGICAL SURVEY, WELL INSTALLATION SECTION, PO BOX 250, ROLLA, MO 65402 PHONE: 573-368-2165 FAX: 573-368-2317 EMAIL: welldrillers@dnr.mo.gov SUBMIT RECORD AND FEE WITHIN 60 DAYS AFTER WELL PLUGGING OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS RECORD (AND FEE) MAY BE SUBMITTED ONLINE: dnr.mo.gov/mowellts



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523085	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052439	APPROVED BY	
		DATE APPROVED	07/23/2019
ENTERED NRSMITK4		ROUTE	
		PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P13S		DATE	
LOCATION OF WELL		DRILL AREA			
LAT. <u>38</u> ° <u>7</u> ' <u>35.7</u> "		SMALLEST _____ 1/4 _____ 1/4 _____ NE 1/4			
LONG. <u>90</u> ° <u>15</u> ' <u>37.7</u> "		COUNTY			
		JEFFERSON			
		Sec. <u>8</u> Township <u>39</u> North Range. <u>7</u> E			

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
JAMES MCDONALD	12/11/2012	11.04	

<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.
DEPTH OF THE WELL	LENGTH OF RISER	QUANTITY	DEPTH	TYPE OF FILL MATERIAL
58.0 FT.	59.4 FT.			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER
SCREEN/RISER DIAMETER	WELL SCREEN AND RISER REMOVED?			AMOUNT OF FILL USED
2.0 IN.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS
PUMP AND SAMPLING EQUIPMENT REMOVED?	CASING REMOVED?			DEPTH TO TOP OF FILL
<input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	total	total	FT
		BORING(S)	FT.	

GROUT INSTALLATION METHOD	GROUT MATERIAL USED	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE?	TOTAL NUMBER OF BAGS OF GROUT USED
<input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	5.0	1.0
		<input checked="" type="checkbox"/> Hydrated to Saturation	POUNDS OF GROUT PER BAG
			50

DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED	FINISHED SURFACE MATERIAL	SURFACE MATERIAL LENGTH
	06/26/2019	<input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	3.0 IN.

REMARKS	REASON FOR ABANDONMENT

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 06/26/2019
PERMIT NUMBER x 001560	DATE 06/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
BORING PLUGGING REGISTRATION REPORT

FOR OFFICE USE ONLY	
REF NO. 523085	DATE RECEIVED JUL 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. B052439	REVENUE 07/18/19

ROUTE R05	APPROVED 	DATE 7/23/19	ENTERED KKK
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OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE ZIP CODE MO 63127
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center		DNR/EPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)	VARIANCE NUMBER (IF ISSUED)
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly		PERMIT NUMBER 001560-WPM	Section 256.607(3), RSMo, requires all primary contractors to comply with all rules and regulations promulgated pursuant to Sections 256.600 to 256.640 RSMo.

LOCATION INFORMATION			
Latitude 38 ° 7 ' 35.70 "	COUNTY Jefferson	Section 8 Township 39 N Range 7 NE 1/4	
Longitude 90 ° 15 ' 37.70 "		E O W	

MONITORING WELL INFORMATION				
DATE WELL PLUGGED 6/26/2019	ORIGINAL DRILLER (IF KNOWN) James McDonald	DATE ORIGINALLY DRILLED (IF KNOWN) 12/11/2012	REFERENCE NUMBER (IF KNOWN) 00481768	WELL NUMBER P13S
DEPTH OF WELL 58.0 ft	STATIC WATER LEVEL 11.04 ft	LENGTH OF RISER AND SCREEN 59.4 ft	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Removed)
PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		CASING REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION				
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS
				AVERAGE DEPTH OF ALL WELLS/BORINGS
				DATE FIRST WELL/BORING WAS PLUGGED
				DATE LAST WELL/BORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 58.0 ft	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input checked="" type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) _____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input checked="" type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)					
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT: <input type="checkbox"/> Type I <input type="checkbox"/> Type III BENTONITE: <input checked="" type="checkbox"/> Chips <input type="checkbox"/> Pellets <input type="checkbox"/> Other	NUMBER OF SACKS OF GROUT USED 1 LBS PER SACK 50	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES			

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR Jerry Hancock	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE

MO-780-2161 (06-19) SEND COMPLETED FORM ALONG WITH \$50 REGISTRATION FEE TO: MISSOURI DEPARTMENT OF NATURAL RESOURCES, MISSOURI GEOLOGICAL SURVEY, WELL INSTALLATION SECTION, PO BOX 250, ROLLA, MO 65402. PHONE: 573-369-2165 FAX: 573-369-2317 EMAIL: well@drillers.dnr.mo.gov
SUBMIT RECORD AND FEE WITHIN 60 DAYS AFTER WELL PLUGGING OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS
RECORD (AND FEE) MAY BE SUBMITTED ONLINE: dnr.mo.gov/mewell



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523086	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052438	APPROVED BY	
ENTERED NRSMTK4		DATE APPROVED	07/23/2019
Ph 1 07/23/2019 Ph 2 07/23/2019 Ph 3 07/23/2019		ROUTE PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P13L		DATE	
LOCATION OF WELL	DRILL AREA	SMALLEST		LARGEST	
LAT. <u>38° 7' 35.6"</u>	Code Description not found	<u>1/4</u>		<u>1/4</u> <u>NE 1/4</u>	
LONG. <u>90° 15' 37.7"</u>	COUNTY JEFFERSON	Sec. <u>8</u> Township <u>39</u> North		Range. <u>7</u> E	

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED	STATIC WATER LEVEL	Driller Notes
MATTHEW COOPER	12/07/2013	10.38	

<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.
DEPTH OF THE WELL 81.0 FT.	LENGTH OF RISER 83.0 FT.	QUANTITY	DEPTH	TYPE OF FILL MATERIAL
SCREEN/RISER DIAMETER 2.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER
PUMP AND SAMPLING EQUIPMENT REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No			AMOUNT OF FILL USED <input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS
		total BORING(S)	total FT.	DEPTH TO TOP OF FILL FT.

GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation	TOTAL NUMBER OF BAGS OF GROUT USED 1.0 POUNDS OF GROUT PER BAG 50
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DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED 06/26/2019	FINISHED SURFACE MATERIAL <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER	SURFACE MATERIAL LENGTH 3.0 IN.
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REMARKS	REASON FOR ABANDONMENT

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 06/26/2019
PERMIT NUMBER x 001560	DATE 06/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 GEOLOGICAL SURVEY PROGRAM
 MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
 BORING PLUGGING REGISTRATION REPORT

FOR OFFICE USE ONLY	
REF NO. 523086	DATE RECEIVED JUL 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. B052438	REVENUE NO. 011819

ROUTE R-0-3	APPROVED <i>[Signature]</i>	DATE 7/23/19	ENTERED KKK
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OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE MO
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	ZIP CODE 63127
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center	DNREPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)		VARIANCE NUMBER (IF ISSUED)
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly	PERMIT NUMBER 001560-WPM	Section 256.607(3), RSMo, requires all primary contractors to comply with all rules and regulations promulgated pursuant to Sections 256.600 to 256.640 RSMo.	

LOCATION INFORMATION			
Latitude 38 ° 7 ' 35.60 "	Longitude 90 ° 15 ' 37.70 "	COUNTY Jefferson	Section <u>8</u> Township <u>39</u> N Range <u>7</u> <input checked="" type="checkbox"/> E <input type="checkbox"/> W

MONITORING WELL INFORMATION					
DATE WELL PLUGGED 6/26/2019	ORIGINAL DRILLER (IF KNOWN) Mathew Cooper	DATE ORIGINALLY DRILLED (IF KNOWN) 12/07/2013	REFERENCE NUMBER (IF KNOWN) 00492833	WELL NUMBER P13L	
DEPTH OF WELL 81.0 ft.	STATIC WATER LEVEL 10.38 ft.	LENGTH OF RISER AND SCREEN 83.0 ft.	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Removed)	PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
			CASING REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION				
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS
				AVERAGE DEPTH OF ALL WELLS/BORINGS
				DATE FIRST WELL/BORING WAS PLUGGED
				DATE LAST WELL/BORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 81.0 ft.	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) _____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)					
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT <input type="checkbox"/> Type I <input type="checkbox"/> Type III <input type="checkbox"/> Bentonite <input checked="" type="checkbox"/> Chips <input type="checkbox"/> Pellets <input type="checkbox"/> Other <input type="checkbox"/> Granular <input type="checkbox"/> Slurry	NUMBER OF SACKS OF GROUT USED LBS PER SACK <u>50</u>	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES			

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR <i>Jerry Hancock</i>	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE



MISSOURI DEPARTMENT
OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
**MONITORING WELL PLUGGING
REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF NO	00523087	07/18/2019	
CR NO		CHECK NO.	5445
		TRANSMITTAL NO.	071819
STATE WELL NUMBER	B052437	APPROVED BY	
ENTERED NRSMTK4		DATE APPROVED	07/23/2019
Ph 1 07/23/2019 Ph 2 07/23/2019 Ph 3 07/23/2019		ROUTE PCD3	

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME AMEREN MISSOURI		TELEPHONE NUMBER 314-554-6101		VARIANCE NUMBER (IF APPLICABLE)	
OWNER ADDRESS 3700 SOUTH LINDBERG MAIL CODE F-604		CITY ST LOUIS	STATE MO	ZIP 63127	
ADDRESS OF WELL SITE 100 BIG HOLLOW ROAD		CITY FESTUS	STATE MO	ZIP	
SITE NAME AMEREN MO RUSH ISLAND ENERGY CENTER		WELL NUMBER P13D		DATE	
LOCATION OF WELL	DRILL AREA	SMALLEST		LARGEST	
LAT. <u>38° 7' 35.6"</u>		<u>1/4</u>		<u>1/4</u> <u>NE 1/4</u>	
LONG. <u>90° 15' 37.8"</u>	COUNTY JEFFERSON	Sec. <u>8</u> Township <u>39</u> North		Range. <u>7</u> E	

PLUGGING INFORMATION

ORIGINAL DRILLER (IF KNOWN) MATTHEW COOPER	DATE ORIGINALLY DRILLED 12/05/2013	STATIC WATER LEVEL 10.29	Driller Notes		
<input checked="" type="checkbox"/> MONITORING WELL		<input type="checkbox"/> SOIL BORING(S)		Boring Diameter: IN.	
DEPTH OF THE WELL 145.0 FT.	LENGTH OF RISER 145.0 FT.	QUANTITY	DEPTH	TYPE OF FILL MATERIAL	
SCREEN/RISER DIAMETER 2.0 IN.	WELL SCREEN AND RISER REMOVED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> GRAVEL <input type="checkbox"/> SAND <input type="checkbox"/> OTHER	
PUMP AND SAMPLING EQUIPMENT REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No	CASING REMOVED? <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> No			AMOUNT OF FILL USED <input type="checkbox"/> TONS <input type="checkbox"/> CUBIC YARDS	
		total BORING(S)	total FT.	DEPTH TO TOP OF FILL FT.	
GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED NEAT CEMENT BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input type="checkbox"/> TYPE 1 <input checked="" type="checkbox"/> CHIPS <input type="checkbox"/> OTHER	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 5.0 <input checked="" type="checkbox"/> Hydrated to Saturation		TOTAL NUMBER OF BAGS OF GROUT USED 1.3 POUNDS OF GROUT PER BAG 50	
DATE 1st WELL PLUGGED	DATE LAST WELL PLUGGED 06/26/2019	FINISHED SURFACE MATERIAL <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> OTHER		SURFACE MATERIAL LENGTH 3.0 IN.	
REMARKS		REASON FOR ABANDONMENT			

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR) x TIMOTHY KELLY	SIGNATURE (CONTRACTOR) x JERRY HANCOCK	PERMIT NUMBER 004497	DATE 06/26/2019
PERMIT NUMBER x 001560	DATE 06/26/2019	SIGNATURE (APPRENTICE) x	PERMIT NUMBER DATE

REMIT TO: WELL INSTALLATION SECTION, PO. BOX 250, ROLLA, MO 65402 573/ 368-2165
ENCLOSE \$50 FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL PLUGGING
OR WITHIN 180 DAYS AFTER THE PLUGGING OF TEMPORARY WELLS



MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM
MONITORING WELL/TEST HOLE/SOIL AND GEOTECHNICAL
BORING PLUGGING REGISTRATION REPORT

FOR OFFICE USE ONLY	
REF NO. 523087	DATE RECEIVED JUL 18 2019
CR NO.	CHECK NO. 5445
STATE CERT NO. 6052437	REVENUE NO. 071819

ROUTE RD-3	APPROVED [Signature]	DATE 7/23/19	ENTERED KKK
---------------	-------------------------	-----------------	----------------

OWNER AND SITE INFORMATION			
PROPERTY OWNER NAME WHERE WELL IS LOCATED Ameren Missouri		PRIMARY PHONE NUMBER WITH AREA CODE (314) 554-6101	
PROPERTY OWNER MAILING ADDRESS 3700 S. Lindberg Mail Code F-604		CITY St. Louis	STATE MO
PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED 100 Big Hollow Rd.		CITY Festus	
NAME OF SITE, BUSINESS, OR CLEANUP PROJECT Ameren MO Rush Island Energy Center		DNR/EPA PROJECT NUMBER OR REGULATORY SITE ID NUMBER (IF APPLICABLE)	
PRIMARY CONTRACTOR NAME (PLEASE PRINT) Timothy L. Kelly		PERMIT NUMBER 001560-WPM	

LOCATION INFORMATION			
Latitude 38 ° 7 ' 35.60 "	County Jefferson	Section 8 Township 39 N Range 7 <input checked="" type="checkbox"/> E <input type="checkbox"/> W	
Longitude 90 ° 15 ' 37.80 "			

MONITORING WELL INFORMATION					
DATE WELL PLUGGED 6/26/2019	ORIGINAL DRILLER (IF KNOWN) Mathew Cooper	DATE ORIGINALLY DRILLED (IF KNOWN) 12/05/2013	REFERENCE NUMBER (IF KNOWN) 00492832	WELL NUMBER P13D	
DEPTH OF WELL 145.0 ft	STATIC WATER LEVEL 10.29 ft	LENGTH OF RISER AND SCREEN 145.0 ft	DIAMETER OF RISER AND SCREEN 2 in.	RISER AND SCREEN PLUGGED IN PLACE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Removed)	PUMP OR SAMPLING EQUIPMENT REMOVED <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

TEMPORARY MONITORING WELL/SOIL BORING/GEOTECHNICAL BORING INFORMATION					
Quantity	Depth of Well or Boring (ft.)	Diameter (in.)	Total Depth (Linear Feet) of All Wells or Borings	TOTAL NUMBER OF WELLS/BORINGS	
				AVERAGE DEPTH OF ALL WELLS/BORINGS	
				DATE FIRST WELLBORING WAS PLUGGED	DATE LAST WELLBORING WAS PLUGGED

TEST HOLE INFORMATION						
DATE TEST HOLE PLUGGED	DEPTH OF WELL 145.0 ft	LENGTH OF GROUT PLUG Bottom _____ ft. Top _____ ft.	DAVIS FORMATION REACHED <input type="checkbox"/> Yes <input type="checkbox"/> No	MECHANICAL PACKER (IF USED) <input type="checkbox"/> Yes, Depth _____ ft. <input type="checkbox"/> No	AMOUNT OF CLEAN FILL (IF USED) ____ Tons or _____ Cubic Yards	CASING REMOVED (CHOOSE ONE) <input type="checkbox"/> Yes, Diameter of Remaining Borehole _____ in. <input type="checkbox"/> No, Diameter of Casing _____ in.

PLUGGING INFORMATION (This section is required in addition to one of the well, soil boring or test hole sections above.)						
WELL REMOVED BY EXCAVATION <input type="checkbox"/> Yes <input type="checkbox"/> No	GROUT INSTALLATION METHOD <input checked="" type="checkbox"/> Gravity <input type="checkbox"/> Tremie <input type="checkbox"/> Pressure	GROUT MATERIAL USED CEMENT <input type="checkbox"/> Type I <input type="checkbox"/> Type III BENTONITE <input checked="" type="checkbox"/> Chips <input type="checkbox"/> Pellets <input type="checkbox"/> Other	NUMBER OF SACKS OF GROUT USED 1.25	NUMBER OF GALLONS OF WATER USED PER SACK 5	GROUT HYDRATED TO SATURATION <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
FINISHED SURFACE MATERIAL <input type="checkbox"/> Asphalt <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Other	SURFACE MATERIAL DEPTH 3 ft. 0 in.	DRILLER NOTES				

I hereby certify that the monitoring well herein described was plugged in accordance with the Department of Natural Resources requirements.

MONITORING WELL INSTALLATION CONTRACTOR Jerry Hancock [Signature]	PERMIT NUMBER 004497	DATE 7/12/2019
MONITORING WELL INSTALLATION CONTRACTOR APPRENTICE (IF APPLICABLE)	PERMIT NUMBER	DATE

APPENDIX D

Laboratory Analytical Data

December 04, 2018

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

RE: Project: AMEREN RIEC 153-1406.0002G
Pace Project No.: 60285459

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory between November 02, 2018 and November 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

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CERTIFICATIONS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

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

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SAMPLE SUMMARY

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285459001	R-P01S	Water	11/01/18 12:45	11/02/18 02:38
60285459002	R-P05S	Water	11/01/18 10:45	11/02/18 02:38
60285459003	R-P05I	Water	11/01/18 12:05	11/02/18 02:38
60285459004	R-P22S	Water	11/01/18 13:20	11/02/18 02:38
60285588001	R-P21S	Water	11/02/18 11:45	11/03/18 02:40
60285588002	R-P21I	Water	11/02/18 12:20	11/03/18 02:40
60285588003	R-P21D	Water	11/02/18 12:55	11/03/18 02:40
60285588004	R-P22I	Water	11/02/18 09:55	11/03/18 02:40
60285588005	R-P22D	Water	11/02/18 10:50	11/03/18 02:40
60285588006	R-NE-FB-1	Water	11/02/18 12:20	11/03/18 02:40
60285459011	R-P03S	Water	11/05/18 14:25	11/06/18 04:09
60285459012	R-P03D	Water	11/05/18 15:10	11/06/18 04:09
60285459013	R-P08S	Water	11/05/18 13:15	11/06/18 04:09
60285459014	R-P08D	Water	11/05/18 14:00	11/06/18 04:09
60285459015	R-P10S	Water	11/05/18 15:10	11/06/18 04:09
60285459016	R-P13S	Water	11/05/18 11:40	11/06/18 04:09
60285459017	R-P13I	Water	11/05/18 11:10	11/06/18 04:09
60285459018	R-P13D	Water	11/05/18 10:25	11/06/18 04:09
60285459019	R-P30S	Water	11/05/18 15:25	11/06/18 04:09
60285459020	R-NE-DUP-1	Water	11/05/18 08:00	11/06/18 04:09
60285459021	R-NE-DUP-2	Water	11/05/18 08:00	11/06/18 04:09
60285459022	R-NE-DUP-3	Water	11/05/18 08:00	11/06/18 04:09
60285459023	R-NE-FB-2	Water	11/05/18 11:00	11/06/18 04:09
60285459024	R-P29S	Water	11/06/18 11:55	11/07/18 03:58
60285459025	R-P29D	Water	11/06/18 12:35	11/07/18 03:58
60285459026	R-P31S	Water	11/06/18 08:45	11/07/18 03:58
60285459027	R-NE-FB-3	Water	11/06/18 08:40	11/07/18 03:58

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285459001	R-P01S	EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	CTR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		60285459002	R-P05S	EPA 200.7	EMR
EPA 200.8	JGP			6	PASI-K
EPA 7470	CTR			1	PASI-K
SM 2320B	MJK			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
SM 3500-Fe B#4	MJK			1	PASI-K
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
60285459003	R-P05I			EPA 200.7	EMR
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	CTR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		60285459004	R-P22S	EPA 200.7	EMR
EPA 200.8	JGP			6	PASI-K
EPA 7470	CTR			1	PASI-K
SM 2320B	MJK			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
SM 3500-Fe B#4	MJK			1	PASI-K
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
60285588001	R-P21S			EPA 200.7	EMR

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285588002	R-P211	EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
60285588003	R-P21D	SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		60285588004	R-P22I	EPA 200.8	JDH
EPA 7470	EMR			1	PASI-K
SM 2320B	MJK			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
SM 3500-Fe B#4	MJK			1	PASI-K
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
EPA 200.7	EMR			18	PASI-K
EPA 200.8	JDH			6	PASI-K
EPA 7470	EMR			1	PASI-K
SM 2320B	MJK			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
60285588005	R-P22D	SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285588006	R-NE-FB-1	EPA 7470	EMR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
60285459011	R-P03S	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
60285459012	R-P03D	SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60285459013	R-P08S	EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
60285459014	R-P08D	SM 2320B	RMT	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	MJK	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
		EPA 365.4	BLA	1	PASI-K		
		EPA 200.7	EMR	18	PASI-K		
		EPA 200.8	JDH	6	PASI-K		
		EPA 7470	EMR	1	PASI-K		
		SM 2320B	RMT	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	MJK	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
60285459015	R-P10S	EPA 365.4	BLA	1	PASI-K		
		EPA 200.7	EMR	18	PASI-K		
		EPA 200.8	JDH	6	PASI-K		
		EPA 7470	EMR	1	PASI-K		
		SM 2320B	RMT	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	MJK	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
		EPA 365.4	BLA	1	PASI-K		
		60285459016	R-P13S	EPA 200.7	EMR	18	PASI-K
				EPA 200.8	JDH	6	PASI-K
				EPA 7470	EMR	1	PASI-K
				SM 2320B	RMT	1	PASI-K
SM 2540C	RLG			1	PASI-K		
SM 3500-Fe B#4	LDB			1	PASI-K		
SM 3500-Fe B#4	MJK			1	PASI-K		
EPA 300.0	WNM			3	PASI-K		
EPA 365.4	BLA			1	PASI-K		
60285459017	R-P13I			EPA 200.7	EMR	18	PASI-K
				EPA 200.8	JDH	6	PASI-K
				EPA 7470	EMR	1	PASI-K
				SM 2320B	RMT	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285459018	R-P13D	SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		60285459019	R-P30S	EPA 300.0	WNM
EPA 365.4	BLA			1	PASI-K
EPA 200.7	EMR			18	PASI-K
EPA 200.8	JDH			6	PASI-K
EPA 7470	EMR			1	PASI-K
SM 2320B	RMT			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
SM 3500-Fe B#4	MJK			1	PASI-K
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
EPA 200.7	EMR			18	PASI-K
60285459020	R-NE-DUP-1			EPA 200.8	JDH
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		60285459021	R-NE-DUP-2	SM 2540C	RLG
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
EPA 200.7	EMR			18	PASI-K
EPA 200.8	JDH			6	PASI-K
EPA 7470	EMR			1	PASI-K
SM 2320B	RMT			1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285459022	R-NE-DUP-3	SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
60285459023	R-NE-FB-2	SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
60285459024	R-P29S	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60285459025	R-P29D	EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285459026	R-P31S	SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
60285459027	R-NE-FB-3	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	ZMH	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
EPA 365.4	BLA	1	PASI-K		

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P01S **Lab ID: 60285459001** Collected: 11/01/18 12:45 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	67.2J	ug/L	75.0	21.1	1	11/05/18 17:55	11/07/18 15:46	7429-90-5	B
Barium	290	ug/L	5.0	1.5	1	11/05/18 17:55	11/07/18 15:46	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/05/18 17:55	11/07/18 15:46	7440-41-7	
Boron	249	ug/L	100	12.5	1	11/05/18 17:55	11/07/18 15:46	7440-42-8	
Calcium	154000	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 15:46	7440-70-2	
Cobalt	1.9J	ug/L	5.0	0.87	1	11/05/18 17:55	11/07/18 15:46	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/05/18 17:55	11/07/18 15:46	7440-50-8	
Iron	8250	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 15:46	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/05/18 17:55	11/07/18 15:46	7439-92-1	
Lithium	27.8	ug/L	10.0	4.6	1	11/05/18 17:55	11/07/18 15:46	7439-93-2	
Magnesium	32000	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 15:46	7439-95-4	
Manganese	411	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 15:46	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/05/18 17:55	11/07/18 15:46	7439-98-7	
Nickel	2.0J	ug/L	5.0	1.4	1	11/05/18 17:55	11/07/18 15:46	7440-02-0	
Potassium	5570	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 15:46	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/05/18 17:55	11/07/18 15:46	7440-22-4	
Sodium	19900	ug/L	500	157	1	11/05/18 17:55	11/07/18 15:46	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/05/18 17:55	11/07/18 15:46	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:01	7440-36-0	
Arsenic	19.6	ug/L	1.0	0.065	1	11/05/18 17:55	11/08/18 15:01	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/05/18 17:55	11/08/18 15:01	7440-43-9	
Chromium	0.11J	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:01	7440-47-3	
Selenium	0.31J	ug/L	1.0	0.085	1	11/05/18 17:55	11/08/18 15:01	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/05/18 17:55	11/08/18 15:01	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 11:05	11/16/18 19:00	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	478	mg/L	20.0	4.9	1		11/09/18 13:18		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	691	mg/L	5.0	5.0	1		11/06/18 07:50		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	4.8	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	3.5	mg/L	0.20	0.012	1		11/02/18 11:24		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	27.7	mg/L	10.0	2.9	10		11/15/18 14:55	16887-00-6	
Fluoride	0.23	mg/L	0.20	0.19	1		11/15/18 14:41	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P01S **Lab ID: 60285459001** Collected: 11/01/18 12:45 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	87.2	mg/L	10.0	2.4	10		11/15/18 14:55	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.36	mg/L	0.10	0.050	1		11/08/18 12:08	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P05S Lab ID: 60285459002 Collected: 11/01/18 10:45 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	308	ug/L	75.0	21.1	1	11/05/18 17:55	11/07/18 15:49	7429-90-5	
Barium	157	ug/L	5.0	1.5	1	11/05/18 17:55	11/07/18 15:49	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/05/18 17:55	11/07/18 15:49	7440-41-7	
Boron	4170	ug/L	100	12.5	1	11/05/18 17:55	11/07/18 15:49	7440-42-8	
Calcium	59700	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 15:49	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/05/18 17:55	11/07/18 15:49	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/05/18 17:55	11/07/18 15:49	7440-50-8	
Iron	8790	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 15:49	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/05/18 17:55	11/07/18 15:49	7439-92-1	
Lithium	17.6	ug/L	10.0	4.6	1	11/05/18 17:55	11/07/18 15:49	7439-93-2	
Magnesium	20700	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 15:49	7439-95-4	
Manganese	315	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 15:49	7439-96-5	
Molybdenum	10.6J	ug/L	20.0	0.90	1	11/05/18 17:55	11/07/18 15:49	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/05/18 17:55	11/07/18 15:49	7440-02-0	
Potassium	5570	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 15:49	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/05/18 17:55	11/07/18 15:49	7440-22-4	
Sodium	28400	ug/L	500	157	1	11/05/18 17:55	11/07/18 15:49	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/05/18 17:55	11/07/18 15:49	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:03	7440-36-0	
Arsenic	149	ug/L	1.0	0.065	1	11/05/18 17:55	11/08/18 15:03	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/05/18 17:55	11/08/18 15:03	7440-43-9	
Chromium	0.37J	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:03	7440-47-3	
Selenium	0.22J	ug/L	1.0	0.085	1	11/05/18 17:55	11/08/18 15:03	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/05/18 17:55	11/08/18 15:03	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 11:05	11/16/18 19:02	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	271	mg/L	20.0	4.9	1		11/09/18 13:22		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	293	mg/L	5.0	5.0	1		11/06/18 07:50		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	7.1	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.7	mg/L	0.20	0.012	1		11/02/18 11:23		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.3	mg/L	10.0	2.9	10		11/15/18 15:52	16887-00-6	
Fluoride	0.36	mg/L	0.20	0.19	1		11/15/18 15:10	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P05S **Lab ID: 60285459002** Collected: 11/01/18 10:45 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	24.6	mg/L	10.0	2.4	10		11/15/18 15:52	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	1.3	mg/L	0.10	0.050	1		11/08/18 12:10	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P051 **Lab ID: 60285459003** Collected: 11/01/18 12:05 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	84.6	ug/L	75.0	21.1	1	11/05/18 17:55	11/07/18 15:51	7429-90-5	B
Barium	526	ug/L	5.0	1.5	1	11/05/18 17:55	11/07/18 15:51	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/05/18 17:55	11/07/18 15:51	7440-41-7	
Boron	50.7J	ug/L	100	12.5	1	11/05/18 17:55	11/07/18 15:51	7440-42-8	
Calcium	115000	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 15:51	7440-70-2	
Cobalt	1.0J	ug/L	5.0	0.87	1	11/05/18 17:55	11/07/18 15:51	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/05/18 17:55	11/07/18 15:51	7440-50-8	
Iron	8150	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 15:51	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/05/18 17:55	11/07/18 15:51	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	11/05/18 17:55	11/07/18 15:51	7439-93-2	
Magnesium	17800	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 15:51	7439-95-4	
Manganese	449	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 15:51	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/05/18 17:55	11/07/18 15:51	7439-98-7	
Nickel	1.5J	ug/L	5.0	1.4	1	11/05/18 17:55	11/07/18 15:51	7440-02-0	
Potassium	2100	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 15:51	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/05/18 17:55	11/07/18 15:51	7440-22-4	
Sodium	4010	ug/L	500	157	1	11/05/18 17:55	11/07/18 15:51	7440-23-5	
Zinc	3.8J	ug/L	50.0	3.5	1	11/05/18 17:55	11/07/18 15:51	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:05	7440-36-0	
Arsenic	4.8	ug/L	1.0	0.065	1	11/05/18 17:55	11/08/18 15:05	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/05/18 17:55	11/08/18 15:05	7440-43-9	
Chromium	0.10J	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:05	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	11/05/18 17:55	11/08/18 15:05	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/05/18 17:55	11/08/18 15:05	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 11:05	11/16/18 19:05	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	382	mg/L	20.0	4.9	1		11/09/18 13:28		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	410	mg/L	5.0	5.0	1		11/06/18 07:50		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	6.0	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	2.1	mg/L	0.20	0.012	1		11/02/18 11:23		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	2.7	mg/L	1.0	0.29	1		11/15/18 16:06	16887-00-6	
Fluoride	0.25	mg/L	0.20	0.19	1		11/15/18 16:06	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P051 **Lab ID: 60285459003** Collected: 11/01/18 12:05 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	0.48J	mg/L	1.0	0.24	1		11/15/18 16:06	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.093J	mg/L	0.10	0.050	1		11/08/18 12:11	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P22S **Lab ID: 60285459004** Collected: 11/01/18 13:20 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	77.0	ug/L	75.0	21.1	1	11/05/18 17:55	11/07/18 15:57	7429-90-5	B
Barium	119	ug/L	5.0	1.5	1	11/05/18 17:55	11/07/18 15:57	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/05/18 17:55	11/07/18 15:57	7440-41-7	
Boron	432	ug/L	100	12.5	1	11/05/18 17:55	11/07/18 15:57	7440-42-8	
Calcium	118000	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 15:57	7440-70-2	
Cobalt	1.4J	ug/L	5.0	0.87	1	11/05/18 17:55	11/07/18 15:57	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/05/18 17:55	11/07/18 15:57	7440-50-8	
Iron	140	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 15:57	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/05/18 17:55	11/07/18 15:57	7439-92-1	
Lithium	36.6	ug/L	10.0	4.6	1	11/05/18 17:55	11/07/18 15:57	7439-93-2	
Magnesium	24500	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 15:57	7439-95-4	
Manganese	283	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 15:57	7439-96-5	
Molybdenum	13.5J	ug/L	20.0	0.90	1	11/05/18 17:55	11/07/18 15:57	7439-98-7	
Nickel	4.5J	ug/L	5.0	1.4	1	11/05/18 17:55	11/07/18 15:57	7440-02-0	
Potassium	5920	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 15:57	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/05/18 17:55	11/07/18 15:57	7440-22-4	
Sodium	52900	ug/L	500	157	1	11/05/18 17:55	11/07/18 15:57	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/05/18 17:55	11/07/18 15:57	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.096J	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:08	7440-36-0	
Arsenic	0.81J	ug/L	1.0	0.065	1	11/05/18 17:55	11/08/18 15:08	7440-38-2	
Cadmium	0.070J	ug/L	0.50	0.033	1	11/05/18 17:55	11/08/18 15:08	7440-43-9	
Chromium	0.078J	ug/L	1.0	0.078	1	11/05/18 17:55	11/08/18 15:08	7440-47-3	
Selenium	0.20J	ug/L	1.0	0.085	1	11/05/18 17:55	11/08/18 15:08	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/05/18 17:55	11/08/18 15:08	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 11:05	11/16/18 19:07	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	321	mg/L	20.0	4.9	1		11/09/18 13:34		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	336	mg/L	5.0	5.0	1		11/06/18 07:50		
Iron, Ferric (Calculation) Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.14	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/02/18 11:24		H6
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	31.8	mg/L	10.0	2.9	10		11/15/18 16:49	16887-00-6	
Fluoride	0.51	mg/L	0.20	0.19	1		11/15/18 16:35	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P22S **Lab ID: 60285459004** Collected: 11/01/18 13:20 Received: 11/02/18 02:38 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	172	mg/L	10.0	2.4	10		11/15/18 16:49	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 12:12	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P21S **Lab ID: 60285588001** Collected: 11/02/18 11:45 Received: 11/03/18 02:40 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							
Aluminum	<21.1	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:24	7429-90-5	
Barium	279	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:24	7440-39-3	
Beryllium	0.24J	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:24	7440-41-7	
Boron	1380	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:24	7440-42-8	
Calcium	113000	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:24	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:24	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:24	7440-50-8	
Iron	9780	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:24	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:24	7439-92-1	
Lithium	20.6	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:24	7439-93-2	
Magnesium	32000	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:24	7439-95-4	
Manganese	1680	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:24	7439-96-5	
Molybdenum	5.5J	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:24	7439-98-7	
Nickel	2.5J	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:24	7440-02-0	
Potassium	5270	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:24	7440-09-7	
Silver	3.9J	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:24	7440-22-4	
Sodium	48600	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:24	7440-23-5	
Zinc	4.3J	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:24	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:52	7440-36-0	
Arsenic	14.0	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 17:52	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 17:52	7440-43-9	
Chromium	0.29J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:52	7440-47-3	B
Selenium	0.21J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 17:52	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 17:52	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 10:56	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	476	mg/L	20.0	4.9	1		11/09/18 14:10		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	557	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	9.4	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.41	mg/L	0.20	0.012	1		11/05/18 16:25		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	29.2	mg/L	10.0	2.9	10		11/14/18 23:12	16887-00-6	B
Fluoride	0.41	mg/L	0.20	0.19	1		11/14/18 22:58	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P21S **Lab ID: 60285588001** Collected: 11/02/18 11:45 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	29.6	mg/L	10.0	2.4	10		11/14/18 23:12	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.64	mg/L	0.10	0.050	1		11/08/18 12:35	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P211 **Lab ID: 60285588002** Collected: 11/02/18 12:20 Received: 11/03/18 02:40 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							
Aluminum	61.8J	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:27	7429-90-5	B
Barium	33.4	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:27	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:27	7440-41-7	
Boron	1910	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:27	7440-42-8	
Calcium	15200	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:27	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:27	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:27	7440-50-8	
Iron	521	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:27	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:27	7439-92-1	
Lithium	18.4	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:27	7439-93-2	
Magnesium	2190	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:27	7439-95-4	
Manganese	75.0	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:27	7439-96-5	
Molybdenum	61.2	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:27	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:27	7440-02-0	
Potassium	3980	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:27	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:27	7440-22-4	
Sodium	78900	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:27	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:27	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:54	7440-36-0	
Arsenic	4.9	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 17:54	7440-38-2	
Cadmium	0.063J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 17:54	7440-43-9	
Chromium	0.56J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:54	7440-47-3	B
Selenium	0.61J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 17:54	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 17:54	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 10:59	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	130	mg/L	20.0	4.9	1		11/12/18 12:14		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	222	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.56	mg/L	0.20	0.012	1		11/05/18 16:25		1e,H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	29.2	mg/L	10.0	2.9	10		11/14/18 23:55	16887-00-6	B
Fluoride	1.3	mg/L	0.20	0.19	1		11/14/18 23:40	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P211 **Lab ID: 60285588002** Collected: 11/02/18 12:20 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	41.8	mg/L	10.0	2.4	10		11/14/18 23:55	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	2.8	mg/L	0.10	0.050	1		11/08/18 12:36	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P21D Lab ID: 60285588003 Collected: 11/02/18 12:55 Received: 11/03/18 02:40 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									
Aluminum	<21.1	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:29	7429-90-5	
Barium	44.1	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:29	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:29	7440-41-7	
Boron	8110	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:29	7440-42-8	
Calcium	34700	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:29	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:29	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:29	7440-50-8	
Iron	1130	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:29	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:29	7439-92-1	
Lithium	49.8	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:29	7439-93-2	
Magnesium	9740	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:29	7439-95-4	
Manganese	227	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:29	7439-96-5	
Molybdenum	422	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:29	7439-98-7	
Nickel	1.6J	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:29	7440-02-0	
Potassium	5180	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:29	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:29	7440-22-4	
Sodium	174000	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:29	7440-23-5	M1
Zinc	<3.5	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:29	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:56	7440-36-0	
Arsenic	0.56J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 17:56	7440-38-2	
Cadmium	0.14J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 17:56	7440-43-9	
Chromium	0.38J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:56	7440-47-3	B
Selenium	0.23J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 17:56	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 17:56	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 10:29	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	278	mg/L	20.0	4.9	1		11/12/18 12:19		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	633	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation) Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.29	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.84	mg/L	0.20	0.012	1		11/05/18 16:25		H6
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	119	mg/L	10.0	2.9	10		11/15/18 01:34	16887-00-6	
Fluoride	1.7	mg/L	0.20	0.19	1		11/15/18 00:52	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P21D **Lab ID: 60285588003** Collected: 11/02/18 12:55 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	71.9	mg/L	10.0	2.4	10		11/15/18 01:34	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	3.5	mg/L	0.10	0.050	1		11/08/18 12:37	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P221 Lab ID: 60285588004 Collected: 11/02/18 09:55 Received: 11/03/18 02:40 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							
Aluminum	46.0J	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:30	7429-90-5	
Barium	116	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:30	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:30	7440-41-7	
Boron	572	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:30	7440-42-8	
Calcium	60300	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:30	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:30	7440-48-4	
Copper	4.8J	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:30	7440-50-8	
Iron	1750	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:30	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:30	7439-92-1	
Lithium	23.2	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:30	7439-93-2	
Magnesium	11000	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:30	7439-95-4	
Manganese	371	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:30	7439-96-5	
Molybdenum	33.8	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:30	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:30	7440-02-0	
Potassium	5860	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:30	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:30	7440-22-4	
Sodium	54600	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:30	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:30	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:02	7440-36-0	
Arsenic	9.7	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:02	7440-38-2	
Cadmium	0.036J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:02	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:02	7440-47-3	B
Selenium	0.087J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:02	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:02	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 10:36	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	166	mg/L	20.0	4.9	1		11/12/18 15:25		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	382	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	1.7	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.074J	mg/L	0.20	0.012	1		11/05/18 16:27		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.0	mg/L	10.0	2.9	10		11/15/18 03:56	16887-00-6	B,M1
Fluoride	0.82	mg/L	0.20	0.19	1		11/15/18 03:28	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P221 **Lab ID: 60285588004** Collected: 11/02/18 09:55 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	134	mg/L	10.0	2.4	10		11/15/18 03:56	14808-79-8	M1
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.35	mg/L	0.10	0.050	1		11/08/18 12:42	7723-14-0	M1

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P22D Lab ID: 60285588005 Collected: 11/02/18 10:50 Received: 11/03/18 02:40 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									
Aluminum	109	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:36	7429-90-5	
Barium	69.4	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:36	7440-39-3	
Beryllium	0.29J	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:36	7440-41-7	B
Boron	9940	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:36	7440-42-8	
Calcium	26400	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:36	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:36	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:36	7440-50-8	
Iron	1130	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:36	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:36	7439-92-1	
Lithium	20.5	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:36	7439-93-2	
Magnesium	3600	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:36	7439-95-4	
Manganese	69.6	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:36	7439-96-5	
Molybdenum	343	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:36	7439-98-7	
Nickel	4.1J	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:36	7440-02-0	
Potassium	4770	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:36	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:36	7440-22-4	
Sodium	162000	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:36	7440-23-5	
Zinc	3.9J	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:36	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.10J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:13	7440-36-0	
Arsenic	12.6	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:13	7440-38-2	
Cadmium	0.15J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:13	7440-43-9	
Chromium	1.1	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:13	7440-47-3	B
Selenium	0.77J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:13	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:13	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 11:01	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	305	mg/L	20.0	4.9	1		11/12/18 15:35		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	565	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation) Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.0J	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	1.4	mg/L	0.40	0.024	2		11/05/18 16:27		1e,H6
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	28.2	mg/L	10.0	2.9	10		11/15/18 06:44	16887-00-6	B
Fluoride	2.2	mg/L	0.20	0.19	1		11/15/18 06:30	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P22D **Lab ID: 60285588005** Collected: 11/02/18 10:50 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	82.3	mg/L	10.0	2.4	10		11/15/18 06:44	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	5.2	mg/L	0.50	0.25	5		11/08/18 13:13	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-1 Lab ID: 60285588006 Collected: 11/02/18 12:20 Received: 11/03/18 02:40 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							
Aluminum	<21.1	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:38	7429-90-5	
Barium	<1.5	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:38	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:38	7440-41-7	
Boron	43.1J	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:38	7440-42-8	
Calcium	<53.5	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:38	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:38	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:38	7440-50-8	
Iron	<6.1	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:38	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:38	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:38	7439-93-2	
Magnesium	<14.0	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:38	7439-95-4	
Manganese	<0.73	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:38	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:38	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:38	7440-02-0	
Potassium	<79.3	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:38	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:38	7440-22-4	
Sodium	<157	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:38	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:38	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:15	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:15	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:15	7440-43-9	
Chromium	0.12J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:15	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:15	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:15	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 11:03	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/12/18 15:38		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	732	mg/L	5.0	5.0	1		11/08/18 08:05		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/05/18 16:28		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.29	mg/L	1.0	0.29	1		11/15/18 07:12	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		11/15/18 07:12	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-1 **Lab ID: 60285588006** Collected: 11/02/18 12:20 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	<0.24	mg/L	1.0	0.24	1		11/15/18 07:12	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 12:45	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P03S **Lab ID: 60285459011** Collected: 11/05/18 14:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	46.4J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 22:20	7429-90-5	
Barium	253	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 22:20	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 22:20	7440-41-7	
Boron	905	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 22:20	7440-42-8	
Calcium	95000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 22:20	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 22:20	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 22:20	7440-50-8	
Iron	14700	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 22:20	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 22:20	7439-92-1	
Lithium	10.4	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 22:20	7439-93-2	
Magnesium	38500	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 22:20	7439-95-4	
Manganese	222	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 22:20	7439-96-5	
Molybdenum	5.1J	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 22:20	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 22:20	7440-02-0	
Potassium	7830	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 22:20	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 22:20	7440-22-4	
Sodium	41000	ug/L	500	157	1	11/08/18 08:56	11/08/18 22:20	7440-23-5	
Zinc	4.7J	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 22:20	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:38	7440-36-0	
Arsenic	239	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:38	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:38	7440-43-9	
Chromium	0.45J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:38	7440-47-3	B
Selenium	0.20J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:38	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:38	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 13:45	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	488	mg/L	20.0	4.9	1		11/14/18 19:41		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	488	mg/L	5.0	5.0	1		11/08/18 08:08		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	12.6	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	2.1	mg/L	0.20	0.012	1		11/06/18 15:50		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	18.5	mg/L	1.0	0.29	1		11/18/18 23:34	16887-00-6	
Fluoride	0.21	mg/L	0.20	0.19	1		11/18/18 23:34	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P03S **Lab ID: 60285459011** Collected: 11/05/18 14:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	0.84J	mg/L	1.0	0.24	1		11/18/18 23:34	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	1.4	mg/L	0.10	0.050	1		11/08/18 13:05	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P03D Lab ID: 60285459012 Collected: 11/05/18 15:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	111	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:08	7429-90-5	
Barium	471	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:08	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:08	7440-41-7	
Boron	576	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:08	7440-42-8	
Calcium	121000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:08	7440-70-2	
Cobalt	3.7J	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:08	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:08	7440-50-8	
Iron	11000	ug/L	50.0	6.1	1	11/08/18 08:56	11/09/18 16:13	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:08	7439-92-1	
Lithium	25.5	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:08	7439-93-2	
Magnesium	26100	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:08	7439-95-4	
Manganese	545	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:08	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:08	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:08	7440-02-0	
Potassium	4180	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:08	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:08	7440-22-4	
Sodium	18400	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:08	7440-23-5	
Zinc	9.5J	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:08	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:40	7440-36-0	
Arsenic	0.57J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:40	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:40	7440-43-9	
Chromium	0.22J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:40	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:40	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:40	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 13:52	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	439	mg/L	20.0	4.9	1		11/14/18 19:55		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	491	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	8.5	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	2.5	mg/L	0.20	0.012	1		11/06/18 15:50		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	11.3	mg/L	1.0	0.29	1		11/18/18 23:50	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		11/18/18 23:50	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P03D **Lab ID: 60285459012** Collected: 11/05/18 15:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	18.6	mg/L	1.0	0.24	1		11/18/18 23:50	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.76	mg/L	0.10	0.050	1		11/08/18 13:09	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P08S Lab ID: 60285459013 Collected: 11/05/18 13:15 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	57.6J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:11	7429-90-5	
Barium	220	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:11	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:11	7440-41-7	
Boron	3610	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:11	7440-42-8	
Calcium	69100	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:11	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:11	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:11	7440-50-8	
Iron	10200	ug/L	50.0	6.1	1	11/08/18 08:56	11/09/18 16:15	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:11	7439-92-1	
Lithium	15.7	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:11	7439-93-2	
Magnesium	28000	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:11	7439-95-4	
Manganese	285	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:11	7439-96-5	
Molybdenum	21.5	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:11	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:11	7440-02-0	
Potassium	5940	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:11	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:11	7440-22-4	
Sodium	49800	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:11	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:11	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:42	7440-36-0	
Arsenic	209	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:42	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:42	7440-43-9	
Chromium	0.41J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:42	7440-47-3	B
Selenium	0.22J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:42	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:42	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 13:54	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	374	mg/L	20.0	4.9	1		11/14/18 20:00		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	306	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	7.2	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	3.0	mg/L	0.20	0.012	1		11/06/18 15:50		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	19.2	mg/L	1.0	0.29	1		11/19/18 00:38	16887-00-6	
Fluoride	0.45	mg/L	0.20	0.19	1		11/19/18 00:38	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P08S **Lab ID: 60285459013** Collected: 11/05/18 13:15 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	10	mg/L	1.0	0.24	1		11/19/18 00:38	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	1.1	mg/L	0.10	0.050	1		11/08/18 13:10	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P08D Lab ID: 60285459014 Collected: 11/05/18 14:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	90.8	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:13	7429-90-5	
Barium	99.0	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:13	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:13	7440-41-7	
Boron	2180	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:13	7440-42-8	
Calcium	116000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:13	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:13	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:13	7440-50-8	
Iron	1420	ug/L	50.0	6.1	1	11/08/18 08:56	11/09/18 16:17	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:13	7439-92-1	
Lithium	8.7J	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:13	7439-93-2	
Magnesium	17000	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:13	7439-95-4	
Manganese	121	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:13	7439-96-5	
Molybdenum	43.6	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:13	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:13	7440-02-0	
Potassium	2880	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:13	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:13	7440-22-4	
Sodium	24600	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:13	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:13	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:45	7440-36-0	
Arsenic	1.5	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:45	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:45	7440-43-9	
Chromium	0.28J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:45	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:45	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:45	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:01	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	331	mg/L	20.0	4.9	1		11/14/18 20:06		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	345	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	1.3	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.13J	mg/L	0.20	0.012	1		11/06/18 15:51		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	10.8	mg/L	1.0	0.29	1		11/19/18 00:54	16887-00-6	
Fluoride	0.29	mg/L	0.20	0.19	1		11/19/18 00:54	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P08D **Lab ID: 60285459014** Collected: 11/05/18 14:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	67.0	mg/L	10.0	2.4	10		11/20/18 14:32	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 13:11	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P10S **Lab ID: 60285459015** Collected: 11/05/18 15:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	114	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:20	7429-90-5	
Barium	89.2	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:20	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:20	7440-41-7	
Boron	3430	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:20	7440-42-8	
Calcium	41300	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:20	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:20	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:20	7440-50-8	
Iron	670	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:20	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:20	7439-92-1	
Lithium	10.4	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:20	7439-93-2	
Magnesium	7640	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:20	7439-95-4	
Manganese	631	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:20	7439-96-5	
Molybdenum	150	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:20	7439-98-7	
Nickel	2.8J	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:20	7440-02-0	
Potassium	4280	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:20	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:20	7440-22-4	
Sodium	110000	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:20	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:20	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.99J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:47	7440-36-0	
Arsenic	11.4	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:47	7440-38-2	
Cadmium	0.084J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:47	7440-43-9	
Chromium	0.40J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:47	7440-47-3	B
Selenium	0.20J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:47	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:47	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:03	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	176	mg/L	20.0	4.9	1		11/14/18 20:11		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	470	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.54	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.13J	mg/L	0.20	0.012	1		11/06/18 15:51		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	22.4	mg/L	2.0	0.58	2		11/20/18 15:20	16887-00-6	
Fluoride	0.53	mg/L	0.20	0.19	1		11/19/18 01:10	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P10S **Lab ID: 60285459015** Collected: 11/05/18 15:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	161	mg/L	20.0	4.8	20		11/20/18 15:36	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	2.0	mg/L	0.10	0.050	1		11/08/18 13:14	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P13S **Lab ID: 60285459016** Collected: 11/05/18 11:40 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	69.8J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:22	7429-90-5	
Barium	67.7	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:22	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:22	7440-41-7	
Boron	2380	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:22	7440-42-8	
Calcium	111000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:22	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:22	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:22	7440-50-8	
Iron	32.6J	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:22	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:22	7439-92-1	
Lithium	39.1	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:22	7439-93-2	
Magnesium	21100	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:22	7439-95-4	
Manganese	93.4	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:22	7439-96-5	
Molybdenum	35.1	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:22	7439-98-7	
Nickel	1.6J	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:22	7440-02-0	
Potassium	6360	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:22	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:22	7440-22-4	
Sodium	85100	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:22	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:22	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.11J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:49	7440-36-0	
Arsenic	0.78J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:49	7440-38-2	
Cadmium	0.061J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:49	7440-43-9	
Chromium	0.22J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:49	7440-47-3	B
Selenium	0.089J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:49	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:49	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:06	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	339	mg/L	20.0	4.9	1		11/14/18 12:28		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	696	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.033J	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/06/18 15:51		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	26.7	mg/L	2.0	0.58	2		11/20/18 16:24	16887-00-6	
Fluoride	0.40	mg/L	0.20	0.19	1		11/19/18 01:26	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P13S **Lab ID: 60285459016** Collected: 11/05/18 11:40 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	198	mg/L	20.0	4.8	20		11/20/18 16:40	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.051J	mg/L	0.10	0.050	1		11/08/18 13:15	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P131 Lab ID: 60285459017 Collected: 11/05/18 11:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	33.9J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:24	7429-90-5	
Barium	46.9	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:24	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:24	7440-41-7	
Boron	4030	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:24	7440-42-8	
Calcium	21300	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:24	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:24	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:24	7440-50-8	
Iron	403	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:24	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:24	7439-92-1	
Lithium	12.0	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:24	7439-93-2	
Magnesium	2850	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:24	7439-95-4	
Manganese	87.1	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:24	7439-96-5	
Molybdenum	203	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:24	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:24	7440-02-0	
Potassium	4690	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:24	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:24	7440-22-4	
Sodium	133000	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:24	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:24	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:58	7440-36-0	
Arsenic	23.6	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 17:58	7440-38-2	
Cadmium	0.096J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 17:58	7440-43-9	
Chromium	0.29J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:58	7440-47-3	B
Selenium	0.34J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 17:58	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 17:58	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:08	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	88.4	mg/L	20.0	4.9	1		11/14/18 12:32		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	402	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.42	mg/L	0.20	0.012	1		11/06/18 15:51		1e,H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	27.2	mg/L	2.0	0.58	2		11/20/18 16:56	16887-00-6	
Fluoride	1.1	mg/L	0.20	0.19	1		11/19/18 01:42	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P13I **Lab ID: 60285459017** Collected: 11/05/18 11:10 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	219	mg/L	20.0	4.8	20		11/20/18 17:12	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	2.6	mg/L	0.10	0.050	1		11/08/18 13:17	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P13D Lab ID: 60285459018 Collected: 11/05/18 10:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	55.9J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:26	7429-90-5	
Barium	86.6	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:26	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:26	7440-41-7	
Boron	5780	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:26	7440-42-8	
Calcium	69000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:26	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:26	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:26	7440-50-8	
Iron	3240	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:26	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:26	7439-92-1	
Lithium	78.7	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:26	7439-93-2	
Magnesium	26800	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:26	7439-95-4	
Manganese	487	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:26	7439-96-5	
Molybdenum	1300	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:26	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:26	7440-02-0	
Potassium	8390	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:26	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:26	7440-22-4	
Sodium	64700	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:26	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:26	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:02	7440-36-0	
Arsenic	0.29J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:02	7440-38-2	
Cadmium	0.40J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:02	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:02	7440-47-3	B
Selenium	0.13J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:02	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:02	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:10	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	123	mg/L	20.0	4.9	1		11/14/18 12:41		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	589	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	2.8	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.41	mg/L	0.20	0.012	1		11/06/18 15:52		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	24.9	mg/L	2.0	0.58	2		11/20/18 17:28	16887-00-6	
Fluoride	0.32	mg/L	0.20	0.19	1		11/18/18 23:02	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P13D **Lab ID: 60285459018** Collected: 11/05/18 10:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	286	mg/L	50.0	12.0	50		11/20/18 17:51	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.64	mg/L	0.10	0.050	1		11/08/18 13:18	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P30S **Lab ID: 60285459019** Collected: 11/05/18 15:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	81.2	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:28	7429-90-5	
Barium	110	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:28	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:28	7440-41-7	
Boron	468	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:28	7440-42-8	
Calcium	161000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:28	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:28	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:28	7440-50-8	
Iron	49.8J	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:28	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:28	7439-92-1	
Lithium	47.7	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:28	7439-93-2	
Magnesium	31800	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:28	7439-95-4	
Manganese	20.7	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:28	7439-96-5	
Molybdenum	1.3J	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:28	7439-98-7	
Nickel	2.0J	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:28	7440-02-0	
Potassium	6120	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:28	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:28	7440-22-4	
Sodium	53400	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:28	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:28	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.12J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:04	7440-36-0	
Arsenic	1.1	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:04	7440-38-2	
Cadmium	0.058J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:04	7440-43-9	
Chromium	0.17J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:04	7440-47-3	B
Selenium	0.32J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:04	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:04	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:12	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	432	mg/L	20.0	4.9	1		11/14/18 12:46		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	766	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation) Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.050J	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/06/18 15:52		H6
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	41.4	mg/L	5.0	1.4	5		11/20/18 18:07	16887-00-6	
Fluoride	0.26	mg/L	0.20	0.19	1		11/18/18 23:51	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P30S **Lab ID: 60285459019** Collected: 11/05/18 15:25 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	169	mg/L	20.0	4.8	20		11/20/18 18:23	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 13:19	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-1 Lab ID: 60285459020 Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	78.6	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:31	7429-90-5	
Barium	93.1	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:31	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:31	7440-41-7	
Boron	2070	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:31	7440-42-8	
Calcium	109000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:31	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:31	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:31	7440-50-8	
Iron	1020	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:31	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:31	7439-92-1	
Lithium	6.7J	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:31	7439-93-2	
Magnesium	16200	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:31	7439-95-4	
Manganese	109	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:31	7439-96-5	
Molybdenum	41.4	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:31	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:31	7440-02-0	
Potassium	2770	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:31	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:31	7440-22-4	
Sodium	23300	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:31	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:31	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:06	7440-36-0	
Arsenic	1.4	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:06	7440-38-2	
Cadmium	0.038J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:06	7440-43-9	
Chromium	0.29J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:06	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:06	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:06	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:15	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	333	mg/L	20.0	4.9	1		11/14/18 12:52		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	386	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation) Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.80	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.22	mg/L	0.20	0.012	1		11/06/18 15:52		H6
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	10.2	mg/L	1.0	0.29	1		11/19/18 00:08	16887-00-6	
Fluoride	0.31	mg/L	0.20	0.19	1		11/19/18 00:08	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-1 **Lab ID: 60285459020** Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	65.5	mg/L	10.0	2.4	10		11/20/18 18:39	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.094J	mg/L	0.10	0.050	1		11/08/18 13:22	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-2 **Lab ID: 60285459021** Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	63.0J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:33	7429-90-5	
Barium	82.5	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:33	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:33	7440-41-7	
Boron	5510	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:33	7440-42-8	
Calcium	65500	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:33	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:33	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:33	7440-50-8	
Iron	3080	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:33	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:33	7439-92-1	
Lithium	79.8	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:33	7439-93-2	
Magnesium	25600	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:33	7439-95-4	
Manganese	464	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:33	7439-96-5	
Molybdenum	1240	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:33	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:33	7440-02-0	
Potassium	8140	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:33	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:33	7440-22-4	
Sodium	61800	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:33	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:33	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:07	7440-36-0	
Arsenic	0.25J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:07	7440-38-2	
Cadmium	0.40J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:07	7440-43-9	
Chromium	0.17J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:07	7440-47-3	B
Selenium	0.088J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:07	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:07	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:17	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	122	mg/L	20.0	4.9	1		11/14/18 12:57		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	607	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	2.7	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.34	mg/L	0.20	0.012	1		11/06/18 15:53		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	24.5	mg/L	2.0	0.58	2		11/20/18 18:55	16887-00-6	
Fluoride	0.32	mg/L	0.20	0.19	1		11/19/18 00:24	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-2 **Lab ID: 60285459021** Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	261	mg/L	50.0	12.0	50		11/20/18 19:43	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.67	mg/L	0.10	0.050	1		11/08/18 13:23	7723-14-0	M1

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-3 Lab ID: 60285459022 Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	80.6	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:35	7429-90-5	
Barium	70.7	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:35	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:35	7440-41-7	
Boron	2440	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:35	7440-42-8	
Calcium	114000	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:35	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:35	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:35	7440-50-8	
Iron	49.5J	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:35	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:35	7439-92-1	
Lithium	43.1	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:35	7439-93-2	
Magnesium	21700	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:35	7439-95-4	
Manganese	98.6	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:35	7439-96-5	
Molybdenum	36.1	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:35	7439-98-7	
Nickel	2.6J	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:35	7440-02-0	
Potassium	6430	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:35	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:35	7440-22-4	
Sodium	87400	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:35	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:35	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.15J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:09	7440-36-0	
Arsenic	1.0	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:09	7440-38-2	
Cadmium	0.093J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:09	7440-43-9	
Chromium	0.33J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:09	7440-47-3	B
Selenium	0.17J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:09	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:09	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:19	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	341	mg/L	20.0	4.9	1		11/14/18 13:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	732	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.050J	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/06/18 15:53		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	26.1	mg/L	2.0	0.58	2		11/20/18 19:59	16887-00-6	
Fluoride	0.43	mg/L	0.20	0.19	1		11/19/18 00:41	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-DUP-3 **Lab ID: 60285459022** Collected: 11/05/18 08:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	189	mg/L	20.0	4.8	20		11/20/18 20:15	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 13:26	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-2 **Lab ID:** 60285459023 Collected: 11/05/18 11:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	<21.1	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:37	7429-90-5	
Barium	<1.5	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:37	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:37	7440-41-7	
Boron	24.0J	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:37	7440-42-8	
Calcium	<53.5	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:37	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:37	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:37	7440-50-8	
Iron	<6.1	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:37	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:37	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:37	7439-93-2	
Magnesium	<14.0	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:37	7439-95-4	
Manganese	<0.73	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:37	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:37	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:37	7440-02-0	
Potassium	130J	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:37	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:37	7440-22-4	
Sodium	<157	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:37	7440-23-5	
Zinc	3.8J	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:37	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:50	7440-36-0	
Arsenic	0.080J	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 17:50	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 17:50	7440-43-9	
Chromium	0.20J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 17:50	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 17:50	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 17:50	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:22	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/14/18 13:15		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/06/18 15:53		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.29	mg/L	1.0	0.29	1		11/19/18 00:57	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		11/19/18 00:57	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-2 **Lab ID: 60285459023** Collected: 11/05/18 11:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	<0.24	mg/L	1.0	0.24	1		11/19/18 00:57	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/08/18 13:27	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P29S **Lab ID: 60285459024** Collected: 11/06/18 11:55 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	334	ug/L	75.0	21.1	1	11/08/18 14:29	11/16/18 18:03	7429-90-5	
Barium	335	ug/L	5.0	1.5	1	11/08/18 14:29	11/16/18 18:03	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 14:29	11/16/18 18:03	7440-41-7	
Boron	64.6J	ug/L	100	12.5	1	11/08/18 14:29	11/16/18 18:03	7440-42-8	
Calcium	113000	ug/L	200	53.5	1	11/08/18 14:29	11/16/18 18:03	7440-70-2	
Cobalt	1.4J	ug/L	5.0	0.87	1	11/08/18 14:29	11/16/18 18:03	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 14:29	11/16/18 18:03	7440-50-8	
Iron	14200	ug/L	50.0	6.1	1	11/08/18 14:29	11/16/18 18:03	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 14:29	11/16/18 18:03	7439-92-1	
Lithium	11.1	ug/L	10.0	4.6	1	11/08/18 14:29	11/16/18 18:03	7439-93-2	
Magnesium	30300	ug/L	50.0	14.0	1	11/08/18 14:29	11/16/18 18:03	7439-95-4	
Manganese	535	ug/L	5.0	0.73	1	11/08/18 14:29	11/16/18 18:03	7439-96-5	
Molybdenum	1.1J	ug/L	20.0	0.90	1	11/08/18 14:29	11/16/18 18:03	7439-98-7	
Nickel	1.6J	ug/L	5.0	1.4	1	11/08/18 14:29	11/16/18 18:03	7440-02-0	
Potassium	4890	ug/L	500	79.3	1	11/08/18 14:29	11/16/18 18:03	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 14:29	11/16/18 18:03	7440-22-4	
Sodium	13900	ug/L	500	157	1	11/08/18 14:29	11/16/18 18:03	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 14:29	11/16/18 18:03	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.093J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:40	7440-36-0	
Arsenic	51.7	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:40	7440-38-2	
Cadmium	0.057J	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:40	7440-43-9	
Chromium	0.61J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:40	7440-47-3	B
Selenium	0.17J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:40	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:40	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/30/18 15:30	12/03/18 11:09	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	431	mg/L	20.0	4.9	1		11/15/18 14:41		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	454	mg/L	5.0	5.0	1		11/12/18 14:11		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	8.6	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	5.6	mg/L	0.40	0.024	2		11/07/18 13:12		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	13.7	mg/L	1.0	0.29	1		12/01/18 05:49	16887-00-6	
Fluoride	0.26	mg/L	0.20	0.19	1		12/01/18 05:49	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P29S **Lab ID: 60285459024** Collected: 11/06/18 11:55 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	2.7	mg/L	1.0	0.24	1		12/01/18 05:49	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.86	mg/L	0.10	0.050	1		11/13/18 09:16	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P29D **Lab ID: 60285459025** Collected: 11/06/18 12:35 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	105	ug/L	75.0	21.1	1	11/08/18 14:29	11/16/18 18:05	7429-90-5	
Barium	152	ug/L	5.0	1.5	1	11/08/18 14:29	11/16/18 18:05	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 14:29	11/16/18 18:05	7440-41-7	
Boron	80.1J	ug/L	100	12.5	1	11/08/18 14:29	11/16/18 18:05	7440-42-8	
Calcium	92600	ug/L	200	53.5	1	11/08/18 14:29	11/16/18 18:05	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 14:29	11/16/18 18:05	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 14:29	11/16/18 18:05	7440-50-8	
Iron	4940	ug/L	50.0	6.1	1	11/08/18 14:29	11/16/18 18:05	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 14:29	11/16/18 18:05	7439-92-1	
Lithium	47.9	ug/L	10.0	4.6	1	11/08/18 14:29	11/16/18 18:05	7439-93-2	
Magnesium	29400	ug/L	50.0	14.0	1	11/08/18 14:29	11/16/18 18:05	7439-95-4	
Manganese	172	ug/L	5.0	0.73	1	11/08/18 14:29	11/16/18 18:05	7439-96-5	
Molybdenum	1.6J	ug/L	20.0	0.90	1	11/08/18 14:29	11/16/18 18:05	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 14:29	11/16/18 18:05	7440-02-0	
Potassium	5080	ug/L	500	79.3	1	11/08/18 14:29	11/16/18 18:05	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 14:29	11/16/18 18:05	7440-22-4	
Sodium	77600	ug/L	500	157	1	11/08/18 14:29	11/16/18 18:05	7440-23-5	
Zinc	4.7J	ug/L	50.0	3.5	1	11/08/18 14:29	11/16/18 18:05	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:45	7440-36-0	
Arsenic	1.1	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:45	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:45	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:45	7440-47-3	B
Selenium	0.091J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:45	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:45	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/30/18 15:30	12/03/18 11:16	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	318	mg/L	20.0	4.9	1		11/15/18 14:47		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	557	mg/L	5.0	5.0	1		11/12/18 14:12		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	28.2	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.2	mg/L	0.20	0.012	1		11/07/18 13:13		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	130	mg/L	10.0	2.9	10		12/01/18 07:18	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.19	1		12/01/18 07:00	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P29D **Lab ID: 60285459025** Collected: 11/06/18 12:35 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	28.1	mg/L	10.0	2.4	10		12/01/18 07:18	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.11	mg/L	0.10	0.050	1		11/13/18 09:17	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P31S **Lab ID: 60285459026** Collected: 11/06/18 08:45 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	37.5J	ug/L	75.0	21.1	1	11/08/18 14:29	11/16/18 18:36	7429-90-5	
Barium	141	ug/L	5.0	1.5	1	11/08/18 14:29	11/16/18 18:36	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 14:29	11/16/18 18:36	7440-41-7	
Boron	315	ug/L	100	12.5	1	11/08/18 14:29	11/16/18 18:36	7440-42-8	
Calcium	61700	ug/L	200	53.5	1	11/08/18 14:29	11/16/18 18:36	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 14:29	11/16/18 18:36	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 14:29	11/16/18 18:36	7440-50-8	
Iron	4170	ug/L	50.0	6.1	1	11/08/18 14:29	11/16/18 18:36	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 14:29	11/16/18 18:36	7439-92-1	
Lithium	8.3J	ug/L	10.0	4.6	1	11/08/18 14:29	11/16/18 18:36	7439-93-2	
Magnesium	11400	ug/L	50.0	14.0	1	11/08/18 14:29	11/16/18 18:36	7439-95-4	
Manganese	890	ug/L	5.0	0.73	1	11/08/18 14:29	11/16/18 18:36	7439-96-5	
Molybdenum	7.8J	ug/L	20.0	0.90	1	11/08/18 14:29	11/16/18 18:36	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 14:29	11/16/18 18:36	7440-02-0	
Potassium	4310	ug/L	500	79.3	1	11/08/18 14:29	11/16/18 18:36	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 14:29	11/16/18 18:36	7440-22-4	
Sodium	11600	ug/L	500	157	1	11/08/18 14:29	11/16/18 18:36	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 14:29	11/16/18 18:36	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:46	7440-36-0	
Arsenic	15.6	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:46	7440-38-2	
Cadmium	0.037J	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:46	7440-43-9	
Chromium	0.19J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:46	7440-47-3	B
Selenium	0.14J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:46	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:46	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/30/18 15:30	12/03/18 11:18	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	208	mg/L	20.0	4.9	1		11/15/18 14:51		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	204	mg/L	5.0	5.0	1		11/12/18 14:12		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	3.5	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.63	mg/L	0.20	0.012	1		11/07/18 12:59		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	2.6	mg/L	1.0	0.29	1		12/01/18 07:36	16887-00-6	
Fluoride	0.39	mg/L	0.20	0.19	1		12/01/18 07:36	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-P31S **Lab ID: 60285459026** Collected: 11/06/18 08:45 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	18.4	mg/L	1.0	0.24	1		12/01/18 07:36	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.36	mg/L	0.10	0.050	1		11/13/18 09:18	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-3 **Lab ID: 60285459027** Collected: 11/06/18 08:40 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	<21.1	ug/L	75.0	21.1	1	11/08/18 14:29	11/16/18 18:38	7429-90-5	
Barium	<1.5	ug/L	5.0	1.5	1	11/08/18 14:29	11/16/18 18:38	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 14:29	11/16/18 18:38	7440-41-7	
Boron	<12.5	ug/L	100	12.5	1	11/08/18 14:29	11/16/18 18:38	7440-42-8	
Calcium	<53.5	ug/L	200	53.5	1	11/08/18 14:29	11/16/18 18:38	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 14:29	11/16/18 18:38	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 14:29	11/16/18 18:38	7440-50-8	
Iron	14.5J	ug/L	50.0	6.1	1	11/08/18 14:29	11/16/18 18:38	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 14:29	11/16/18 18:38	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	11/08/18 14:29	11/16/18 18:38	7439-93-2	
Magnesium	<14.0	ug/L	50.0	14.0	1	11/08/18 14:29	11/16/18 18:38	7439-95-4	
Manganese	<0.73	ug/L	5.0	0.73	1	11/08/18 14:29	11/16/18 18:38	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	11/08/18 14:29	11/16/18 18:38	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 14:29	11/16/18 18:38	7440-02-0	
Potassium	<79.3	ug/L	500	79.3	1	11/08/18 14:29	11/16/18 18:38	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 14:29	11/16/18 18:38	7440-22-4	
Sodium	348J	ug/L	500	157	1	11/08/18 14:29	11/16/18 18:38	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 14:29	11/16/18 18:38	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:48	7440-36-0	
Arsenic	0.12J	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:48	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:48	7440-43-9	
Chromium	0.19J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:48	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:48	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:48	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/30/18 15:30	12/03/18 11:20	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/15/18 15:04		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	5.5	mg/L	5.0	5.0	1		11/12/18 14:12		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.015J	mg/L	0.050	0.012	1		12/03/18 14:32	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		11/07/18 12:58		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.29	mg/L	1.0	0.29	1		12/01/18 08:11	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		12/01/18 08:11	16984-48-8	

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Sample: R-NE-FB-3 **Lab ID: 60285459027** Collected: 11/06/18 08:40 Received: 11/07/18 03:58 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	<0.24	mg/L	1.0	0.24	1		12/01/18 08:11	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/13/18 09:19	7723-14-0	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555355 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2278157 Matrix: Water
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/16/18 18:51	

LABORATORY CONTROL SAMPLE: 2278158

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.5	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278159 2278160

Parameter	Units	60285635004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.5	4.6	89	90	75-125	1	20	

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

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555449 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

METHOD BLANK: 2278650 Matrix: Water
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/20/18 10:15	

LABORATORY CONTROL SAMPLE: 2278651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278652 2278653

Parameter	Units	60284830001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.1	5.0	101	101	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278654 2278655

Parameter	Units	60285588003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	4.9	100	99	75-125	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278656 2278657

Parameter	Units	60285588004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	5.0	100	101	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555581

Analysis Method: EPA 7470

QC Batch Method: EPA 7470

Analysis Description: 7470 Mercury

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

METHOD BLANK: 2279193

Matrix: Water

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/20/18 13:40	

LABORATORY CONTROL SAMPLE: 2279194

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.2	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2279195 2279196

Parameter	Units	60285459011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.2	5.2	105	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 557799 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2288401 Matrix: Water
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	12/03/18 11:00	

LABORATORY CONTROL SAMPLE: 2288402

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288403 2288404

Parameter	Units	60285459024 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	4.9	4.9	97	98	75-125	0	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553504 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2269780 Matrix: Water
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	22.2J	75.0	21.1	11/07/18 15:28	
Barium	ug/L	<1.5	5.0	1.5	11/07/18 15:28	
Beryllium	ug/L	<0.16	1.0	0.16	11/07/18 15:28	
Boron	ug/L	<12.5	100	12.5	11/07/18 15:28	
Calcium	ug/L	<53.5	200	53.5	11/07/18 15:28	
Cobalt	ug/L	<0.87	5.0	0.87	11/07/18 15:28	
Copper	ug/L	<4.5	10.0	4.5	11/07/18 15:28	
Iron	ug/L	<6.1	50.0	6.1	11/07/18 15:28	
Lead	ug/L	<3.0	10.0	3.0	11/07/18 15:28	
Lithium	ug/L	<4.6	10.0	4.6	11/07/18 15:28	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 15:28	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 15:28	
Molybdenum	ug/L	<0.90	20.0	0.90	11/07/18 15:28	
Nickel	ug/L	<1.4	5.0	1.4	11/07/18 15:28	
Potassium	ug/L	<79.3	500	79.3	11/07/18 15:28	
Silver	ug/L	<2.0	7.0	2.0	11/07/18 15:28	
Sodium	ug/L	<157	500	157	11/07/18 15:28	
Zinc	ug/L	<3.5	50.0	3.5	11/07/18 15:28	

LABORATORY CONTROL SAMPLE: 2269781

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9390	94	85-115	
Barium	ug/L	1000	976	98	85-115	
Beryllium	ug/L	1000	931	93	85-115	
Boron	ug/L	1000	958	96	85-115	
Calcium	ug/L	10000	9380	94	85-115	
Cobalt	ug/L	1000	950	95	85-115	
Copper	ug/L	1000	953	95	85-115	
Iron	ug/L	10000	9500	95	85-115	
Lead	ug/L	1000	951	95	85-115	
Lithium	ug/L	1000	976	98	85-115	
Magnesium	ug/L	10000	9590	96	85-115	
Manganese	ug/L	1000	940	94	85-115	
Molybdenum	ug/L	1000	970	97	85-115	
Nickel	ug/L	1000	962	96	85-115	
Potassium	ug/L	10000	9720	97	85-115	
Silver	ug/L	500	486	97	85-115	
Sodium	ug/L	10000	9620	96	85-115	
Zinc	ug/L	1000	931	93	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Parameter	Units	60285463002		2269782		2269783		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec							
Aluminum	ug/L	138	20000	20000	9640	9300	48	46	70-130	4	20	M1		
Barium	ug/L	378	2000	2000	1340	1300	48	46	70-130	3	20	M1		
Beryllium	ug/L	<0.16	2000	2000	936	904	47	45	70-130	4	20	M1		
Boron	ug/L	115	2000	2000	1080	1050	48	47	70-130	3	20	M1		
Calcium	ug/L	130000	20000	20000	136000	132000	34	14	70-130	3	20	M1		
Cobalt	ug/L	<0.87	2000	2000	921	899	46	45	70-130	2	20	M1		
Copper	ug/L	<4.5	2000	2000	959	935	48	47	70-130	3	20	M1		
Iron	ug/L	11400	20000	20000	20200	19600	44	41	70-130	3	20	M1		
Lead	ug/L	<3.0	2000	2000	924	897	46	45	70-130	3	20	M1		
Lithium	ug/L	8.6J	2000	2000	993	963	49	48	70-130	3	20	M1		
Magnesium	ug/L	17800	20000	20000	26400	25800	43	40	70-130	2	20	M1		
Manganese	ug/L	445	2000	2000	1360	1320	46	44	70-130	3	20	M1		
Molybdenum	ug/L	<0.90	2000	2000	967	946	48	47	70-130	2	20	M1		
Nickel	ug/L	<1.4	2000	2000	925	903	46	45	70-130	2	20	M1		
Potassium	ug/L	2200	20000	20000	12000	11700	49	47	70-130	3	20	M1		
Silver	ug/L	<2.0	1000	1000	484	470	48	47	70-130	3	20	M1		
Sodium	ug/L	4740	20000	20000	14400	13900	48	46	70-130	3	20	M1		
Zinc	ug/L	5.2J	2000	2000	914	890	45	44	70-130	3	20	M1		

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553877 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285588001, 60285588002, 60285588003

METHOD BLANK: 2271156 Matrix: Water

Associated Lab Samples: 60285588001, 60285588002, 60285588003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	22.2J	75.0	21.1	11/07/18 16:33	
Barium	ug/L	<1.5	5.0	1.5	11/07/18 16:33	
Beryllium	ug/L	<0.16	1.0	0.16	11/07/18 16:33	
Boron	ug/L	<12.5	100	12.5	11/07/18 16:33	
Calcium	ug/L	<53.5	200	53.5	11/07/18 16:33	
Cobalt	ug/L	<0.87	5.0	0.87	11/07/18 16:33	
Copper	ug/L	<4.5	10.0	4.5	11/07/18 16:33	
Iron	ug/L	<6.1	50.0	6.1	11/07/18 16:33	
Lead	ug/L	<3.0	10.0	3.0	11/07/18 16:33	
Lithium	ug/L	<4.6	10.0	4.6	11/07/18 16:33	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 16:33	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 16:33	
Molybdenum	ug/L	<0.90	20.0	0.90	11/07/18 16:33	
Nickel	ug/L	<1.4	5.0	1.4	11/07/18 16:33	
Potassium	ug/L	250J	500	79.3	11/07/18 16:33	
Silver	ug/L	<2.0	7.0	2.0	11/07/18 16:33	
Sodium	ug/L	<157	500	157	11/07/18 16:33	
Zinc	ug/L	<3.5	50.0	3.5	11/07/18 16:33	

LABORATORY CONTROL SAMPLE: 2271157

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9820	98	85-115	
Barium	ug/L	1000	974	97	85-115	
Beryllium	ug/L	1000	955	95	85-115	
Boron	ug/L	1000	967	97	85-115	
Calcium	ug/L	10000	9700	97	85-115	
Cobalt	ug/L	1000	985	99	85-115	
Copper	ug/L	1000	998	100	85-115	
Iron	ug/L	10000	9530	95	85-115	
Lead	ug/L	1000	984	98	85-115	
Lithium	ug/L	1000	984	98	85-115	
Magnesium	ug/L	10000	9840	98	85-115	
Manganese	ug/L	1000	958	96	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Nickel	ug/L	1000	988	99	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Silver	ug/L	500	499	100	85-115	
Sodium	ug/L	10000	10100	101	85-115	
Zinc	ug/L	1000	957	96	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

MATRIX SPIKE SAMPLE: 2271158

Parameter	Units	60285719007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	<21.1	10000	9770	98	70-130	
Barium	ug/L	25.2	1000	998	97	70-130	
Beryllium	ug/L	<0.16	1000	950	95	70-130	
Boron	ug/L	<12.5	1000	1010	100	70-130	
Calcium	ug/L	59900	10000	68700	88	70-130	
Cobalt	ug/L	<0.87	1000	956	96	70-130	
Copper	ug/L	<4.5	1000	1000	100	70-130	
Iron	ug/L	11.4J	10000	9470	95	70-130	
Lead	ug/L	<3.0	1000	957	96	70-130	
Lithium	ug/L	172	1000	1160	98	70-130	
Magnesium	ug/L	73300	10000	82400	92	70-130	
Manganese	ug/L	23.9	1000	972	95	70-130	
Molybdenum	ug/L	<0.90	1000	1030	103	70-130	
Nickel	ug/L	1.8J	1000	962	96	70-130	
Potassium	ug/L	67100	10000	76200	92	70-130	
Silver	ug/L	<2.0	500	504	101	70-130	
Sodium	ug/L	12200	10000	22100	100	70-130	
Zinc	ug/L	17.9J	1000	957	94	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271159 2271160

Parameter	Units	60285588003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Aluminum	ug/L	<21.1	10000	10000	9780	10100	98	101	70-130	3	20
Barium	ug/L	44.1	1000	1000	1020	1050	98	100	70-130	2	20
Beryllium	ug/L	<0.16	1000	1000	968	995	97	99	70-130	3	20
Boron	ug/L	8110	1000	1000	8970	9050	86	94	70-130	1	20
Calcium	ug/L	34700	10000	10000	43700	44900	90	102	70-130	3	20
Cobalt	ug/L	<0.87	1000	1000	975	985	98	98	70-130	1	20
Copper	ug/L	<4.5	1000	1000	1010	1020	101	102	70-130	1	20
Iron	ug/L	1130	10000	10000	10700	11000	95	98	70-130	3	20
Lead	ug/L	<3.0	1000	1000	952	963	95	96	70-130	1	20
Lithium	ug/L	49.8	1000	1000	1040	1060	99	101	70-130	2	20
Magnesium	ug/L	9740	10000	10000	19200	19700	95	99	70-130	2	20
Manganese	ug/L	227	1000	1000	1160	1180	94	96	70-130	2	20
Molybdenum	ug/L	422	1000	1000	1430	1440	101	102	70-130	0	20
Nickel	ug/L	1.6J	1000	1000	974	982	97	98	70-130	1	20
Potassium	ug/L	5180	10000	10000	15000	15500	98	103	70-130	3	20
Silver	ug/L	<2.0	500	500	506	517	101	103	70-130	2	20
Sodium	ug/L	174000	10000	10000	181000	183000	62	85	70-130	1	20 M1
Zinc	ug/L	<3.5	1000	1000	951	971	95	97	70-130	2	20

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553881 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285588004, 60285588005, 60285588006

METHOD BLANK: 2271171 Matrix: Water

Associated Lab Samples: 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/07/18 17:23	
Barium	ug/L	<1.5	5.0	1.5	11/07/18 17:23	
Beryllium	ug/L	0.27J	1.0	0.16	11/07/18 17:23	
Boron	ug/L	<12.5	100	12.5	11/07/18 17:23	
Calcium	ug/L	<53.5	200	53.5	11/07/18 17:23	
Cobalt	ug/L	<0.87	5.0	0.87	11/07/18 17:23	
Copper	ug/L	<4.5	10.0	4.5	11/07/18 17:23	
Iron	ug/L	6.8J	50.0	6.1	11/07/18 17:23	
Lead	ug/L	<3.0	10.0	3.0	11/07/18 17:23	
Lithium	ug/L	<4.6	10.0	4.6	11/07/18 17:23	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 17:23	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 17:23	
Molybdenum	ug/L	<0.90	20.0	0.90	11/07/18 17:23	
Nickel	ug/L	<1.4	5.0	1.4	11/07/18 17:23	
Potassium	ug/L	212J	500	79.3	11/07/18 17:23	
Silver	ug/L	<2.0	7.0	2.0	11/07/18 17:23	
Sodium	ug/L	<157	500	157	11/07/18 17:23	
Zinc	ug/L	<3.5	50.0	3.5	11/07/18 17:23	

LABORATORY CONTROL SAMPLE: 2271172

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9520	95	85-115	
Barium	ug/L	1000	966	97	85-115	
Beryllium	ug/L	1000	915	91	85-115	
Boron	ug/L	1000	959	96	85-115	
Calcium	ug/L	10000	9210	92	85-115	
Cobalt	ug/L	1000	953	95	85-115	
Copper	ug/L	1000	964	96	85-115	
Iron	ug/L	10000	9270	93	85-115	
Lead	ug/L	1000	949	95	85-115	
Lithium	ug/L	1000	987	99	85-115	
Magnesium	ug/L	10000	9620	96	85-115	
Manganese	ug/L	1000	920	92	85-115	
Molybdenum	ug/L	1000	971	97	85-115	
Nickel	ug/L	1000	951	95	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Silver	ug/L	500	483	97	85-115	
Sodium	ug/L	10000	9860	99	85-115	
Zinc	ug/L	1000	936	94	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271173												2271174	
Parameter	Units	60285588004 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
			Spike Conc.	Spike Conc.									
Aluminum	ug/L	46.0J	10000	10000	9530	9440	95	94	70-130	1	20		
Barium	ug/L	116	1000	1000	1060	1060	95	94	70-130	1	20		
Beryllium	ug/L	<0.16	1000	1000	909	906	91	91	70-130	0	20		
Boron	ug/L	572	1000	1000	1530	1510	96	94	70-130	1	20		
Calcium	ug/L	60300	10000	10000	69700	69200	94	89	70-130	1	20		
Cobalt	ug/L	<0.87	1000	1000	919	914	92	91	70-130	1	20		
Copper	ug/L	4.8J	1000	1000	941	939	94	93	70-130	0	20		
Iron	ug/L	1750	10000	10000	10800	10800	91	90	70-130	0	20		
Lead	ug/L	<3.0	1000	1000	903	900	90	90	70-130	0	20		
Lithium	ug/L	23.2	1000	1000	989	985	97	96	70-130	0	20		
Magnesium	ug/L	11000	10000	10000	20200	20000	92	90	70-130	1	20		
Manganese	ug/L	371	1000	1000	1260	1260	89	89	70-130	1	20		
Molybdenum	ug/L	33.8	1000	1000	996	991	96	96	70-130	1	20		
Nickel	ug/L	<1.4	1000	1000	913	912	91	91	70-130	0	20		
Potassium	ug/L	5860	10000	10000	15400	15200	95	94	70-130	1	20		
Silver	ug/L	<2.0	500	500	471	469	94	94	70-130	1	20		
Sodium	ug/L	54600	10000	10000	64700	64100	101	94	70-130	1	20		
Zinc	ug/L	<3.5	1000	1000	913	908	91	90	70-130	1	20		

MATRIX SPIKE SAMPLE: 2271175											
Parameter	Units	60285589001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers				
								Aluminum	ug/L	422	10000
Barium	ug/L	15.1	1000	959	94	70-130					
Beryllium	ug/L	<0.16	1000	908	91	70-130					
Boron	ug/L	2470	1000	3440	96	70-130					
Calcium	ug/L	26800	10000	36100	94	70-130					
Cobalt	ug/L	0.92J	1000	917	92	70-130					
Copper	ug/L	<4.5	1000	941	94	70-130					
Iron	ug/L	13.1J	10000	9120	91	70-130					
Lead	ug/L	<3.0	1000	898	90	70-130					
Lithium	ug/L	<4.6	1000	973	97	70-130					
Magnesium	ug/L	753	10000	9940	92	70-130					
Manganese	ug/L	2.3J	1000	892	89	70-130					
Molybdenum	ug/L	102	1000	1060	96	70-130					
Nickel	ug/L	<1.4	1000	913	91	70-130					
Potassium	ug/L	6080	10000	15600	96	70-130					
Silver	ug/L	<2.0	500	466	93	70-130					
Sodium	ug/L	107000	10000	120000	125	70-130					
Zinc	ug/L	<3.5	1000	917	92	70-130					

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554058 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

METHOD BLANK: 2272155 Matrix: Water
 Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/08/18 17:50	
Barium	ug/L	<1.5	5.0	1.5	11/08/18 17:50	
Beryllium	ug/L	<0.16	1.0	0.16	11/08/18 17:50	
Boron	ug/L	<12.5	100	12.5	11/08/18 17:50	
Calcium	ug/L	<53.5	200	53.5	11/08/18 17:50	
Cobalt	ug/L	<0.87	5.0	0.87	11/08/18 17:50	
Copper	ug/L	<4.5	10.0	4.5	11/08/18 17:50	
Iron	ug/L	<6.1	50.0	6.1	11/08/18 17:50	
Lead	ug/L	<3.0	10.0	3.0	11/08/18 17:50	
Lithium	ug/L	<4.6	10.0	4.6	11/08/18 17:50	
Magnesium	ug/L	<14.0	50.0	14.0	11/08/18 17:50	
Manganese	ug/L	<0.73	5.0	0.73	11/08/18 17:50	
Molybdenum	ug/L	<0.90	20.0	0.90	11/08/18 17:50	
Nickel	ug/L	<1.4	5.0	1.4	11/08/18 17:50	
Potassium	ug/L	<79.3	500	79.3	11/08/18 17:50	
Silver	ug/L	<2.0	7.0	2.0	11/08/18 17:50	
Sodium	ug/L	<157	500	157	11/08/18 17:50	
Zinc	ug/L	<3.5	50.0	3.5	11/08/18 17:50	

LABORATORY CONTROL SAMPLE: 2272156

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9440	94	85-115	
Barium	ug/L	1000	953	95	85-115	
Beryllium	ug/L	1000	945	95	85-115	
Boron	ug/L	1000	975	98	85-115	
Calcium	ug/L	10000	9310	93	85-115	
Cobalt	ug/L	1000	967	97	85-115	
Copper	ug/L	1000	1010	101	85-115	
Iron	ug/L	10000	9320	93	85-115	
Lead	ug/L	1000	953	95	85-115	
Lithium	ug/L	1000	968	97	85-115	
Magnesium	ug/L	10000	9300	93	85-115	
Manganese	ug/L	1000	931	93	85-115	
Molybdenum	ug/L	1000	999	100	85-115	
Nickel	ug/L	1000	967	97	85-115	
Potassium	ug/L	10000	9480	95	85-115	
Silver	ug/L	500	492	98	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

LABORATORY CONTROL SAMPLE: 2272156

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sodium	ug/L	10000	9740	97	85-115	
Zinc	ug/L	1000	911	91	85-115	

MATRIX SPIKE SAMPLE: 2272157

Parameter	Units	60285938002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	64.8J	10000	10000	100	70-130	
Barium	ug/L	120	1000	1090	97	70-130	
Beryllium	ug/L	ND	1000	911	91	70-130	
Boron	ug/L	22.4J	1000	1040	102	70-130	
Calcium	ug/L	105000	10000	113000	79	70-130	
Cobalt	ug/L	ND	1000	990	99	70-130	
Copper	ug/L	ND	1000	1010	101	70-130	
Iron	ug/L	14.5J	10000	9010	90	70-130	
Lead	ug/L	8.0J	1000	978	97	70-130	
Lithium	ug/L	ND	1000	1040	103	70-130	
Magnesium	ug/L	8340	10000	18200	99	70-130	
Manganese	ug/L	ND	1000	901	90	70-130	
Molybdenum	ug/L	ND	1000	1040	104	70-130	
Nickel	ug/L	1.8J	1000	941	94	70-130	
Potassium	ug/L	1580	10000	11700	102	70-130	
Silver	ug/L	ND	500	498	100	70-130	
Sodium	ug/L	10800	10000	21200	105	70-130	
Zinc	ug/L	239	1000	1210	97	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2272158 2272159

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60285459011 Result	Spike Conc.	Spike Conc.	MS Conc.								
Aluminum	ug/L	46.4J	10000	10000	9970	9730	99	97	70-130	2	20		
Barium	ug/L	253	1000	1000	1230	1200	97	95	70-130	2	20		
Beryllium	ug/L	<0.16	1000	1000	905	884	91	88	70-130	2	20		
Boron	ug/L	905	1000	1000	1920	1890	102	99	70-130	1	20		
Calcium	ug/L	95000	10000	10000	107000	105000	116	104	70-130	1	20		
Cobalt	ug/L	<0.87	1000	1000	977	955	98	95	70-130	2	20		
Copper	ug/L	<4.5	1000	1000	998	978	100	98	70-130	2	20		
Iron	ug/L	14700	10000	10000	23400	23000	86	82	70-130	2	20		
Lead	ug/L	<3.0	1000	1000	946	917	95	92	70-130	3	20		
Lithium	ug/L	10.4	1000	1000	1040	1020	103	101	70-130	2	20		
Magnesium	ug/L	38500	10000	10000	49600	49000	110	105	70-130	1	20		
Manganese	ug/L	222	1000	1000	1100	1080	88	86	70-130	2	20		
Molybdenum	ug/L	5.1J	1000	1000	1040	1010	103	100	70-130	3	20		
Nickel	ug/L	<1.4	1000	1000	925	905	92	90	70-130	2	20		
Potassium	ug/L	7830	10000	10000	18100	17800	103	99	70-130	2	20		

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Parameter	Units	2272158		2272159		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		60285459011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Silver	ug/L	<2.0	500	500	498	487	100	97	70-130	2	20		
Sodium	ug/L	41000	10000	10000	52700	51900	118	109	70-130	2	20		
Zinc	ug/L	4.7J	1000	1000	1000	979	100	97	70-130	2	20		

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554168 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2272758 Matrix: Water
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/16/18 16:57	
Barium	ug/L	<1.5	5.0	1.5	11/16/18 16:57	
Beryllium	ug/L	0.17J	1.0	0.16	11/16/18 16:57	
Boron	ug/L	<12.5	100	12.5	11/16/18 16:57	
Calcium	ug/L	<53.5	200	53.5	11/16/18 16:57	
Cobalt	ug/L	<0.87	5.0	0.87	11/16/18 16:57	
Copper	ug/L	<4.5	10.0	4.5	11/16/18 16:57	
Iron	ug/L	<6.1	50.0	6.1	11/16/18 16:57	
Lead	ug/L	<3.0	10.0	3.0	11/16/18 16:57	
Lithium	ug/L	<4.6	10.0	4.6	11/16/18 16:57	
Magnesium	ug/L	<14.0	50.0	14.0	11/16/18 16:57	
Manganese	ug/L	<0.73	5.0	0.73	11/16/18 16:57	
Molybdenum	ug/L	<0.90	20.0	0.90	11/16/18 16:57	
Nickel	ug/L	<1.4	5.0	1.4	11/16/18 16:57	
Potassium	ug/L	<79.3	500	79.3	11/16/18 16:57	
Silver	ug/L	<2.0	7.0	2.0	11/16/18 16:57	
Sodium	ug/L	<157	500	157	11/16/18 16:57	
Zinc	ug/L	<3.5	50.0	3.5	11/16/18 16:57	

LABORATORY CONTROL SAMPLE: 2272759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9870	99	85-115	
Barium	ug/L	1000	959	96	85-115	
Beryllium	ug/L	1000	980	98	85-115	
Boron	ug/L	1000	984	98	85-115	
Calcium	ug/L	10000	9960	100	85-115	
Cobalt	ug/L	1000	991	99	85-115	
Copper	ug/L	1000	1020	102	85-115	
Iron	ug/L	10000	9730	97	85-115	
Lead	ug/L	1000	990	99	85-115	
Lithium	ug/L	1000	961	96	85-115	
Magnesium	ug/L	10000	10400	104	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Molybdenum	ug/L	1000	1000	100	85-115	
Nickel	ug/L	1000	976	98	85-115	
Potassium	ug/L	10000	9760	98	85-115	
Silver	ug/L	500	513	103	85-115	
Sodium	ug/L	10000	9920	99	85-115	
Zinc	ug/L	1000	978	98	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

MATRIX SPIKE SAMPLE: 2272760

Parameter	Units	60285895002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	22500	10000	32200	97	70-130	
Barium	ug/L	44.1	1000	1010	96	70-130	
Beryllium	ug/L	<0.16	1000	984	98	70-130	
Boron	ug/L	6100	1000	6880	78	70-130	
Calcium	ug/L	25500	10000	34200	87	70-130	
Cobalt	ug/L	<0.87	1000	972	97	70-130	
Copper	ug/L	<4.5	1000	963	96	70-130	
Iron	ug/L	6.6J	10000	9780	98	70-130	
Lead	ug/L	<3.0	1000	935	94	70-130	
Lithium	ug/L	68.1	1000	1060	100	70-130	
Magnesium	ug/L	31.8J	10000	9700	97	70-130	
Manganese	ug/L	<0.73	1000	983	98	70-130	
Molybdenum	ug/L	258	1000	1260	100	70-130	
Nickel	ug/L	12.1	1000	978	97	70-130	
Potassium	ug/L	55100	10000	65000	99	70-130	
Silver	ug/L	<2.0	500	483	97	70-130	
Sodium	ug/L	377000	10000	381000	44	70-130	M1
Zinc	ug/L	3.9J	1000	1010	101	70-130	

MATRIX SPIKE SAMPLE: 2272761

Parameter	Units	60285674001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	145	10000	9810	97	70-130	
Barium	ug/L	63.4	1000	1020	96	70-130	
Beryllium	ug/L	ND	1000	958	96	70-130	
Boron	ug/L	3050	1000	3820	77	70-130	
Calcium	ug/L	418000	10000	417000	-8	70-130	M1
Cobalt	ug/L	ND	1000	896	90	70-130	
Copper	ug/L	ND	1000	968	97	70-130	
Iron	ug/L	ND	10000	9470	94	70-130	
Lead	ug/L	ND	1000	860	86	70-130	
Lithium	ug/L	2210	1000	3210	100	70-130	
Magnesium	ug/L	218000	10000	221000	33	70-130	M1
Manganese	ug/L	ND	1000	977	97	70-130	
Molybdenum	ug/L	ND	1000	977	97	70-130	
Nickel	ug/L	12.9	1000	901	89	70-130	
Potassium	ug/L	99000	10000	111000	116	70-130	
Silver	ug/L	ND	500	533	107	70-130	
Sodium	ug/L	5420000	10000	5270000	-1550	70-130	M1
Zinc	ug/L	ND	1000	963	95	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553503 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2269773 Matrix: Water
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/08/18 14:59	
Arsenic	ug/L	<0.065	1.0	0.065	11/08/18 14:59	
Cadmium	ug/L	<0.033	0.50	0.033	11/08/18 14:59	
Chromium	ug/L	<0.078	1.0	0.078	11/08/18 14:59	
Selenium	ug/L	<0.085	1.0	0.085	11/08/18 14:59	
Thallium	ug/L	<0.099	1.0	0.099	11/08/18 14:59	

LABORATORY CONTROL SAMPLE: 2269774

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	41.5	104	85-115	
Arsenic	ug/L	40	39.5	99	85-115	
Cadmium	ug/L	40	38.9	97	85-115	
Chromium	ug/L	40	38.1	95	85-115	
Selenium	ug/L	40	43.8	109	85-115	
Thallium	ug/L	40	38.0	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2269775 2269776

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60285463002 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	<0.078	80	80	81.1	82.9	101	104	70-130	2	20
Arsenic	ug/L	3.6	80	80	84.5	85.0	101	102	70-130	1	20
Cadmium	ug/L	<0.033	80	80	74.0	75.0	92	94	70-130	1	20
Chromium	ug/L	0.15J	80	80	77.0	77.3	96	96	70-130	0	20
Selenium	ug/L	<0.085	80	80	84.0	84.3	105	105	70-130	0	20
Thallium	ug/L	<0.099	80	80	70.3	72.3	88	90	70-130	3	20

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch:	553993	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Samples:	60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006		

METHOD BLANK:	2271645	Matrix:	Water
Associated Lab Samples:	60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/14/18 17:48	
Arsenic	ug/L	<0.065	1.0	0.065	11/14/18 17:48	
Cadmium	ug/L	<0.033	0.50	0.033	11/14/18 17:48	
Chromium	ug/L	0.12J	1.0	0.078	11/14/18 17:48	
Selenium	ug/L	<0.085	1.0	0.085	11/14/18 17:48	
Thallium	ug/L	<0.099	1.0	0.099	11/14/18 17:48	

LABORATORY CONTROL SAMPLE: 2271646

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	99	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	38.9	97	85-115	
Chromium	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	39.0	97	85-115	
Thallium	ug/L	40	37.6	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271647 2271648

Parameter	Units	60285588003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max		Qual
										RPD	RPD	
Antimony	ug/L	<0.078	40	40	39.4	38.5	99	96	70-130	2	20	
Arsenic	ug/L	0.56J	40	40	38.0	37.2	94	92	70-130	2	20	
Cadmium	ug/L	0.14J	40	40	37.0	36.3	92	91	70-130	2	20	
Chromium	ug/L	0.38J	40	40	39.2	38.5	97	95	70-130	2	20	
Selenium	ug/L	0.23J	40	40	34.4	34.1	85	85	70-130	1	20	
Thallium	ug/L	<0.099	40	40	38.4	37.6	96	94	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271649 2271650

Parameter	Units	60285588004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max		Qual
										RPD	RPD	
Antimony	ug/L	<0.078	40	40	36.9	37.5	92	94	70-130	2	20	
Arsenic	ug/L	9.7	40	40	44.3	45.0	86	88	70-130	2	20	
Cadmium	ug/L	0.036J	40	40	35.6	36.5	89	91	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Parameter	Units	60285588004		2271649		2271650		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result								
Chromium	ug/L	0.16J	40	40	36.5	37.4	91	93	70-130	2	20			
Selenium	ug/L	0.087J	40	40	32.2	32.8	80	82	70-130	2	20			
Thallium	ug/L	<0.099	40	40	36.5	36.7	91	92	70-130	1	20			

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553997 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

METHOD BLANK: 2271675 Matrix: Water
 Associated Lab Samples: 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/14/18 17:54	
Arsenic	ug/L	<0.065	1.0	0.065	11/14/18 17:54	
Cadmium	ug/L	<0.033	0.50	0.033	11/14/18 17:54	
Chromium	ug/L	0.086J	1.0	0.078	11/14/18 17:54	
Selenium	ug/L	<0.085	1.0	0.085	11/14/18 17:54	
Thallium	ug/L	<0.099	1.0	0.099	11/14/18 17:54	

LABORATORY CONTROL SAMPLE: 2271676

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.1	98	85-115	
Arsenic	ug/L	40	38.6	97	85-115	
Cadmium	ug/L	40	39.3	98	85-115	
Chromium	ug/L	40	38.7	97	85-115	
Selenium	ug/L	40	36.4	91	85-115	
Thallium	ug/L	40	36.8	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271677 2271678

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60285459017 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	<0.078	40	40	39.5	39.7	98	99	70-130	0	20
Arsenic	ug/L	23.6	40	40	62.1	62.5	96	97	70-130	1	20
Cadmium	ug/L	0.096J	40	40	38.9	38.6	97	96	70-130	1	20
Chromium	ug/L	0.29J	40	40	38.0	37.6	94	93	70-130	1	20
Selenium	ug/L	0.34J	40	40	35.9	35.4	89	88	70-130	2	20
Thallium	ug/L	<0.099	40	40	38.7	38.2	97	96	70-130	1	20

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G
Pace Project No.: 60285459

QC Batch: 554272 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2273296 Matrix: Water
Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/14/18 14:01	
Arsenic	ug/L	<0.065	1.0	0.065	11/14/18 14:01	
Cadmium	ug/L	<0.033	0.50	0.033	11/14/18 14:01	
Chromium	ug/L	0.085J	1.0	0.078	11/14/18 14:01	
Selenium	ug/L	<0.085	1.0	0.085	11/14/18 14:01	
Thallium	ug/L	<0.099	1.0	0.099	11/14/18 14:01	

LABORATORY CONTROL SAMPLE: 2273297

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	98	85-115	
Arsenic	ug/L	40	39.8	99	85-115	
Cadmium	ug/L	40	39.1	98	85-115	
Chromium	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	39.8	99	85-115	
Thallium	ug/L	40	38.0	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2273298 2273299

Parameter	Units	60285742002		60285463015		2273298		2273299		% Rec Limits	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.	MS % Rec	MSD % Rec	MS % Rec	MSD % Rec			
Antimony	ug/L	ND	40	40	40	42.0	40.6	103	99	70-130	3	20
Arsenic	ug/L	1.1	40	40	40	42.8	42.2	104	103	70-130	1	20
Cadmium	ug/L	ND	40	40	40	38.3	37.5	96	94	70-130	2	20
Chromium	ug/L	2.4	40	40	40	42.5	42.2	100	100	70-130	1	20
Selenium	ug/L	4.8	40	40	40	43.1	42.0	96	93	70-130	2	20
Thallium	ug/L	ND	40	40	40	40.1	39.7	100	99	70-130	1	20

MATRIX SPIKE SAMPLE: 2273300

Parameter	Units	60285463015 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	40.1	100	70-130	
Arsenic	ug/L	1.3	40	42.0	102	70-130	
Cadmium	ug/L	0.23J	40	38.3	95	70-130	
Chromium	ug/L	0.20J	40	38.9	97	70-130	
Selenium	ug/L	0.24J	40	38.3	95	70-130	
Thallium	ug/L	<0.099	40	38.4	96	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554304

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004, 60285588001

METHOD BLANK: 2273460

Matrix: Water

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004, 60285588001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/09/18 11:47	

LABORATORY CONTROL SAMPLE: 2273461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	513	103	90-110	

SAMPLE DUPLICATE: 2273463

Parameter	Units	60285458009 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	186	188	1	10	

SAMPLE DUPLICATE: 2273464

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	385	399	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554631 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

METHOD BLANK: 2275134 Matrix: Water
 Associated Lab Samples: 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/12/18 11:39	

LABORATORY CONTROL SAMPLE: 2275135

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	504	101	90-110	

SAMPLE DUPLICATE: 2275136

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	278	284	2	10	

SAMPLE DUPLICATE: 2275137

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	166	176	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554633

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015

METHOD BLANK: 2275141

Matrix: Water

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/14/18 17:53	

LABORATORY CONTROL SAMPLE: 2275142

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	511	102	90-110	

SAMPLE DUPLICATE: 2275143

Parameter	Units	60285669003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	326	337	3	10	

SAMPLE DUPLICATE: 2275144

Parameter	Units	60286055003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	25.2	25.5	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555056

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

METHOD BLANK: 2277012

Matrix: Water

Associated Lab Samples: 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/14/18 12:23	

LABORATORY CONTROL SAMPLE: 2277013

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	508	102	90-110	

SAMPLE DUPLICATE: 2277014

Parameter	Units	60285459017 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	88.4	84.0	5	10	

SAMPLE DUPLICATE: 2277015

Parameter	Units	60285786001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	1150	1140	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G
Pace Project No.: 60285459

QC Batch: 555057 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2277016 Matrix: Water
Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/15/18 14:10	

LABORATORY CONTROL SAMPLE: 2277017

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	486	97	90-110	

SAMPLE DUPLICATE: 2277018

Parameter	Units	60285463019 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	263	264	0	10	

SAMPLE DUPLICATE: 2277019

Parameter	Units	60285981001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	2020	2010	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553343

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2269295

Matrix: Water

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/06/18 07:46	

LABORATORY CONTROL SAMPLE: 2269296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 2269297

Parameter	Units	60285426001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	680	729	7	10	

SAMPLE DUPLICATE: 2269298

Parameter	Units	60285434007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	368000	796000			D6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553994

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

METHOD BLANK: 2271651

Matrix: Water

Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/08/18 08:03	

LABORATORY CONTROL SAMPLE: 2271652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	977	98	80-120	

SAMPLE DUPLICATE: 2271653

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	411	434	5	10	

SAMPLE DUPLICATE: 2271654

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	382	391	2	10	

SAMPLE DUPLICATE: 2272215

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	633	623	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553999

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285459011

METHOD BLANK: 2271685

Matrix: Water

Associated Lab Samples: 60285459011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	7.0	5.0	5.0	11/08/18 08:07	

LABORATORY CONTROL SAMPLE: 2271686

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	979	98	80-120	

SAMPLE DUPLICATE: 2271687

Parameter	Units	60285669003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2950	2930	1	10	

SAMPLE DUPLICATE: 2271688

Parameter	Units	60285719003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2440	2410	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch:	554334	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples:	60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023		

METHOD BLANK:	2273547	Matrix:	Water
Associated Lab Samples:	60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/07/18 10:13	

LABORATORY CONTROL SAMPLE: 2273548

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

SAMPLE DUPLICATE: 2273549

Parameter	Units	60285435001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1400	1000	33	10	D6

SAMPLE DUPLICATE: 2273550

Parameter	Units	60286055003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	14300	12500	13	10	D6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554725

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2275612

Matrix: Water

Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/12/18 14:11	

LABORATORY CONTROL SAMPLE: 2275613

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	968	97	80-120	

SAMPLE DUPLICATE: 2275614

Parameter	Units	60285463021 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	<5.0	<5.0		10	

SAMPLE DUPLICATE: 2275615

Parameter	Units	60286083004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1100	1100	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553047 Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2267988 Matrix: Water

Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/02/18 11:22	H6

LABORATORY CONTROL SAMPLE: 2267989

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.2	109	90-110	H6

SAMPLE DUPLICATE: 2267990

Parameter	Units	60285459002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	1.7	1.6	2	20	H6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553472 Analysis Method: SM 3500-Fe B#4
 QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

METHOD BLANK: 2269693 Matrix: Water
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/05/18 16:23	H6

LABORATORY CONTROL SAMPLE: 2269694

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	101	90-110	H6

SAMPLE DUPLICATE: 2269695

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.61	0.62	2	20	H6

SAMPLE DUPLICATE: 2269696

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.84	0.85	1	20	H6

SAMPLE DUPLICATE: 2269697

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.074J	0.072J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553945 Analysis Method: SM 3500-Fe B#4
 QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2271402 Matrix: Water
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/07/18 12:57	H6

LABORATORY CONTROL SAMPLE: 2271403

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	104	90-110	H6

SAMPLE DUPLICATE: 2271405

Parameter	Units	60285459027 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 RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554525 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2274427 Matrix: Water
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/15/18 10:10	
Fluoride	mg/L	<0.19	0.20	0.19	11/15/18 10:10	
Sulfate	mg/L	<0.24	1.0	0.24	11/15/18 10:10	

LABORATORY CONTROL SAMPLE: 2274428

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE SAMPLE: 2274431

Parameter	Units	60285463002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	7.4	5	12.4	100	90-110	
Fluoride	mg/L	<0.19	2.5	2.7	101	90-110	
Sulfate	mg/L	14.3	5	19.4	102	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch:	555119	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
Associated Lab Samples:	60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006		

METHOD BLANK: 2277295 Matrix: Water
Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.74J	1.0	0.29	11/14/18 13:40	
Fluoride	mg/L	<0.19	0.20	0.19	11/14/18 13:40	
Sulfate	mg/L	<0.24	1.0	0.24	11/14/18 13:40	

LABORATORY CONTROL SAMPLE: 2277296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.1	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2277297 2277298

Parameter	Units	60285588003		2277297		2277298		% Rec Limits	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec			
Fluoride	mg/L	1.7	2.5	2.5	4.3	4.3	102	103	90-110	0 15

MATRIX SPIKE SAMPLE: 2277299

Parameter	Units	60285588004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	25.0	50	76.1	102	90-110	M1
Fluoride	mg/L	0.82	2.5	3.4	104	90-110	
Sulfate	mg/L	134	50	189	111	90-110	M1

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555836

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017

METHOD BLANK: 2281068

Matrix: Water

Associated Lab Samples: 60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/18/18 21:58	
Fluoride	mg/L	<0.19	0.20	0.19	11/18/18 21:58	
Sulfate	mg/L	<0.24	1.0	0.24	11/18/18 21:58	

LABORATORY CONTROL SAMPLE: 2281069

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2281070 2281071

Parameter	Units	60286506006		MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Fluoride	mg/L	ND	62.5	62.5	62.5	59.9	59.8	96	96	90-110	0	15		
Sulfate	mg/L	230	125	125	125	354	352	99	98	90-110	0	15		

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 555837 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

METHOD BLANK: 2281072 Matrix: Water
 Associated Lab Samples: 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/18/18 22:29	
Fluoride	mg/L	<0.19	0.20	0.19	11/18/18 22:29	
Sulfate	mg/L	<0.24	1.0	0.24	11/18/18 22:29	

LABORATORY CONTROL SAMPLE: 2281073

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.3	93	90-110	
Fluoride	mg/L	5	4.9	99	90-110	
Sulfate	mg/L	10	9.3	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2281074 2281075

Parameter	Units	60285459018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.32	2.5	2.5	2.7	2.8	95	99	90-110	4	15	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch:	556128	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
Associated Lab Samples:	60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022		

METHOD BLANK:	2281830	Matrix:	Water
Associated Lab Samples:	60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/20/18 08:33	
Sulfate	mg/L	<0.24	1.0	0.24	11/20/18 08:33	

LABORATORY CONTROL SAMPLE: 2281831						
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	101	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2281832												2281833	
Parameter	Units	60285459014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
Sulfate	mg/L	67.0	50	50	118	117	101	101	90-110	0	15		

MATRIX SPIKE SAMPLE: 2281834											
Parameter	Units	60286055003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers				
Chloride	mg/L	511	500	1060	110	90-110					
Sulfate	mg/L	6170	5000	12000	117	90-110 M1					

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 557760

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2288320

Matrix: Water

Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/30/18 23:35	
Fluoride	mg/L	<0.19	0.20	0.19	11/30/18 23:35	
Sulfate	mg/L	<0.24	1.0	0.24	11/30/18 23:35	

LABORATORY CONTROL SAMPLE: 2288321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	93	90-110	
Fluoride	mg/L	2.5	2.5	98	90-110	
Sulfate	mg/L	5	5.2	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2288322 2288323

Parameter	Units	60287132006		MSD		MS		MSD		% Rec Limits	Max		Qual
		Result	MS Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	% Rec	RPD		RPD		
Chloride	mg/L	2.9	5	5	7.7	7.6	95	94	90-110	1	15		
Fluoride	mg/L	2.0	2.5	2.5	4.6	4.6	105	106	90-110	1	15		
Sulfate	mg/L	783	250	250	889	936	43	62	90-110	5	15	M1	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553805 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

METHOD BLANK: 2270850 Matrix: Water
 Associated Lab Samples: 60285459001, 60285459002, 60285459003, 60285459004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/08/18 11:51	

LABORATORY CONTROL SAMPLE: 2270851

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	96	90-110	

MATRIX SPIKE SAMPLE: 2270852

Parameter	Units	60285717001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.8	89	90-110	M1

MATRIX SPIKE SAMPLE: 2270854

Parameter	Units	60285463002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.41	2	2.2	88	90-110	M1

SAMPLE DUPLICATE: 2270853

Parameter	Units	60285414003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	1.1	0.97	14	10	D6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 553806 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

METHOD BLANK: 2270855 Matrix: Water
 Associated Lab Samples: 60285588001, 60285588002, 60285588003, 60285588004, 60285588005, 60285588006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/08/18 12:25	

LABORATORY CONTROL SAMPLE: 2270856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	98	90-110	

MATRIX SPIKE SAMPLE: 2270857

Parameter	Units	60285617009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.60	2	2.4	92	90-110	

MATRIX SPIKE SAMPLE: 2270859

Parameter	Units	60285588004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.35	2	2.1	87	90-110	M1

SAMPLE DUPLICATE: 2270858

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	3.5	3.5	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch:	553830	Analysis Method:	EPA 365.4
QC Batch Method:	EPA 365.4	Analysis Description:	365.4 Phosphorus
Associated Lab Samples:	60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023		

METHOD BLANK:	2270902	Matrix:	Water
Associated Lab Samples:	60285459011, 60285459012, 60285459013, 60285459014, 60285459015, 60285459016, 60285459017, 60285459018, 60285459019, 60285459020, 60285459021, 60285459022, 60285459023		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/08/18 13:01	

LABORATORY CONTROL SAMPLE: 2270903						
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	93	90-110	

MATRIX SPIKE SAMPLE: 2270904							
Parameter	Units	60285715002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2.2	2	4.0	90	90-110	

MATRIX SPIKE SAMPLE: 2270906							
Parameter	Units	60285459021 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.67	2	2.3	83	90-110	M1

SAMPLE DUPLICATE: 2270905						
Parameter	Units	60285459014 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	<0.050	<0.050		10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

QC Batch: 554599 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

METHOD BLANK: 2275090 Matrix: Water
 Associated Lab Samples: 60285459024, 60285459025, 60285459026, 60285459027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/13/18 09:10	

LABORATORY CONTROL SAMPLE: 2275091

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	101	90-110	

MATRIX SPIKE SAMPLE: 2275092

Parameter	Units	60285463021 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	<0.050	2	1.7	87	90-110	M1

MATRIX SPIKE SAMPLE: 2275094

Parameter	Units	60285979001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	9.6	2	11.3	85	90-110	M1

SAMPLE DUPLICATE: 2275093

Parameter	Units	60285975004 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	6.2	6.3	2	10	

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QUALIFIERS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

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

SAMPLE QUALIFIERS

Sample: 60285459016

[1] ANIONS: CL 2X SO4 20X

ANALYTE QUALIFIERS

1e FERROUS IRON result is greater than the IRON. Data is within laboratory control limits.

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285459001	R-P01S	EPA 200.7	553504	EPA 200.7	553586
60285459002	R-P05S	EPA 200.7	553504	EPA 200.7	553586
60285459003	R-P05I	EPA 200.7	553504	EPA 200.7	553586
60285459004	R-P22S	EPA 200.7	553504	EPA 200.7	553586
60285588001	R-P21S	EPA 200.7	553877	EPA 200.7	553979
60285588002	R-P21I	EPA 200.7	553877	EPA 200.7	553979
60285588003	R-P21D	EPA 200.7	553877	EPA 200.7	553979
60285588004	R-P22I	EPA 200.7	553881	EPA 200.7	553980
60285588005	R-P22D	EPA 200.7	553881	EPA 200.7	553980
60285588006	R-NE-FB-1	EPA 200.7	553881	EPA 200.7	553980
60285459011	R-P03S	EPA 200.7	554058	EPA 200.7	554136
60285459012	R-P03D	EPA 200.7	554058	EPA 200.7	554136
60285459013	R-P08S	EPA 200.7	554058	EPA 200.7	554136
60285459014	R-P08D	EPA 200.7	554058	EPA 200.7	554136
60285459015	R-P10S	EPA 200.7	554058	EPA 200.7	554136
60285459016	R-P13S	EPA 200.7	554058	EPA 200.7	554136
60285459017	R-P13I	EPA 200.7	554058	EPA 200.7	554136
60285459018	R-P13D	EPA 200.7	554058	EPA 200.7	554136
60285459019	R-P30S	EPA 200.7	554058	EPA 200.7	554136
60285459020	R-NE-DUP-1	EPA 200.7	554058	EPA 200.7	554136
60285459021	R-NE-DUP-2	EPA 200.7	554058	EPA 200.7	554136
60285459022	R-NE-DUP-3	EPA 200.7	554058	EPA 200.7	554136
60285459023	R-NE-FB-2	EPA 200.7	554058	EPA 200.7	554136
60285459024	R-P29S	EPA 200.7	554168	EPA 200.7	554260
60285459025	R-P29D	EPA 200.7	554168	EPA 200.7	554260
60285459026	R-P31S	EPA 200.7	554168	EPA 200.7	554260
60285459027	R-NE-FB-3	EPA 200.7	554168	EPA 200.7	554260
60285459001	R-P01S	EPA 200.8	553503	EPA 200.8	553585
60285459002	R-P05S	EPA 200.8	553503	EPA 200.8	553585
60285459003	R-P05I	EPA 200.8	553503	EPA 200.8	553585
60285459004	R-P22S	EPA 200.8	553503	EPA 200.8	553585
60285588001	R-P21S	EPA 200.8	553993	EPA 200.8	554038
60285588002	R-P21I	EPA 200.8	553993	EPA 200.8	554038
60285588003	R-P21D	EPA 200.8	553993	EPA 200.8	554038
60285588004	R-P22I	EPA 200.8	553993	EPA 200.8	554038
60285588005	R-P22D	EPA 200.8	553993	EPA 200.8	554038
60285588006	R-NE-FB-1	EPA 200.8	553993	EPA 200.8	554038
60285459011	R-P03S	EPA 200.8	553993	EPA 200.8	554038
60285459012	R-P03D	EPA 200.8	553993	EPA 200.8	554038
60285459013	R-P08S	EPA 200.8	553993	EPA 200.8	554038
60285459014	R-P08D	EPA 200.8	553993	EPA 200.8	554038
60285459015	R-P10S	EPA 200.8	553993	EPA 200.8	554038
60285459016	R-P13S	EPA 200.8	553993	EPA 200.8	554038
60285459017	R-P13I	EPA 200.8	553997	EPA 200.8	554039
60285459018	R-P13D	EPA 200.8	553997	EPA 200.8	554039

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285459019	R-P30S	EPA 200.8	553997	EPA 200.8	554039
60285459020	R-NE-DUP-1	EPA 200.8	553997	EPA 200.8	554039
60285459021	R-NE-DUP-2	EPA 200.8	553997	EPA 200.8	554039
60285459022	R-NE-DUP-3	EPA 200.8	553997	EPA 200.8	554039
60285459023	R-NE-FB-2	EPA 200.8	553997	EPA 200.8	554039
60285459024	R-P29S	EPA 200.8	554272	EPA 200.8	554344
60285459025	R-P29D	EPA 200.8	554272	EPA 200.8	554344
60285459026	R-P31S	EPA 200.8	554272	EPA 200.8	554344
60285459027	R-NE-FB-3	EPA 200.8	554272	EPA 200.8	554344
60285459001	R-P01S	EPA 7470	555355	EPA 7470	555389
60285459002	R-P05S	EPA 7470	555355	EPA 7470	555389
60285459003	R-P05I	EPA 7470	555355	EPA 7470	555389
60285459004	R-P22S	EPA 7470	555355	EPA 7470	555389
60285588001	R-P21S	EPA 7470	555449	EPA 7470	555490
60285588002	R-P21I	EPA 7470	555449	EPA 7470	555490
60285588003	R-P21D	EPA 7470	555449	EPA 7470	555490
60285588004	R-P22I	EPA 7470	555449	EPA 7470	555490
60285588005	R-P22D	EPA 7470	555449	EPA 7470	555490
60285588006	R-NE-FB-1	EPA 7470	555449	EPA 7470	555490
60285459011	R-P03S	EPA 7470	555581	EPA 7470	556033
60285459012	R-P03D	EPA 7470	555581	EPA 7470	556033
60285459013	R-P08S	EPA 7470	555581	EPA 7470	556033
60285459014	R-P08D	EPA 7470	555581	EPA 7470	556033
60285459015	R-P10S	EPA 7470	555581	EPA 7470	556033
60285459016	R-P13S	EPA 7470	555581	EPA 7470	556033
60285459017	R-P13I	EPA 7470	555581	EPA 7470	556033
60285459018	R-P13D	EPA 7470	555581	EPA 7470	556033
60285459019	R-P30S	EPA 7470	555581	EPA 7470	556033
60285459020	R-NE-DUP-1	EPA 7470	555581	EPA 7470	556033
60285459021	R-NE-DUP-2	EPA 7470	555581	EPA 7470	556033
60285459022	R-NE-DUP-3	EPA 7470	555581	EPA 7470	556033
60285459023	R-NE-FB-2	EPA 7470	555581	EPA 7470	556033
60285459024	R-P29S	EPA 7470	557799	EPA 7470	557857
60285459025	R-P29D	EPA 7470	557799	EPA 7470	557857
60285459026	R-P31S	EPA 7470	557799	EPA 7470	557857
60285459027	R-NE-FB-3	EPA 7470	557799	EPA 7470	557857
60285459001	R-P01S	SM 2320B	554304		
60285459002	R-P05S	SM 2320B	554304		
60285459003	R-P05I	SM 2320B	554304		
60285459004	R-P22S	SM 2320B	554304		
60285588001	R-P21S	SM 2320B	554304		
60285588002	R-P21I	SM 2320B	554631		
60285588003	R-P21D	SM 2320B	554631		
60285588004	R-P22I	SM 2320B	554631		
60285588005	R-P22D	SM 2320B	554631		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285588006	R-NE-FB-1	SM 2320B	554631		
60285459011	R-P03S	SM 2320B	554633		
60285459012	R-P03D	SM 2320B	554633		
60285459013	R-P08S	SM 2320B	554633		
60285459014	R-P08D	SM 2320B	554633		
60285459015	R-P10S	SM 2320B	554633		
60285459016	R-P13S	SM 2320B	555056		
60285459017	R-P13I	SM 2320B	555056		
60285459018	R-P13D	SM 2320B	555056		
60285459019	R-P30S	SM 2320B	555056		
60285459020	R-NE-DUP-1	SM 2320B	555056		
60285459021	R-NE-DUP-2	SM 2320B	555056		
60285459022	R-NE-DUP-3	SM 2320B	555056		
60285459023	R-NE-FB-2	SM 2320B	555056		
60285459024	R-P29S	SM 2320B	555057		
60285459025	R-P29D	SM 2320B	555057		
60285459026	R-P31S	SM 2320B	555057		
60285459027	R-NE-FB-3	SM 2320B	555057		
60285459001	R-P01S	SM 2540C	553343		
60285459002	R-P05S	SM 2540C	553343		
60285459003	R-P05I	SM 2540C	553343		
60285459004	R-P22S	SM 2540C	553343		
60285588001	R-P21S	SM 2540C	553994		
60285588002	R-P21I	SM 2540C	553994		
60285588003	R-P21D	SM 2540C	553994		
60285588004	R-P22I	SM 2540C	553994		
60285588005	R-P22D	SM 2540C	553994		
60285588006	R-NE-FB-1	SM 2540C	553994		
60285459011	R-P03S	SM 2540C	553999		
60285459012	R-P03D	SM 2540C	554334		
60285459013	R-P08S	SM 2540C	554334		
60285459014	R-P08D	SM 2540C	554334		
60285459015	R-P10S	SM 2540C	554334		
60285459016	R-P13S	SM 2540C	554334		
60285459017	R-P13I	SM 2540C	554334		
60285459018	R-P13D	SM 2540C	554334		
60285459019	R-P30S	SM 2540C	554334		
60285459020	R-NE-DUP-1	SM 2540C	554334		
60285459021	R-NE-DUP-2	SM 2540C	554334		
60285459022	R-NE-DUP-3	SM 2540C	554334		
60285459023	R-NE-FB-2	SM 2540C	554334		
60285459024	R-P29S	SM 2540C	554725		
60285459025	R-P29D	SM 2540C	554725		
60285459026	R-P31S	SM 2540C	554725		
60285459027	R-NE-FB-3	SM 2540C	554725		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285459001	R-P01S	SM 3500-Fe B#4	554999		
60285459002	R-P05S	SM 3500-Fe B#4	554999		
60285459003	R-P05I	SM 3500-Fe B#4	554999		
60285459004	R-P22S	SM 3500-Fe B#4	554999		
60285588001	R-P21S	SM 3500-Fe B#4	554999		
60285588002	R-P21I	SM 3500-Fe B#4	554999		
60285588003	R-P21D	SM 3500-Fe B#4	554999		
60285588004	R-P22I	SM 3500-Fe B#4	554999		
60285588005	R-P22D	SM 3500-Fe B#4	554999		
60285588006	R-NE-FB-1	SM 3500-Fe B#4	554999		
60285459011	R-P03S	SM 3500-Fe B#4	556178		
60285459012	R-P03D	SM 3500-Fe B#4	556178		
60285459013	R-P08S	SM 3500-Fe B#4	556178		
60285459014	R-P08D	SM 3500-Fe B#4	556178		
60285459015	R-P10S	SM 3500-Fe B#4	556178		
60285459016	R-P13S	SM 3500-Fe B#4	556178		
60285459017	R-P13I	SM 3500-Fe B#4	556178		
60285459018	R-P13D	SM 3500-Fe B#4	556178		
60285459019	R-P30S	SM 3500-Fe B#4	556178		
60285459020	R-NE-DUP-1	SM 3500-Fe B#4	556178		
60285459021	R-NE-DUP-2	SM 3500-Fe B#4	556178		
60285459022	R-NE-DUP-3	SM 3500-Fe B#4	556178		
60285459023	R-NE-FB-2	SM 3500-Fe B#4	556178		
60285459024	R-P29S	SM 3500-Fe B#4	558081		
60285459025	R-P29D	SM 3500-Fe B#4	558081		
60285459026	R-P31S	SM 3500-Fe B#4	558081		
60285459027	R-NE-FB-3	SM 3500-Fe B#4	558081		
60285459001	R-P01S	SM 3500-Fe B#4	553047		
60285459002	R-P05S	SM 3500-Fe B#4	553047		
60285459003	R-P05I	SM 3500-Fe B#4	553047		
60285459004	R-P22S	SM 3500-Fe B#4	553047		
60285588001	R-P21S	SM 3500-Fe B#4	553472		
60285588002	R-P21I	SM 3500-Fe B#4	553472		
60285588003	R-P21D	SM 3500-Fe B#4	553472		
60285588004	R-P22I	SM 3500-Fe B#4	553472		
60285588005	R-P22D	SM 3500-Fe B#4	553472		
60285588006	R-NE-FB-1	SM 3500-Fe B#4	553472		
60285459011	R-P03S	SM 3500-Fe B#4	553781		
60285459012	R-P03D	SM 3500-Fe B#4	553781		
60285459013	R-P08S	SM 3500-Fe B#4	553781		
60285459014	R-P08D	SM 3500-Fe B#4	553781		
60285459015	R-P10S	SM 3500-Fe B#4	553781		
60285459016	R-P13S	SM 3500-Fe B#4	553781		
60285459017	R-P13I	SM 3500-Fe B#4	553781		
60285459018	R-P13D	SM 3500-Fe B#4	553781		
60285459019	R-P30S	SM 3500-Fe B#4	553781		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285459020	R-NE-DUP-1	SM 3500-Fe B#4	553781		
60285459021	R-NE-DUP-2	SM 3500-Fe B#4	553781		
60285459022	R-NE-DUP-3	SM 3500-Fe B#4	553781		
60285459023	R-NE-FB-2	SM 3500-Fe B#4	553781		
60285459024	R-P29S	SM 3500-Fe B#4	553945		
60285459025	R-P29D	SM 3500-Fe B#4	553945		
60285459026	R-P31S	SM 3500-Fe B#4	553945		
60285459027	R-NE-FB-3	SM 3500-Fe B#4	553945		
60285459001	R-P01S	EPA 300.0	554525		
60285459002	R-P05S	EPA 300.0	554525		
60285459003	R-P05I	EPA 300.0	554525		
60285459004	R-P22S	EPA 300.0	554525		
60285588001	R-P21S	EPA 300.0	555119		
60285588002	R-P21I	EPA 300.0	555119		
60285588003	R-P21D	EPA 300.0	555119		
60285588004	R-P22I	EPA 300.0	555119		
60285588005	R-P22D	EPA 300.0	555119		
60285588006	R-NE-FB-1	EPA 300.0	555119		
60285459011	R-P03S	EPA 300.0	555836		
60285459012	R-P03D	EPA 300.0	555836		
60285459013	R-P08S	EPA 300.0	555836		
60285459014	R-P08D	EPA 300.0	555836		
60285459014	R-P08D	EPA 300.0	556128		
60285459015	R-P10S	EPA 300.0	555836		
60285459015	R-P10S	EPA 300.0	556128		
60285459016	R-P13S	EPA 300.0	555836		
60285459016	R-P13S	EPA 300.0	556128		
60285459017	R-P13I	EPA 300.0	555836		
60285459017	R-P13I	EPA 300.0	556128		
60285459018	R-P13D	EPA 300.0	555837		
60285459018	R-P13D	EPA 300.0	556128		
60285459019	R-P30S	EPA 300.0	555837		
60285459019	R-P30S	EPA 300.0	556128		
60285459020	R-NE-DUP-1	EPA 300.0	555837		
60285459020	R-NE-DUP-1	EPA 300.0	556128		
60285459021	R-NE-DUP-2	EPA 300.0	555837		
60285459021	R-NE-DUP-2	EPA 300.0	556128		
60285459022	R-NE-DUP-3	EPA 300.0	555837		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60285459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285459022	R-NE-DUP-3	EPA 300.0	556128		
60285459023	R-NE-FB-2	EPA 300.0	555837		
60285459024	R-P29S	EPA 300.0	557760		
60285459025	R-P29D	EPA 300.0	557760		
60285459026	R-P31S	EPA 300.0	557760		
60285459027	R-NE-FB-3	EPA 300.0	557760		
60285459001	R-P01S	EPA 365.4	553805		
60285459002	R-P05S	EPA 365.4	553805		
60285459003	R-P05I	EPA 365.4	553805		
60285459004	R-P22S	EPA 365.4	553805		
60285588001	R-P21S	EPA 365.4	553806		
60285588002	R-P21I	EPA 365.4	553806		
60285588003	R-P21D	EPA 365.4	553806		
60285588004	R-P22I	EPA 365.4	553806		
60285588005	R-P22D	EPA 365.4	553806		
60285588006	R-NE-FB-1	EPA 365.4	553806		
60285459011	R-P03S	EPA 365.4	553830		
60285459012	R-P03D	EPA 365.4	553830		
60285459013	R-P08S	EPA 365.4	553830		
60285459014	R-P08D	EPA 365.4	553830		
60285459015	R-P10S	EPA 365.4	553830		
60285459016	R-P13S	EPA 365.4	553830		
60285459017	R-P13I	EPA 365.4	553830		
60285459018	R-P13D	EPA 365.4	553830		
60285459019	R-P30S	EPA 365.4	553830		
60285459020	R-NE-DUP-1	EPA 365.4	553830		
60285459021	R-NE-DUP-2	EPA 365.4	553830		
60285459022	R-NE-DUP-3	EPA 365.4	553830		
60285459023	R-NE-FB-2	EPA 365.4	553830		
60285459024	R-P29S	EPA 365.4	554599		
60285459025	R-P29D	EPA 365.4	554599		
60285459026	R-P31S	EPA 365.4	554599		
60285459027	R-NE-FB-3	EPA 365.4	554599		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285459
Barcode
60285459

Client Name: Golder Assoc

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] 201c

Thermometer Used: T-298 Type of Ice: Wet [x] Blue [] None []

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

Date and initials of person examining contents: 11/2/18 [initials]

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Requirement and Yes/No/N/A checkboxes. Includes items like Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, etc.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 11/2/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A

Required Client Information: Company: **Goldier Associates**
 Address: **13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021**
 Phone: **636-724-9191** Fax: **636-724-9323**
 Requested Due Date/TAT: **Standard**

Section B

Required Project Information: Report To: **Mark Hadlock (mhadlock@goldier.com)**
 Copy To: **Jeffrey Ingram**
 Purchase Order No.:
 Project Name: **Ameren Rush Island EC-Geochem/Hydrogeology**
 Project Number: **153-1406.0002G (COC #10)**

Section C

Invoice Information: Attention: **J. C. Schneider**
 Company Name: **J. C. Schneider**
 Address: **Ballwin, MO 63021**
 Site Location: **MO**
 State: **MO**
 Project Profile #: **9285**

REGULATORY AGENCY	
NPDES	GROUND WATER
UST	RCRA
	DRINKING WATER
	OTHER

ITEM #	Valid Matrix Codes	Matrix Code	Sample Type (G=Grab, C=Comp)	Collected		Sample Temp at Collection	# of Containers	Preservatives	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.				
				Composite Start	Composite End				Analysis Test	Metals	Mercury	Chloride/Fluoride/Sulfate	Alkalinity	TDS	Total Phosphorus	Ferrous Iron	Ferric Iron									
1	R-P01S	WT G	G	11/11/18	12:45		4	Unpreserved	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	091	
2	R-P02S	WT G	G																							
3	R-P03D	WT G	G																							
4	R-P05S	WT G	G	11/11/18	10:45		4	H ₂ SO ₄	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	002
5	R-P05I	WT G	G	11/11/18	12:05		4	HNO ₃	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	003
6	R-P06S	WT G	G																							
7	R-P08D	WT G	G																							
8	R-P10S	WT G	G																							
9	R-P10F	WT G	G																							
10	R-P13D	WT G	G																							
11	R-P17S	WT G	G																							
12		WT G	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<i>Wadsworth/Goldier</i>	11/11/18	11:35	<i>E. Brockett/Arce</i>	11/21/18	08:38	Temp in °C: <u>0.9</u> Received on Ice (Y/N): <u>Y</u> Cooler (Y/N): <u>Y</u> Samples Intact (Y/N): <u>Y</u>

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: *Eric Schneider*
 SIGNATURE of SAMPLER: *Eric Schneider*
 DATE Signed (MM/DD/YY): 11/01/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 2 of 2

Section A Required Client Information:

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

Section B Required Project Information:

Report To: Mark Haddock (mhaddock@golder.com)
Copy To: Jeffrey Ingram (Jeffrey.Schmedt@golder.com)
Purchase Order No.:
Project Name: Ameren Rush Island EC-Geochem/Hydrogeo
Project Number: 153-1406.0002G (COC #10)

Section C Invoice Information:

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

REGULATORY AGENCY: NPDES, UST, DRINKING WATER, OTHER

Site Location: MO

STATE: MO

Table with columns for Section D (Valid Matrix Codes, Required Client Information, Sample ID), Section B (Collected, Matrix Code, Sample Type, Date, Time), Section C (Preservatives, Analysis Test, # of Containers), and Section A (Requested Analysis Filtered, Date, Time, Affiliation).

Table with columns for Section A (Relinquished by/Affiliation, Date, Time, Affiliation), Section B (Sample Temp at Collection), Section C (Preservatives, Analysis Test, # of Containers), and Section A (Accepted by/Affiliation, Date, Time, Affiliation).

ADDITIONAL COMMENTS: EPA 200.7: B, Ca, Ba, Sr, Co, Pb, Li, Mn, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zg; EPA 200.8: Sb, As, Cd, Cr, Se, Ti

Table with columns for Section C (Temp in C, Received on Ice (Y/N), Custody Sealed Cooler (Y/N), Samples Intact (Y/N)), Section B (Sampler Name and Signature, Print Name of Sampler, Signature of Sampler), and Section A (Date Signed (MM/DD/YY)).



Sample Condition Upon Receipt

WO#: 60285588
Barcode with number 60285588

Client Name: Golder

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No []

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [x] Other []

Thermometer Used: 301 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 3.4 4.0 Corr. Factor +2.0 Corrected 3.4 4.0

Date and initials of person examining contents: JIS JB 11/3

Temperature should be above freezing to 6°C

Table with 3 columns: Question, Yes/No/N/A checkboxes, and Notes. Rows include Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, Correct containers used, Pace containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match COC, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 11/4/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: **2** of **3**

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Goldier Associates	Report To:	Mark Haddock (mhaddock@goldier.com)	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021	Copy To:	Jeffrey Ingram, Eric Schneider, Collier	Company Name:	
Email To:	mhaddock@goldier.com	Purchase Order No.:		Address:	
Phone:	636-724-9191	Project Name:	Ameren Rush Island EC-Geochem/Hydrogeo	Face Quote Reference:	
Requested Due Date/TAT:	Standard	Project Number:	153-1406.0002G (COC #10)	Site Location:	Jamie Church
				State:	MO

ITEM #	Valid Matrix Codes EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mn, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn EPA 200.8: Sb, As, Cd, Cr, Se, Tl	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	PRESERVATIVES	Requested Analysis Filtered (Y/N)											Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)						
			MATRIX CODE (566 Valid codes to left)	DATE				TIME	DATE	TIME	Metals*	Mercury	Chloride/Fluoride/Sulfate	Alkalinity	TDS	Total Phosphorus	Ferrous Iron	Ferric Iron					Residual Chlorine (Y/N)					
1	R-P211	WT G	11/21/18	1220		4	H2SO4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2	R-P21D (X)	WT G	11/21/18	1255		4	HNO3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
3	R-P22S	WT G	11/21/18	0955		4	HCl	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
4	R-P221 (X)	WT G	11/21/18	1050		4	HNO3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5	R-P22D	WT G																										
6	R-P29S	WT G																										
7	R-P29D	WT G																										
8	R-P30S	WT G																										
9	R-P31S	WT G																										
10	R-NE-DUP-1	WT G																										
11	R-NE-DUP-2	WT G																										
12	R-NE-DUP-3	WT G																										

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Goldier/Amtrak		Goldier/Amtrak	11/09/18	1735	Eric Schneider	11/3	12:40	Y Y Y Y Y
SAMPLER NAME AND SIGNATURE		PRINT Name of SAMPLER:		SIGNATURE of SAMPLER:		DATE signed (MM/DD/YYYY):		
Eric Schneider		Eric Schneider		Eric Schneider		11/02/18		



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Goldier Associates	Report To: Mark Haddock (mhaddock@goldier.com)	Requester: Jeffrey Ingram	Company Name: Goldier Associates	Attention: Eric Schneider	Project Name: Ameren Rush Island EC-Geochem/Hydrogeo
Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021	Copy To: Jeffrey Ingram, Eric Schneider	Project Address: Ameren Rush Island EC-Geochem/Hydrogeo	Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021	Site Location: MO	Requested Due Date/TAT: Standard
Email To: mhaddock@goldier.com	Purchase Order No:	Project Number: 153-1406.0002G (COC #10)	Price Quote Reference:	State: MO	Requested Analysis Filtered (Y/N)
Phone: 636-724-9191	Project Name: Ameren Rush Island EC-Geochem/Hydrogeo	Project Manager: Jamie Church	Price Profile #:	NPDES	Requested Analysis Filtered (Y/N)
Fax: 636-724-9323	Project Number: 153-1406.0002G (COC #10)	Price Profile #:	Price Profile #:	UST	Requested Analysis Filtered (Y/N)

Page: **3** of **3**

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW PRECIPITATION P SOIL/SOLID S SLURRY S WATER W WASTE WATER W PRECIPITATION P SOIL/SOLID S	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	TEMP IN °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1	R-NE-FB-1	WT	G	11/21/18	1220						
2	R-NE-FB-2	WT	G								
3	R-NE-FB-3	WT	G								
4	R-P-22I MSD-1	WT	G	11/21/18	0955						
5	R-P-22I MSD-1	WT	G	11/21/18	0955						
6	R-P-21D MSD-2	WT	G	11/21/18	1255						
7	R-P-21D MSD-2	WT	G	11/21/18	1255						
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	
*EPA 200.7: B, Ca, Ba, Sb, Co, Pb, Li, Ni, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn		bolden/wr.m.p.		11/21/18		1735		Eric Schneider		11/2		0240	
*EPA 200.6: Sb, As, Cd, Cr, Se, Tl													

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: **Eric Schneider**
 SIGNATURE of SAMPLER: *Eric Schneider*
 DATE Signed (MM/DD/YYYY): **11/02/18**



Sample Condition Upon Receipt

WO#: 60285459



COC # 3

Client Name: Cooler Assoc.

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: _____ Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] tpic

Thermometer Used: T300 Type of Ice: (Wet) Blue None

Cooler Temperature (°C): As-read 0.6 Corr. Factor +0.2 Corrected 0.8

Date and initials of person examining contents: 11/6/18 JWS

Temperature should be above freezing to 6°C 0.3, 0.5, 0.3 0.5, 0.7, 0.5

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Fe + 2
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: WT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Church Date: 11/6/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information: Company: Golder Associates
Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021
Email To: 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 Rush Island EC-Geochem/Hydrogoc
Project Number: 153-1406.0002G (COC #10)

Section C Invoice Information: Attention:
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 9285

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____

Site Location: MO STATE: MO

Page: 1 of 3

ITEM #	Section D Required Client Information		COLLECTED		SAMPLE TYPE AT COLLECTION		Requested Analysis Filtered (Y/N)										Pace Project No./Lab I.D.			
	Valid Matrix Codes MATRIX CODE DW DRINKING WATER WW WASTE WATER P PRODUCT SL SOIL/SOLID OL OIL	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	DATE TIME		DATE TIME		# OF CONTAINERS	Analysis Test ↑	Y/N ↑	Metals*	Mercury	Chloride/Fluoride/Sulfate	Alkalinity	TDS	Total Phosphorus		Feros Iron	Ferric Iron	Residual Chlorine (Y/N)
				COMPOSITE START	COMPOSITE END/GRAB	DATE	TIME													
1	R-P01S	WT	G	11/5/18	1425			4	2	1	1	1	1	1	1	1	1	1	0.0111	
2	R-P03S	WT	G	11/5/18	1510			4	2	1	1	1	1	1	1	1	1	1	0.0111	
3	R-P03D	WT	G					1	1	1	1	1	1	1	1	1	1	1	0.0111	
4	R-P05S	WT	G																	
5	R-P05I	WT	G																	
6	R-P08S	WT	G	11/5/18	1315			4	2	1	1	1	1	1	1	1	1	1	0.0111	
7	R-P08D	WT	G																	
8	R-P10S	WT	G	11/5/18	1510			1	1	1	1	1	1	1	1	1	1	1	0.0111	
9	R-P13S	WT	G	11/5/18	1140			1	1	1	1	1	1	1	1	1	1	1	0.0111	
10	R-P13I	WT	G	11/5/18	1110			1	1	1	1	1	1	1	1	1	1	1	0.0111	
11	R-P13D	WT	G	11/5/18	1025			1	1	1	1	1	1	1	1	1	1	1	0.0111	
12	R-P21S	WT	G																	

ACCEPTED BY / AFFILIATION *M. Golder* **DATE** 11/6/18 **TIME** 1730

RELINQUISHED BY / AFFILIATION *M. Golder* **DATE** 11/5/18 **TIME** 1730

RECEIVED BY / AFFILIATION *J. Golder* **DATE** 11/6/18 **TIME** 040908

Temp in °C 0.5

Received on Ice (Y/N)

Custody Sealed (Y/N)

Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE *J. Golder*

PRINT Name of SAMPLER: J. Golder

SIGNATURE of SAMPLER: [Signature]

DATE Signed (MM/DD/YY): 11/5/18

*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.

CHAIN-OF-CUSTODY / Analytical Request Document

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

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

Section B Project Information:
 Report To: Mark Haddock (mhaddock@golder.com)
 Copy To: Jeffrey Ingram
 Purchase Order No.:
 Project Name: Ameren Rush Island EC-Geochem/Hydrogeo
 Project Number: 153-1406.0002G (COC #10)

Section C Invoice Information:
 Attention:
 Company Name:
 Address:
 Pace Quote Reference:
 Pace Project Manager: Jamie Church
 Pace Profile #: 9285

Page: 2 of 3

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST FCRA OTHER

Site Location MO
STATE:

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOILSOLID SL OIL OL WP AR OT IS	MATRIX CODE (see valid codes to left)	COLLECTED		# OF CONTAINERS	PRESERVATIVES ↑ Y/N Unpreserved H ₂ SO ₄ HCl NaOH Na ₂ S ₂ O ₈ Methanol Other	Analysis Test ↑ Y/N Metals* Mercury Chloride/Fluoride/Sulfate Alkalinity TDS Total Phosphorus Ferro Iron Ferric Iron	Requested Analysis Filtered (Y/N)	SAMPLE CONDITIONS								
			COMPOSITE START DATE TIME	COMPOSITE END/GRAB DATE TIME					Temp in °C	Received on Ice (Y/N)	Cooler Sealed (Y/N)	Samples Intact (Y/N)					
1		WT G															
2		WT G															
3		WT G															
4		WT G															
5		WT G															
6		WT G															
7		WT G															
8		WT G	11/18 1525		4	2	1			26 P20				Y			
9		WT G															
10		WT G			4	2	1			26 P20				Y			
11		WT G															
12		WT G															

ADDITIONAL COMMENTS
 RELINQUISHED BY / AFFILIATION: JMG Golder DATE: 4/15/18 TIME: 1730 ACCEPTED BY / AFFILIATION: JMG Golder DATE: 11-6-18 TIME: 1640
 SIGNATURE of SAMPLER: [Signature] DATE Signed (MM/DD/YY): 11/15/18



Sample Condition Upon Receipt

WO# : 60285459
60285459
Coc # 4

Client Name: Cooler Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other Ziploc

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.7 Corr. Factor +0.2 Corrected 0.9

Date and initials of person examining contents: 11.7.18 *JLS*

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>Fe+2</u>
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Church Date: 11/7/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A
 Required Client Information:
 Company: Golder Associates
 Address: 13515 Barrett Parkway Drive, Ste 260
 Ballwin, MO 63021
 Email To: mhaddock@golder.com
 Phone: 636-724-9191 Fax: 636-724-9923
 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 Rush Island EC-Geochem/Hydroge
 Project Manager: Jamie Church
 Project Number: 153-1406.0002G (COC #10)

Section C
 Invoice Information:
 Attention:
 Company Name:
 Address:
 Pace Quote Reference:
 Project Manager: Jamie Church
 Pace Profile #: 9285

REGULATORY AGENCY
 NPDES GROUND WATER
 UST RCRA DRINKING WATER
 OTHER

Site Location
 STATE: MO

ITEM #	Valid Matrix Codes MATRIX CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	DATE		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	PRESERVATIVES	Analysis Test ↑	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.										
		COMPOSITE START	COMPOSITE END/GRAB		DATE	TIME					DATE	TIME	Metals	Mercury	Chloride/Fluoride/Sulfate	Alkalinity	TDS	Total Phosphorus	Ferrous Iron	Ferric Iron														
1	R-P211			G							Y	N	N	N	N	N	N	N																
2	R-P21D			G																														
3	R-P22S			G																														
4	R-P22I			G																														
5	R-P22D			G																														
6	R-P29S			G	11/6/18	11/5	4 21	1															1	1	1	1	1	1	1	1	1	1	2BP2U, 5 P200, 5 P35	
7	R-P29D			G	11/6/18	1235	4 21	1															1	1	1	1	1	1	1	1	1	2BP2U, 5 P200, 5 P35		
8	R-P30S			G	11/6/18	0845	4 21	1															1	1	1	1	1	1	1	1	1	2BP2U, 5 P200, 5 P35		
9	R-P31S			G																														
10	R-NE-DUP-1			G																														
11	R-NE-DUP-2			G																														
12	R-NE-DUP-3			G																														

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
<i>[Signature]</i>	11/06/18	1550	<i>[Signature]</i>	11/18/18	1550	
<i>[Signature]</i>	11/6/18	1700	<i>[Signature]</i>	11-7-18	0558.0.7	Temp In °C Received on Ice (Y/N) Custody Sealed Cooler (Y/N) Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Eric Schmeid
 SIGNATURE of SAMPLER: *[Signature]*
 DATE Signed (MM/DD/YYYY): 11/06/18

MEMORANDUM**DATE** January 4, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – NOVEMBER 2018 – N&E
– DATA PACKAGE 60285459**

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 or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC - Nov 2018 - N+E
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/4/19

Laboratory: Pace Analytical SDG #: 60285459
 Analytical Method (type and no.): Metals (200.7+200.8), H₂ (7470), Alk (2320B), TDS (2540C), Fe^{2+/3+} (SM3500), Anions (300.0), P (365.4)
 Matrix: Air Soil/Sed. Water Waste
 Sample Names R-P01S, R-P05S, R-P05I, R-P22S, R-P21S, R-P21I, R-P21D, R-P22I, R-P22D, R-NE-FB-1, R-P03S, R-P03D, R-P08S, R-P08D, R-P10S, R-P13S, R-P13I, R-P13D, R-P30S, R-NE-DUP-1, R-NE-DUP-2, R-NE-DUP-3, R-NE-FB-2, R-P29S, R-P29D, R-P31S, R-NE-FB-3

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grab
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	pH, Cond, Turb, Temp, DO, ORP, Flow, DTW
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>FB-1: B(43.1), Cr(0.12), TDS(732)</u>
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>FB-2: B(24.0), K(130), Zn(3.8), As(0.080), Cr(0.20)</u>
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>FB-3: Fe(14.5), Na(348), As(0.12), Cr(0.19), TDS(5.5), Fe³⁺(6.015)</u>
Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Dup-1 @ P08D ; Dup-2 @ P13D ; Dup-3 @ P13S</u> <u>FB-1 @ P21I ; FB-2 @ P13I ; FB-3 @ P31S</u>
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>DUP-1: Fe,t(33); Li,t(26); Cd,t(200); Pt(200); Fe³⁺(48); Fe²⁺(51)</u>
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>DUP-2: Se,t(39)</u> <u>DUP-3: Fe(41); Ni(48); Sb(51); As(25); Cd(42); Cr(40); Se(63); P(200);</u> <u>TDS [9001-04+12-23]; P [9001-04] Fe³⁺(41)</u>
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>All 200.7, Cl⁻, SO₄²⁻, P</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>All 200.7, SO₄²⁻</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

Method Blank (MB) Detections

#9001-04: Al,t(22.2)

#9011-26: Cr,t(0.12), TDS(7.0) [9011 only]

#8001-03: Al,t(22.2); K,t(250); Cr,t(0.12); Cl⁻(0.74)

#9027-27: Be,t(0.17); Cr,t(0.085)

#8004-06: Be,t(0.27); Fe(6.8); K(212); Cr,t(0.12); Cl⁻(0.74)

#9017-23: Cr,t(0.086)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
R-P01S	Aluminum, total (Al,t)	75.0	U	Detected in Method Blank (MB); MDL < Result < PQL
* All Samples	Ferrous Iron (Fe ²⁺)	—	J/UJ	Analyzed outside EPA hold time
R-P05I	Al,t	84.6	J	MB; PQL < Result < 10x B
R-P22S	↓	77.0	J	↓
R-P21S	Chromium,t (Cr,t)	1.0	U	↓; MDL < Result < PQL
R-P01S	TDS	691	J	Sample DUP(SD) exceeded limits; Result > MDL
↓	Phosphorus (P)	0.36	J	
R-P05S	TDS	293	J	
↓	P	1.3	J	
R-P05I	TDS	410	J	
↓	P	0.093	J	
R-P22S	TDS	336	J	
↓	P	0.050	UJ	; MDL > Result
R-P21I	Al,t	75.0	U	MB; MDL < Result < PQL
↓	Cr,t	1.0	U	↓ ↓
R-P21D	TDS	222	J	FB; PQL < Result < 10x B
R-P21D	Cr,t	1.0	U	MB; MDL < Result < PQL
R-P22I	Cr,t	1.0	U	↓
R-P22D	Beryllium,t (Be,t)	1.0	U	↓
↓	Cr,t	1.1	J	; PQL < Result < 10x B
R-NE-FB-1	Cr,t	1.0	U	; MDL < Result < PQL
R-P03S	Cr,t	1.0	U	↓ ↓
R-P03D	Cr,t	1.0	U	↓ ↓
↓	TDS	491	J	SD exceeded limit; Result > MDL
R-P08S	↓	306	J	↓ ↓
↓	Cr,t	1.0	U	MB; MDL < Result < PQL
R-P10S	↓	1.0	U	↓ ↓
↓	TDS	470	J	SD; Result > MDL
R-P13I	↓	402	J	↓ ↓
↓	Cr,t	1.0	U	MB; MDL < Result < PQL
Continue on Next Page				

Signature: Tommy J. Mordoff

Date: 1/4/19

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
R-P08D	Cr,t	1.0	U	MB; MDL < Result < PQL
	Iron,t (Fe,t)	1420	J	RPD; Result > MDL
	Cadmium,t (Cd,t)	0.033	UJ	; MDL > Result
	P	0.050	UJ	
	Ferric Iron (Fe ³⁺)	1.3	J	; Result > MDL
R-P13D	Cr,t	1.0	U	MB; MDL < Result < PQL
R-P13S	Cr,t	1.0	U	
R-P30S	Cr,t	1.0	U	
R-NE-DUP-1	Cr,t	1.0	U	
	Fe,t	1020	J	RPD; Result > MDL
	Fe ³⁺	0.80	J	
	Fe ²⁺	0.22	J	
R-NE-DUP-2	Cr,t	1.0	U	MB; MDL < Result < PQL
	TDS	607	J	SD; Result > MDL
R-P08D	TSS	345	J	
R-P13S	TSS	696	J	
R-P13D	TSS	589	J	
R-P30S	TSS	766	J	
R-NE-DUP-1	TSS	386	J	
R-NE-DUP-3	TSS	732	J	
	Cr,t	1.0	U	MB; MDL < Result < PQL
	P	0.050	UJ	RPD; MDL > Result
R-NE-FB-2	TDS	5.0	UJ	SD; MDL > Result
	Cr,t	1.0	U	MB; MDL < Result < PQL
R-P29S	TSS	1.0	U	
R-P29D	TSS	1.0	U	
R-P31S	TSS	1.0	U	
R-NE-FB-3	TSS	1.0	U	

Signature: *Tommy J. Wood*

Date: 1/4/19

December 26, 2018

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

RE: Project: AMEREN RIEC RCPA / GeoHydro
Pace Project No.: 60290480

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory between November 03, 2018 and November 06, 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.

Samples moved from workorder 60285463

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Arkansas Drinking Water
Missouri Certification Number: 10090
WY STR Certification #: 2456.01
Arkansas Certification #: 18-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116 / E10426

Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070
Missouri Certification Number: 10090

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285589005	R-P17S	Water	11/02/18 14:20	11/03/18 02:40
60285589006	R-P17I	Water	11/02/18 13:00	11/03/18 02:40
60285463015	R-P17D	Water	11/05/18 10:00	11/06/18 04:09
60285463016	R-P19S	Water	11/05/18 11:45	11/06/18 04:09
60285463017	R-P19I	Water	11/05/18 10:55	11/06/18 04:09
60285463018	R-P19D	Water	11/05/18 10:55	11/06/18 04:09

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285589005	R-P17S	EPA 200.7	EMR	18	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		60285589006	R-P17I	EPA 200.7	EMR
EPA 200.7	EMR			18	PASI-K
EPA 200.8	JDH			6	PASI-K
EPA 200.8	JGP			6	PASI-K
EPA 7470	EMR			1	PASI-K
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	JLW			1	PASI-PA
SM 2320B	MJK			1	PASI-K
SM 2540C	RLG			1	PASI-K
SM 3500-Fe B#4	LDB			1	PASI-K
SM 3500-Fe B#4	MJK			1	PASI-K
EPA 300.0	WNM			3	PASI-K
EPA 365.4	BLA			1	PASI-K
60285463015	R-P17D			EPA 200.7	EMR
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285463016	R-P19S	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
60285463017	R-P19I	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.7	JGP	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
60285463018	R-P19D	EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JDH	6	PASI-K
		EPA 7470	EMR	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	RMT	1	PASI-K
		SM 2540C	RLG	1	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-Fe B#4	ZMH	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
		EPA 365.4	BLA	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17S Lab ID: 60285589005 Collected: 11/02/18 14:20 Received: 11/03/18 02:40 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							
Aluminum	55.9J	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:56	7429-90-5	
Barium	57.3	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:56	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:56	7440-41-7	
Boron	3530	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:56	7440-42-8	
Calcium	66400	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:56	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:56	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:56	7440-50-8	
Iron	985	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:56	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:56	7439-92-1	
Lithium	21.4	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:56	7439-93-2	
Magnesium	15600	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:56	7439-95-4	
Manganese	332	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:56	7439-96-5	
Molybdenum	125	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:56	7439-98-7	
Nickel	6.2	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:56	7440-02-0	
Potassium	3410	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:56	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:56	7440-22-4	
Sodium	122000	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:56	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:56	7440-66-6	
200.7 Metals, Dissolved		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 11:55	11/16/18 19:51	7429-90-5	
Barium, Dissolved	55.4	ug/L	5.0	1.5	1	11/16/18 11:55	11/16/18 19:51	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 11:55	11/16/18 19:51	7440-41-7	
Boron, Dissolved	3520	ug/L	100	12.5	1	11/16/18 11:55	11/16/18 19:51	7440-42-8	
Calcium, Dissolved	70200	ug/L	200	53.5	1	11/16/18 11:55	11/16/18 19:51	7440-70-2	
Cobalt, Dissolved	0.87J	ug/L	5.0	0.87	1	11/16/18 11:55	11/16/18 19:51	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 11:55	11/16/18 19:51	7440-50-8	
Iron, Dissolved	870	ug/L	50.0	6.1	1	11/16/18 11:55	11/16/18 19:51	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 11:55	11/16/18 19:51	7439-92-1	
Lithium, Dissolved	20.1	ug/L	10.0	4.6	1	11/16/18 11:55	11/16/18 19:51	7439-93-2	
Magnesium, Dissolved	16000	ug/L	50.0	14.0	1	11/16/18 11:55	11/16/18 19:51	7439-95-4	
Manganese, Dissolved	347	ug/L	5.0	0.73	1	11/16/18 11:55	11/16/18 19:51	7439-96-5	
Molybdenum, Dissolved	130	ug/L	20.0	0.90	1	11/16/18 11:55	11/16/18 19:51	7439-98-7	
Nickel, Dissolved	5.1	ug/L	5.0	1.4	1	11/16/18 11:55	11/16/18 19:51	7440-02-0	
Potassium, Dissolved	3590	ug/L	500	79.3	1	11/16/18 11:55	11/16/18 19:51	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 11:55	11/16/18 19:51	7440-22-4	
Sodium, Dissolved	123000	ug/L	500	157	1	11/16/18 11:55	11/16/18 19:51	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 11:55	11/16/18 19:51	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.24J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:25	7440-36-0	
Arsenic	38.0	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:25	7440-38-2	
Cadmium	0.064J	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:25	7440-43-9	
Chromium	0.27J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:25	7440-47-3	B
Selenium	0.52J	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:25	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:25	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17S **Lab ID: 60285589005** Collected: 11/02/18 14:20 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	<0.15	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:02	7440-36-0	
Arsenic, Dissolved	40.6	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:02	7440-38-2	D9
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 20:02	7440-43-9	
Chromium, Dissolved	0.26J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 20:02	7440-47-3	
Selenium, Dissolved	0.44J	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 20:02	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 20:02	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 11:10	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO ₃	231	mg/L	20.0	4.9	1		11/12/18 16:16		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	666	mg/L	5.0	5.0	1		11/08/18 08:07		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.64	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.34	mg/L	0.20	0.012	1		11/05/18 16:30		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	24.3	mg/L	5.0	1.4	5		11/17/18 04:09	16887-00-6	
Fluoride	1.5	mg/L	0.20	0.19	1		11/17/18 03:53	16984-48-8	
Sulfate	238	mg/L	20.0	4.8	20		11/17/18 04:25	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.48	mg/L	0.10	0.050	1		11/08/18 12:51	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P171 Lab ID: 60285589006 Collected: 11/02/18 13:00 Received: 11/03/18 02:40 Matrix: Water

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

Aluminum	261	ug/L	75.0	21.1	1	11/07/18 10:32	11/07/18 17:59	7429-90-5	
Barium	13.0	ug/L	5.0	1.5	1	11/07/18 10:32	11/07/18 17:59	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/07/18 10:32	11/07/18 17:59	7440-41-7	
Boron	2500	ug/L	100	12.5	1	11/07/18 10:32	11/07/18 17:59	7440-42-8	
Calcium	5940	ug/L	200	53.5	1	11/07/18 10:32	11/07/18 17:59	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/07/18 10:32	11/07/18 17:59	7440-48-4	
Copper	40.8	ug/L	10.0	4.5	1	11/07/18 10:32	11/07/18 17:59	7440-50-8	
Iron	502	ug/L	50.0	6.1	1	11/07/18 10:32	11/07/18 17:59	7439-89-6	
Lead	31.2	ug/L	10.0	3.0	1	11/07/18 10:32	11/07/18 17:59	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	11/07/18 10:32	11/07/18 17:59	7439-93-2	
Magnesium	121	ug/L	50.0	14.0	1	11/07/18 10:32	11/07/18 17:59	7439-95-4	
Manganese	7.7	ug/L	5.0	0.73	1	11/07/18 10:32	11/07/18 17:59	7439-96-5	
Molybdenum	100	ug/L	20.0	0.90	1	11/07/18 10:32	11/07/18 17:59	7439-98-7	
Nickel	4.8J	ug/L	5.0	1.4	1	11/07/18 10:32	11/07/18 17:59	7440-02-0	
Potassium	1460	ug/L	500	79.3	1	11/07/18 10:32	11/07/18 17:59	7440-09-7	B
Silver	<2.0	ug/L	7.0	2.0	1	11/07/18 10:32	11/07/18 17:59	7440-22-4	
Sodium	218000	ug/L	500	157	1	11/07/18 10:32	11/07/18 17:59	7440-23-5	
Zinc	9.3J	ug/L	50.0	3.5	1	11/07/18 10:32	11/07/18 17:59	7440-66-6	

200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7

Aluminum, Dissolved	49.4J	ug/L	75.0	21.1	1	11/16/18 11:55	11/16/18 19:53	7429-90-5	
Barium, Dissolved	11.8	ug/L	5.0	1.5	1	11/16/18 11:55	11/16/18 19:53	7440-39-3	
Beryllium, Dissolved	0.39J	ug/L	1.0	0.16	1	11/16/18 11:55	11/16/18 19:53	7440-41-7	
Boron, Dissolved	2550	ug/L	100	12.5	1	11/16/18 11:55	11/16/18 19:53	7440-42-8	
Calcium, Dissolved	6340	ug/L	200	53.5	1	11/16/18 11:55	11/16/18 19:53	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 11:55	11/16/18 19:53	7440-48-4	
Copper, Dissolved	33.8	ug/L	15.0	4.5	1	11/16/18 11:55	11/16/18 19:53	7440-50-8	
Iron, Dissolved	346	ug/L	50.0	6.1	1	11/16/18 11:55	11/16/18 19:53	7439-89-6	
Lead, Dissolved	23.0	ug/L	10.0	3.0	1	11/16/18 11:55	11/16/18 19:53	7439-92-1	
Lithium, Dissolved	<4.6	ug/L	10.0	4.6	1	11/16/18 11:55	11/16/18 19:53	7439-93-2	
Magnesium, Dissolved	102	ug/L	50.0	14.0	1	11/16/18 11:55	11/16/18 19:53	7439-95-4	
Manganese, Dissolved	5.0J	ug/L	5.0	0.73	1	11/16/18 11:55	11/16/18 19:53	7439-96-5	
Molybdenum, Dissolved	114	ug/L	20.0	0.90	1	11/16/18 11:55	11/16/18 19:53	7439-98-7	
Nickel, Dissolved	4.4J	ug/L	5.0	1.4	1	11/16/18 11:55	11/16/18 19:53	7440-02-0	
Potassium, Dissolved	1540	ug/L	500	79.3	1	11/16/18 11:55	11/16/18 19:53	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 11:55	11/16/18 19:53	7440-22-4	
Sodium, Dissolved	232000	ug/L	500	157	1	11/16/18 11:55	11/16/18 19:53	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 11:55	11/16/18 19:53	7440-66-6	

200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8

Antimony	0.90J	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:28	7440-36-0	
Arsenic	107	ug/L	1.0	0.065	1	11/07/18 16:32	11/14/18 18:28	7440-38-2	
Cadmium	1.1	ug/L	0.50	0.033	1	11/07/18 16:32	11/14/18 18:28	7440-43-9	
Chromium	1.4	ug/L	1.0	0.078	1	11/07/18 16:32	11/14/18 18:28	7440-47-3	
Selenium	6.5	ug/L	1.0	0.085	1	11/07/18 16:32	11/14/18 18:28	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/07/18 16:32	11/14/18 18:28	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P171 **Lab ID: 60285589006** Collected: 11/02/18 13:00 Received: 11/03/18 02:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	0.25J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:09	7440-36-0	
Arsenic, Dissolved	102	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:09	7440-38-2	
Cadmium, Dissolved	0.13J	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 20:09	7440-43-9	
Chromium, Dissolved	0.63J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 20:09	7440-47-3	
Selenium, Dissolved	1.4	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 20:09	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 20:09	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/15/18 17:05	11/20/18 11:12	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO ₃	219	mg/L	20.0	4.9	1		11/12/18 16:21		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	751	mg/L	5.0	5.0	1		11/08/18 08:07		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.59	mg/L	0.20	0.012	1		11/05/18 16:42		1e,H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.0	mg/L	2.0	0.58	2		11/17/18 05:45	16887-00-6	
Fluoride	2.1	mg/L	0.20	0.19	1		11/17/18 05:29	16984-48-8	
Sulfate	225	mg/L	20.0	4.8	20		11/17/18 04:41	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	2.9	mg/L	0.10	0.050	1		11/08/18 12:52	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17D Lab ID: 60285463015 Collected: 11/05/18 10:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	56.0J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:53	7429-90-5	
Barium	117	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:53	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:53	7440-41-7	
Boron	7590	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:53	7440-42-8	
Calcium	47900	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:53	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:53	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:53	7440-50-8	
Iron	3280	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:53	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:53	7439-92-1	
Lithium	41.4	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:53	7439-93-2	
Magnesium	12000	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:53	7439-95-4	
Manganese	498	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:53	7439-96-5	
Molybdenum	732	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:53	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:53	7440-02-0	
Potassium	7340	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:53	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:53	7440-22-4	
Sodium	132000	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:53	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:53	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 15:08	11/20/18 18:20	7429-90-5	
Barium, Dissolved	118	ug/L	5.0	1.5	1	11/16/18 15:08	11/20/18 18:20	7440-39-3	D9
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 15:08	11/20/18 18:20	7440-41-7	
Boron, Dissolved	7210	ug/L	100	12.5	1	11/16/18 15:08	11/20/18 18:20	7440-42-8	
Calcium, Dissolved	49300	ug/L	200	53.5	1	11/16/18 15:08	11/20/18 18:20	7440-70-2	D9
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 15:08	11/20/18 18:20	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 15:08	11/20/18 18:20	7440-50-8	
Iron, Dissolved	3260	ug/L	50.0	6.1	1	11/16/18 15:08	11/20/18 18:20	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 15:08	11/20/18 18:20	7439-92-1	
Lithium, Dissolved	45.2	ug/L	10.0	4.6	1	11/16/18 15:08	11/20/18 18:20	7439-93-2	D9
Magnesium, Dissolved	11100	ug/L	50.0	14.0	1	11/16/18 15:08	11/20/18 18:20	7439-95-4	
Manganese, Dissolved	543	ug/L	5.0	0.73	1	11/16/18 15:08	11/20/18 18:20	7439-96-5	D9
Molybdenum, Dissolved	725	ug/L	20.0	0.90	1	11/16/18 15:08	11/20/18 18:20	7439-98-7	
Nickel, Dissolved	<1.4	ug/L	5.0	1.4	1	11/16/18 15:08	11/20/18 18:20	7440-02-0	
Potassium, Dissolved	7110	ug/L	500	79.3	1	11/16/18 15:08	11/20/18 18:20	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 15:08	11/20/18 18:20	7440-22-4	
Sodium, Dissolved	130000	ug/L	500	157	1	11/16/18 15:08	11/20/18 18:20	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 15:08	11/20/18 18:20	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 13:53	7440-36-0	
Arsenic	1.3	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 13:53	7440-38-2	
Cadmium	0.23J	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 13:53	7440-43-9	
Chromium	0.20J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 13:53	7440-47-3	B
Selenium	0.24J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 13:53	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 13:53	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17D **Lab ID: 60285463015** Collected: 11/05/18 10:00 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	<0.15	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:15	7440-36-0	
Arsenic, Dissolved	1.3	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:15	7440-38-2	
Cadmium, Dissolved	0.19J	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 20:15	7440-43-9	
Chromium, Dissolved	<0.19	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 20:15	7440-47-3	
Selenium, Dissolved	0.23J	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 20:15	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 20:15	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:28	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	118	mg/L	20.0	4.9	1		11/14/18 13:47		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	388	mg/L	5.0	5.0	1		11/09/18 10:14		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	3.0	mg/L	0.050		1		11/19/18 17:52	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.31	mg/L	0.20	0.012	1		11/06/18 15:54		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	27.2	mg/L	5.0	1.4	5		11/20/18 21:35	16887-00-6	
Fluoride	0.58	mg/L	0.20	0.19	1		11/20/18 21:19	16984-48-8	
Sulfate	291	mg/L	50.0	12.0	50		11/20/18 21:51	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	1.1	mg/L	0.10	0.050	1		11/08/18 13:31	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19S Lab ID: 60285463016 Collected: 11/05/18 11:45 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	63.3J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:55	7429-90-5	
Barium	260	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:55	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:55	7440-41-7	
Boron	3840	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:55	7440-42-8	
Calcium	85600	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:55	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:55	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:55	7440-50-8	
Iron	10800	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:55	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:55	7439-92-1	
Lithium	42.1	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:55	7439-93-2	
Magnesium	29400	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:55	7439-95-4	
Manganese	372	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:55	7439-96-5	
Molybdenum	26.0	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:55	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:55	7440-02-0	
Potassium	6550	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:55	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:55	7440-22-4	
Sodium	65300	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:55	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:55	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	25.4J	ug/L	75.0	21.1	1	11/16/18 15:08	11/20/18 18:22	7429-90-5	
Barium, Dissolved	262	ug/L	5.0	1.5	1	11/16/18 15:08	11/20/18 18:22	7440-39-3	D9
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 15:08	11/20/18 18:22	7440-41-7	
Boron, Dissolved	3600	ug/L	100	12.5	1	11/16/18 15:08	11/20/18 18:22	7440-42-8	
Calcium, Dissolved	87400	ug/L	200	53.5	1	11/16/18 15:08	11/20/18 18:22	7440-70-2	D9
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 15:08	11/20/18 18:22	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 15:08	11/20/18 18:22	7440-50-8	
Iron, Dissolved	10800	ug/L	50.0	6.1	1	11/16/18 15:08	11/20/18 18:22	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 15:08	11/20/18 18:22	7439-92-1	
Lithium, Dissolved	39.0	ug/L	10.0	4.6	1	11/16/18 15:08	11/20/18 18:22	7439-93-2	
Magnesium, Dissolved	28000	ug/L	50.0	14.0	1	11/16/18 15:08	11/20/18 18:22	7439-95-4	
Manganese, Dissolved	404	ug/L	5.0	0.73	1	11/16/18 15:08	11/20/18 18:22	7439-96-5	D9
Molybdenum, Dissolved	26.1	ug/L	20.0	0.90	1	11/16/18 15:08	11/20/18 18:22	7439-98-7	D9
Nickel, Dissolved	<1.4	ug/L	5.0	1.4	1	11/16/18 15:08	11/20/18 18:22	7440-02-0	
Potassium, Dissolved	6280	ug/L	500	79.3	1	11/16/18 15:08	11/20/18 18:22	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 15:08	11/20/18 18:22	7440-22-4	
Sodium, Dissolved	62200	ug/L	500	157	1	11/16/18 15:08	11/20/18 18:22	7440-23-5	
Zinc, Dissolved	7.9J	ug/L	50.0	3.5	1	11/16/18 15:08	11/20/18 18:22	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.096J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:27	7440-36-0	
Arsenic	37.3	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:27	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:27	7440-43-9	
Chromium	0.21J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:27	7440-47-3	B
Selenium	0.15J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:27	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:27	7440-28-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19S **Lab ID: 60285463016** Collected: 11/05/18 11:45 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	<0.15	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:17	7440-36-0	
Arsenic, Dissolved	38.5	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:17	7440-38-2	
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 20:17	7440-43-9	
Chromium, Dissolved	0.26J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 20:17	7440-47-3	
Selenium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 20:17	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 20:17	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:31	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	347	mg/L	20.0	4.9	1		11/14/18 13:52		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	550	mg/L	5.0	5.0	1		11/12/18 14:07		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	5.5	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	5.3	mg/L	0.20	0.012	1		11/06/18 15:55		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.6	mg/L	2.0	0.58	2		11/20/18 22:55	16887-00-6	
Fluoride	0.41	mg/L	0.20	0.19	1		11/20/18 22:07	16984-48-8	
Sulfate	106	mg/L	10.0	2.4	10		11/20/18 23:11	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	1.2	mg/L	0.10	0.050	1		11/08/18 13:32	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P191 Lab ID: 60285463017 Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	57.0J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 21:57	7429-90-5	
Barium	15.9	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 21:57	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 21:57	7440-41-7	
Boron	6580	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 21:57	7440-42-8	
Calcium	7430	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 21:57	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 21:57	7440-48-4	
Copper	10.7	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 21:57	7440-50-8	
Iron	113	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 21:57	7439-89-6	
Lead	12.5	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 21:57	7439-92-1	
Lithium	16.1	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 21:57	7439-93-2	
Magnesium	18.6J	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 21:57	7439-95-4	
Manganese	4.0J	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 21:57	7439-96-5	
Molybdenum	368	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 21:57	7439-98-7	
Nickel	9.0	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 21:57	7440-02-0	
Potassium	12300	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 21:57	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 21:57	7440-22-4	
Sodium	315000	ug/L	500	157	1	11/08/18 08:56	11/08/18 21:57	7440-23-5	
Zinc	7.9J	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 21:57	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 15:08	11/20/18 18:24	7429-90-5	
Barium, Dissolved	16.7	ug/L	5.0	1.5	1	11/16/18 15:08	11/20/18 18:24	7440-39-3	D9
Beryllium, Dissolved	0.29J	ug/L	1.0	0.16	1	11/16/18 15:08	11/20/18 18:24	7440-41-7	B
Boron, Dissolved	5980	ug/L	100	12.5	1	11/16/18 15:08	11/20/18 18:24	7440-42-8	
Calcium, Dissolved	7640	ug/L	200	53.5	1	11/16/18 15:08	11/20/18 18:24	7440-70-2	D9
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 15:08	11/20/18 18:24	7440-48-4	
Copper, Dissolved	4.6J	ug/L	15.0	4.5	1	11/16/18 15:08	11/20/18 18:24	7440-50-8	
Iron, Dissolved	47.3J	ug/L	50.0	6.1	1	11/16/18 15:08	11/20/18 18:24	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 15:08	11/20/18 18:24	7439-92-1	
Lithium, Dissolved	14.1	ug/L	10.0	4.6	1	11/16/18 15:08	11/20/18 18:24	7439-93-2	
Magnesium, Dissolved	<14.0	ug/L	50.0	14.0	1	11/16/18 15:08	11/20/18 18:24	7439-95-4	
Manganese, Dissolved	2.9J	ug/L	5.0	0.73	1	11/16/18 15:08	11/20/18 18:24	7439-96-5	
Molybdenum, Dissolved	384	ug/L	20.0	0.90	1	11/16/18 15:08	11/20/18 18:24	7439-98-7	D9
Nickel, Dissolved	7.5	ug/L	5.0	1.4	1	11/16/18 15:08	11/20/18 18:24	7440-02-0	
Potassium, Dissolved	13000	ug/L	500	79.3	1	11/16/18 15:08	11/20/18 18:24	7440-09-7	D9
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 15:08	11/20/18 18:24	7440-22-4	
Sodium, Dissolved	301000	ug/L	500	157	1	11/16/18 15:08	11/20/18 18:24	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 15:08	11/20/18 18:24	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	6.4	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:29	7440-36-0	
Arsenic	293	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:29	7440-38-2	
Cadmium	0.59	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:29	7440-43-9	
Chromium	0.48J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:29	7440-47-3	B
Selenium	3.4	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:29	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:29	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P191 **Lab ID: 60285463017** Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	3.1	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:19	7440-36-0	
Arsenic, Dissolved	219	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 20:19	7440-38-2	
Cadmium, Dissolved	0.15J	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 20:19	7440-43-9	
Chromium, Dissolved	0.31J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 20:19	7440-47-3	
Selenium, Dissolved	1.3	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 20:19	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 20:19	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:33	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO ₃	306	mg/L	20.0	4.9	1		11/14/18 13:58		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	1030	mg/L	5.0	5.0	1		11/12/18 14:07		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	<0.012	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.29	mg/L	0.20	0.012	1		11/06/18 15:55		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	24.5	mg/L	5.0	1.4	5		11/20/18 23:43	16887-00-6	
Fluoride	1.4	mg/L	0.20	0.19	1		11/20/18 23:27	16984-48-8	
Sulfate	18.7	mg/L	5.0	1.2	5		11/20/18 23:43	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.29	mg/L	0.10	0.050	1		11/08/18 13:36	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19D Lab ID: 60285463018 Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water

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

Aluminum	60.1J	ug/L	75.0	21.1	1	11/08/18 08:56	11/08/18 22:00	7429-90-5	
Barium	121	ug/L	5.0	1.5	1	11/08/18 08:56	11/08/18 22:00	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	11/08/18 08:56	11/08/18 22:00	7440-41-7	
Boron	12600	ug/L	100	12.5	1	11/08/18 08:56	11/08/18 22:00	7440-42-8	
Calcium	37500	ug/L	200	53.5	1	11/08/18 08:56	11/08/18 22:00	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	11/08/18 08:56	11/08/18 22:00	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	11/08/18 08:56	11/08/18 22:00	7440-50-8	
Iron	2100	ug/L	50.0	6.1	1	11/08/18 08:56	11/08/18 22:00	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	11/08/18 08:56	11/08/18 22:00	7439-92-1	
Lithium	24.5	ug/L	10.0	4.6	1	11/08/18 08:56	11/08/18 22:00	7439-93-2	
Magnesium	6220	ug/L	50.0	14.0	1	11/08/18 08:56	11/08/18 22:00	7439-95-4	
Manganese	301	ug/L	5.0	0.73	1	11/08/18 08:56	11/08/18 22:00	7439-96-5	
Molybdenum	1040	ug/L	20.0	0.90	1	11/08/18 08:56	11/08/18 22:00	7439-98-7	
Nickel	1.8J	ug/L	5.0	1.4	1	11/08/18 08:56	11/08/18 22:00	7440-02-0	
Potassium	3900	ug/L	500	79.3	1	11/08/18 08:56	11/08/18 22:00	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	11/08/18 08:56	11/08/18 22:00	7440-22-4	
Sodium	155000	ug/L	500	157	1	11/08/18 08:56	11/08/18 22:00	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	11/08/18 08:56	11/08/18 22:00	7440-66-6	

200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7

Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 15:08	11/21/18 19:32	7429-90-5	
Barium, Dissolved	126	ug/L	5.0	1.5	1	11/16/18 15:08	11/21/18 19:32	7440-39-3	D9
Beryllium, Dissolved	0.23J	ug/L	1.0	0.16	1	11/16/18 15:08	11/21/18 19:32	7440-41-7	B
Boron, Dissolved	12600	ug/L	100	12.5	1	11/16/18 15:08	11/21/18 19:32	7440-42-8	
Calcium, Dissolved	40500	ug/L	200	53.5	1	11/16/18 15:08	11/21/18 19:32	7440-70-2	D9
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 15:08	11/21/18 19:32	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 15:08	11/21/18 19:32	7440-50-8	
Iron, Dissolved	2160	ug/L	50.0	6.1	1	11/16/18 15:08	11/21/18 19:32	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 15:08	11/21/18 19:32	7439-92-1	
Lithium, Dissolved	26.1	ug/L	10.0	4.6	1	11/16/18 15:08	11/21/18 19:32	7439-93-2	D9
Magnesium, Dissolved	5930	ug/L	50.0	14.0	1	11/16/18 15:08	11/21/18 19:32	7439-95-4	
Manganese, Dissolved	316	ug/L	5.0	0.73	1	11/16/18 15:08	11/21/18 19:32	7439-96-5	
Molybdenum, Dissolved	1040	ug/L	20.0	0.90	1	11/16/18 15:08	11/21/18 19:32	7439-98-7	
Nickel, Dissolved	2.0J	ug/L	5.0	1.4	1	11/16/18 15:08	11/21/18 19:32	7440-02-0	
Potassium, Dissolved	3930	ug/L	500	79.3	1	11/16/18 15:08	11/21/18 19:32	7440-09-7	D9
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 15:08	11/21/18 19:32	7440-22-4	
Sodium, Dissolved	151000	ug/L	500	157	1	11/16/18 15:08	11/21/18 19:32	7440-23-5	
Zinc, Dissolved	7.1J	ug/L	50.0	3.5	1	11/16/18 15:08	11/21/18 19:32	7440-66-6	

200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8

Antimony	0.086J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:30	7440-36-0	
Arsenic	0.71J	ug/L	1.0	0.065	1	11/09/18 07:00	11/14/18 17:30	7440-38-2	
Cadmium	0.34J	ug/L	0.50	0.033	1	11/09/18 07:00	11/14/18 17:30	7440-43-9	
Chromium	0.38J	ug/L	1.0	0.078	1	11/09/18 07:00	11/14/18 17:30	7440-47-3	B
Selenium	0.30J	ug/L	1.0	0.085	1	11/09/18 07:00	11/14/18 17:30	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/09/18 07:00	11/14/18 17:30	7440-28-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19D **Lab ID: 60285463018** Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	<0.15	ug/L	1.0	0.15	1	11/15/18 11:26	11/16/18 15:12	7440-36-0	
Arsenic, Dissolved	0.50J	ug/L	1.0	0.15	1	11/15/18 11:26	11/16/18 15:12	7440-38-2	
Cadmium, Dissolved	0.31J	ug/L	0.50	0.070	1	11/15/18 11:26	11/16/18 15:12	7440-43-9	
Chromium, Dissolved	<0.19	ug/L	1.0	0.19	1	11/15/18 11:26	11/16/18 15:12	7440-47-3	
Selenium, Dissolved	0.28J	ug/L	1.0	0.16	1	11/15/18 11:26	11/16/18 15:12	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/15/18 11:26	11/16/18 15:12	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/19/18 12:14	11/20/18 14:35	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO ₃	194	mg/L	20.0	4.9	1		11/14/18 14:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	606	mg/L	5.0	5.0	1		11/12/18 14:07		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	1.5	mg/L	0.050	0.012	1		12/03/18 14:44	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.64	mg/L	0.20	0.012	1		11/06/18 15:55		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.6	mg/L	5.0	1.4	5		11/21/18 00:31	16887-00-6	
Fluoride	1.3	mg/L	0.20	0.19	1		11/21/18 00:15	16984-48-8	
Sulfate	202	mg/L	20.0	4.8	20		11/21/18 00:47	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	1.8	mg/L	0.10	0.050	1		11/09/18 13:40	7723-14-0	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555449 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2278650 Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/20/18 10:15	

LABORATORY CONTROL SAMPLE: 2278651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278652 2278653

Parameter	Units	60284830001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.1	5.0	101	101	75-125	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278654 2278655

Parameter	Units	60285588003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	4.9	100	99	75-125	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278656 2278657

Parameter	Units	60285588004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	5.0	100	101	75-125	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555581 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2279193 Matrix: Water
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/20/18 13:40	

LABORATORY CONTROL SAMPLE: 2279194

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.2	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2279195 2279196

Parameter	Units	60285459011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.2	5.2	105	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553881 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2271171 Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/07/18 17:23	
Barium	ug/L	<1.5	5.0	1.5	11/07/18 17:23	
Beryllium	ug/L	0.27J	1.0	0.16	11/07/18 17:23	
Boron	ug/L	<12.5	100	12.5	11/07/18 17:23	
Calcium	ug/L	<53.5	200	53.5	11/07/18 17:23	
Cobalt	ug/L	<0.87	5.0	0.87	11/07/18 17:23	
Copper	ug/L	<4.5	10.0	4.5	11/07/18 17:23	
Iron	ug/L	6.8J	50.0	6.1	11/07/18 17:23	
Lead	ug/L	<3.0	10.0	3.0	11/07/18 17:23	
Lithium	ug/L	<4.6	10.0	4.6	11/07/18 17:23	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 17:23	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 17:23	
Molybdenum	ug/L	<0.90	20.0	0.90	11/07/18 17:23	
Nickel	ug/L	<1.4	5.0	1.4	11/07/18 17:23	
Potassium	ug/L	212J	500	79.3	11/07/18 17:23	
Silver	ug/L	<2.0	7.0	2.0	11/07/18 17:23	
Sodium	ug/L	<157	500	157	11/07/18 17:23	
Zinc	ug/L	<3.5	50.0	3.5	11/07/18 17:23	

LABORATORY CONTROL SAMPLE: 2271172

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9520	95	85-115	
Barium	ug/L	1000	966	97	85-115	
Beryllium	ug/L	1000	915	91	85-115	
Boron	ug/L	1000	959	96	85-115	
Calcium	ug/L	10000	9210	92	85-115	
Cobalt	ug/L	1000	953	95	85-115	
Copper	ug/L	1000	964	96	85-115	
Iron	ug/L	10000	9270	93	85-115	
Lead	ug/L	1000	949	95	85-115	
Lithium	ug/L	1000	987	99	85-115	
Magnesium	ug/L	10000	9620	96	85-115	
Manganese	ug/L	1000	920	92	85-115	
Molybdenum	ug/L	1000	971	97	85-115	
Nickel	ug/L	1000	951	95	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Silver	ug/L	500	483	97	85-115	
Sodium	ug/L	10000	9860	99	85-115	
Zinc	ug/L	1000	936	94	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271173												2271174	
Parameter	Units	60285588004 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
			Spike Conc.	Spike Conc.									
Aluminum	ug/L	46.0J	10000	10000	9530	9440	95	94	70-130	1	20		
Barium	ug/L	116	1000	1000	1060	1060	95	94	70-130	1	20		
Beryllium	ug/L	<0.16	1000	1000	909	906	91	91	70-130	0	20		
Boron	ug/L	572	1000	1000	1530	1510	96	94	70-130	1	20		
Calcium	ug/L	60300	10000	10000	69700	69200	94	89	70-130	1	20		
Cobalt	ug/L	<0.87	1000	1000	919	914	92	91	70-130	1	20		
Copper	ug/L	4.8J	1000	1000	941	939	94	93	70-130	0	20		
Iron	ug/L	1750	10000	10000	10800	10800	91	90	70-130	0	20		
Lead	ug/L	<3.0	1000	1000	903	900	90	90	70-130	0	20		
Lithium	ug/L	23.2	1000	1000	989	985	97	96	70-130	0	20		
Magnesium	ug/L	11000	10000	10000	20200	20000	92	90	70-130	1	20		
Manganese	ug/L	371	1000	1000	1260	1260	89	89	70-130	1	20		
Molybdenum	ug/L	33.8	1000	1000	996	991	96	96	70-130	1	20		
Nickel	ug/L	<1.4	1000	1000	913	912	91	91	70-130	0	20		
Potassium	ug/L	5860	10000	10000	15400	15200	95	94	70-130	1	20		
Silver	ug/L	<2.0	500	500	471	469	94	94	70-130	1	20		
Sodium	ug/L	54600	10000	10000	64700	64100	101	94	70-130	1	20		
Zinc	ug/L	<3.5	1000	1000	913	908	91	90	70-130	1	20		

MATRIX SPIKE SAMPLE: 2271175											
Parameter	Units	60285589001 Result	Spike Conc.	MS	MS	% Rec Limits	Qualifiers				
				Result	% Rec						
Aluminum	ug/L		422	10000	9790	94	70-130				
Barium	ug/L		15.1	1000	959	94	70-130				
Beryllium	ug/L		<0.16	1000	908	91	70-130				
Boron	ug/L		2470	1000	3440	96	70-130				
Calcium	ug/L		26800	10000	36100	94	70-130				
Cobalt	ug/L		0.92J	1000	917	92	70-130				
Copper	ug/L		<4.5	1000	941	94	70-130				
Iron	ug/L		13.1J	10000	9120	91	70-130				
Lead	ug/L		<3.0	1000	898	90	70-130				
Lithium	ug/L		<4.6	1000	973	97	70-130				
Magnesium	ug/L		753	10000	9940	92	70-130				
Manganese	ug/L		2.3J	1000	892	89	70-130				
Molybdenum	ug/L		102	1000	1060	96	70-130				
Nickel	ug/L		<1.4	1000	913	91	70-130				
Potassium	ug/L		6080	10000	15600	96	70-130				
Silver	ug/L		<2.0	500	466	93	70-130				
Sodium	ug/L		107000	10000	120000	125	70-130				
Zinc	ug/L		<3.5	1000	917	92	70-130				

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 554059 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2272160 Matrix: Water
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/08/18 20:39	
Barium	ug/L	<1.5	5.0	1.5	11/08/18 20:39	
Beryllium	ug/L	<0.16	1.0	0.16	11/08/18 20:39	
Boron	ug/L	<12.5	100	12.5	11/08/18 20:39	
Calcium	ug/L	<53.5	200	53.5	11/08/18 20:39	
Cobalt	ug/L	<0.87	5.0	0.87	11/08/18 20:39	
Copper	ug/L	<4.5	10.0	4.5	11/08/18 20:39	
Iron	ug/L	9.6J	50.0	6.1	11/09/18 17:27	
Lead	ug/L	<3.0	10.0	3.0	11/08/18 20:39	
Lithium	ug/L	<4.6	10.0	4.6	11/08/18 20:39	
Magnesium	ug/L	<14.0	50.0	14.0	11/08/18 20:39	
Manganese	ug/L	<0.73	5.0	0.73	11/08/18 20:39	
Molybdenum	ug/L	<0.90	20.0	0.90	11/08/18 20:39	
Nickel	ug/L	<1.4	5.0	1.4	11/08/18 20:39	
Potassium	ug/L	159J	500	79.3	11/08/18 20:39	
Silver	ug/L	<2.0	7.0	2.0	11/08/18 20:39	
Sodium	ug/L	<157	500	157	11/08/18 20:39	
Zinc	ug/L	<3.5	50.0	3.5	11/08/18 20:39	

LABORATORY CONTROL SAMPLE: 2272161

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9810	98	85-115	
Barium	ug/L	1000	968	97	85-115	
Beryllium	ug/L	1000	904	90	85-115	
Boron	ug/L	1000	984	98	85-115	
Calcium	ug/L	10000	9280	93	85-115	
Cobalt	ug/L	1000	1010	101	85-115	
Copper	ug/L	1000	996	100	85-115	
Iron	ug/L	10000	10100	101	85-115	
Lead	ug/L	1000	990	99	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Magnesium	ug/L	10000	10300	103	85-115	
Manganese	ug/L	1000	909	91	85-115	
Molybdenum	ug/L	1000	1040	104	85-115	
Nickel	ug/L	1000	967	97	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Silver	ug/L	500	496	99	85-115	
Sodium	ug/L	10000	10300	103	85-115	
Zinc	ug/L	1000	1010	101	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Parameter	Units	2272162		2272163		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60285463014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							
Aluminum	ug/L	73.5J	10000	10000	9370	9830	93	98	70-130	5	20	
Barium	ug/L	9.5	1000	1000	928	970	92	96	70-130	4	20	
Beryllium	ug/L	<0.16	1000	1000	871	910	87	91	70-130	4	20	
Boron	ug/L	3290	1000	1000	4180	4240	89	94	70-130	1	20	
Calcium	ug/L	8840	10000	10000	17200	17700	84	88	70-130	3	20	
Cobalt	ug/L	<0.87	1000	1000	934	994	93	99	70-130	6	20	
Copper	ug/L	<4.5	1000	1000	955	1000	95	100	70-130	5	20	
Iron	ug/L	62.8	10000	10000	8720	9160	87	91	70-130	5	20	
Lead	ug/L	6.2J	1000	1000	902	954	90	95	70-130	6	20	
Lithium	ug/L	<4.6	1000	1000	973	1020	97	101	70-130	5	20	
Magnesium	ug/L	<14.0	10000	10000	9490	10000	95	100	70-130	6	20	
Manganese	ug/L	3.9J	1000	1000	865	909	86	91	70-130	5	20	
Molybdenum	ug/L	170	1000	1000	1150	1220	98	105	70-130	5	20	
Nickel	ug/L	5.1	1000	1000	890	946	88	94	70-130	6	20	
Potassium	ug/L	3260	10000	10000	12700	13200	94	99	70-130	4	20	
Silver	ug/L	<2.0	500	500	468	492	94	98	70-130	5	20	
Sodium	ug/L	246000	10000	10000	254000	253000	78	71	70-130	0	20	
Zinc	ug/L	<3.5	1000	1000	984	1050	98	104	70-130	6	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555618

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Dissolved

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2279413

Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<21.1	75.0	21.1	11/16/18 19:25	
Barium, Dissolved	ug/L	<1.5	5.0	1.5	11/16/18 19:25	
Beryllium, Dissolved	ug/L	<0.16	1.0	0.16	11/16/18 19:25	
Boron, Dissolved	ug/L	<12.5	100	12.5	11/16/18 19:25	
Calcium, Dissolved	ug/L	<53.5	200	53.5	11/16/18 19:25	
Cobalt, Dissolved	ug/L	<0.87	5.0	0.87	11/16/18 19:25	
Copper, Dissolved	ug/L	<4.5	15.0	4.5	11/16/18 19:25	
Iron, Dissolved	ug/L	10.3J	50.0	6.1	11/16/18 19:25	
Lead, Dissolved	ug/L	<3.0	10.0	3.0	11/16/18 19:25	
Lithium, Dissolved	ug/L	<4.6	10.0	4.6	11/16/18 19:25	
Magnesium, Dissolved	ug/L	<14.0	50.0	14.0	11/16/18 19:25	
Manganese, Dissolved	ug/L	<0.73	5.0	0.73	11/16/18 19:25	
Molybdenum, Dissolved	ug/L	<0.90	20.0	0.90	11/16/18 19:25	
Nickel, Dissolved	ug/L	<1.4	5.0	1.4	11/16/18 19:25	
Potassium, Dissolved	ug/L	<79.3	500	79.3	11/16/18 19:25	
Silver, Dissolved	ug/L	<2.0	7.0	2.0	11/16/18 19:25	
Sodium, Dissolved	ug/L	216J	500	157	11/16/18 19:25	
Zinc, Dissolved	ug/L	<3.5	50.0	3.5	11/16/18 19:25	

LABORATORY CONTROL SAMPLE: 2279414

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	9620	96	85-115	
Barium, Dissolved	ug/L	1000	955	95	85-115	
Beryllium, Dissolved	ug/L	1000	948	95	85-115	
Boron, Dissolved	ug/L	1000	937	94	85-115	
Calcium, Dissolved	ug/L	10000	9630	96	85-115	
Cobalt, Dissolved	ug/L	1000	998	100	85-115	
Copper, Dissolved	ug/L	1000	990	99	85-115	
Iron, Dissolved	ug/L	10000	9250	93	85-115	
Lead, Dissolved	ug/L	1000	985	99	85-115	
Lithium, Dissolved	ug/L	1000	971	97	85-115	
Magnesium, Dissolved	ug/L	10000	10000	100	85-115	
Manganese, Dissolved	ug/L	1000	986	99	85-115	
Molybdenum, Dissolved	ug/L	1000	1000	100	85-115	
Nickel, Dissolved	ug/L	1000	994	99	85-115	
Potassium, Dissolved	ug/L	10000	9690	97	85-115	
Silver, Dissolved	ug/L	500	493	99	85-115	
Sodium, Dissolved	ug/L	10000	10100	101	85-115	
Zinc, Dissolved	ug/L	1000	989	99	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Parameter	Units	60285463002		2279415		2279416		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec							
Aluminum, Dissolved	ug/L	93.6	10000	10000	9750	9930	97	98	97	98	70-130	2	20	
Barium, Dissolved	ug/L	374	1000	1000	1340	1350	97	98	97	98	70-130	1	20	
Beryllium, Dissolved	ug/L	<0.16	1000	1000	971	988	97	99	97	99	70-130	2	20	
Boron, Dissolved	ug/L	101	1000	1000	1060	1070	96	97	96	97	70-130	1	20	
Calcium, Dissolved	ug/L	130000	10000	10000	142000	145000	123	148	123	148	70-130	2	20	M1
Cobalt, Dissolved	ug/L	<0.87	1000	1000	962	982	96	98	96	98	70-130	2	20	
Copper, Dissolved	ug/L	<4.5	1000	1000	977	988	98	99	98	99	70-130	1	20	
Iron, Dissolved	ug/L	10700	10000	10000	20000	20300	93	96	93	96	70-130	2	20	
Lead, Dissolved	ug/L	<3.0	1000	1000	949	966	95	96	95	96	70-130	2	20	
Lithium, Dissolved	ug/L	10.2	1000	1000	1020	1030	101	102	101	102	70-130	2	20	
Magnesium, Dissolved	ug/L	17800	10000	10000	27700	28100	99	103	99	103	70-130	1	20	
Manganese, Dissolved	ug/L	446	1000	1000	1420	1440	97	99	97	99	70-130	2	20	
Molybdenum, Dissolved	ug/L	<0.90	1000	1000	1000	1020	100	102	100	102	70-130	2	20	
Nickel, Dissolved	ug/L	<1.4	1000	1000	958	979	96	98	96	98	70-130	2	20	
Potassium, Dissolved	ug/L	2180	10000	10000	12500	12800	103	106	103	106	70-130	2	20	
Silver, Dissolved	ug/L	<2.0	500	500	488	493	98	99	98	99	70-130	1	20	
Sodium, Dissolved	ug/L	5080	10000	10000	15300	15500	102	104	102	104	70-130	2	20	
Zinc, Dissolved	ug/L	<3.5	1000	1000	964	982	96	98	96	98	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555676 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Dissolved
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2279684 Matrix: Water
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<21.1	75.0	21.1	11/20/18 18:07	
Barium, Dissolved	ug/L	<1.5	5.0	1.5	11/20/18 18:07	
Beryllium, Dissolved	ug/L	0.50J	1.0	0.16	11/20/18 18:07	
Boron, Dissolved	ug/L	<12.5	100	12.5	11/20/18 18:07	
Calcium, Dissolved	ug/L	<53.5	200	53.5	11/20/18 18:07	
Cobalt, Dissolved	ug/L	<0.87	5.0	0.87	11/20/18 18:07	
Copper, Dissolved	ug/L	<4.5	15.0	4.5	11/20/18 18:07	
Iron, Dissolved	ug/L	<6.1	50.0	6.1	11/20/18 18:07	
Lead, Dissolved	ug/L	<3.0	10.0	3.0	11/20/18 18:07	
Lithium, Dissolved	ug/L	<4.6	10.0	4.6	11/20/18 18:07	
Magnesium, Dissolved	ug/L	<14.0	50.0	14.0	11/20/18 18:07	
Manganese, Dissolved	ug/L	<0.73	5.0	0.73	11/20/18 18:07	
Molybdenum, Dissolved	ug/L	<0.90	20.0	0.90	11/20/18 18:07	
Nickel, Dissolved	ug/L	<1.4	5.0	1.4	11/20/18 18:07	
Potassium, Dissolved	ug/L	<79.3	500	79.3	11/20/18 18:07	
Silver, Dissolved	ug/L	<2.0	7.0	2.0	11/20/18 18:07	
Sodium, Dissolved	ug/L	<157	500	157	11/20/18 18:07	
Zinc, Dissolved	ug/L	<3.5	50.0	3.5	11/20/18 18:07	

LABORATORY CONTROL SAMPLE: 2279685

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	10000	100	85-115	
Barium, Dissolved	ug/L	1000	986	99	85-115	
Beryllium, Dissolved	ug/L	1000	958	96	85-115	
Boron, Dissolved	ug/L	1000	963	96	85-115	
Calcium, Dissolved	ug/L	10000	9750	98	85-115	
Cobalt, Dissolved	ug/L	1000	998	100	85-115	
Copper, Dissolved	ug/L	1000	1010	101	85-115	
Iron, Dissolved	ug/L	10000	9530	95	85-115	
Lead, Dissolved	ug/L	1000	996	100	85-115	
Lithium, Dissolved	ug/L	1000	1000	100	85-115	
Magnesium, Dissolved	ug/L	10000	9880	99	85-115	
Manganese, Dissolved	ug/L	1000	998	100	85-115	
Molybdenum, Dissolved	ug/L	1000	1010	101	85-115	
Nickel, Dissolved	ug/L	1000	998	100	85-115	
Potassium, Dissolved	ug/L	10000	10200	102	85-115	
Silver, Dissolved	ug/L	500	506	101	85-115	
Sodium, Dissolved	ug/L	10000	10300	103	85-115	
Zinc, Dissolved	ug/L	1000	972	97	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Parameter	Units	60285463014		2279686		2279687		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec							
Aluminum, Dissolved	ug/L	28.2J	10000	10000	9950	9960	99	99	99	70-130	0	20		
Barium, Dissolved	ug/L	12.8	1000	1000	1000	1000	99	99	99	70-130	0	20		
Beryllium, Dissolved	ug/L	0.34J	1000	1000	972	978	97	98	98	70-130	1	20		
Boron, Dissolved	ug/L	3160	1000	1000	4110	4080	96	92	92	70-130	1	20		
Calcium, Dissolved	ug/L	9380	10000	10000	18800	18900	95	95	95	70-130	0	20		
Cobalt, Dissolved	ug/L	<0.87	1000	1000	988	989	99	99	99	70-130	0	20		
Copper, Dissolved	ug/L	<4.5	1000	1000	1010	992	100	99	99	70-130	1	20		
Iron, Dissolved	ug/L	26.9J	10000	10000	9650	9680	96	96	96	70-130	0	20		
Lead, Dissolved	ug/L	<3.0	1000	1000	952	955	95	95	95	70-130	0	20		
Lithium, Dissolved	ug/L	<4.6	1000	1000	1020	1020	102	102	102	70-130	0	20		
Magnesium, Dissolved	ug/L	<14.0	10000	10000	9710	9650	97	97	97	70-130	1	20		
Manganese, Dissolved	ug/L	2.9J	1000	1000	999	991	100	99	99	70-130	1	20		
Molybdenum, Dissolved	ug/L	193	1000	1000	1200	1210	100	101	101	70-130	1	20		
Nickel, Dissolved	ug/L	4.5J	1000	1000	993	994	99	99	99	70-130	0	20		
Potassium, Dissolved	ug/L	3310	10000	10000	13900	14000	106	107	107	70-130	0	20		
Silver, Dissolved	ug/L	<2.0	500	500	499	494	100	99	99	70-130	1	20		
Sodium, Dissolved	ug/L	244000	10000	10000	255000	255000	101	107	107	70-130	0	20		
Zinc, Dissolved	ug/L	<3.5	1000	1000	1000	1000	100	100	100	70-130	0	20		

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553993 Analysis Method: EPA 200.8

QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2271645 Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/14/18 17:48	
Arsenic	ug/L	<0.065	1.0	0.065	11/14/18 17:48	
Cadmium	ug/L	<0.033	0.50	0.033	11/14/18 17:48	
Chromium	ug/L	0.12J	1.0	0.078	11/14/18 17:48	
Selenium	ug/L	<0.085	1.0	0.085	11/14/18 17:48	
Thallium	ug/L	<0.099	1.0	0.099	11/14/18 17:48	

LABORATORY CONTROL SAMPLE: 2271646

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	99	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	38.9	97	85-115	
Chromium	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	39.0	97	85-115	
Thallium	ug/L	40	37.6	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271647 2271648

Parameter	Units	60285588003		MSD		MSD		% Rec		Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony	ug/L	<0.078	40	40	39.4	38.5	99	96	70-130	2	20		
Arsenic	ug/L	0.56J	40	40	38.0	37.2	94	92	70-130	2	20		
Cadmium	ug/L	0.14J	40	40	37.0	36.3	92	91	70-130	2	20		
Chromium	ug/L	0.38J	40	40	39.2	38.5	97	95	70-130	2	20		
Selenium	ug/L	0.23J	40	40	34.4	34.1	85	85	70-130	1	20		
Thallium	ug/L	<0.099	40	40	38.4	37.6	96	94	70-130	2	20		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271649 2271650

Parameter	Units	60285588004		MSD		MSD		% Rec		Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony	ug/L	<0.078	40	40	36.9	37.5	92	94	70-130	2	20		
Arsenic	ug/L	9.7	40	40	44.3	45.0	86	88	70-130	2	20		
Cadmium	ug/L	0.036J	40	40	35.6	36.5	89	91	70-130	3	20		
Chromium	ug/L	0.16J	40	40	36.5	37.4	91	93	70-130	2	20		
Selenium	ug/L	0.087J	40	40	32.2	32.8	80	82	70-130	2	20		

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Parameter	Units	60285588004		2271649		2271650		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS Result	MSD Result							
Thallium	ug/L	<0.099	40	40	36.5	36.7	91	92	70-130	1	20			

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro
Pace Project No.: 60290480

QC Batch: 554272 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2273296 Matrix: Water
Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/14/18 14:01	
Arsenic	ug/L	<0.065	1.0	0.065	11/14/18 14:01	
Cadmium	ug/L	<0.033	0.50	0.033	11/14/18 14:01	
Chromium	ug/L	0.085J	1.0	0.078	11/14/18 14:01	
Selenium	ug/L	<0.085	1.0	0.085	11/14/18 14:01	
Thallium	ug/L	<0.099	1.0	0.099	11/14/18 14:01	

LABORATORY CONTROL SAMPLE: 2273297

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.4	98	85-115	
Arsenic	ug/L	40	39.8	99	85-115	
Cadmium	ug/L	40	39.1	98	85-115	
Chromium	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	39.8	99	85-115	
Thallium	ug/L	40	38.0	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2273298 2273299

Parameter	Units	60285742002		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.	% Rec	% Rec						
Antimony	ug/L	ND	40	40	42.0	40.6	103	99	70-130	3	20		
Arsenic	ug/L	1.1	40	40	42.8	42.2	104	103	70-130	1	20		
Cadmium	ug/L	ND	40	40	38.3	37.5	96	94	70-130	2	20		
Chromium	ug/L	2.4	40	40	42.5	42.2	100	100	70-130	1	20		
Selenium	ug/L	4.8	40	40	43.1	42.0	96	93	70-130	2	20		
Thallium	ug/L	ND	40	40	40.1	39.7	100	99	70-130	1	20		

MATRIX SPIKE SAMPLE: 2273300

Parameter	Units	60285463015 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	40.1	100	70-130	
Arsenic	ug/L	1.3	40	42.0	102	70-130	
Cadmium	ug/L	0.23J	40	38.3	95	70-130	
Chromium	ug/L	0.20J	40	38.9	97	70-130	
Selenium	ug/L	0.24J	40	38.3	95	70-130	
Thallium	ug/L	<0.099	40	38.4	96	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553967 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285589005, 60285589006

METHOD BLANK: 2271491 Matrix: Water
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.15	1.0	0.15	11/08/18 19:17	
Arsenic, Dissolved	ug/L	<0.15	1.0	0.15	11/08/18 19:17	
Cadmium, Dissolved	ug/L	<0.070	0.50	0.070	11/08/18 19:17	
Chromium, Dissolved	ug/L	<0.19	1.0	0.19	11/08/18 19:17	
Selenium, Dissolved	ug/L	<0.16	1.0	0.16	11/08/18 19:17	
Thallium, Dissolved	ug/L	<0.14	1.0	0.14	11/08/18 19:17	

LABORATORY CONTROL SAMPLE: 2271492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	39.7	99	85-115	
Arsenic, Dissolved	ug/L	40	40.6	101	85-115	
Cadmium, Dissolved	ug/L	40	39.2	98	85-115	
Chromium, Dissolved	ug/L	40	40.5	101	85-115	
Selenium, Dissolved	ug/L	40	38.0	95	85-115	
Thallium, Dissolved	ug/L	40	38.8	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271493 2271494

Parameter	Units	60285081007		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony, Dissolved	ug/L	0.28J	40	40	40.2	39.6	100	98	70-130	2	20		
Arsenic, Dissolved	ug/L	2.3	40	40	42.7	42.6	101	101	70-130	0	20		
Cadmium, Dissolved	ug/L	0.073J	40	40	38.5	38.7	96	97	70-130	1	20		
Chromium, Dissolved	ug/L	0.28J	40	40	39.6	39.6	98	98	70-130	0	20		
Selenium, Dissolved	ug/L	1.1	40	40	37.5	37.2	91	90	70-130	1	20		
Thallium, Dissolved	ug/L	<0.14	40	40	37.1	36.9	93	92	70-130	1	20		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271495 2271496

Parameter	Units	60285463002		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony, Dissolved	ug/L	<0.15	40	40	39.7	40.0	99	100	70-130	1	20		
Arsenic, Dissolved	ug/L	3.5	40	40	44.9	44.9	103	104	70-130	0	20		
Cadmium, Dissolved	ug/L	<0.070	40	40	38.7	38.5	97	96	70-130	1	20		
Chromium, Dissolved	ug/L	<0.19	40	40	43.1	42.8	107	107	70-130	1	20		
Selenium, Dissolved	ug/L	<0.16	40	40	37.1	37.3	93	93	70-130	0	20		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Parameter	Units	2271495		2271496		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Thallium, Dissolved	ug/L	<0.14	40	40	36.9	37.1	92	93	70-130	1	20

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro
Pace Project No.: 60290480

QC Batch: 555332 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60285463018

METHOD BLANK: 2278037 Matrix: Water
Associated Lab Samples: 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.15	1.0	0.15	11/16/18 15:08	
Arsenic, Dissolved	ug/L	<0.15	1.0	0.15	11/16/18 15:08	
Cadmium, Dissolved	ug/L	<0.070	0.50	0.070	11/16/18 15:08	
Chromium, Dissolved	ug/L	<0.19	1.0	0.19	11/16/18 15:08	
Selenium, Dissolved	ug/L	<0.16	1.0	0.16	11/16/18 15:08	
Thallium, Dissolved	ug/L	<0.14	1.0	0.14	11/16/18 15:08	

LABORATORY CONTROL SAMPLE: 2278038

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	40.5	101	85-115	
Arsenic, Dissolved	ug/L	40	39.7	99	85-115	
Cadmium, Dissolved	ug/L	40	39.3	98	85-115	
Chromium, Dissolved	ug/L	40	40.6	102	85-115	
Selenium, Dissolved	ug/L	40	39.5	99	85-115	
Thallium, Dissolved	ug/L	40	38.4	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278039 2278040

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max	Qual
		60285463018 Result	Spike Conc.	Spike Conc.	Result						
Antimony, Dissolved	ug/L	<0.15	40	40	39.8	40.1	99	100	70-130	1	20
Arsenic, Dissolved	ug/L	0.50J	40	40	39.3	39.5	97	98	70-130	1	20
Cadmium, Dissolved	ug/L	0.31J	40	40	36.8	37.1	91	92	70-130	1	20
Chromium, Dissolved	ug/L	<0.19	40	40	37.7	37.8	94	94	70-130	0	20
Selenium, Dissolved	ug/L	0.28J	40	40	36.6	36.5	91	90	70-130	0	20
Thallium, Dissolved	ug/L	<0.14	40	40	35.2	35.5	88	89	70-130	1	20

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 554631 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2275134 Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	11/12/18 11:39	

LABORATORY CONTROL SAMPLE: 2275135

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	504	101	90-110	

SAMPLE DUPLICATE: 2275136

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	278	284	2	10	

SAMPLE DUPLICATE: 2275137

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	166	176	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555056

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2277012

Matrix: Water

Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/14/18 12:23	

LABORATORY CONTROL SAMPLE: 2277013

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	508	102	90-110	

SAMPLE DUPLICATE: 2277014

Parameter	Units	60285459017 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	88.4	84.0	5	10	

SAMPLE DUPLICATE: 2277015

Parameter	Units	60285786001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	1150	1140	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553994

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2271651

Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/08/18 08:03	

LABORATORY CONTROL SAMPLE: 2271652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	977	98	80-120	

SAMPLE DUPLICATE: 2271653

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	411	434	5	10	

SAMPLE DUPLICATE: 2271654

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	382	391	2	10	

SAMPLE DUPLICATE: 2272215

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	633	623	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 554334

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285463015

METHOD BLANK: 2273547

Matrix: Water

Associated Lab Samples: 60285463015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/07/18 10:13	

LABORATORY CONTROL SAMPLE: 2273548

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

SAMPLE DUPLICATE: 2273549

Parameter	Units	60285435001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1400	1000	33	10	D6

SAMPLE DUPLICATE: 2273550

Parameter	Units	60286055003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	14300	12500	13	10	D6

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 554724

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285463016, 60285463017, 60285463018

METHOD BLANK: 2275599

Matrix: Water

Associated Lab Samples: 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/12/18 13:58	

LABORATORY CONTROL SAMPLE: 2275600

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1040	104	80-120	

SAMPLE DUPLICATE: 2275601

Parameter	Units	60285463016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	550	551	0	10	

SAMPLE DUPLICATE: 2275602

Parameter	Units	60285911006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	204	197	3	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553472 Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2269693 Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/05/18 16:23	H6

LABORATORY CONTROL SAMPLE: 2269694

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	101	90-110	H6

SAMPLE DUPLICATE: 2269695

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.61	0.62	2	20	H6

SAMPLE DUPLICATE: 2269696

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.84	0.85	1	20	H6

SAMPLE DUPLICATE: 2269697

Parameter	Units	60285588004 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.074J	0.072J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553781 Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2270734 Matrix: Water

Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/06/18 15:48	H6

LABORATORY CONTROL SAMPLE: 2270735

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	104	90-110	H6

SAMPLE DUPLICATE: 2270736

Parameter	Units	60285459011 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.1	2.1	1	20	H6

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 555497

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2278823

Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.34J	1.0	0.29	11/17/18 00:09	
Fluoride	mg/L	<0.19	0.20	0.19	11/17/18 00:09	
Sulfate	mg/L	<0.24	1.0	0.24	11/17/18 00:09	

LABORATORY CONTROL SAMPLE: 2278824

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	2.6	102	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 556128 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

METHOD BLANK: 2281830 Matrix: Water
 Associated Lab Samples: 60285463015, 60285463016, 60285463017, 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/20/18 08:33	
Fluoride	mg/L	<0.19	0.20	0.19	11/20/18 08:33	
Sulfate	mg/L	<0.24	1.0	0.24	11/20/18 08:33	

LABORATORY CONTROL SAMPLE: 2281831

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	101	90-110	
Fluoride	mg/L	2.5	2.3	91	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2281832 2281833

Parameter	Units	60285459014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	67.0	50	50	118	117	101	101	90-110	0	15	

MATRIX SPIKE SAMPLE: 2281834

Parameter	Units	60286055003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	511	500	1060	110	90-110	
Sulfate	mg/L	6170	5000	12000	117	90-110 M1	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553806

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 60285589005, 60285589006

METHOD BLANK: 2270855

Matrix: Water

Associated Lab Samples: 60285589005, 60285589006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/08/18 12:25	

LABORATORY CONTROL SAMPLE: 2270856

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	98	90-110	

MATRIX SPIKE SAMPLE: 2270857

Parameter	Units	60285617009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.60	2	2.4	92	90-110	

MATRIX SPIKE SAMPLE: 2270859

Parameter	Units	60285588004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.35	2	2.1	87	90-110	M1

SAMPLE DUPLICATE: 2270858

Parameter	Units	60285588003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	3.5	3.5	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 553830 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285463015, 60285463016, 60285463017

METHOD BLANK: 2270902 Matrix: Water

Associated Lab Samples: 60285463015, 60285463016, 60285463017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/08/18 13:01	

LABORATORY CONTROL SAMPLE: 2270903

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	93	90-110	

MATRIX SPIKE SAMPLE: 2270904

Parameter	Units	60285715002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2.2	2	4.0	90	90-110	

MATRIX SPIKE SAMPLE: 2270906

Parameter	Units	60285459021 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.67	2	2.3	83	90-110	M1

SAMPLE DUPLICATE: 2270905

Parameter	Units	60285459014 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	<0.050	<0.050		10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 554066	Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4	Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60285463018	

METHOD BLANK: 2272193 Matrix: Water
Associated Lab Samples: 60285463018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	0.054J	0.10	0.050	11/09/18 13:24	

LABORATORY CONTROL SAMPLE: 2272194

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	101	90-110	

MATRIX SPIKE SAMPLE: 2272195

Parameter	Units	60285769001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	5.9	2	8.3	118	90-110	M1

SAMPLE DUPLICATE: 2272196

Parameter	Units	60285789001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.89	0.94	5	10	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17S **Lab ID: 60285589005** Collected: 11/02/18 14:20 Received: 11/03/18 02:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.260 ± 0.270 (0.402) C:NA T:96%	pCi/L	11/27/18 11:17	13982-63-3	
Radium-228	EPA 904.0	1.47 ± 0.614 (0.980) C:67% T:80%	pCi/L	11/26/18 17:13	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P171 **Lab ID: 60285589006** Collected: 11/02/18 13:00 Received: 11/03/18 02:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.787 ± 0.679 (1.01) C:NA T:61%	pCi/L	11/27/18 11:17	13982-63-3	
Radium-228	EPA 904.0	1.10 ± 0.589 (1.04) C:59% T:78%	pCi/L	11/26/18 17:13	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P17D **Lab ID: 60285463015** Collected: 11/05/18 10:00 Received: 11/06/18 04:09 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.10 ± 0.497 (0.368) C:NA T:87%	pCi/L	11/27/18 11:04	13982-63-3	
Radium-228	EPA 904.0	1.30 ± 0.618 (1.09) C:69% T:84%	pCi/L	11/26/18 17:10	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19S **Lab ID: 60285463016** Collected: 11/05/18 11:45 Received: 11/06/18 04:09 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.518 ± 0.427 (0.618) C:NA T:90%	pCi/L	11/27/18 11:04	13982-63-3	
Radium-228	EPA 904.0	1.56 ± 0.663 (1.11) C:72% T:77%	pCi/L	11/26/18 17:10	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P191 **Lab ID: 60285463017** Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.317 ± 0.390 (0.635) C:NA T:80%	pCi/L	11/27/18 11:04	13982-63-3	
Radium-228	EPA 904.0	0.533 ± 0.654 (1.39) C:66% T:77%	pCi/L	11/26/18 17:10	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Sample: R-P19D **Lab ID: 60285463018** Collected: 11/05/18 10:55 Received: 11/06/18 04:09 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.633 ± 0.393 (0.388) C:NA T:81%	pCi/L	11/27/18 11:04	13982-63-3	
Radium-228	EPA 904.0	0.901 ± 0.693 (1.40) C:67% T:81%	pCi/L	11/26/18 17:10	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch:	320180	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60285463015, 60285463016, 60285463017, 60285463018, 60285589005, 60285589006		

METHOD BLANK:	1562008	Matrix:	Water
Associated Lab Samples:	60285463015, 60285463016, 60285463017, 60285463018, 60285589005, 60285589006		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.302 ± 0.343 (0.542) C:NA T:84%	pCi/L	11/27/18 10:29	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch:	320185	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60285463015, 60285463016, 60285463017, 60285463018, 60285589005, 60285589006		

METHOD BLANK:	1562013	Matrix:	Water
Associated Lab Samples:	60285463015, 60285463016, 60285463017, 60285463018, 60285589005, 60285589006		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.773 ± 0.434 (0.752) C:68% T:77%	pCi/L	11/26/18 17:13	

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

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 321135

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples:

METHOD BLANK: 1566280

Matrix: Water

Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0526 ± 0.240 (0.488) C:NA T:90%	pCi/L	11/29/18 21:58	

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

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 321146

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples:

METHOD BLANK: 1566295

Matrix: Water

Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.139 ± 0.301 (0.738) C:76% T:81%	pCi/L	11/28/18 11:29	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

QC Batch: 321145

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples:

METHOD BLANK: 1566294

Matrix: Water

Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.289 ± 0.326 (0.684) C:78% T:86%	pCi/L	11/26/18 15:42	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

1e FERROUS IRON result is greater than the IRON. Data is within laboratory control limits.

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

D9 Dissolved result is greater than the total. Data is within laboratory control limits.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285589005	R-P17S	EPA 200.7	553881	EPA 200.7	553980
60285589006	R-P17I	EPA 200.7	553881	EPA 200.7	553980
60285463015	R-P17D	EPA 200.7	554059	EPA 200.7	554138
60285463016	R-P19S	EPA 200.7	554059	EPA 200.7	554138
60285463017	R-P19I	EPA 200.7	554059	EPA 200.7	554138
60285463018	R-P19D	EPA 200.7	554059	EPA 200.7	554138
60285589005	R-P17S	EPA 200.7	555618	EPA 200.7	555634
60285589006	R-P17I	EPA 200.7	555618	EPA 200.7	555634
60285463015	R-P17D	EPA 200.7	555676	EPA 200.7	555704
60285463016	R-P19S	EPA 200.7	555676	EPA 200.7	555704
60285463017	R-P19I	EPA 200.7	555676	EPA 200.7	555704
60285463018	R-P19D	EPA 200.7	555676	EPA 200.7	555704
60285589005	R-P17S	EPA 200.8	553993	EPA 200.8	554038
60285589006	R-P17I	EPA 200.8	553993	EPA 200.8	554038
60285463015	R-P17D	EPA 200.8	554272	EPA 200.8	554344
60285463016	R-P19S	EPA 200.8	554272	EPA 200.8	554344
60285463017	R-P19I	EPA 200.8	554272	EPA 200.8	554344
60285463018	R-P19D	EPA 200.8	554272	EPA 200.8	554344
60285589005	R-P17S	EPA 200.8	553967	EPA 200.8	554042
60285589006	R-P17I	EPA 200.8	553967	EPA 200.8	554042
60285463015	R-P17D	EPA 200.8	553967	EPA 200.8	554042
60285463016	R-P19S	EPA 200.8	553967	EPA 200.8	554042
60285463017	R-P19I	EPA 200.8	553967	EPA 200.8	554042
60285463018	R-P19D	EPA 200.8	555332	EPA 200.8	555404
60285589005	R-P17S	EPA 7470	555449	EPA 7470	555490
60285589006	R-P17I	EPA 7470	555449	EPA 7470	555490
60285463015	R-P17D	EPA 7470	555581	EPA 7470	556033
60285463016	R-P19S	EPA 7470	555581	EPA 7470	556033
60285463017	R-P19I	EPA 7470	555581	EPA 7470	556033
60285463018	R-P19D	EPA 7470	555581	EPA 7470	556033
60285589005	R-P17S	EPA 903.1	320180		
60285589006	R-P17I	EPA 903.1	320180		
60285463015	R-P17D	EPA 903.1	320180		
60285463016	R-P19S	EPA 903.1	320180		
60285463017	R-P19I	EPA 903.1	320180		
60285463018	R-P19D	EPA 903.1	320180		
60285589005	R-P17S	EPA 904.0	320185		
60285589006	R-P17I	EPA 904.0	320185		
60285463015	R-P17D	EPA 904.0	320185		
60285463016	R-P19S	EPA 904.0	320185		
60285463017	R-P19I	EPA 904.0	320185		
60285463018	R-P19D	EPA 904.0	320185		
60285589005	R-P17S	SM 2320B	554631		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC RCPA / GeoHydro

Pace Project No.: 60290480

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285589006	R-P17I	SM 2320B	554631		
60285463015	R-P17D	SM 2320B	555056		
60285463016	R-P19S	SM 2320B	555056		
60285463017	R-P19I	SM 2320B	555056		
60285463018	R-P19D	SM 2320B	555056		
60285589005	R-P17S	SM 2540C	553994		
60285589006	R-P17I	SM 2540C	553994		
60285463015	R-P17D	SM 2540C	554334		
60285463016	R-P19S	SM 2540C	554724		
60285463017	R-P19I	SM 2540C	554724		
60285463018	R-P19D	SM 2540C	554724		
60285589005	R-P17S	SM 3500-Fe B#4	554999		
60285589006	R-P17I	SM 3500-Fe B#4	554999		
60285463015	R-P17D	SM 3500-Fe B#4	556178		
60285463016	R-P19S	SM 3500-Fe B#4	558082		
60285463017	R-P19I	SM 3500-Fe B#4	558082		
60285463018	R-P19D	SM 3500-Fe B#4	558082		
60285589005	R-P17S	SM 3500-Fe B#4	553472		
60285589006	R-P17I	SM 3500-Fe B#4	553472		
60285463015	R-P17D	SM 3500-Fe B#4	553781		
60285463016	R-P19S	SM 3500-Fe B#4	553781		
60285463017	R-P19I	SM 3500-Fe B#4	553781		
60285463018	R-P19D	SM 3500-Fe B#4	553781		
60285589005	R-P17S	EPA 300.0	555497		
60285589006	R-P17I	EPA 300.0	555497		
60285463015	R-P17D	EPA 300.0	556128		
60285463016	R-P19S	EPA 300.0	556128		
60285463017	R-P19I	EPA 300.0	556128		
60285463018	R-P19D	EPA 300.0	556128		
60285589005	R-P17S	EPA 365.4	553806		
60285589006	R-P17I	EPA 365.4	553806		
60285463015	R-P17D	EPA 365.4	553830		
60285463016	R-P19S	EPA 365.4	553830		
60285463017	R-P19I	EPA 365.4	553830		
60285463018	R-P19D	EPA 365.4	554066		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285463
Barcode
60285463

Client Name: Golder Assoc

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

Tracking #: Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other zplc

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

Cooler Temperature (°C): As-read 1.7, 1.1 Corr. Factor 0.0 Corrected 1.7, 1.1

Date and initials of person examining contents: 11/2/18

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Requirement and Yes/No/N/A checkboxes. Rows include Chain of Custody, Short Hold Time, Rush Turn Around Time, Sufficient volume, Correct containers used, Pace containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match COC, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached to 5035A / TX1005 vials.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 11/2/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram, Eric Schneider, Golder		Company Name:	
Ballwin, MO 63021				Address:	
Email To: maddock@golder.com		Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island Engery Center-RCPA		Pace Project Manager: Jamie Church	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		Pace Profile #: 9285	
				REGULATORY AGENCY	
				<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER	
				Site Location: MO	
				STATE: MO	

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID CL OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.						
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	Preservatives											Metals*	Chloride/Fluoride/Sulfate	TDS	Radium 226	Radium 228	
					DATE	TIME	DATE	TIME				H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test ↓	N								N
1	R-MW-1		WT	G																								
2	R-MW-2		WT	G																								
3	R-MW-3		WT	G																								
4	R-MW-4		WT	G			11/1/18	1345		7	2	1	4														2 BP1W, 2 BP2W, BP3S, BP3W, BP3F 001	
5	R-MW-5		WT	G			11/1/18	1335		7	2	1	4															002
6	R-MW-6		WT	G																								
7	R-MW-7		WT	G																								
8	R-MW-B1		WT	G																								
9	R-MW-B2		WT	G																								
10	R-P170		WT	G																								
11	R-P171		WT	G																								
12	R-P170		WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	<i>Eric Schneider / Golder</i>	11/1/18	1835	E Brackett / Pace	11/2/18	0239	1.7	Y	Y	Y
							1.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE				Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <i>Eric Schneider</i>							
SIGNATURE of SAMPLER: <i>Eric Schneider</i>							

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram, Eric Schneider (Golder)		Company Name:	
Ballwin, MO 63021		Purchase Order No.:		REGULATORY AGENCY	
Email To: maddock@golder.com		Project Name: Ameren Rush Island Engery Center-RCPA		NPDES <u>GROUND WATER</u> DRINKING WATER	
Phone: 636-724-9191 Fax: 636-724-9323		Project Manager: Jamie Church		UST <u>ROCK</u> OTHER	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		Site Location: MO	
		Pace Quote Reference: 9285		STATE: MO	

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER W WASTE WATER WW PRODUCT P GOL/SOLID SL OIL OL VP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.							
					COMPOSITE START		COMPOSITE END/GRAB				Preservatives																		
					DATE	TIME	DATE	TIME			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Metals*	Chloride/Fluoride/Sulfate			TDS	Radium 226	Radium 228				
1	R-P190		WT	G																									
2	R-P191		WT	G																									
3	R-P192		WT	G																									
4	R-DUP-1		WT	G			11/11/18			7	2	1	4																
5	R-DUP-2		WT	G																									
6	R-FB-1		WT	G																									
7	R-FB-2		WT	G																									
8	R-MW-5-MS		WT	G			11/11/18	1335		7	2	1	4																
9	R-MW-5-MSD		WT	G			11/11/18	1335		7	2	1	4																
10			WT	G																									
11			WT	G																									
12			WT	G																									

003

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se		Eric Schneider / Golder		11/11/18	1335	E Brackett / Pace		11/21/18	0239	1.7	Y	Y	Y
										1.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE		Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Eric Schneider					
SIGNATURE of SAMPLER: <i>Eric Schneider</i>					
DATE Signed (MM/DD/YY): 11/01/18					



Sample Condition Upon Receipt

WO# : 60285589

60285589

Client Name: Goldo

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: 301 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 3.6 4.0 Corr. Factor 1.20 Corrected 3.6 4.0

Date and initials of person examining contents: 2/11/18

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>IC²</u>
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Chish Date: 11/4/18



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram, Eric Schneider, Balda		Company Name:	
Ballwin, MO 63021				Address:	
Email To: maddock@golder.com		Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island Engery Center-RCPA		Pace Project Manager: Jamie Church	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		Pace Profile #: 9285	
				REGULATORY AGENCY	
				<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER	
				Site Location	
				STATE: <u>MO</u>	

ITEM #	Section D Required Client Information SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE	Valid Matrix Codes MATRIX CODE	CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test ↓	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.		
						DATE	TIME	DATE	TIME			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other					Metals*	Chloride/Fluoride/Sulfate
1	R-MW-1	WT	G			11/2/18	1025			7	2	1	4												091
2	R-MW-2	WT	G																						092
3	R-MW-3	WT	G			11/2/18	1410			7	2	1	4												093
4	R-MW-4	WT	G																						094
5	R-MW-5	WT	G																						095
6	R-MW-6	WT	G																						096
7	R-MW-7	WT	G			11/2/18	1135			7	2	1	4												097
8	R-MW-B1	WT	G			11/2/18	1025			7	2	1	4												098
9	R-MW-B2	WT	G																						099
10	R-P17S	WT	G			11/2/18	1420			7	2	1	4												099
11	R-P17I	WT	G			11/2/18	1300			7	2	1	4												099
12	R-P17D	WT	G																						099

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	Golder / Eric Schneider	11/2/18	1735	[Signature]	11/2/18	0240	4.0	Y	Y	Y
							3.6	Y	Y	Y
							4.2	Y	Y	Y

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Eric Schneider	SIGNATURE of SAMPLER: [Signature]				
DATE Signed (MM/DD/YY): 11/02/18					

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

CHAIN-OF-CUSTODY / Analytical Request Document

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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: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021		Copy To: Jeffrey Ingram <i>Eric Schreider@bddd</i>		Company Name:	
Email To: maddock@golder.com		Purchase Order No.:		Address:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island Engery Center-RCPA		Site Location: MO	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		STATE:	
REGULATORY AGENCY					
NPDES <u>GROUND WATER</u> DRINKING WATER					
UST RCRA OTHER					

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	DATE	TIME	COMPOSITE START	COMPOSITE END/GRAB	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.						
									COLLECTED							Preservatives							Metals*	Chloride/Fluoride/Sulfate	TDS	Radium 226	Radium 228	
									DATE	TIME	DATE	TIME	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₈	Methanol	Other								Analysis Test J
1	R-P19S	WT																										
2	R-P19I	WT																										
3	R-P19D	WT																										
4	R-DUP-1	WT																										
5	R-DUP-2	WT			11/2/18			7	2	1	4							1	1	1	1			(2) B12u B155 B154	B17x	(2) B15u	007	
6	R-FB-1	WT			11/2/18	1133		6	2	1	3							1	1	1	1						008	
7	R-FB-2	WT																										
8		WT																										
9		WT																										
10		WT																										
11		WT																										
12		WT																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	<i>Golder/Ingram</i>	11/2/18	1735	<i>[Signature]</i>	11/5/18	0240	4.0	X	Y	Y
							3.6	X	Y	Y
							4.2	X	Y	Y

SAMPLER NAME AND SIGNATURE			Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <i>Eric Schreider</i>						
SIGNATURE of SAMPLER: <i>[Signature]</i>		DATE Signed (MM/DD/YYYY): 11/02/18				



CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		Page: 1 of 2
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:		REGULATORY AGENCY
Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021		Copy To: Jeffrey Ingram		Company Name:		
Email To: maddock@golder.com		Purchase Order No.:		Face Quote Reference:		NPDES <u>GROUND WATER</u> DRINKING WATER UST RCRA OTHER
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island EC Geochem/Hydrogeo		Face Project Manager: Jamie Church		Site Location MO
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002G (COC #9)		Face Profile #: 9285		STATE: _____

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL SL UL WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Face Project No./ Lab I.D.							
					COMPOSITE START		COMPOSITE END/GRAB				Y	N	Y	N	Y	N	Y	N	Y	N			Y	N	Y	N			
						DATE	TIME	DATE	TIME	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test ↓	Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	CCR App'lV Metals***+Hg		
1	R-MW-1	WT	G					11/2/18	1025	7	2	1	4					/	/	/	/	/	/	/	/	/			
2	R-MW-2	WT	G																										
3	R-MW-3	WT	G					11/2/18	1410	7	2	1	4					/	/	/	/	/	/	/	/	/			
4	R-MW-4	WT	G																										
5	R-MW-5	WT	G																										
6	R-MW-6	WT	G																										
7	R-MW-7	WT	G					11/2/18	1135	7	2	1	4					/	/	/	/	/	/	/	/	/			
8	R-MW-B1	WT	G					11/2/18	1025	7	2	1	4					/	/	/	/	/	/	/	/	/			
9	R-MW-B2	WT	G																										
10	R-P17S	WT	G					11/2/18	1420	7	2	1	4					/	/	/	/	/	/	/	/	/			
11	R-P17I	WT	G					11/2/18	1300	7	2	1	4					/	/	/	/	/	/	/	/	/			
12	R-P17D	WT	G																										

ADDITIONAL COMMENTS *EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn **EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn ***EPA 200.8: Sb, As, Cd, Cr, Se, Tl ****EPA 200.7: Be, Co, Pb *****EPA 200.8: Cd, Cr, Tl	RELINQUISHED BY / AFFILIATION Golder / WMA	DATE 11/2/18	TIME 1735	ACCEPTED BY / AFFILIATION 	DATE 	TIME 	SAMPLE CONDITIONS
---	--	------------------------	---------------------	--	---------------------	---------------------	----------------------------------

SAMPLER NAME AND SIGNATURE				Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Eric Schneider							
SIGNATURE of SAMPLER: <i>[Signature]</i>			DATE Signed (MM/DD/YY): 11/2/18				



CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice information:			
Company: <u>Golder Associates</u>		Report To: <u>Mark Haddock (mhaddock@golder.com)</u>		Attention:			
Address: <u>13515 Barrett Parkway Drive, Ste 260</u>		Copy To: <u>Jeffrey Ingram</u>		Company Name:		REGULATORY AGENCY NPDES <u>GROUND WATER</u> DRINKING WATER UST RCRA OTHER	
<u>Ballwin, MO 63021</u>				Address:			
Email To: <u>maddock@golder.com</u>		Purchase Order No.:		Pace Quote Reference:		Site Location <u>MO</u>	
Phone: <u>636-724-9191</u> Fax: <u>636-724-9323</u>		Project Name: <u>Ameren Rush Island EC Geochem/Hydrogeo</u>		Pace Project Manager: <u>Jamie Church</u>			
Requested Due Date/TAT: <u>Standard</u>		Project Number: <u>153-1406.0002G (COC #9)</u>		Pace Profile #: <u>9285</u>		STATE: _____	

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOL/SOLID SL OL WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB, C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Requested Analysis Filtered (Y/N)											Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	↓ Analysis Test ↓	Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	CCR Appliv Metals***+Hig			
					DATE	TIME	DATE	TIME																							
1	R-P19S		WT	G																											
2	R-P19I		WT	G																											
3	R-P19D		WT	G																											
4	R-DUP-1		WT	G																											
5	R-DUP-2		WT	G																											
6	R-FB-1		WT	G																											
7	R-FB-2		WT	G																											
8			WT	G																											
9			WT	G																											
10			WT	G																											
11			WT	G																											
12			WT	G																											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS						
**EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>Golder/Water</i>	<u>11/2/18</u>	<u>1735</u>										
**EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn													
**EPA 200.8: Sb, As, Cd, Cr, Se, Tl													
***EPA 200.7: Be, Co, Pb													
***EPA 200.8: Cd, Cr, Tl													

SAMPLER NAME AND SIGNATURE		Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Eric Schneider</u>					
SIGNATURE of SAMPLER: <i>[Signature]</i>	DATE Signed (MM/DD/YYYY): <u>11/02/18</u>				



Sample Condition Upon Receipt

WO#: 60285463



Count 3

Client Name: Cooler Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other epic

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.6 Corr. Factor +0.2 Corrected 0.8

Date and initials of person examining contents: 11.6.18 JLS

Temperature should be above freezing to 6°C 0.3, 0.5, 0.3 0.5, 0.7, 0.5

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Chish Date: 11/6/18

CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram		Company Name:	
Ballwin, MO 63021				Address:	
Email To: maddock@golder.com		Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island Engery Center-RCPA		Pace Project Manager: Jamie Church	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		Pace Profile #: 9285	
REGULATORY AGENCY					
<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER					
Site Location				MO	
STATE:					

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	MATRIX CODE (see valid codes to left)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.										
				COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Metals*					Chloride/Fluoride/Sulfate	TDS	Radium 226	Radium 228					
				DATE	TIME	DATE	TIME											N	N			N					N	N			
1	R-MW-1	WT	G						2	4																					
2	R-MW-2	WT	G						7	1	2																				
3	R-MW-3	WT	G																												
4	R-MW-4	WT	G																												
5	R-MW-5	WT	G																												
6	R-MW-6	WT	G																												
7	R-MW-7	WT	G																												
8	R-MW-B1	WT	G																												
9	R-MW-B2	WT	G																												
10	R-P17S	WT	G																												
11	R-P17I	WT	G						2	4																					
12	R-P17D	WT	G						7	1	2																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	<i>Tommy Golder</i>	11/5/18	1730	<i>WZ pt 1 pas</i>	11/6/18	0709	0.8	Y	Y	Y
							0.5	Y	Y	Y
							0.7	Y	Y	Y
							0.5	Y	Y	Y

SAMPLER NAME AND SIGNATURE				Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <i>T Golder</i>							
SIGNATURE of SAMPLER: <i>[Signature]</i>			DATE Signed (MM/DD/YY): <i>11/5/18</i>				



CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: Golder Associates	Report To: Mark Haddock (mhaddock@golder.com)	Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260	Copy To: Jeffrey Ingram	Company Name:	REGULATORY AGENCY
Ballwin, MO 63021		Address:	
Email To: maddock@golder.com	Purchase Order No.:	Pace Quote Reference:	NPDES <u>GROUND WATER</u> DRINKING WATER
Phone: 636-724-9191 Fax: 636-724-9323	Project Name: Ameren Rush Island Engery Center-RCPA	Pace Project Manager: Jamie Church	UST RCRA OTHER
Requested Due Date/TAT: Standard	Project Number: 153-1406.0002E (COC #8)	Pace Profile #: 9285	Site Location MO
			STATE:

ITEM #	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	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test Metals* Chloride/Fluoride/Sulfate TDS Radium 226 Radium 228	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.									
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol		Other	N	N	N	N	N	N	N	N	N			N	N	N	N	N	N	N	N	N
					DATE	TIME	DATE	TIME																															
1	R-P19S		WT	G			11/5/18	1145		7	3	1	2	4																			218 P19, DP210, DP211, DP212	016					
2	R-P19I		WT	G				1055		1	1	1	1	1																			DP210	017					
3	R-P19D		WT	G				1005		1	1	1	1	1																			DP210	018					
4	R-DUP-1		WT	G																																			
5	R-DUP-2		WT	G																																			
6	R-FB-1		WT	G																																			
7	R-FB-2		WT	G																																			
8			WT	G																																			
9			WT	G																																			
10			WT	G																																			
11			WT	G																																			
12			WT	G																																			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	JA / Golder	11/5/18	1730	UZ: pf / Pace	11-6-18	0709	0.8	Y	Y	Y
							0.5	↓	↓	↓
							0.7	↓	↓	↓
							0.5	↓	↓	↓

SAMPLER NAME AND SIGNATURE				Temp in °C	Received on ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: To Golder							
SIGNATURE of SAMPLER: <i>[Signature]</i>							
				DATE Signed (MM/DD/YY): 11/5/18			

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:			Section B Required Project Information:			Section C Invoice Information:			Page: 2 of 2
Company: Golder Associates			Report To: Mark Haddock (mhaddock@golder.com)			Attention:			
Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021			Copy To: Jeffrey Ingram			Company Name:			
Email To: maddock@golder.com			Purchase Order No.:			Address:			
Phone: 636-724-9191		Fax: 636-724-9323		Project Name: Ameren Rush Island EC Geochem/Hydrogeo			Pace Quote Reference:		
Requested Due Date/TAT: Standard			Project Number: 153-1406.0002G (COC #9)			Pace Project Manager: Jamie Church			REGULATORY AGENCY
						Pace Profile #: 9285			
						STATE: MO			
						NPDES GROUND WATER DRINKING WATER UST RCRA OTHER			

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.					
				COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test	Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	CCR AppIV Metals***+Hg									
1	R-P19S	WT	G			11/5/18	1145		7	2	1	4																								
2	R-P19I	WT	G			↓	1055		↓	↓	↓	↓																								
3	R-P19D	WT	G			↓	1005		↓	↓	↓	↓																								
4	R-DUP-1	WT	G																																	
5	R-DUP-2	WT	G																																	
6	R-FB-1	WT	G																																	
7	R-FB-2	WT	G																																	
8		WT	G																																	
9		WT	G																																	
10		WT	G																																	
11		WT	G																																	
12		WT	G																																	

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>[Signature]</i>	11/5/18	1730				
**EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn							
**EPA 200.8: Sb, As, Cd, Cr, Se, Tl							
***EPA 200.7: Be, Co, Pb							
***EPA 200.8: Cd, Cr, Tl							

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER: <i>J. Gaudin</i>			
SIGNATURE of SAMPLER: <i>[Signature]</i>			DATE Signed (MM/DD/YY): 11/5/18
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)



CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		REGULATORY AGENCY		
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:		NPDES GROUND WATER DRINKING WATER		
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram		Company Name:		UST RCRA OTHER _____		
Ballwin, MO 63021				Address:		Site Location		
Email To: maddock@golder.com		Purchase Order No.:		Pace Quote Reference:		STATE: MO		
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island EC Geochem/Hydrogeo		Pace Project Manager: Jamie Church				
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002G (COC #9)		Pace Profile #: 9285				

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	COLLECTED	PRESERVATIVES	ANALYSIS TEST	Requested Analysis Filtered (Y/N)											Pace Project No./ Lab I.D.								
						MATRIX CODE	SAMPLE TYPE	COMPOSITE START	COMPOSITE END/GRAB	UNPRESERVED	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol		Other	Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron
	SAMPLE ID (A-Z, 0-9 / -)		DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS																	
1	R-MW-1	WT	G					2	4																
2	R-MW-2	WT	G			11/5/18	1155	7	1	2															
3	R-MW-3	WT	G																						
4	R-MW-4	WT	G																						
5	R-MW-5	WT	G																						
6	R-MW-6	WT	G																						
7	R-MW-7	WT	G																						
8	R-MW-B1	WT	G																						
9	R-MW-B2	WT	G																						
10	R-P17S	WT	G																						
11	R-P17I	WT	G																						
12	R-P17D	WT	G			11/5/18	1000	7	1	2															

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS					
*EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn		<i>J. Golder</i>	11/5/18	1730				Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)		
**EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn													
**EPA 200.8: Sb, As, Cd, Cr, Se, Tl													
***EPA 200.7: Be, Co, Pb													
***EPA 200.8: Cd, Cr, Tl													

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:					
SIGNATURE of SAMPLER:					
DATE Signed (MM/DD/YY): 11/5/18					



Sample Condition Upon Receipt

WO#: 60285463
Barcode
60285463

Client Name: Cooler Assoc.

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

Tracking #: Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other 2pic

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.7 Corr. Factor +0.2 Corrected 0.9
Temperature should be above freezing to 6°C 0.8 +0.2 1.0

Date and initials of person examining contents: 11-7-18 JLS

Table with 3 columns: Question, Yes/No/N/A checkboxes, and handwritten notes (e.g., Fe+2, WT, List sample IDs...)

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 11/7/18



CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 2

Section A

Required Client Information:

Section B

Required Project Information:

Section C

Invoice Information:

Company: Golder Associates	Report To: Mark Haddock (mhaddock@golder.com)	Attention:
Address: 13515 Barrett Parkway Drive, Ste 260	Copy To: Jeffrey Ingram	Company Name:
Ballwin, MO 63021		Address:
Email To: maddock@golder.com	Purchase Order No.:	Pace Quote Reference:
Phone: 636-724-9191 Fax: 636-724-9323	Project Name: Ameren Rush Island Engery Center-RCPA	Pace Project Manager: Jamie Church
Requested Due Date/TAT: Standard	Project Number: 153-1406.0002E (COC #8)	Pace Profile #: 9285

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location MO

STATE: MO

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	COLLECTED	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Analysis Test	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.			
											Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Metals*	Chloride/Fluoride/Sulfate					TDS	Radium 226	Radium 228
1	R-MW-1	WT	G																								
2	R-MW-2	WT	G																								
3	R-MW-3	WT	G																								
4	R-MW-4	WT	G																								
5	R-MW-5	WT	G																								
6	R-MW-6	WT	G			11/6/18	0910			7	2	1	4														049
7	R-MW-7	WT	G																								
8	R-MW-B1	WT	G																								
9	R-MW-B2	WT	G			11/6/18	1050			7	2	1	4														020
10	R-P17S	WT	G																								
11	R-P17I	WT	G																								
12	R-P17D	WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS							
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	<i>Golder / Pace</i>	11/06/18	1550	<i>JAN / Pace</i>	11/6/18	1550								
	<i>JAN / Pace</i>	11/6/18	1700	<i>Wenge / Pace</i>	11-7-18	0358	09	Y	Y	Y				
							1.0	↓	↓	↓				

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <i>Eric Schneider</i>					
SIGNATURE of SAMPLER: <i>[Signature]</i>					
DATE Signed (MM/DD/YY): <i>11/06/18</i>					

Page 75 of 78

CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:										
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:										
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram		Company Name:										
Ballwin, MO 63021				Address:										
Email To: maddock@golder.com		Purchase Order No.:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="3" style="text-align: center;">REGULATORY AGENCY</th> </tr> <tr> <td style="width: 33%;">NPDES</td> <td style="width: 33%; text-align: center;"><u>GROUND WATER</u></td> <td style="width: 33%;">DRINKING WATER</td> </tr> <tr> <td>UST</td> <td>RCRA</td> <td>OTHER</td> </tr> </table>		REGULATORY AGENCY			NPDES	<u>GROUND WATER</u>	DRINKING WATER	UST	RCRA	OTHER
REGULATORY AGENCY														
NPDES	<u>GROUND WATER</u>	DRINKING WATER												
UST	RCRA	OTHER												
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island Engery Center-RCPA		Pace Quote Reference:										
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002E (COC #8)		Pace Project Manager: Jamie Church										
				Pace Profile #: 9285										
				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">Site Location</th> <td style="width: 20%; text-align: center;">MO</td> <td style="width: 60%;"></td> </tr> <tr> <th>STATE:</th> <td></td> <td></td> </tr> </table>		Site Location	MO		STATE:					
Site Location	MO													
STATE:														

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	MATRIX CODE (see valid codes to left)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.						
				COMPOSITE START		COMPOSITE END/GRAB				Preservatives																	
				DATE	TIME	DATE	TIME			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test	Metals*			Chloride/Fluoride/Sulfate	TDS	Radium 226	Radium 228		
1	R-P19S	WT	G																								
2	R-P19I	WT	G																								
3	R-P19D	WT	G																								
4	R-DUP-1	WT	G																								
5	R-DUP-2	WT	G																								
6	R-FB-1	WT	G																								
7	R-FB-2	WT	G			11/6/18	0900		6	2	1	3															WC 11-7-18
8		WT	G																								
9		WT	G																								
10		WT	G																								
11		WT	G																								
12		WT	G																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS				
*EPA 200.7: B, Ca, Ba, Li, Mo *EPA 200.8: Sb, As, Se	<i>Golder Associates</i>	11/6/18	1550	<i>Jamie Church / PACE</i>	11/6/18	1550					
	<i>Jamie Church / PACE</i>	11/6/18	1700	<i>WC 07 / PACE</i>	11-7-18	0358	0.9	4	Y	Y	Y
							1.0	0	↓	↓	↓

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <i>E. Schneider</i>					
SIGNATURE of SAMPLER: <i>E. Schneider</i>					
DATE Signed (MM/DD/YY): <i>11/06/18</i>					

CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Mark Haddock (mhaddock@golder.com)		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Jeffrey Ingram		Company Name:	
Ballwin, MO 63021				Address:	
Email To: maddock@golder.com		Purchase Order No.:		Pace Quote Reference:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island EC Geochem/Hydrogeo		Pace Project Manager: Jamie Church	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002G (COC #9)		Pace Profile #: 9285	
				REGULATORY AGENCY	
				NPDES <u>GROUND WATER</u> DRINKING WATER	
				UST RCRA OTHER	
				Site Location	
				STATE: MO	

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	MATRIX CODE (see valid codes to left)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test	Requested Analysis Filtered (Y/N)											Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other		Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron	CCR AppIV Metals***+Hg				
				DATE	TIME	DATE	TIME																								
1	R-MW-1	WT	G																												
2	R-MW-2	WT	G																												
3	R-MW-3	WT	G																												
4	R-MW-4	WT	G																												
5	R-MW-5	WT	G																												
6	R-MW-6	WT	G			11/6/18	0910		7	2	1	4																			
7	R-MW-7	WT	G																												
8	R-MW-B1	WT	G																												
9	R-MW-B2	WT	G			11/6/18	1050		7	2	1	4																			
10	R-P17S	WT	G																												
11	R-P17I	WT	G																												
12	R-P17D	WT	G																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS						
*EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>[Signature]</i>	11/06/18	1550	<i>[Signature]</i>	11/6/18	1050							
**EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>[Signature]</i>	11/6/18	1720	<i>[Signature]</i>	11-7-18	0358	0.9	Y	Y	Y			
**EPA 200.8: Sb, As, Cd, Cr, Se, Ti							1.0	Y	Y	Y			
***EPA 200.7: Be, Co, Pb													
***EPA 200.8: Cd, Cr, Ti													

SAMPLER NAME AND SIGNATURE				Temp in °C	Received on ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples intact (Y/N)
PRINT Name of SAMPLER: Eric Schneider							
SIGNATURE of SAMPLER: <i>[Signature]</i>			DATE Signed (MM/DD/YY): 11/06/18				

CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
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Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021		Copy To: Jeffrey Ingram		Company Name:	
Email To: maddock@golder.com		Purchase Order No.:		Address:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Name: Ameren Rush Island EC Geochem/Hydrogeo		Pace Quote Reference:	
Requested Due Date/TAT: Standard		Project Number: 153-1406.0002G (COC #9)		Pace Project Manager: Jamie Church	
				Pace Profile #: 9285	
				REGULATORY AGENCY	
				NPDES <u>GROUND WATER</u> DRINKING WATER	
				UST RCRA OTHER	
				Site Location	
				STATE: MO	

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	COLLECTED	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)													Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.								
						COMPOSITE START		COMPOSITE END/GRAB		Preservatives																		
						DATE	TIME	DATE	TIME	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test			Metals*	Metals, Dissolved**	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Ferrous Iron	Ferric Iron
1	R-P19S	WT	G																									
2	R-P19I	WT	G																									
3	R-P19D	WT	G																									
4	R-DUP-1	WT	G																									
5	R-DUP-2	WT	G																									
6	R-FB-1	WT	G																									
7	R-FB-2	WT	G			11/6/18	0900		6	2	1	3																
8		WT	G																									
9		WT	G																									
10		WT	G																									
11		WT	G																									
12		WT	G																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS				
*EPA 200.7: Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>Baldy / Golder</i>	11/06/18	1550	<i>Jamie Church</i>	11/6/18	1850					
**EPA 200.7: Ba, Be, B, Ca, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na, Al, Cu, Ni, Ag, Zn	<i>Jamie Church</i>	11/6/18	1700	<i>WZ pf / Pcs</i>	11-7-18	0258	0.9	Y	Y	Y	
**EPA 200.8: Sb, As, Cd, Cr, Se, Tl							1.0	↓	↓	↓	
***EPA 200.7: Be, Co, Pb											
***EPA 200.8: Cd, Cr, Tl											

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER: <i>Eric Schaefer</i>		DATE Signed (MM/DD/YY): 11/06/18	
SIGNATURE of SAMPLER: <i>Eric Schaefer</i>			
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

MEMORANDUM**DATE** January 4, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – NOVEMBER 2018 - DATA PACKAGE 60290480**

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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

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

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/4/19

Laboratory: Pace Analytical SDG #: 60290480
 Analytical Method (type and no.): Metals (200.7+200.8), Hg (7470), Alk (2320B), TDS (2540C), Fe^{2+/3+} (SM3500), Anions (3000), P (365.4)
 Matrix: Air Soil/Sed. Water Waste Ra (903.1+904.0)
 Sample Names R-P17S, R-P17E, R-P17D, R-P19S, R-P19E, R-P19D

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>11/02 + 11/05</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Flow, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	05-06 (Be(0.27), Fe(6.8), K(212), Fe,d(10.3), Na,d(216) (Cr(0.12), Cl(0.34)) 15-18 (Fe(7.6), K(159), Be,d(0.50), Cr(0.085), P(0.054 #18)) Re-228(0.773)
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dup-1@ N/A FB-1@ N/A
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TD5 (33 #15)

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____


Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SO ₄ ²⁻ , P ⁽⁻⁾
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ca ⁽⁺⁾
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason	
R-P17S	Chromium, total (Cr,t)	1.0	U	Detected in MB ; MDL < Result < PQL ; PQL < Result < 10x B ; MDL < Result < PQL	
R-P17I	Potassium, total (K,t)	1460	J		
R-P17D	Cr,t	1.0	U		
R-P19S	Cr,t	1.0	U		
R-P19I	Beryllium, dissolved (Be,d)	1.0	U		
↓	Cr,t	1.0	U		
R-P19D	Be,d	1.0	U		
↓	Cr,t	1.0	U		
All Samples	Ferrous Iron (Fe ²⁺)	-	J/U		Analyzed outside EPA hold time

Signature: 

Date: 1/4/2019

December 21, 2018

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

RE: Project: AMEREN RIEC 153-1406.0002G
Pace Project No.: 60288819

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on December 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
Eric Schneider, Golder Associates



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

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

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SAMPLE SUMMARY

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60288819001	R-P29S	Water	12/06/18 08:15	12/07/18 03:10

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60288819001	R-P29S	EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JDE	1	PASI-K
		SM 2320B	RMT	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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

Sample: R-P29S **Lab ID: 60288819001** Collected: 12/06/18 08:15 Received: 12/07/18 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							
Aluminum	67.0J	ug/L	75.0	21.1	1	12/18/18 15:14	12/20/18 22:32	7429-90-5	
Barium	384	ug/L	5.0	1.5	1	12/18/18 15:14	12/20/18 22:32	7440-39-3	
Beryllium	0.25J	ug/L	1.0	0.16	1	12/18/18 15:14	12/20/18 22:32	7440-41-7	
Boron	107	ug/L	100	12.5	1	12/18/18 15:14	12/20/18 22:32	7440-42-8	
Calcium	141000	ug/L	200	53.5	1	12/18/18 15:14	12/20/18 22:32	7440-70-2	
Cobalt	1.7J	ug/L	5.0	0.87	1	12/18/18 15:14	12/20/18 22:32	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	12/18/18 15:14	12/20/18 22:32	7440-50-8	
Iron	14200	ug/L	50.0	6.1	1	12/18/18 15:14	12/20/18 22:32	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	12/18/18 15:14	12/20/18 22:32	7439-92-1	
Lithium	17.0	ug/L	10.0	4.6	1	12/18/18 15:14	12/20/18 22:32	7439-93-2	
Magnesium	34900	ug/L	50.0	14.0	1	12/18/18 15:14	12/20/18 22:32	7439-95-4	
Manganese	690	ug/L	5.0	0.73	1	12/18/18 15:14	12/20/18 22:32	7439-96-5	
Molybdenum	1.8J	ug/L	20.0	0.90	1	12/18/18 15:14	12/20/18 22:32	7439-98-7	
Nickel	3.3J	ug/L	5.0	1.4	1	12/18/18 15:14	12/20/18 22:32	7440-02-0	
Potassium	5380	ug/L	500	79.3	1	12/18/18 15:14	12/20/18 22:32	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	12/18/18 15:14	12/20/18 22:32	7440-22-4	
Sodium	15300	ug/L	500	157	1	12/18/18 15:14	12/20/18 22:32	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	12/18/18 15:14	12/20/18 22:32	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	12/17/18 17:30	12/20/18 14:38	7440-36-0	
Arsenic	49.0	ug/L	1.0	0.065	1	12/17/18 17:30	12/20/18 14:38	7440-38-2	
Cadmium	0.053J	ug/L	0.50	0.033	1	12/17/18 17:30	12/20/18 14:38	7440-43-9	
Chromium	0.14J	ug/L	1.0	0.078	1	12/17/18 17:30	12/20/18 14:38	7440-47-3	
Selenium	0.12J	ug/L	1.0	0.085	1	12/17/18 17:30	12/20/18 14:38	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	12/17/18 17:30	12/20/18 14:38	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	12/17/18 15:30	12/18/18 12:35	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	523	mg/L	20.0	4.9	1		12/15/18 11:27		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	576	mg/L	5.0	5.0	1		12/10/18 12:15		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	7.7	mg/L	0.050		1		12/21/18 16:37	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	6.5	mg/L	0.40	0.024	2		12/07/18 09:50		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.0	mg/L	2.0	0.58	2		12/19/18 22:30	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		12/18/18 17:58	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

Sample: R-P29S **Lab ID: 60288819001** Collected: 12/06/18 08:15 Received: 12/07/18 03:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	16.3	mg/L	1.0	0.24	1		12/18/18 17:58	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	0.78	mg/L	0.10	0.050	1		12/13/18 13:29	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 560620

Analysis Method: EPA 7470

QC Batch Method: EPA 7470

Analysis Description: 7470 Mercury

Associated Lab Samples: 60288819001

METHOD BLANK: 2301331

Matrix: Water

Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	12/18/18 12:24	

LABORATORY CONTROL SAMPLE: 2301332

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.6	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2301333 2301334

Parameter	Units	60288818001		2301333		2301334		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec				
Mercury	ug/L	<0.090	5	5	4.7	4.6	93	92	75-125	1	20

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 560802 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60288819001

METHOD BLANK: 2301840 Matrix: Water
 Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	12/20/18 22:11	
Barium	ug/L	<1.5	5.0	1.5	12/20/18 22:11	
Beryllium	ug/L	<0.16	1.0	0.16	12/20/18 22:11	
Boron	ug/L	<12.5	100	12.5	12/20/18 22:11	
Calcium	ug/L	<53.5	200	53.5	12/20/18 22:11	
Cobalt	ug/L	<0.87	5.0	0.87	12/20/18 22:11	
Copper	ug/L	<4.5	10.0	4.5	12/20/18 22:11	
Iron	ug/L	<6.1	50.0	6.1	12/20/18 22:11	
Lead	ug/L	<3.0	10.0	3.0	12/20/18 22:11	
Lithium	ug/L	<4.6	10.0	4.6	12/20/18 22:11	
Magnesium	ug/L	<14.0	50.0	14.0	12/20/18 22:11	
Manganese	ug/L	<0.73	5.0	0.73	12/20/18 22:11	
Molybdenum	ug/L	<0.90	20.0	0.90	12/20/18 22:11	
Nickel	ug/L	<1.4	5.0	1.4	12/20/18 22:11	
Potassium	ug/L	<79.3	500	79.3	12/20/18 22:11	
Silver	ug/L	<2.0	7.0	2.0	12/20/18 22:11	
Sodium	ug/L	<157	500	157	12/21/18 10:06	
Zinc	ug/L	<3.5	50.0	3.5	12/20/18 22:11	

LABORATORY CONTROL SAMPLE: 2301841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	10300	103	85-115	
Barium	ug/L	1000	995	100	85-115	
Beryllium	ug/L	1000	989	99	85-115	
Boron	ug/L	1000	950	95	85-115	
Calcium	ug/L	10000	10400	104	85-115	
Cobalt	ug/L	1000	1000	100	85-115	
Copper	ug/L	1000	1010	101	85-115	
Iron	ug/L	10000	10300	103	85-115	
Lead	ug/L	1000	974	97	85-115	
Lithium	ug/L	1000	1020	102	85-115	
Magnesium	ug/L	10000	9830	98	85-115	
Manganese	ug/L	1000	950	95	85-115	
Molybdenum	ug/L	1000	1030	103	85-115	
Nickel	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Silver	ug/L	500	505	101	85-115	
Sodium	ug/L	10000	10000	100	85-115	
Zinc	ug/L	1000	993	99	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2301842												2301843	
Parameter	Units	60288818001		MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual	
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD		
Aluminum	ug/L	190	10000	10000	10400	10300	102	101	70-130	1	20		
Barium	ug/L	73.3	1000	1000	1040	1030	97	95	70-130	2	20		
Beryllium	ug/L	<0.16	1000	1000	964	947	96	95	70-130	2	20		
Boron	ug/L	9410	1000	1000	10600	10200	117	77	70-130	4	20		
Calcium	ug/L	85100	10000	10000	95800	92500	107	74	70-130	4	20		
Cobalt	ug/L	<0.87	1000	1000	969	945	97	94	70-130	3	20		
Copper	ug/L	5.1J	1000	1000	994	970	99	96	70-130	2	20		
Iron	ug/L	389	10000	10000	10500	10400	101	100	70-130	1	20		
Lead	ug/L	<3.0	1000	1000	932	908	93	91	70-130	3	20		
Lithium	ug/L	16.5	1000	1000	1020	994	100	98	70-130	2	20		
Magnesium	ug/L	4580	10000	10000	14100	13700	95	91	70-130	3	20		
Manganese	ug/L	106	1000	1000	1020	998	92	89	70-130	3	20		
Molybdenum	ug/L	220	1000	1000	1240	1210	102	99	70-130	3	20		
Nickel	ug/L	2.4J	1000	1000	979	955	98	95	70-130	3	20		
Potassium	ug/L	9790	10000	10000	20000	19500	102	97	70-130	3	20		
Silver	ug/L	<2.0	500	500	493	481	99	96	70-130	2	20		
Sodium	ug/L	65200	10000	10000	75800	73300	106	80	70-130	3	20		
Zinc	ug/L	4.7J	1000	1000	963	940	96	94	70-130	2	20		

MATRIX SPIKE SAMPLE: 2301844											
Parameter	Units	60289240001		Spike	MS	MS	% Rec	Qualifiers			
		Result	Conc.	Conc.	Result	% Rec	Limits				
Aluminum	ug/L	ND	10000	10000	10000	100	70-130				
Barium	ug/L	49.0	1000	1000	1030	98	70-130				
Beryllium	ug/L	ND	1000	1000	976	98	70-130				
Boron	ug/L	143	1000	1000	1110	97	70-130				
Calcium	ug/L	35500	10000	10000	45600	101	70-130				
Cobalt	ug/L	ND	1000	1000	960	96	70-130				
Copper	ug/L	14.0	1000	1000	1020	101	70-130				
Iron	ug/L	99.4	10000	10000	10100	100	70-130				
Lead	ug/L	ND	1000	1000	921	92	70-130				
Lithium	ug/L	39.3	1000	1000	1050	101	70-130				
Magnesium	ug/L	27600	10000	10000	37200	95	70-130				
Manganese	ug/L	53.9	1000	1000	969	92	70-130				
Molybdenum	ug/L	ND	1000	1000	1020	102	70-130				
Nickel	ug/L	ND	1000	1000	966	96	70-130				
Potassium	ug/L	60500	10000	10000	71400	109	70-130				
Silver	ug/L	ND	500	500	504	101	70-130				
Sodium	ug/L	212000	10000	10000	225000	126	70-130				
Zinc	ug/L	ND	1000	1000	981	96	70-130				

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 560656	Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8	Analysis Description: 200.8 MET
Associated Lab Samples: 60288819001	

METHOD BLANK: 2301396 Matrix: Water
Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	12/20/18 14:30	
Arsenic	ug/L	<0.065	1.0	0.065	12/20/18 14:30	
Cadmium	ug/L	<0.033	0.50	0.033	12/20/18 14:30	
Chromium	ug/L	<0.078	1.0	0.078	12/20/18 14:30	
Selenium	ug/L	<0.085	1.0	0.085	12/20/18 14:30	
Thallium	ug/L	<0.099	1.0	0.099	12/20/18 14:30	

LABORATORY CONTROL SAMPLE: 2301397

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.2	98	85-115	
Arsenic	ug/L	40	39.5	99	85-115	
Cadmium	ug/L	40	39.2	98	85-115	
Chromium	ug/L	40	38.7	97	85-115	
Selenium	ug/L	40	39.0	97	85-115	
Thallium	ug/L	40	36.7	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2301398 2301399

Parameter	Units	60289359001		2301398		2301399		% Rec	% Rec	% Rec	Limits	RPD	Max	Qual
		MS Result	MSD Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result							
Antimony	ug/L	<0.0010 mg/L	40	40	40	40	38.0	37.8	95	94	70-130	1	20	
Arsenic	ug/L	0.069 mg/L	40	40	40	40	108	108	98	96	70-130	1	20	
Cadmium	ug/L	<0.00050 mg/L	40	40	40	40	34.2	33.9	86	85	70-130	1	20	
Chromium	ug/L	<1.0	40	40	40	40	42.1	42.1	105	105	70-130	0	20	
Selenium	ug/L	<0.0010 mg/L	40	40	40	40	40.1	38.9	99	96	70-130	3	20	
Thallium	ug/L	<0.0010 mg/L	40	40	40	40	31.5	31.0	79	78	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 560339	Analysis Method: SM 2320B
QC Batch Method: SM 2320B	Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60288819001	

METHOD BLANK: 2299946 Matrix: Water
Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.9	20.0	4.9	12/15/18 09:59	

LABORATORY CONTROL SAMPLE: 2299947

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	533	107	90-110	

SAMPLE DUPLICATE: 2299948

Parameter	Units	60288904004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	116	119	2	10	

SAMPLE DUPLICATE: 2299949

Parameter	Units	60288803005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	152	158	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 559153

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60288819001

METHOD BLANK: 2295070

Matrix: Water

Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	12/10/18 12:15	

LABORATORY CONTROL SAMPLE: 2295071

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

SAMPLE DUPLICATE: 2295072

Parameter	Units	60288904002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	416	393	6	10	

SAMPLE DUPLICATE: 2295073

Parameter	Units	60288942003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	855	812	5	10	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 558947	Analysis Method: SM 3500-Fe B#4
QC Batch Method: SM 3500-Fe B#4	Analysis Description: Iron, Ferrous
Associated Lab Samples: 60288819001	

METHOD BLANK: 2293484 Matrix: Water
Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	12/07/18 09:49	H6

LABORATORY CONTROL SAMPLE: 2293485

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.0	101	90-110	H6

SAMPLE DUPLICATE: 2293486

Parameter	Units	60288819001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	6.5	6.5	0	20	H6

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 560519

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60288819001

METHOD BLANK: 2301123

Matrix: Water

Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.19	0.20	0.19	12/18/18 15:23	
Sulfate	mg/L	<0.24	1.0	0.24	12/18/18 15:23	

LABORATORY CONTROL SAMPLE: 2301124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE SAMPLE: 2301127

Parameter	Units	60289640001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	1.0	2.5	3.6	103	90-110	
Sulfate	mg/L	803	250	1070	107	90-110 E	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 561048	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60288819001	

METHOD BLANK: 2302742 Matrix: Water
Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	12/19/18 15:52	

LABORATORY CONTROL SAMPLE: 2302743

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	

MATRIX SPIKE SAMPLE: 2302744

Parameter	Units	60287798002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	199	100	299	100	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

QC Batch: 559865	Analysis Method: EPA 365.4
QC Batch Method: EPA 365.4	Analysis Description: 365.4 Phosphorus
Associated Lab Samples: 60288819001	

METHOD BLANK: 2297482 Matrix: Water
Associated Lab Samples: 60288819001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	12/13/18 13:25	

LABORATORY CONTROL SAMPLE: 2297483

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	95	90-110	

MATRIX SPIKE SAMPLE: 2297484

Parameter	Units	60288818001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.24	2	2.2	96	90-110	

MATRIX SPIKE SAMPLE: 2297486

Parameter	Units	60289149002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2.7	2	4.5	91	90-110	

SAMPLE DUPLICATE: 2297485

Parameter	Units	60288874001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	14.7	14.0	5	10	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

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

H6 Analysis initiated outside of the 15 minute EPA required holding time.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RIEC 153-1406.0002G

Pace Project No.: 60288819

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60288819001	R-P29S	EPA 200.7	560802	EPA 200.7	560932
60288819001	R-P29S	EPA 200.8	560656	EPA 200.8	560729
60288819001	R-P29S	EPA 7470	560620	EPA 7470	560639
60288819001	R-P29S	SM 2320B	560339		
60288819001	R-P29S	SM 2540C	559153		
60288819001	R-P29S	SM 3500-Fe B#4	561617		
60288819001	R-P29S	SM 3500-Fe B#4	558947		
60288819001	R-P29S	EPA 300.0	560519		
60288819001	R-P29S	EPA 300.0	561048		
60288819001	R-P29S	EPA 365.4	559865		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO# : 60288819

60288819

Client Name: Golder

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: 301 Type of Ice: Wet Blue None

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

Date and initials of person examining contents: JLS JB12/7

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>Fe²⁺</u>
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>Wt</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jana Church Date: 12/8/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A
Required Client Information:

Company: **Golder Associates**
Address: **13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021**
Email To: **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 Rush Island EC-Geochem/Hydrogeo**
Project Number: **153-1406.0002G (COC #10)**

Section C
Invoice Information:

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

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER
 Site Location: _____
 STATE: **MO**

Valid Matrix Codes
 MATRIX CODE
 DRINKING WATER DW
 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

Section D
Required Client Information

MATRIX CODE (see valid codes to left)
 SAMPLE TYPE (G=GRAB C=COMP)
 COLLECTED
 COMPOSITE START DATE TIME
 COMPOSITE END/GRAB DATE TIME
 SAMPLE TEMP AT COLLECTION
 # OF CONTAINERS
 Unpreserved
 H₂SO₄
 HNO₃
 HCl
 NaOH
 Na₂O₂
 Methanol
 Other
 Y/N
 ↑ Analysis Test! Metals* Mercury Chloride/Fluoride/Sulfate
 TDS Total Phosphorus Ferrus Iron Ferric Iron

Requested Analysis Filtered (Y/N)
 Residual Chlorine (Y/N)

ITEM #	Matrix Code	Sample Type	Composite Start Date/Time	Composite End/Grab Date/Time	Sample Temp at Collection	# of Containers	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ O ₂	Methanol	Other	Y/N	Analysis Test!	Metals*	Mercury	Chloride/Fluoride/Sulfate	TDS	Total Phosphorus	Ferrus Iron	Ferric Iron	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	R-P29S	G	12/16/18 0615	12/19/18 0615		5	113																		60288814 Pace Labs Ballwin (EPA) 00
2		G																							
3		G																							
4		G																							
5		G																							
6		G																							
7		G																							
8		G																							
9		G																							
10		G																							
11		G																							
12		G																							

RELEASING BY / AFFILIATION
 DATE: 12/16/18
 TIME: 17:35
 SIGNATURE: *Jeffrey Ingram*

ACCEPTED BY / AFFILIATION
 DATE: 12/7/18
 TIME: 08:55
 SIGNATURE: *J. Schneider*

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: **Er. c Schneider**
 SIGNATURE of SAMPLER: *Er. c Schneider*
 DATE Signed (MM/DD/YYYY): **12/06/18**

TEMP IN °C
 40

RECEIVED ON (Y/N): Y

CUSTODY SEALED (Y/N): Y

COOLER (Y/N): Y

SAMPLES INTACT (Y/N): Y

MEMORANDUM**DATE** January 7, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – DECEMBER 2018 –
BACKGROUND – DATA PACKAGE 60288819**

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

- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J), and the samples without detections were qualified as non-detects and estimates (UJ).
- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC - Dec 2018 - Background
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/7/19

Laboratory: Pace Analytical SDG #: 60288819
 Analytical Method (type and no.): Metals(200.7+200.8); H₂(7470), Alk(2320B), TDS(2540C), Fe^{2+/3+}(3500), Ammon(3000), P(365.Y)
 Matrix: Air Soil/Sed. Water Waste
 Sample Names R-P2A5

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>12/6/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Flow, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dup-1@ N/A
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FB-1@ N/A
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SD ₁ ²⁻
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
R-P295	Ferrous Iron (Fe ²⁺)	6.5	J	Analyzed outside EPA hold time
/				

Signature: Tommy J. Wood Jr

Date: 1/7/19

January 09, 2019

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

RE: Project: RCPA GW SAMPLING
Pace Project No.: 60291123

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on January 05, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: RCPA GW SAMPLING

Pace Project No.: 60291123

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

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SAMPLE SUMMARY

Project: RCPA GW SAMPLING

Pace Project No.: 60291123

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60291123001	R-MW-6	Water	01/04/19 14:55	01/05/19 01:40

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: RCPA GW SAMPLING
Pace Project No.: 60291123

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60291123001	R-MW-6	EPA 300.0	MGS	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RCPA GW SAMPLING

Pace Project No.: 60291123

Sample: R-MW-6 **Lab ID: 60291123001** Collected: 01/04/19 14:55 Received: 01/05/19 01:40 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	<0.19	mg/L	0.20	0.19	1		01/08/19 17:52	16984-48-8	

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QUALITY CONTROL DATA

Project: RCPA GW SAMPLING
Pace Project No.: 60291123

QC Batch: 563695 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60291123001

METHOD BLANK: 2312684 Matrix: Water
Associated Lab Samples: 60291123001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.19	0.20	0.19	01/08/19 17:20	

LABORATORY CONTROL SAMPLE: 2312685

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2312686 2312687

Parameter	Units	60291119003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	<0.19	2.5	2.5	2.6	2.7	97	102	90-110	5	15	

MATRIX SPIKE SAMPLE: 2312688

Parameter	Units	60291121002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.23	2.5	2.9	105	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

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QUALIFIERS

Project: RCPA GW SAMPLING

Pace Project No.: 60291123

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RCPA GW SAMPLING
Pace Project No.: 60291123

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60291123001	R-MW-6	EPA 300.0	563695		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

JLS

WO#: 60291123



60291123

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 ZPLC

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

Cooler Temperature (°C): As-read 4.3 Corr. Factor 0.0 Corrected 4.3

Date and initials of person examining contents: 1-5-19
AM

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>NO Time recorded</u>
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added. <u>Added 2.5 mL of HNO₃</u> <u>Lot # 9589-34</u> <u>Time 0800</u> <u>Initial - 5.0</u> <u>Final - 5.0</u> <u>Adj. pH w/ NO change</u>
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Chish 1/7/19 Date: _____



GOLDER

MEMORANDUM

DATE January 11, 2019

Project No. 1531406

TO Project File
Golder Associates

CC

FROM Tommy Goodwin

EMAIL tgoodwin@golder.com

**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – VERIFICATION
SAMPLING – DATA PACKAGE 60291123**

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

- None

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC - VS - Jan 2019
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/11/19

Laboratory: Pace Analytical SDG #: 60291123 72
 Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe BPA), Anions (300.0), P (365.4), Ra (903.1&904.0)
 Matrix: Air Soil/Sed. Water Waste
 Sample Names: R-MW-6

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>1/11/19</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Q, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dup-1@ <i>N/A</i> _____
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	FB-1@ <i>N/A</i> _____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy [Signature]

Date: 4/11/19

August 29, 2019

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

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60310411

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between July 31, 2019 and August 02, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60310411001	R-MW-1	Water	07/30/19 12:30	07/31/19 02:45
60310411002	R-MW-2	Water	07/30/19 12:00	07/31/19 02:45
60310411003	R-MW-B1	Water	07/29/19 10:30	07/31/19 02:45
60310411004	R-MW-B2	Water	07/29/19 13:55	07/31/19 02:45
60310411005	R-MW-3	Water	07/31/19 10:35	08/02/19 02:45
60310411006	R-MW-4	Water	07/31/19 16:25	08/02/19 02:45
60310411007	R-MW-5	Water	07/31/19 12:50	08/02/19 02:45
60310411008	R-MW-6	Water	07/31/19 15:00	08/02/19 02:45
60310411009	R-DUP-1	Water	07/31/19 10:35	08/02/19 02:45
60310411010	R-FB-1	Water	07/31/19 15:10	08/02/19 02:45
60310411011	R-MW-1 MS	Water	07/30/19 12:30	07/31/19 14:45
60310411012	R-MW-1 MSD	Water	07/30/19 12:30	07/31/19 14:45

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310411001	R-MW-1	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411002	R-MW-2	EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411003	R-MW-B1	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411004	R-MW-B2	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411005	R-MW-3	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310411006	R-MW-4	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
60310411007	R-MW-5	SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
60310411008	R-MW-6	EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411009	R-DUP-1	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
60310411010	R-FB-1	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310411011	R-MW-1 MS	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310411012	R-MW-1 MSD	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-1 **Lab ID:** 60310411001 Collected: 07/30/19 12:30 Received: 07/31/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Barium	16.4	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 14:36	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 14:36	7440-41-7	
Boron	2980	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 14:36	7440-42-8	
Calcium	27300	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 14:36	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 14:36	7440-48-4	
Iron	24.2J	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 14:36	7439-89-6	B
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 14:36	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 14:36	7439-93-2	
Magnesium	1240	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 14:36	7439-95-4	
Manganese	4.8J	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 14:36	7439-96-5	
Molybdenum	135	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 14:36	7439-98-7	
Potassium	5940	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 14:36	7440-09-7	
Sodium	125000	ug/L	500	144	1	08/06/19 14:15	08/07/19 14:36	7440-23-5	M1
200.8 MET ICPMS									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.62J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:35	7440-36-0	B
Arsenic	10.7	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:35	7440-38-2	
Cadmium	0.052J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:35	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:14	7440-47-3	
Selenium	0.70J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:35	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:35	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:41	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	97.5	mg/L	20.0	6.5	1		08/12/19 14:49		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	493	mg/L	10.0	10.0	1		08/06/19 15:24		
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	22.5	mg/L	2.0	0.44	2		08/09/19 18:33	16887-00-6	
Fluoride	0.86	mg/L	0.20	0.085	1		08/09/19 17:48	16984-48-8	
Sulfate	217	mg/L	20.0	4.6	20		08/09/19 19:47	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-2 **Lab ID: 60310411002** Collected: 07/30/19 12:00 Received: 07/31/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	9.1	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:15	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:15	7440-41-7	
Boron	3330	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:15	7440-42-8	
Calcium	8120	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:15	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:15	7440-48-4	
Iron	78.9	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 14:16	7439-89-6	
Lead	9.7J	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:15	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:15	7439-93-2	
Magnesium	13.6J	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:15	7439-95-4	B
Manganese	3.0J	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:15	7439-96-5	
Molybdenum	136	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:15	7439-98-7	
Potassium	2710	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:15	7440-09-7	
Sodium	203000	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:15	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	3.5	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:40	7440-36-0	
Arsenic	216	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:40	7440-38-2	
Cadmium	0.29J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:40	7440-43-9	
Chromium	0.36J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:17	7440-47-3	
Selenium	1.4	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:40	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:40	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:46	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	182	mg/L	20.0	6.5	1		08/12/19 14:58		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	761	mg/L	10.0	10.0	1		08/06/19 15:24		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.1	mg/L	2.0	0.44	2		08/09/19 20:46	16887-00-6	
Fluoride	1.5	mg/L	0.20	0.085	1		08/09/19 20:32	16984-48-8	
Sulfate	273	mg/L	20.0	4.6	20		08/09/19 21:01	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-B1 **Lab ID: 60310411003** Collected: 07/29/19 10:30 Received: 07/31/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	439	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 14:46	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 14:46	7440-41-7	
Boron	106	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 14:46	7440-42-8	
Calcium	139000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 14:46	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 14:46	7440-48-4	
Iron	24900	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 14:46	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 14:46	7439-92-1	
Lithium	53.0	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 14:46	7439-93-2	
Magnesium	44300	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 14:46	7439-95-4	
Manganese	1230	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 14:46	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 14:46	7439-98-7	
Potassium	8210	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 14:46	7440-09-7	
Sodium	36200	ug/L	500	144	1	08/06/19 14:15	08/07/19 14:46	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.089J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:42	7440-36-0	B
Arsenic	28.9	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:42	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/08/19 15:42	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:18	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:42	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:42	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:48	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	460	mg/L	20.0	6.5	1		08/12/19 14:15		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	687	mg/L	10.0	10.0	1		08/05/19 12:39		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	64.7	mg/L	5.0	1.1	5		08/09/19 21:31	16887-00-6	
Fluoride	0.18J	mg/L	0.20	0.085	1		08/09/19 21:16	16984-48-8	
Sulfate	43.2	mg/L	5.0	1.2	5		08/09/19 21:31	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-B2 **Lab ID: 60310411004** Collected: 07/29/19 13:55 Received: 07/31/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	377	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 14:48	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 14:48	7440-41-7	
Boron	41.1J	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 14:48	7440-42-8	
Calcium	102000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 14:48	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 14:48	7440-48-4	
Iron	9310	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 14:48	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 14:48	7439-92-1	
Lithium	6.0J	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 14:48	7439-93-2	
Magnesium	18200	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 14:48	7439-95-4	
Manganese	226	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 14:48	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 14:48	7439-98-7	
Potassium	1940	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 14:48	7440-09-7	
Sodium	20000	ug/L	500	144	1	08/06/19 14:15	08/07/19 14:48	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:43	7440-36-0	
Arsenic	3.0	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:43	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/08/19 15:43	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:19	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:43	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:43	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:50	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	313	mg/L	20.0	6.5	1		08/12/19 14:21		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	416	mg/L	10.0	10.0	1		08/05/19 12:39		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	28.1	mg/L	5.0	1.1	5		08/09/19 22:30	16887-00-6	
Fluoride	0.22	mg/L	0.20	0.085	1		08/09/19 21:46	16984-48-8	
Sulfate	15.5	mg/L	1.0	0.23	1		08/09/19 21:46	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-3 **Lab ID: 60310411005** Collected: 07/31/19 10:35 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	13.4	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:03	7440-39-3	
Beryllium	0.32J	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:03	7440-41-7	
Boron	14100	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:03	7440-42-8	
Calcium	6200	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:03	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:03	7440-48-4	
Iron	368	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:03	7439-89-6	
Lead	7.8J	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:03	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:03	7439-93-2	
Magnesium	48.3J	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:03	7439-95-4	
Manganese	9.5	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:03	7439-96-5	
Molybdenum	898	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:03	7439-98-7	
Potassium	1660	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:03	7440-09-7	
Sodium	248000	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:03	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.18J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:04	7440-36-0	
Arsenic	71.2	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:04	7440-38-2	
Cadmium	0.41J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:04	7440-43-9	
Chromium	0.40J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:04	7440-47-3	
Selenium	0.73J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:04	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:04	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:10	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	369	mg/L	20.0	6.5	1		08/13/19 16:57		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	713	mg/L	10.0	10.0	1		08/06/19 15:25		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	30.1	mg/L	2.0	0.44	2		08/14/19 21:44	16887-00-6	
Fluoride	0.96	mg/L	0.20	0.085	1		08/14/19 21:29	16984-48-8	
Sulfate	96.0	mg/L	20.0	4.6	20		08/16/19 00:41	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-4 **Lab ID: 60310411006** Collected: 07/31/19 16:25 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	246	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:06	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:06	7440-41-7	
Boron	4230	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:06	7440-42-8	
Calcium	64800	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:06	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:06	7440-48-4	
Iron	4580	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:06	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:06	7439-92-1	
Lithium	45.2	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:06	7439-93-2	
Magnesium	13000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:06	7439-95-4	
Manganese	251	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:06	7439-96-5	
Molybdenum	118	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:06	7439-98-7	
Potassium	4600	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:06	7440-09-7	
Sodium	66200	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:06	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:06	7440-36-0	
Arsenic	6.8	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:06	7440-38-2	
Cadmium	0.061J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:06	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:06	7440-47-3	
Selenium	0.17J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:06	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:06	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:12	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	252	mg/L	20.0	6.5	1		08/13/19 17:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	466	mg/L	10.0	10.0	1		08/06/19 15:25		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	22.1	mg/L	2.0	0.44	2		08/14/19 23:18	16887-00-6	
Fluoride	0.88	mg/L	0.20	0.085	1		08/14/19 22:47	16984-48-8	
Sulfate	61.2	mg/L	5.0	1.2	5		08/16/19 02:56	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-5 **Lab ID: 60310411007** Collected: 07/31/19 12:50 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	367	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:08	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:08	7440-41-7	
Boron	116	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:08	7440-42-8	
Calcium	129000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:08	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:08	7440-48-4	
Iron	10800	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:08	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:08	7439-92-1	
Lithium	6.8J	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:08	7439-93-2	
Magnesium	17700	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:08	7439-95-4	
Manganese	443	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:08	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:08	7439-98-7	
Potassium	2080	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:08	7440-09-7	
Sodium	4970	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:08	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:08	7440-36-0	
Arsenic	3.3	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:08	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:08	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:08	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:08	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:08	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:14	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	374	mg/L	20.0	6.5	1		08/13/19 17:07		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	484	mg/L	10.0	10.0	1		08/06/19 15:26		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	7.0	mg/L	1.0	0.22	1		08/16/19 03:13	16887-00-6	
Fluoride	0.15J	mg/L	0.20	0.085	1		08/16/19 03:13	16984-48-8	
Sulfate	15.9	mg/L	1.0	0.23	1		08/16/19 03:13	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-6 **Lab ID: 60310411008** Collected: 07/31/19 15:00 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	589	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:10	7440-39-3	
Beryllium	0.40J	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:10	7440-41-7	
Boron	200	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:10	7440-42-8	
Calcium	188000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:10	7440-70-2	
Cobalt	2.3J	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:10	7440-48-4	
Iron	29700	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:10	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:10	7439-92-1	
Lithium	13.6	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:10	7439-93-2	
Magnesium	45000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:10	7439-95-4	
Manganese	3060	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:10	7439-96-5	
Molybdenum	5.3J	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:10	7439-98-7	
Potassium	12700	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:10	7440-09-7	
Sodium	37300	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:10	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.094J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:10	7440-36-0	
Arsenic	115	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:10	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:10	7440-43-9	
Chromium	0.14J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:10	7440-47-3	
Selenium	0.73J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:10	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:10	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:16	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	693	mg/L	20.0	6.5	1		08/14/19 14:17		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	756	mg/L	10.0	10.0	1		08/06/19 15:26		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	22.2	mg/L	2.0	0.44	2		08/15/19 00:52	16887-00-6	
Fluoride	0.25	mg/L	0.20	0.085	1		08/16/19 03:30	16984-48-8	
Sulfate	14.9	mg/L	1.0	0.23	1		08/16/19 03:30	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-DUP-1 **Lab ID: 60310411009** Collected: 07/31/19 10:35 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	388	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:12	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:12	7440-41-7	
Boron	110	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:12	7440-42-8	
Calcium	135000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:12	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:12	7440-48-4	
Iron	11300	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:12	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:12	7439-92-1	
Lithium	7.6J	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:12	7439-93-2	
Magnesium	18400	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:12	7439-95-4	
Manganese	457	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:12	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:12	7439-98-7	
Potassium	2200	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:12	7440-09-7	
Sodium	5130	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:12	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:14	7440-36-0	
Arsenic	3.3	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:14	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:14	7440-43-9	
Chromium	0.19J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:14	7440-47-3	
Selenium	0.092J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:14	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:14	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:19	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	385	mg/L	20.0	6.5	1		08/14/19 14:30		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	455	mg/L	10.0	10.0	1		08/06/19 15:26		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	7.0	mg/L	1.0	0.22	1		08/16/19 03:46	16887-00-6	
Fluoride	0.15J	mg/L	0.20	0.085	1		08/16/19 03:46	16984-48-8	
Sulfate	15.7	mg/L	1.0	0.23	1		08/16/19 03:46	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-FB-1 **Lab ID: 60310411010** Collected: 07/31/19 15:10 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Barium	<1.4	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:14	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:14	7440-41-7	
Boron	<10.7	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:14	7440-42-8	
Calcium	60.4J	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:14	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:14	7440-48-4	
Iron	<14.0	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:14	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:14	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:14	7439-93-2	
Magnesium	21.0J	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:14	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:14	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:14	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:14	7440-09-7	
Sodium	165J	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:14	7440-23-5	B
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:23	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:23	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:23	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:23	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:23	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:23	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:21	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		08/14/19 14:34		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		08/06/19 15:26		
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	<0.22	mg/L	1.0	0.22	1		08/16/19 00:58	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		08/16/19 00:58	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/16/19 00:58	14808-79-8	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601745

Analysis Method: EPA 7470

QC Batch Method: EPA 7470

Analysis Description: 7470 Mercury

Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

METHOD BLANK: 2461609

Matrix: Water

Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/08/19 15:13	

LABORATORY CONTROL SAMPLE: 2461610

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461611 2461612

Parameter	Units	60309737003		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec						
Mercury	ug/L	ND	5	5	5.1	4.9	103	99	75-125	4	20				

MATRIX SPIKE SAMPLE: 2461613

Parameter	Units	60310411001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.037	5	5.1	101	75-125	

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

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601918 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

METHOD BLANK: 2462389 Matrix: Water
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/09/19 10:03	

LABORATORY CONTROL SAMPLE: 2462390

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462391 2462392

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60310412023 Result	Spike Conc.	Spike Conc.	Conc.								
Mercury	ug/L	0.54	5	5	5.0	5.0	4.8	90	86	75-125	4	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601401 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60310411001, 60310411003, 60310411004

METHOD BLANK: 2460487 Matrix: Water

Associated Lab Samples: 60310411001, 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/07/19 14:31	
Beryllium	ug/L	<0.25	1.0	0.25	08/07/19 14:31	
Boron	ug/L	<10.7	100	10.7	08/07/19 14:31	
Calcium	ug/L	<50.0	200	50.0	08/07/19 14:31	
Cobalt	ug/L	<0.84	5.0	0.84	08/07/19 14:31	
Iron	ug/L	59.9	50.0	14.0	08/07/19 14:31	
Lead	ug/L	<3.4	10.0	3.4	08/07/19 14:31	
Lithium	ug/L	<5.9	10.0	5.9	08/07/19 14:31	
Magnesium	ug/L	<13.0	50.0	13.0	08/07/19 14:31	
Manganese	ug/L	<2.1	5.0	2.1	08/07/19 14:31	
Molybdenum	ug/L	<2.6	20.0	2.6	08/07/19 14:31	
Potassium	ug/L	<79.0	500	79.0	08/07/19 14:31	
Sodium	ug/L	<144	500	144	08/07/19 14:31	

LABORATORY CONTROL SAMPLE: 2460488

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	998	100	85-115	
Beryllium	ug/L	1000	1010	101	85-115	
Boron	ug/L	1000	970	97	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Cobalt	ug/L	1000	987	99	85-115	
Iron	ug/L	10000	10200	102	85-115	
Lead	ug/L	1000	1060	106	85-115	
Lithium	ug/L	1000	992	99	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460489 2460490

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		60310411001 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Barium	ug/L	16.4	1000	1000	994	998	98	98	70-130	0	20	
Beryllium	ug/L	<0.25	1000	1000	1010	1010	101	101	70-130	0	20	
Boron	ug/L	2980	1000	1000	3980	4030	100	105	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460489												2460490	
Parameter	Units	60310411001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Calcium	ug/L	27300	10000	10000	37800	38500	106	112	70-130	2	20		
Cobalt	ug/L	<0.84	1000	1000	967	975	97	98	70-130	1	20		
Iron	ug/L	24.2J	10000	10000	10100	10100	101	101	70-130	0	20		
Lead	ug/L	<3.4	1000	1000	1030	1040	103	104	70-130	1	20		
Lithium	ug/L	<5.9	1000	1000	979	980	98	98	70-130	0	20		
Magnesium	ug/L	1240	10000	10000	11100	11200	99	99	70-130	1	20		
Manganese	ug/L	4.8J	1000	1000	972	982	97	98	70-130	1	20		
Molybdenum	ug/L	135	1000	1000	1140	1160	101	102	70-130	1	20		
Potassium	ug/L	5940	10000	10000	16000	16200	101	103	70-130	1	20		
Sodium	ug/L	125000	10000	10000	137000	140000	114	141	70-130	2	20	M1	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460491												2460492	
Parameter	Units	60310412011 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Barium	ug/L	112	1000	1000	1090	1090	98	98	70-130	0	20		
Beryllium	ug/L	0.25J	1000	1000	997	1000	100	100	70-130	1	20		
Boron	ug/L	7480	1000	1000	8350	8570	88	110	70-130	3	20		
Calcium	ug/L	50000	10000	10000	59300	60500	93	105	70-130	2	20		
Cobalt	ug/L	<0.84	1000	1000	967	977	97	98	70-130	1	20		
Iron	ug/L	3230	10000	10000	13200	13300	100	100	70-130	0	20		
Lead	ug/L	<3.4	1000	1000	1030	1020	103	102	70-130	0	20		
Lithium	ug/L	38.3	1000	1000	1040	1030	100	99	70-130	1	20		
Magnesium	ug/L	10900	10000	10000	20600	20800	97	100	70-130	1	20		
Manganese	ug/L	497	1000	1000	1460	1480	96	98	70-130	1	20		
Molybdenum	ug/L	648	1000	1000	1650	1680	100	103	70-130	2	20		
Potassium	ug/L	7090	10000	10000	17200	17300	102	102	70-130	0	20		
Sodium	ug/L	129000	10000	10000	138000	140000	87	112	70-130	2	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601592 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

METHOD BLANK: 2461196 Matrix: Water
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/07/19 16:55	
Beryllium	ug/L	<0.25	1.0	0.25	08/07/19 16:55	
Boron	ug/L	<10.7	100	10.7	08/07/19 16:55	
Calcium	ug/L	<50.0	200	50.0	08/07/19 16:55	
Cobalt	ug/L	<0.84	5.0	0.84	08/07/19 16:55	
Iron	ug/L	<14.0	50.0	14.0	08/07/19 16:55	
Lead	ug/L	<3.4	10.0	3.4	08/07/19 16:55	
Lithium	ug/L	<5.9	10.0	5.9	08/07/19 16:55	
Magnesium	ug/L	<13.0	50.0	13.0	08/07/19 16:55	
Manganese	ug/L	<2.1	5.0	2.1	08/07/19 16:55	
Molybdenum	ug/L	<2.6	20.0	2.6	08/07/19 16:55	
Potassium	ug/L	<79.0	500	79.0	08/07/19 16:55	
Sodium	ug/L	176J	500	144	08/07/19 16:55	

LABORATORY CONTROL SAMPLE: 2461197

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	951	95	85-115	
Beryllium	ug/L	1000	943	94	85-115	
Boron	ug/L	1000	900	90	85-115	
Calcium	ug/L	10000	9780	98	85-115	
Cobalt	ug/L	1000	964	96	85-115	
Iron	ug/L	10000	9560	96	85-115	
Lead	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	982	98	85-115	
Magnesium	ug/L	10000	9830	98	85-115	
Manganese	ug/L	1000	960	96	85-115	
Molybdenum	ug/L	1000	990	99	85-115	
Potassium	ug/L	10000	9810	98	85-115	
Sodium	ug/L	10000	10200	102	85-115	

MATRIX SPIKE SAMPLE: 2461198

Parameter	Units	60310873002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	46.9	1000	1060	102	70-130	
Beryllium	ug/L	ND	1000	987	99	70-130	
Boron	ug/L	432	1000	1430	100	70-130	
Calcium	ug/L	152000	10000	164000	127	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

MATRIX SPIKE SAMPLE: 2461198		60310873002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	ug/L	ND	1000	977	98	70-130	
Iron	ug/L	ND	10000	10000	100	70-130	
Lead	ug/L	ND	1000	1030	103	70-130	
Lithium	ug/L	29.7	1000	1090	106	70-130	
Magnesium	ug/L	152000	10000	167000	147	70-130	M1
Manganese	ug/L	ND	1000	987	98	70-130	
Molybdenum	ug/L	ND	1000	1060	106	70-130	
Potassium	ug/L	14000	10000	25000	110	70-130	
Sodium	ug/L	116000	10000	128000	118	70-130	

MATRIX SPIKE SAMPLE: 2461199		60310412023	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	ug/L	62.1	1000	1020	96	70-130	
Beryllium	ug/L	<0.25	1000	966	97	70-130	
Boron	ug/L	9400	1000	10700	131	70-130	M1
Calcium	ug/L	21100	10000	32000	108	70-130	
Cobalt	ug/L	<0.84	1000	958	96	70-130	
Iron	ug/L	1130	10000	10900	98	70-130	
Lead	ug/L	<3.4	1000	995	99	70-130	
Lithium	ug/L	21.0	1000	1020	100	70-130	
Magnesium	ug/L	2470	10000	12400	100	70-130	
Manganese	ug/L	74.4	1000	1060	98	70-130	
Molybdenum	ug/L	376	1000	1410	103	70-130	
Potassium	ug/L	4350	10000	14700	103	70-130	
Sodium	ug/L	163000	10000	181000	178	70-130	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601954 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310411002

METHOD BLANK: 2462491 Matrix: Water
Associated Lab Samples: 60310411002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/09/19 19:07	
Beryllium	ug/L	<0.25	1.0	0.25	08/09/19 19:07	
Boron	ug/L	<10.7	100	10.7	08/09/19 19:07	
Calcium	ug/L	56.0J	200	50.0	08/09/19 19:07	
Cobalt	ug/L	<0.84	5.0	0.84	08/09/19 19:07	
Iron	ug/L	<14.0	50.0	14.0	08/12/19 14:09	
Lead	ug/L	<3.4	10.0	3.4	08/09/19 19:07	
Lithium	ug/L	<5.9	10.0	5.9	08/09/19 19:07	
Magnesium	ug/L	53.9	50.0	13.0	08/09/19 19:07	
Manganese	ug/L	<2.1	5.0	2.1	08/09/19 19:07	
Molybdenum	ug/L	<2.6	20.0	2.6	08/09/19 19:07	
Potassium	ug/L	<79.0	500	79.0	08/09/19 19:07	
Sodium	ug/L	<144	500	144	08/09/19 19:07	

LABORATORY CONTROL SAMPLE: 2462492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	915	92	85-115	
Beryllium	ug/L	1000	905	91	85-115	
Boron	ug/L	1000	923	92	85-115	
Calcium	ug/L	10000	9410	94	85-115	
Cobalt	ug/L	1000	928	93	85-115	
Iron	ug/L	10000	8860	89	85-115	
Lead	ug/L	1000	985	99	85-115	
Lithium	ug/L	1000	965	97	85-115	
Magnesium	ug/L	10000	9600	96	85-115	
Manganese	ug/L	1000	948	95	85-115	
Molybdenum	ug/L	1000	958	96	85-115	
Potassium	ug/L	10000	9630	96	85-115	
Sodium	ug/L	10000	9760	98	85-115	

MATRIX SPIKE SAMPLE: 2462493

Parameter	Units	60311085001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	0.031 mg/L	1000	983	95	70-130	
Beryllium	ug/L	<0.0010 mg/L	1000	930	93	70-130	
Boron	ug/L	0.37 mg/L	1000	1380	101	70-130	
Calcium	ug/L	160 mg/L	10000	185000	243	70-130 M1	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

MATRIX SPIKE SAMPLE: 2462493		60311085001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	ug/L	<5.0	1000	923	92	70-130	
Iron	ug/L	62.8	10000	10400	103	70-130	
Lead	ug/L	<0.010 mg/L	1000	967	96	70-130	
Lithium	ug/L	0.011 mg/L	1000	1030	102	70-130	
Magnesium	ug/L	42400	10000	55800	134	70-130	M1
Manganese	ug/L	132	1000	1100	97	70-130	
Molybdenum	ug/L	<20.0	1000	998	100	70-130	
Potassium	ug/L	1490	10000	11800	103	70-130	
Sodium	ug/L	70800	10000	88100	173	70-130	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462494		2462495										
Parameter	Units	60310790007	MS	MSD	MS	MSD	MS	MSD	% Rec	Max		
		Result	Spike	Spike	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	ug/L	63.4	1000	1000	972	999	91	94	70-130	3	20	
Beryllium	ug/L		1000	1000	846	877	85	88	70-130	4	20	
Boron	ug/L	14500	1000	1000	15400	15800	90	128	70-130	2	20	
Calcium	ug/L	277000	10000	10000	275000	285000	-18	83	70-130	4	20	M1
Cobalt	ug/L		1000	1000	883	900	88	90	70-130	2	20	
Iron	ug/L	114	10000	10000	8230	8550	81	84	70-130	4	20	
Lead	ug/L		1000	1000	915	937	91	94	70-130	2	20	
Lithium	ug/L	44.8	1000	1000	1070	1000	102	96	70-130	6	20	
Magnesium	ug/L	56500	10000	10000	63800	66700	73	102	70-130	4	20	
Manganese	ug/L	1660	1000	1000	2510	2620	86	96	70-130	4	20	
Molybdenum	ug/L	1140	1000	1000	2130	2140	98	100	70-130	1	20	
Potassium	ug/L	5050	10000	10000	14800	15000	97	100	70-130	2	20	
Sodium	ug/L	148000	10000	10000	172000	159000	240	117	70-130	7	20	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 600688 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

METHOD BLANK: 2458313 Matrix: Water
 Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	0.12J	1.0	0.078	08/07/19 15:30	
Arsenic	ug/L	<0.065	1.0	0.065	08/07/19 15:30	
Cadmium	ug/L	<0.033	0.50	0.033	08/07/19 15:30	
Chromium	ug/L	<0.078	1.0	0.078	08/08/19 10:12	
Selenium	ug/L	<0.085	1.0	0.085	08/07/19 15:30	
Thallium	ug/L	<0.099	1.0	0.099	08/07/19 15:30	

LABORATORY CONTROL SAMPLE: 2458314

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.5	99	85-115	
Arsenic	ug/L	40	40.6	102	85-115	
Cadmium	ug/L	40	40.2	100	85-115	
Chromium	ug/L	40	38.9	97	85-115	
Selenium	ug/L	40	43.4	109	85-115	
Thallium	ug/L	40	36.9	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2458315 2458316

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60310411001 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	0.62J	40	40	39.6	40.4	98	100	70-130	2	20
Arsenic	ug/L	10.7	40	40	50.3	51.7	99	102	70-130	3	20
Cadmium	ug/L	0.052J	40	40	38.4	39.2	96	98	70-130	2	20
Chromium	ug/L	<0.078	40	40	34.5	35.1	86	88	70-130	2	20
Selenium	ug/L	0.70J	40	40	40.2	41.2	99	101	70-130	2	20
Thallium	ug/L	<0.099	40	40	37.3	38.1	93	95	70-130	2	20

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2458317 2458318

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60310412011 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	<0.078	40	40	39.9	39.8	100	99	70-130	0	20
Arsenic	ug/L	1.2	40	40	42.3	42.5	103	103	70-130	1	20
Cadmium	ug/L	0.19J	40	40	39.1	38.7	97	96	70-130	1	20
Chromium	ug/L	<0.078	40	40	34.3	35.0	86	87	70-130	2	20
Selenium	ug/L	0.27J	40	40	41.5	41.0	103	102	70-130	1	20

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2458317 2458318												
Parameter	Units	60310412011 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max	Qual
			Spike Conc.	Spike Conc.							RPD	
Thallium	ug/L	<0.099	40	40	38.3	38.0	96	95	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601684 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

METHOD BLANK: 2461362 Matrix: Water
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/08/19 14:01	
Arsenic	ug/L	<0.065	1.0	0.065	08/08/19 14:01	
Cadmium	ug/L	<0.033	0.50	0.033	08/08/19 14:01	
Chromium	ug/L	<0.078	1.0	0.078	08/08/19 14:01	
Selenium	ug/L	<0.085	1.0	0.085	08/08/19 14:01	
Thallium	ug/L	<0.099	1.0	0.099	08/08/19 14:01	

LABORATORY CONTROL SAMPLE: 2461363

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.9	97	85-115	
Arsenic	ug/L	40	38.2	96	85-115	
Cadmium	ug/L	40	38.4	96	85-115	
Chromium	ug/L	40	36.5	91	85-115	
Selenium	ug/L	40	40.0	100	85-115	
Thallium	ug/L	40	35.1	88	85-115	

MATRIX SPIKE SAMPLE: 2461364

Parameter	Units	60310411008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.094J	40	41.3	103	70-130	
Arsenic	ug/L	115	40	156	104	70-130	
Cadmium	ug/L	<0.033	40	38.8	97	70-130	
Chromium	ug/L	0.14J	40	37.6	94	70-130	
Selenium	ug/L	0.73J	40	40.8	100	70-130	
Thallium	ug/L	<0.099	40	33.6	84	70-130	

MATRIX SPIKE SAMPLE: 2461365

Parameter	Units	60310412023 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.10J	40	42.5	106	70-130	
Arsenic	ug/L	13.8	40	54.7	102	70-130	
Cadmium	ug/L	0.21J	40	40.2	100	70-130	
Chromium	ug/L	0.97J	40	35.9	87	70-130	
Selenium	ug/L	0.86J	40	40.3	99	70-130	
Thallium	ug/L	<0.099	40	34.2	86	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 602454 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

METHOD BLANK: 2464571 Matrix: Water
 Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/12/19 12:06	

LABORATORY CONTROL SAMPLE: 2464572

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	491	98	90-110	

SAMPLE DUPLICATE: 2464573

Parameter	Units	60310440003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	1440	1530	6	10	

SAMPLE DUPLICATE: 2464575

Parameter	Units	60310411001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	97.5	101	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 602800 Analysis Method: SM 2320B

QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60310411005, 60310411006, 60310411007

METHOD BLANK: 2465347 Matrix: Water

Associated Lab Samples: 60310411005, 60310411006, 60310411007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/13/19 14:51	

LABORATORY CONTROL SAMPLE: 2465348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	490	98	90-110	

SAMPLE DUPLICATE: 2465349

Parameter	Units	60310412001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	375	384	2	10	

SAMPLE DUPLICATE: 2465350

Parameter	Units	60310412011 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	122	130	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 603184

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60310411008, 60310411009, 60310411010

METHOD BLANK: 2466673

Matrix: Water

Associated Lab Samples: 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/14/19 14:04	

LABORATORY CONTROL SAMPLE: 2466674

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	497	99	90-110	

SAMPLE DUPLICATE: 2466675

Parameter	Units	60310411008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	693	700	1	10	

SAMPLE DUPLICATE: 2466676

Parameter	Units	60310412022 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	195	185	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 600971

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60310411003, 60310411004

METHOD BLANK: 2459397

Matrix: Water

Associated Lab Samples: 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/05/19 12:36	

LABORATORY CONTROL SAMPLE: 2459398

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 2459399

Parameter	Units	60310288001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1540	1590	3	10	

SAMPLE DUPLICATE: 2459400

Parameter	Units	60310412011 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	630	630	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 601288

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60310411001, 60310411002, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

METHOD BLANK: 2460094

Matrix: Water

Associated Lab Samples: 60310411001, 60310411002, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/06/19 15:23	

LABORATORY CONTROL SAMPLE: 2460095

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

SAMPLE DUPLICATE: 2460096

Parameter	Units	60310411001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	493	492	0	10	

SAMPLE DUPLICATE: 2460097

Parameter	Units	60310629007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4180	4010	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 602370

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

METHOD BLANK: 2463833

Matrix: Water

Associated Lab Samples: 60310411001, 60310411002, 60310411003, 60310411004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/09/19 17:18	
Fluoride	mg/L	<0.085	0.20	0.085	08/09/19 17:18	
Sulfate	mg/L	<0.23	1.0	0.23	08/09/19 17:18	

LABORATORY CONTROL SAMPLE: 2463834

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	2.5	99	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2463835 2463836

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result								
Chloride	mg/L	22.5	10	10	33.4	33.1	109	106	80-120	1	15		
Fluoride	mg/L	0.86	2.5	2.5	3.4	3.5	102	104	80-120	2	15		
Sulfate	mg/L	217	100	100	318	317	101	100	80-120	0	15		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 603125 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60310411005, 60310411006, 60310411008

METHOD BLANK: 2466414 Matrix: Water
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 12:29	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 12:29	

LABORATORY CONTROL SAMPLE: 2466415

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466416 2466417

Parameter	Units	60309975004		2466416		2466417		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Result	MS Result	MSD Result	MS Result	MSD Result				
Chloride	mg/L	3940	2000	2000	5870	5890	97	98	80-120	0	15
Fluoride	mg/L	ND	1000	1000	981	984	98	98	80-120	0	15

MATRIX SPIKE SAMPLE: 2466418

Parameter	Units	60310411006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	22.1	10	32.0	99	80-120	
Fluoride	mg/L	0.88	2.5	3.4	102	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 603431 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

METHOD BLANK: 2467577 Matrix: Water
 Associated Lab Samples: 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/15/19 17:17	
Fluoride	mg/L	<0.085	0.20	0.085	08/15/19 17:17	
Sulfate	mg/L	<0.23	1.0	0.23	08/15/19 17:17	

LABORATORY CONTROL SAMPLE: 2467578

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	5	4.6	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2467579 2467580

Parameter	Units	60310643001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	303	100	100	414	408	111	105	80-120	2	15	E
Fluoride	mg/L	ND	50	50	50.3	49.6	95	94	80-120	2	15	
Sulfate	mg/L	133	100	100	234	231	101	98	80-120	1	15	

MATRIX SPIKE SAMPLE: 2467581

Parameter	Units	60311120002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	280	100	372	92	80-120	
Fluoride	mg/L	2.1	5	7.2	102	80-120	
Sulfate	mg/L	26.0	10	35.9	99	80-120	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-1 **Lab ID: 60310411001** Collected: 07/30/19 12:30 Received: 07/31/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	2.05 ± 1.67 (2.02) C:NA T:87%	pCi/L	08/23/19 13:44	13982-63-3	
Radium-228	EPA 904.0	0.0153 ± 0.589 (1.36) C:78% T:79%	pCi/L	08/22/19 15:03	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-2 **Lab ID: 60310411002** Collected: 07/30/19 12:00 Received: 07/31/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.786 ± 0.624 (0.811) C:NA T:85%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	0.0143 ± 0.646 (1.49) C:73% T:59%	pCi/L	08/19/19 16:54	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-B1 **Lab ID: 60310411003** Collected: 07/29/19 10:30 Received: 07/31/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.778 ± 0.662 (0.930) C:NA T:86%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	1.48 ± 0.651 (1.09) C:79% T:91%	pCi/L	08/19/19 19:54	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-B2 **Lab ID: 60310411004** Collected: 07/29/19 13:55 Received: 07/31/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.307 ± 0.478 (0.827) C:NA T:96%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	1.30 ± 0.606 (1.04) C:75% T:86%	pCi/L	08/19/19 18:35	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-3 **Lab ID: 60310411005** Collected: 07/31/19 10:35 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.927 ± 0.863 (1.14) C:NA T:94%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	0.268 ± 0.603 (1.34) C:64% T:80%	pCi/L	08/19/19 18:36	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-4 **Lab ID: 60310411006** Collected: 07/31/19 16:25 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.245 ± 0.800 (1.48) C:NA T:89%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	0.709 ± 0.478 (0.914) C:76% T:89%	pCi/L	08/19/19 18:36	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-5 **Lab ID: 60310411007** Collected: 07/31/19 12:50 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.252 ± 0.717 (1.33) C:NA T:88%	pCi/L	08/20/19 16:11	13982-63-3	
Radium-228	EPA 904.0	0.144 ± 0.421 (0.944) C:79% T:88%	pCi/L	08/19/19 18:22	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-6 **Lab ID: 60310411008** Collected: 07/31/19 15:00 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.40 ± 0.724 (0.608) C:NA T:96%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.829 ± 0.484 (0.901) C:79% T:94%	pCi/L	08/19/19 18:22	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-DUP-1 **Lab ID: 60310411009** Collected: 07/31/19 10:35 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.390 ± 0.632 (1.10) C:NA T:94%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.295 ± 0.460 (0.996) C:74% T:89%	pCi/L	08/19/19 18:22	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-FB-1 **Lab ID: 60310411010** Collected: 07/31/19 15:10 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.593 (1.21) C:NA T:94%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.0950 ± 0.442 (1.00) C:78% T:82%	pCi/L	08/19/19 18:22	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Sample: R-MW-1 MS **Lab ID: 60310411011** Collected: 07/30/19 12:30 Received: 07/31/19 14:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	93.1 %REC +/- NA (NA) C:NA T:NA	pCi/L	08/23/19 13:44	13982-63-3	
Radium-228	EPA 904.0	108.14 %REC ± NA (NA) C:NA T:NA	pCi/L	08/22/19 15:03	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	96.9 %REC 4.00 RPD +/- NA (NA) C:NA T:NA	pCi/L	08/23/19 13:44	13982-63-3	
Radium-228	EPA 904.0	97.83 %REC 10.01 RPD ± NA (NA) C:NA T:NA	pCi/L	08/22/19 14:59	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch:	356700	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60310411002, 60310411003, 60310411004, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010		

METHOD BLANK:	1732232	Matrix:	Water
Associated Lab Samples:	60310411002, 60310411003, 60310411004, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.317 ± 0.353 (0.736) C:75% T:85%	pCi/L	08/19/19 16:54	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 356964 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60310411001, 60310411011, 60310411012

METHOD BLANK: 1733517 Matrix: Water

Associated Lab Samples: 60310411001, 60310411011, 60310411012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.284 ± 0.415 (0.649) C:NA T:82%	pCi/L	08/23/19 13:25	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch: 356965 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60310411001, 60310411011, 60310411012

METHOD BLANK: 1733519 Matrix: Water

Associated Lab Samples: 60310411001, 60310411011, 60310411012

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.0786 ± 0.318 (0.721) C:74% T:94%	pCi/L	08/22/19 14:57	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

QC Batch:	356697	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60310411002, 60310411003, 60310411004, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010		

METHOD BLANK:	1732222	Matrix:	Water
Associated Lab Samples:	60310411002, 60310411003, 60310411004, 60310411005, 60310411006, 60310411007, 60310411008, 60310411009, 60310411010		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.125 ± 0.300 (0.580) C:NA T:94%	pCi/L	08/20/19 16:11	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

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

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310411001	R-MW-1	EPA 200.7	601401	EPA 200.7	601452
60310411002	R-MW-2	EPA 200.7	601954	EPA 200.7	602073
60310411003	R-MW-B1	EPA 200.7	601401	EPA 200.7	601452
60310411004	R-MW-B2	EPA 200.7	601401	EPA 200.7	601452
60310411005	R-MW-3	EPA 200.7	601592	EPA 200.7	601656
60310411006	R-MW-4	EPA 200.7	601592	EPA 200.7	601656
60310411007	R-MW-5	EPA 200.7	601592	EPA 200.7	601656
60310411008	R-MW-6	EPA 200.7	601592	EPA 200.7	601656
60310411009	R-DUP-1	EPA 200.7	601592	EPA 200.7	601656
60310411010	R-FB-1	EPA 200.7	601592	EPA 200.7	601656
60310411001	R-MW-1	EPA 200.8	600688	EPA 200.8	600908
60310411002	R-MW-2	EPA 200.8	600688	EPA 200.8	600908
60310411003	R-MW-B1	EPA 200.8	600688	EPA 200.8	600908
60310411004	R-MW-B2	EPA 200.8	600688	EPA 200.8	600908
60310411005	R-MW-3	EPA 200.8	601684	EPA 200.8	601734
60310411006	R-MW-4	EPA 200.8	601684	EPA 200.8	601734
60310411007	R-MW-5	EPA 200.8	601684	EPA 200.8	601734
60310411008	R-MW-6	EPA 200.8	601684	EPA 200.8	601734
60310411009	R-DUP-1	EPA 200.8	601684	EPA 200.8	601734
60310411010	R-FB-1	EPA 200.8	601684	EPA 200.8	601734
60310411001	R-MW-1	EPA 7470	601745	EPA 7470	601803
60310411002	R-MW-2	EPA 7470	601745	EPA 7470	601803
60310411003	R-MW-B1	EPA 7470	601745	EPA 7470	601803
60310411004	R-MW-B2	EPA 7470	601745	EPA 7470	601803
60310411005	R-MW-3	EPA 7470	601918	EPA 7470	601997
60310411006	R-MW-4	EPA 7470	601918	EPA 7470	601997
60310411007	R-MW-5	EPA 7470	601918	EPA 7470	601997
60310411008	R-MW-6	EPA 7470	601918	EPA 7470	601997
60310411009	R-DUP-1	EPA 7470	601918	EPA 7470	601997
60310411010	R-FB-1	EPA 7470	601918	EPA 7470	601997
60310411001	R-MW-1	EPA 903.1	356964		
60310411002	R-MW-2	EPA 903.1	356697		
60310411003	R-MW-B1	EPA 903.1	356697		
60310411004	R-MW-B2	EPA 903.1	356697		
60310411005	R-MW-3	EPA 903.1	356697		
60310411006	R-MW-4	EPA 903.1	356697		
60310411007	R-MW-5	EPA 903.1	356697		
60310411008	R-MW-6	EPA 903.1	356697		
60310411009	R-DUP-1	EPA 903.1	356697		
60310411010	R-FB-1	EPA 903.1	356697		
60310411011	R-MW-1 MS	EPA 903.1	356964		
60310411012	R-MW-1 MSD	EPA 903.1	356964		
60310411001	R-MW-1	EPA 904.0	356965		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310411002	R-MW-2	EPA 904.0	356700		
60310411003	R-MW-B1	EPA 904.0	356700		
60310411004	R-MW-B2	EPA 904.0	356700		
60310411005	R-MW-3	EPA 904.0	356700		
60310411006	R-MW-4	EPA 904.0	356700		
60310411007	R-MW-5	EPA 904.0	356700		
60310411008	R-MW-6	EPA 904.0	356700		
60310411009	R-DUP-1	EPA 904.0	356700		
60310411010	R-FB-1	EPA 904.0	356700		
60310411011	R-MW-1 MS	EPA 904.0	356965		
60310411012	R-MW-1 MSD	EPA 904.0	356965		
60310411001	R-MW-1	SM 2320B	602454		
60310411002	R-MW-2	SM 2320B	602454		
60310411003	R-MW-B1	SM 2320B	602454		
60310411004	R-MW-B2	SM 2320B	602454		
60310411005	R-MW-3	SM 2320B	602800		
60310411006	R-MW-4	SM 2320B	602800		
60310411007	R-MW-5	SM 2320B	602800		
60310411008	R-MW-6	SM 2320B	603184		
60310411009	R-DUP-1	SM 2320B	603184		
60310411010	R-FB-1	SM 2320B	603184		
60310411001	R-MW-1	SM 2540C	601288		
60310411002	R-MW-2	SM 2540C	601288		
60310411003	R-MW-B1	SM 2540C	600971		
60310411004	R-MW-B2	SM 2540C	600971		
60310411005	R-MW-3	SM 2540C	601288		
60310411006	R-MW-4	SM 2540C	601288		
60310411007	R-MW-5	SM 2540C	601288		
60310411008	R-MW-6	SM 2540C	601288		
60310411009	R-DUP-1	SM 2540C	601288		
60310411010	R-FB-1	SM 2540C	601288		
60310411001	R-MW-1	EPA 300.0	602370		
60310411002	R-MW-2	EPA 300.0	602370		
60310411003	R-MW-B1	EPA 300.0	602370		
60310411004	R-MW-B2	EPA 300.0	602370		
60310411005	R-MW-3	EPA 300.0	603125		
60310411005	R-MW-3	EPA 300.0	603431		
60310411006	R-MW-4	EPA 300.0	603125		
60310411006	R-MW-4	EPA 300.0	603431		
60310411007	R-MW-5	EPA 300.0	603431		
60310411008	R-MW-6	EPA 300.0	603125		
60310411008	R-MW-6	EPA 300.0	603431		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310411

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310411009	R-DUP-1	EPA 300.0	603431		
60310411010	R-FB-1	EPA 300.0	603431		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60310411



Client Name: Colder Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other ZPK

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read _____ Corr. Factor 10.0 Corrected 0.8, 24.0

Date and initials of person examining contents: 7.31.19

Temperature should be above freezing to 6°C 0.8, 24.0

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Cooler with no ice had SPIN containers
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Church Date: 8/1/19

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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



www.pacelabs.com

Section C

Section A
Required Client Information:
Company: Golder Associates

Section B
Report To: Jeffrey Ingram

Section C
Invoice Information:
Attention: Ryan Feldmann / Eric Schneider

Address: 13515 Barrett Parkway Drive, Ste 260
Ballwin, MO 63021

Email To: jeffrey_ingram@golder.com

Phone: 636-724-9191 Fax: 636-724-9323

Requested Due Date/TAT: Standard

Company Name: Ryan Feldmann / Eric Schneider
Address: _____
Pace Quote Reference: _____
Pace Project Manager: Jamie Church
Pace Profile #: 9285

Section B

Copy To: Ryan Feldmann / Eric Schneider

Purchase Order No.: _____

Project Name: Ameren Rush Island Energy Center
Project Number: 153-1406-01.0002A (COC #4)

Section A

Report To: Jeffrey Ingram

Section C

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Site Location
STATE: MO

ITEM #	Section D Required Client Information				COLLECTED			# OF CONTAINERS		Preservatives		Request Analysis Filtered (Y/N)		Residual Chlorine (Y/N)	Pace Project No. / Lab I.D.	
	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW WATER W PRODUCT P SOILSOLID SL OIL OL WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH			NazO ₂
Section E																
Requested Analysis Filtered (Y/N)																
Analysis Test																
Metals*																
Mercury																
Chloride/Fluoride/Sulfate																
Alkalinity																
Total Phosphorus																
Radium 226																
Radium 228																
1	R-MW-1	SBP3U	WT	G	7/30/19	1230		15	9							001
2	R-MW-2	SBP3U	WT	G	7/30/19	1700		5	2							002
3	R-MW-3		WT	G												
4	R-MW-4		WT	G												
5	R-MW-5		WT	G												
6	R-MW-6		WT	G												
7	R-MW-7		WT	G												
8	R-MW-B1	BPDU, BPJS	WT	G	7/30/19	1630		5	2							003
9	R-MW-B2		WT	G		1355		1	1							004
10	R-DUP-1		WT	G												
11	R-FB-1		WT	G												
12			WT	G												

Section F

RELIQUISHED BY / AFFILIATION: Golder Associates DATE: 7/30/19 TIME: 1750
ACCEPTED BY / AFFILIATION: U2-ft/Par DATE: 7/31/19 TIME: 0245
RELINQUISHED BY / AFFILIATION: _____ DATE: _____ TIME: _____
ACCEPTED BY / AFFILIATION: _____ DATE: _____ TIME: _____

RECEIVED ON: _____ Ice (Y/N): _____
CUSTODY SEALED: _____ Cooler (Y/N): _____
SAMPLES INTACT: _____ (Y/N): _____

Temp in °C: _____

SAMPLER NAME AND SIGNATURE: _____
PRINT Name of SAMPLER: E. C. Schneider
SIGNATURE of SAMPLER: [Signature]

DATE Signed (MM/DD/YY): 07/30/19

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

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



Sample Condition Upon Receipt

WO#: 60310411



Client Name: Golden Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other ATK

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 22.2 Corr. Factor +0.0 Corrected 22.2

Date and initials of person examining contents: 8.2.19 KR

Temperature should be above freezing to 6°C 0.2

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<u>all coolers with no ice had Radium samples</u>
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>Only receive one BPIW Fork-MW-3</u>
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs volumes, lot #'s of preservative and the date/time addec.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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: Janni Clark Date: 8/5/19



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Jeffrey Ingram	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021	Copy To:	Ryan Feldmann / Eric Schneider	Company Name:	
Email To:	Jeffrey.Ingram@golder.com	Purchase Order No.:		Address:	
Phone:	636-724-9191	Project Name:	Ameren Push Island Energy Center	Pace Quote Reference:	
Requested Due Date/TAT:	Standard	Project Number:	153-1406-01.0002A (COC #4)	Pace Project Manager:	Jamie Church
			Site Location STATE: MO		
			REGULATORY AGENCY		
			<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> RCRA <input type="checkbox"/> UST <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> OTHER		

Page: 1 of 1

ITEM #	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 WP AR AR OT OT TS TS	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other	Requested Analysis Filtered (Y/N)	Face Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB						
1	R-MW-1				G	WT				
2	R-MW-2				G	WT				
3	R-MW-3	BPSU	7/31	1035	G	WT	5	2	3	BPIN, BPSU, BPSN
4	R-MW-4		7/31	1625	G	WT	5	2	3	BPIN
5	R-MW-5		7/31	1250	G	WT	5	2	3	
6	R-MW-6		7/31	1500	G	WT	5	2	3	
7	R-MW-7				G	WT				
8	R-MW-B1				G	WT				
9	R-MW-B2				G	WT				
10	R-DUP-1		7/31		G	WT	5	2	3	BPIN, BPSU, BPSN
11	R-FB-1	BPSU	7/31	1510	G	WT	5	2	3	BPIN, BPSU, BPSN
12					G	WT				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		DATE	TIME	DATE	TIME	SAMPLE CONDITIONS										
	PRINT Name of SAMPLER:	SIGNATURE of SAMPLER:	PRINT Name of SAMPLER:	SIGNATURE of SAMPLER:						DATE Signed (MM/DD/YY):									
*EPA 200.7-B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na			Eric Schneider		8/1/19	12:00	Jeffrey Ingram		8-2-19 02:45	22-2-N	Y	Y	Y	Y	Y	Y	Y	Y	Y
*EPA 200.8- Sb, As, Cd, Cr, Se, Tl			Eric Schneider		8/1/19	12:22	Jeffrey Ingram		8-2-19 02:45	22-2-N	Y	Y	Y	Y	Y	Y	Y	Y	Y

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

MEMORANDUM**DATE** September 5, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC** Amanda Derhake, Jeff Ingram**FROM** Tommy Goodwin**EMAIL** Tommy_Goodwin@golder.com**DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60310411**

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

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When a compound was detected in a blank (i.e. method, field), and the blank comparison criterion was not met, associated sample results were qualified as estimates (J) or non-detects (U).
- When matrix spike/matrix spike duplicate (MS/MSD) criterion was not met, the associated sample result was qualified as an estimate (J).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 9/5/2019

Laboratory: Pace Analytical - KS

SDG #: 60310411

Analytical Method (type and no.): EPA 200.7/00.8 (Metals); EPA 7470 (Hg); EPA 903.1/904.0 (Rads); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-MW-1, R-MW-2, R-MW-3, R-MW-4, R-MW-5, R-MW-6, R-MW-B1, R-MW-B2, R-DUP-1, R-FB-1, R-MW-1-MS/MSD

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>7/29-7/31/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (<u>grab</u> composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ R-MW-5
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FB-1 @ R-MW-6
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-11001: Alk, TDS' -11008: Alk
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments/Notes:

MB: -11001,03-04: Fe (59.9); -11002: Ca (56), Mg (53.9); -11005-10: Na (176); -11001-004: Sb (0.12);

FB-1: Ca (60.4), Mg (21.0), Na (165)

DUP-1: Se (200)

MSD: -11001: Na (141%)

Max Lab DUP RPD: 4% (Limit 10%)

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

September 06, 2019

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

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60310412

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between July 31, 2019 and August 16, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60310412001	R-P05I	Water	07/30/19 15:05	07/31/19 02:35
60310412002	R-P10S	Water	07/30/19 15:00	07/31/19 02:35
60310412003	R-P29S	Water	07/30/19 10:00	07/31/19 02:35
60310412004	R-P29D	Water	07/30/19 11:25	07/31/19 02:35
60310412005	R-P31S	Water	07/30/19 13:30	07/31/19 02:35
60310412006	R-NE-FB-1	Water	07/30/19 13:40	07/31/19 02:35
60310412007	R-NE-FB-2	Water	07/30/19 15:10	07/31/19 02:35
60310412008	R-NE-DUP-1	Water	07/30/19 08:00	07/31/19 02:35
60310412009	R-P-17S	Water	07/30/19 11:20	07/31/19 02:35
60310412010	R-P-17I	Water	07/30/19 10:00	07/31/19 02:35
60310412011	R-P-17D	Water	07/30/19 10:20	07/31/19 02:35
60310412012	R-P-19I	Water	07/30/19 13:25	07/31/19 02:35
60310412013	R-P-19S	Water	07/30/19 15:35	07/31/19 02:35
60310412014	R-P-19D	Water	07/30/19 14:32	07/31/19 02:35
60310412015	R-P03S	Water	07/31/19 15:15	08/02/19 02:45
60310412016	R-P03D	Water	07/31/19 14:20	08/02/19 02:45
60310412017	R-P05S	Water	07/31/19 10:50	08/02/19 02:45
60310412018	R-P21S	Water	07/31/19 14:05	08/02/19 02:45
60310412019	R-P21I	Water	07/31/19 12:17	08/02/19 02:45
60310412020	R-P21D	Water	07/31/19 13:25	08/02/19 02:45
60310412021	R-P22S	Water	07/31/19 17:30	08/02/19 02:45
60310412022	R-P22I	Water	07/31/19 15:15	08/02/19 02:45
60310412023	R-P22D	Water	08/01/19 09:15	08/02/19 02:45
60310412024	R-P30S	Water	07/31/19 13:10	08/02/19 02:45
60310412025	R-NE-DUP-2	Water	07/31/19 09:15	08/02/19 02:45
60310412026	R-NE-DUP-3	Water	07/31/19 09:15	08/02/19 02:45
60310412027	R-NE-FB-3	Water	07/31/19 13:20	08/02/19 02:45
60310412028	R-P-17D MS	Water	07/30/19 10:20	07/31/19 02:35
60310412029	R-P-17-D MSD	Water	07/30/19 10:20	07/31/19 02:35
60310412030	R-P22D MS	Water	08/01/19 09:15	08/02/19 02:45
60310412031	R-P22D MSD	Water	08/01/19 09:15	08/02/19 02:45
60310412032	R-P01S	Water	08/15/19 15:25	08/16/19 03:25

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310412001	R-P05I	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		60310412002	R-P10S	EPA 200.7	HKC
EPA 200.8	JGP			6	PASI-K
EPA 7470	JLH			1	PASI-K
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	JLW			1	PASI-PA
SM 2320B	LDB			1	PASI-K
SM 2540C	AJS			1	PASI-K
EPA 300.0	JDS			3	PASI-K
60310412003	R-P29S			EPA 200.7	HKC
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		60310412004	R-P29D	EPA 200.7	HKC
EPA 200.8	JGP			6	PASI-K
EPA 7470	JLH			1	PASI-K
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	JLW			1	PASI-PA
SM 2320B	LDB			1	PASI-K
SM 2540C	AJS			1	PASI-K
EPA 300.0	JDS			3	PASI-K
60310412005	R-P31S			EPA 200.7	HKC
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310412006	R-NE-FB-1	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412007	R-NE-FB-2	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412008	R-NE-DUP-1	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412009	R-P-17S	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
		EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412010	R-P-17I	SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
		EPA 200.7	EMR, HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412011	R-P-17D	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412012	R-P-19I	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412013	R-P-19S	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412014	R-P-19D	EPA 200.7	HKC	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	AJS	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310412015	R-P03S	EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
60310412016	R-P03D	EPA 300.0	MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
60310412017	R-P05S	EPA 300.0	MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
60310412018	R-P21S	EPA 300.0	MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
60310412019	R-P21I	EPA 300.0	JDS, MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310412020	R-P21D	EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
60310412021	R-P22S	SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412022	R-P22I	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
60310412023	R-P22D	EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
60310412024	R-P30S	EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
60310412024	R-P30S	EPA 300.0	JDS	3	PASI-K
		EPA 200.7	EMR	13	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412025	R-NE-DUP-2	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS, MGS	3	PASI-K
60310412026	R-NE-DUP-3	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412027	R-NE-FB-3	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310412028	R-P-17D MS	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412029	R-P-17-D MSD	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412030	R-P22D MS	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60310412031	R-P22D MSD	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
60310412032	R-P01S	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	JLH	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		SM 2540C	LDB	1	PASI-K
EPA 300.0	MGS	3	PASI-K		

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P051 **Lab ID: 60310412001** Collected: 07/30/19 15:05 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	458	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 14:50	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 14:50	7440-41-7	
Boron	43.4J	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 14:50	7440-42-8	
Calcium	124000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 14:50	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 14:50	7440-48-4	
Iron	15300	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 14:50	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 14:50	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 14:50	7439-93-2	
Magnesium	18300	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 14:50	7439-95-4	
Manganese	474	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 14:50	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 14:50	7439-98-7	
Potassium	1630	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 14:50	7440-09-7	
Sodium	3850	ug/L	500	144	1	08/06/19 14:15	08/07/19 14:50	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:45	7440-36-0	
Arsenic	5.2	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:45	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:45	7440-43-9	
Chromium	0.20J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 10:20	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:45	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:45	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:53	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	375	mg/L	20.0	6.5	1		08/13/19 15:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	409	mg/L	10.0	10.0	1		08/05/19 12:36		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	2.6	mg/L	1.0	0.22	1		08/09/19 22:45	16887-00-6	
Fluoride	0.25	mg/L	0.20	0.085	1		08/09/19 22:45	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/09/19 22:45	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P10S **Lab ID: 60310412002** Collected: 07/30/19 15:00 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	108	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 14:53	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 14:53	7440-41-7	
Boron	2660	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 14:53	7440-42-8	
Calcium	59800	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 14:53	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 14:53	7440-48-4	
Iron	815	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 14:53	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 14:53	7439-92-1	
Lithium	15.2	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 14:53	7439-93-2	
Magnesium	9800	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 14:53	7439-95-4	
Manganese	941	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 14:53	7439-96-5	
Molybdenum	130	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 14:53	7439-98-7	
Potassium	4600	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 14:53	7440-09-7	
Sodium	93400	ug/L	500	144	1	08/06/19 14:15	08/07/19 14:53	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:54	7440-36-0	
Arsenic	6.6	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:54	7440-38-2	
Cadmium	0.063J	ug/L	0.50	0.033	1	08/02/19 10:08	08/08/19 15:54	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:21	7440-47-3	
Selenium	0.17J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:54	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:54	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 15:59	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	217	mg/L	20.0	6.5	1		08/13/19 15:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	501	mg/L	10.0	10.0	1		08/05/19 12:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	20.2	mg/L	2.0	0.44	2		08/09/19 23:15	16887-00-6	
Fluoride	0.62	mg/L	0.20	0.085	1		08/09/19 23:00	16984-48-8	
Sulfate	141	mg/L	20.0	4.6	20		08/09/19 23:30	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P29S **Lab ID: 60310412003** Collected: 07/30/19 10:00 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	358	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:00	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:00	7440-41-7	
Boron	84.5J	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:00	7440-42-8	
Calcium	147000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:00	7440-70-2	
Cobalt	2.2J	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:00	7440-48-4	
Iron	12200	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:00	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:00	7439-92-1	
Lithium	15.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:00	7439-93-2	
Magnesium	35000	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:00	7439-95-4	
Manganese	756	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:00	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:00	7439-98-7	
Potassium	5540	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:00	7440-09-7	
Sodium	16700	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:00	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:55	7440-36-0	
Arsenic	43.8	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:55	7440-38-2	
Cadmium	0.035J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:55	7440-43-9	
Chromium	0.45J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:26	7440-47-3	
Selenium	0.18J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:55	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:55	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:02	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	492	mg/L	20.0	6.5	1		08/13/19 15:17		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	571	mg/L	10.0	10.0	1		08/05/19 12:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	20.0	mg/L	2.0	0.44	2		08/10/19 00:00	16887-00-6	
Fluoride	0.23	mg/L	0.20	0.085	1		08/09/19 23:45	16984-48-8	
Sulfate	17.1	mg/L	1.0	0.23	1		08/09/19 23:45	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P29D **Lab ID: 60310412004** Collected: 07/30/19 11:25 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	159	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:03	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:03	7440-41-7	
Boron	78.6J	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:03	7440-42-8	
Calcium	94500	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:03	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:03	7440-48-4	
Iron	4490	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:03	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:03	7439-92-1	
Lithium	38.3	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:03	7439-93-2	
Magnesium	26500	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:03	7439-95-4	
Manganese	162	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:03	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:03	7439-98-7	
Potassium	4320	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:03	7440-09-7	
Sodium	59400	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:03	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:57	7440-36-0	
Arsenic	1.0	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:57	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/08/19 15:57	7440-43-9	
Chromium	0.093J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:27	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:57	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:57	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:04	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	315	mg/L	20.0	6.5	1		08/13/19 15:23		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	516	mg/L	10.0	10.0	1		08/05/19 12:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	91.9	mg/L	10.0	2.2	10		08/10/19 00:44	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.085	1		08/10/19 00:14	16984-48-8	
Sulfate	19.9	mg/L	1.0	0.23	1		08/10/19 00:14	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P31S **Lab ID: 60310412005** Collected: 07/30/19 13:30 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	134	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:05	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:05	7440-41-7	
Boron	318	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:05	7440-42-8	
Calcium	62100	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:05	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:05	7440-48-4	
Iron	4220	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:05	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:05	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:05	7439-93-2	
Magnesium	11200	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:05	7439-95-4	
Manganese	955	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:05	7439-96-5	
Molybdenum	5.6J	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:05	7439-98-7	
Potassium	4120	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:05	7440-09-7	
Sodium	12900	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:05	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:59	7440-36-0	
Arsenic	19.1	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:59	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:59	7440-43-9	
Chromium	0.094J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:28	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:59	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:59	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:34	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	208	mg/L	20.0	6.5	1		08/13/19 15:28		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	14.5	mg/L	5.0	5.0	1		08/05/19 12:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	3.0	mg/L	1.0	0.22	1		08/10/19 01:29	16887-00-6	
Fluoride	0.41	mg/L	0.20	0.085	1		08/10/19 01:29	16984-48-8	
Sulfate	14.3	mg/L	1.0	0.23	1		08/10/19 01:29	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-FB-1 **Lab ID: 60310412006** Collected: 07/30/19 13:40 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	<1.4	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:08	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:08	7440-41-7	
Boron	<10.7	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:08	7440-42-8	
Calcium	92.5J	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:08	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:08	7440-48-4	
Iron	<14.0	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:08	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:08	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:08	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:08	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:08	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:08	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:08	7440-09-7	
Sodium	<144	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:08	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:50	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:50	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:50	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:24	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:50	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:50	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:36	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		08/13/19 15:32		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.22	mg/L	1.0	0.22	1		08/12/19 22:25	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		08/12/19 22:25	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/12/19 22:25	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-FB-2 **Lab ID: 60310412007** Collected: 07/30/19 15:10 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	<1.4	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:10	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:10	7440-41-7	
Boron	<10.7	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:10	7440-42-8	
Calcium	52.9J	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:10	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:10	7440-48-4	
Iron	<14.0	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:10	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:10	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:10	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:10	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:10	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:10	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:10	7440-09-7	
Sodium	<144	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:10	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 15:52	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 15:52	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 15:52	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:25	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 15:52	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 15:52	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:38	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		08/13/19 15:35		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	6.0	mg/L	5.0	5.0	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.22	mg/L	1.0	0.22	1		08/12/19 22:40	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		08/12/19 22:40	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/12/19 22:40	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-1 **Lab ID: 60310412008** Collected: 07/30/19 08:00 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Barium	16.0	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:18	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:18	7440-41-7	
Boron	2390	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:18	7440-42-8	
Calcium	7530	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:18	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:18	7440-48-4	
Iron	414	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 14:18	7439-89-6	
Lead	27.5	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:18	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:18	7439-93-2	
Magnesium	313	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:18	7439-95-4	B
Manganese	8.9	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:18	7439-96-5	
Molybdenum	119	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:18	7439-98-7	
Potassium	1760	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:18	7440-09-7	
Sodium	189000	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:18	7440-23-5	
200.8 MET ICPMS									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.62J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:00	7440-36-0	B
Arsenic	76.4	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:00	7440-38-2	
Cadmium	0.78	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:00	7440-43-9	
Chromium	0.71J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:29	7440-47-3	
Selenium	3.5	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:00	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:00	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:41	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	204	mg/L	20.0	6.5	1		08/13/19 15:50		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	773	mg/L	10.0	10.0	1		08/05/19 12:38		
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	23.9	mg/L	2.0	0.44	2		08/13/19 15:05	16887-00-6	
Fluoride	2.5	mg/L	0.20	0.085	1		08/12/19 22:54	16984-48-8	
Sulfate	235	mg/L	20.0	4.6	20		08/13/19 15:20	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-17S **Lab ID: 60310412009** Collected: 07/30/19 11:20 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	55.6	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:20	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:20	7440-41-7	
Boron	1700	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:20	7440-42-8	
Calcium	72600	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:20	7440-70-2	
Cobalt	1.6J	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:20	7440-48-4	
Iron	414	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 14:21	7439-89-6	
Lead	4.5J	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:20	7439-92-1	
Lithium	23.6	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:20	7439-93-2	
Magnesium	17200	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:20	7439-95-4	
Manganese	651	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:20	7439-96-5	
Molybdenum	49.8	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:20	7439-98-7	
Potassium	2610	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:20	7440-09-7	
Sodium	169000	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:20	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.53J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:02	7440-36-0	B
Arsenic	30.1	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:02	7440-38-2	
Cadmium	0.18J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:02	7440-43-9	
Chromium	0.15J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:30	7440-47-3	
Selenium	2.2	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:02	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:02	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:43	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	426	mg/L	20.0	6.5	1		08/13/19 15:55		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	843	mg/L	13.3	13.3	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	38.3	mg/L	5.0	1.1	5		08/13/19 15:35	16887-00-6	
Fluoride	0.83	mg/L	0.20	0.085	1		08/12/19 23:24	16984-48-8	
Sulfate	183	mg/L	20.0	4.6	20		08/12/19 23:54	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-17I **Lab ID: 60310412010** Collected: 07/30/19 10:00 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	17.0	ug/L	5.0	1.4	1	08/08/19 13:00	08/09/19 19:22	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/08/19 13:00	08/09/19 19:22	7440-41-7	
Boron	2650	ug/L	100	10.7	1	08/08/19 13:00	08/09/19 19:22	7440-42-8	
Calcium	8120	ug/L	200	50.0	1	08/08/19 13:00	08/09/19 19:22	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/08/19 13:00	08/09/19 19:22	7440-48-4	
Iron	469	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 14:23	7439-89-6	
Lead	27.3	ug/L	10.0	3.4	1	08/08/19 13:00	08/09/19 19:22	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/08/19 13:00	08/09/19 19:22	7439-93-2	
Magnesium	331	ug/L	50.0	13.0	1	08/08/19 13:00	08/09/19 19:22	7439-95-4	B
Manganese	9.6	ug/L	5.0	2.1	1	08/08/19 13:00	08/09/19 19:22	7439-96-5	
Molybdenum	130	ug/L	20.0	2.6	1	08/08/19 13:00	08/09/19 19:22	7439-98-7	
Potassium	1900	ug/L	500	79.0	1	08/08/19 13:00	08/09/19 19:22	7440-09-7	
Sodium	205000	ug/L	500	144	1	08/08/19 13:00	08/09/19 19:22	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.61J	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:04	7440-36-0	B
Arsenic	78.2	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:04	7440-38-2	
Cadmium	0.78	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:04	7440-43-9	
Chromium	0.74J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:31	7440-47-3	
Selenium	3.3	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:04	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:04	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:45	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	205	mg/L	20.0	6.5	1		08/13/19 15:59		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	777	mg/L	10.0	10.0	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.1	mg/L	2.0	0.44	2		08/13/19 00:53	16887-00-6	
Fluoride	2.5	mg/L	0.20	0.085	1		08/13/19 00:38	16984-48-8	
Sulfate	237	mg/L	20.0	4.6	20		08/13/19 01:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-17D **Lab ID: 60310412011** Collected: 07/30/19 10:20 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	112	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:20	7440-39-3	
Beryllium	0.25J	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:20	7440-41-7	
Boron	7480	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:20	7440-42-8	
Calcium	50000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:20	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:20	7440-48-4	
Iron	3230	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:20	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:20	7439-92-1	
Lithium	38.3	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:20	7439-93-2	
Magnesium	10900	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:20	7439-95-4	
Manganese	497	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:20	7439-96-5	
Molybdenum	648	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:20	7439-98-7	
Potassium	7090	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:20	7440-09-7	
Sodium	129000	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:20	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:09	7440-36-0	
Arsenic	1.2	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:09	7440-38-2	
Cadmium	0.19J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:09	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:34	7440-47-3	
Selenium	0.27J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:09	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:09	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:48	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	122	mg/L	20.0	6.5	1		08/13/19 16:04		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	630	mg/L	10.0	10.0	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	28.0	mg/L	2.0	0.44	2		08/13/19 02:08	16887-00-6	
Fluoride	0.57	mg/L	0.20	0.085	1		08/13/19 01:23	16984-48-8	
Sulfate	283	mg/L	20.0	4.6	20		08/13/19 02:52	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-19I **Lab ID: 60310412012** Collected: 07/30/19 13:25 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	18.2	ug/L	5.0	1.4	1	08/08/19 13:00	08/12/19 14:25	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/08/19 13:00	08/12/19 14:25	7440-41-7	
Boron	6870	ug/L	100	10.7	1	08/08/19 13:00	08/12/19 14:25	7440-42-8	
Calcium	9260	ug/L	200	50.0	1	08/08/19 13:00	08/12/19 14:25	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/08/19 13:00	08/12/19 14:25	7440-48-4	
Iron	118	ug/L	50.0	14.0	1	08/08/19 13:00	08/12/19 14:25	7439-89-6	
Lead	13.8	ug/L	10.0	3.4	1	08/08/19 13:00	08/12/19 14:25	7439-92-1	
Lithium	15.5	ug/L	10.0	5.9	1	08/08/19 13:00	08/12/19 14:25	7439-93-2	
Magnesium	21.0J	ug/L	50.0	13.0	1	08/08/19 13:00	08/12/19 14:25	7439-95-4	B
Manganese	4.3J	ug/L	5.0	2.1	1	08/08/19 13:00	08/12/19 14:25	7439-96-5	
Molybdenum	402	ug/L	20.0	2.6	1	08/08/19 13:00	08/12/19 14:25	7439-98-7	
Potassium	14000	ug/L	500	79.0	1	08/08/19 13:00	08/12/19 14:25	7440-09-7	
Sodium	327000	ug/L	500	144	1	08/08/19 13:00	08/12/19 14:25	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	6.2	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:14	7440-36-0	
Arsenic	302	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:14	7440-38-2	
Cadmium	0.54	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:14	7440-43-9	
Chromium	0.26J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:37	7440-47-3	
Selenium	3.5	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:14	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:14	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 16:59	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	285	mg/L	20.0	6.5	1		08/13/19 16:13		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	1070	mg/L	13.3	13.3	1		08/05/19 12:38		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	24.2	mg/L	2.0	0.44	2		08/13/19 04:21	16887-00-6	
Fluoride	0.93	mg/L	0.20	0.085	1		08/13/19 04:06	16984-48-8	
Sulfate	321	mg/L	20.0	4.6	20		08/13/19 04:36	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Project No.: 60310412

Sample: R-P-19S **Lab ID: 60310412013** Collected: 07/30/19 15:35 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	349	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:34	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:34	7440-41-7	
Boron	3240	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:34	7440-42-8	
Calcium	145000	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:34	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:34	7440-48-4	
Iron	18900	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:34	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:34	7439-92-1	
Lithium	41.5	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:34	7439-93-2	
Magnesium	30000	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:34	7439-95-4	
Manganese	1170	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:34	7439-96-5	
Molybdenum	8.6J	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:34	7439-98-7	
Potassium	7240	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:34	7440-09-7	
Sodium	72700	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:34	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:16	7440-36-0	
Arsenic	34.2	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:16	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:16	7440-43-9	
Chromium	0.21J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:38	7440-47-3	
Selenium	0.14J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:16	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:16	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/07/19 16:39	08/08/19 17:01	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	524	mg/L	20.0	6.5	1		08/13/19 16:20		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	735	mg/L	10.0	10.0	1		08/05/19 12:39		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	27.1	mg/L	2.0	0.44	2		08/13/19 05:06	16887-00-6	
Fluoride	0.40	mg/L	0.20	0.085	1		08/13/19 04:51	16984-48-8	
Sulfate	74.4	mg/L	10.0	2.3	10		08/13/19 05:21	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-19D **Lab ID: 60310412014** Collected: 07/30/19 14:32 Received: 07/31/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	116	ug/L	5.0	1.4	1	08/06/19 14:15	08/07/19 15:37	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/06/19 14:15	08/07/19 15:37	7440-41-7	
Boron	12500	ug/L	100	10.7	1	08/06/19 14:15	08/07/19 15:37	7440-42-8	
Calcium	37300	ug/L	200	50.0	1	08/06/19 14:15	08/07/19 15:37	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/06/19 14:15	08/07/19 15:37	7440-48-4	
Iron	2200	ug/L	50.0	14.0	1	08/06/19 14:15	08/07/19 15:37	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/06/19 14:15	08/07/19 15:37	7439-92-1	
Lithium	17.3	ug/L	10.0	5.9	1	08/06/19 14:15	08/07/19 15:37	7439-93-2	
Magnesium	5420	ug/L	50.0	13.0	1	08/06/19 14:15	08/07/19 15:37	7439-95-4	
Manganese	286	ug/L	5.0	2.1	1	08/06/19 14:15	08/07/19 15:37	7439-96-5	
Molybdenum	1030	ug/L	20.0	2.6	1	08/06/19 14:15	08/07/19 15:37	7439-98-7	
Potassium	3700	ug/L	500	79.0	1	08/06/19 14:15	08/07/19 15:37	7440-09-7	
Sodium	157000	ug/L	500	144	1	08/06/19 14:15	08/07/19 15:37	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/02/19 10:08	08/07/19 16:17	7440-36-0	
Arsenic	0.62J	ug/L	1.0	0.065	1	08/02/19 10:08	08/07/19 16:17	7440-38-2	
Cadmium	0.31J	ug/L	0.50	0.033	1	08/02/19 10:08	08/07/19 16:17	7440-43-9	
Chromium	0.20J	ug/L	1.0	0.078	1	08/02/19 10:08	08/08/19 10:39	7440-47-3	
Selenium	0.34J	ug/L	1.0	0.085	1	08/02/19 10:08	08/07/19 16:17	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/02/19 10:08	08/07/19 16:17	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:07	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	208	mg/L	20.0	6.5	1		08/13/19 16:24		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	630	mg/L	10.0	10.0	1		08/06/19 15:24		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	27.3	mg/L	2.0	0.44	2		08/13/19 05:50	16887-00-6	
Fluoride	1.8	mg/L	0.20	0.085	1		08/13/19 05:36	16984-48-8	
Sulfate	195	mg/L	20.0	4.6	20		08/13/19 06:35	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P03S **Lab ID: 60310412015** Collected: 07/31/19 15:15 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	274	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:20	7440-39-3	
Beryllium	0.27J	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:20	7440-41-7	
Boron	757	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:20	7440-42-8	
Calcium	107000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:20	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:20	7440-48-4	
Iron	16500	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:20	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:20	7439-92-1	
Lithium	15.2	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:20	7439-93-2	
Magnesium	40300	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:20	7439-95-4	
Manganese	246	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:20	7439-96-5	
Molybdenum	2.8J	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:20	7439-98-7	
Potassium	8130	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:20	7440-09-7	
Sodium	41800	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:20	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:16	7440-36-0	
Arsenic	320	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:16	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:16	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:16	7440-47-3	
Selenium	0.28J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:16	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:16	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:23	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	537	mg/L	20.0	6.5	1		08/14/19 14:41		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	552	mg/L	10.0	10.0	1		08/07/19 13:11		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	16.6	mg/L	1.0	0.22	1		08/15/19 16:32	16887-00-6	
Fluoride	0.29	mg/L	0.20	0.085	1		08/15/19 16:32	16984-48-8	
Sulfate	0.24J	mg/L	1.0	0.23	1		08/15/19 16:32	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P03D **Lab ID: 60310412016** Collected: 07/31/19 14:20 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	478	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:23	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:23	7440-41-7	
Boron	432	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:23	7440-42-8	
Calcium	131000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:23	7440-70-2	
Cobalt	2.0J	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:23	7440-48-4	
Iron	11000	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:23	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:23	7439-92-1	
Lithium	19.7	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:23	7439-93-2	
Magnesium	26600	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:23	7439-95-4	
Manganese	598	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:23	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:23	7439-98-7	
Potassium	3680	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:23	7440-09-7	
Sodium	14500	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:23	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:18	7440-36-0	
Arsenic	0.62J	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:18	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:18	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:18	7440-47-3	
Selenium	0.099J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:18	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:18	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:30	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	472	mg/L	20.0	6.5	1		08/14/19 14:47		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	499	mg/L	10.0	10.0	1		08/07/19 13:11		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	12.4	mg/L	1.0	0.22	1		08/15/19 16:47	16887-00-6	
Fluoride	0.23	mg/L	0.20	0.085	1		08/15/19 16:47	16984-48-8	
Sulfate	10.8	mg/L	1.0	0.23	1		08/15/19 16:47	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P05S **Lab ID: 60310412017** Collected: 07/31/19 10:50 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	158	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:25	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:25	7440-41-7	
Boron	3950	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:25	7440-42-8	
Calcium	60200	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:25	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:25	7440-48-4	
Iron	9240	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:25	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:25	7439-92-1	
Lithium	13.6	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:25	7439-93-2	
Magnesium	22000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:25	7439-95-4	
Manganese	262	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:25	7439-96-5	
Molybdenum	3.0J	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:25	7439-98-7	
Potassium	5560	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:25	7440-09-7	
Sodium	24700	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:25	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:25	7440-36-0	
Arsenic	167	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:25	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:25	7440-43-9	
Chromium	0.23J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:25	7440-47-3	
Selenium	0.23J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:25	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:25	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:33	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	280	mg/L	20.0	6.5	1		08/14/19 14:53		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	365	mg/L	5.0	5.0	1		08/07/19 13:11		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.5	mg/L	2.0	0.44	2		08/15/19 17:17	16887-00-6	
Fluoride	0.38	mg/L	0.20	0.085	1		08/15/19 17:02	16984-48-8	
Sulfate	15.0	mg/L	1.0	0.23	1		08/15/19 17:02	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P21S **Lab ID: 60310412018** Collected: 07/31/19 14:05 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	498	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:27	7440-39-3	
Beryllium	0.29J	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:27	7440-41-7	
Boron	590	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:27	7440-42-8	
Calcium	232000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:27	7440-70-2	
Cobalt	2.1J	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:27	7440-48-4	
Iron	20200	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:27	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:27	7439-92-1	
Lithium	21.3	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:27	7439-93-2	
Magnesium	59200	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:27	7439-95-4	
Manganese	4200	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:27	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:27	7439-98-7	
Potassium	5680	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:27	7440-09-7	
Sodium	35100	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:27	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:27	7440-36-0	
Arsenic	30.9	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:27	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:27	7440-43-9	
Chromium	0.10J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:27	7440-47-3	
Selenium	0.35J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:27	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:27	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:35	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	901	mg/L	20.0	6.5	1		08/14/19 15:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	933	mg/L	13.3	13.3	1		08/07/19 13:11		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	31.1	mg/L	10.0	2.2	10		08/15/19 03:59	16887-00-6	
Fluoride	0.42	mg/L	0.20	0.085	1		08/15/19 17:32	16984-48-8	
Sulfate	14.9	mg/L	1.0	0.23	1		08/15/19 17:32	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P211 **Lab ID: 60310412019** Collected: 07/31/19 12:17 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	19.7	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:29	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:29	7440-41-7	
Boron	1820	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:29	7440-42-8	
Calcium	9520	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:29	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:29	7440-48-4	
Iron	442	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:29	7439-89-6	
Lead	5.0J	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:29	7439-92-1	
Lithium	14.2	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:29	7439-93-2	
Magnesium	1180	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:29	7439-95-4	
Manganese	40.5	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:29	7439-96-5	
Molybdenum	54.3	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:29	7439-98-7	
Potassium	3170	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:29	7440-09-7	
Sodium	74400	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:29	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.11J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:29	7440-36-0	
Arsenic	5.7	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:29	7440-38-2	
Cadmium	0.15J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:29	7440-43-9	
Chromium	0.59J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:29	7440-47-3	
Selenium	0.97J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:29	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:29	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:37	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	110	mg/L	20.0	6.5	1		08/14/19 15:15		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	278	mg/L	5.0	5.0	1		08/07/19 13:12		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	28.3	mg/L	5.0	1.1	5		08/15/19 17:46	16887-00-6	
Fluoride	1.3	mg/L	0.20	0.085	1		08/15/19 04:46	16984-48-8	
Sulfate	30.5	mg/L	5.0	1.2	5		08/15/19 17:46	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P21D **Lab ID: 60310412020** Collected: 07/31/19 13:25 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	55.6	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:31	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:31	7440-41-7	
Boron	7400	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:31	7440-42-8	
Calcium	48000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:31	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:31	7440-48-4	
Iron	1230	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:31	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:31	7439-92-1	
Lithium	59.9	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:31	7439-93-2	
Magnesium	14800	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:31	7439-95-4	
Manganese	312	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:31	7439-96-5	
Molybdenum	416	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:31	7439-98-7	
Potassium	5590	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:31	7440-09-7	
Sodium	208000	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:31	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:31	7440-36-0	
Arsenic	0.57J	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:31	7440-38-2	
Cadmium	0.18J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:31	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:31	7440-47-3	
Selenium	0.22J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:31	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:31	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:39	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	287	mg/L	20.0	6.5	1		08/14/19 15:20		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	771	mg/L	10.0	10.0	1		08/07/19 13:12		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	193	mg/L	10.0	2.2	10		08/15/19 18:47	16887-00-6	
Fluoride	1.5	mg/L	0.20	0.085	1		08/15/19 05:17	16984-48-8	
Sulfate	93.5	mg/L	10.0	2.3	10		08/15/19 18:47	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P22S **Lab ID: 60310412021** Collected: 07/31/19 17:30 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	144	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:33	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:33	7440-41-7	
Boron	407	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:33	7440-42-8	
Calcium	159000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:33	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:33	7440-48-4	
Iron	359	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:33	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:33	7439-92-1	
Lithium	43.5	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:33	7439-93-2	
Magnesium	34000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:33	7439-95-4	
Manganese	355	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:33	7439-96-5	
Molybdenum	8.6J	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:33	7439-98-7	
Potassium	6600	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:33	7440-09-7	
Sodium	50900	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:33	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.087J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:33	7440-36-0	
Arsenic	0.95J	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:33	7440-38-2	
Cadmium	0.089J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:33	7440-43-9	
Chromium	0.083J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:33	7440-47-3	
Selenium	0.14J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:33	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:33	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:42	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	458	mg/L	20.0	6.5	1		08/14/19 15:26		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	768	mg/L	10.0	10.0	1		08/07/19 13:12		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	32.4	mg/L	10.0	2.2	10		08/14/19 17:56	16887-00-6	
Fluoride	0.40	mg/L	0.20	0.085	1		08/14/19 17:39	16984-48-8	
Sulfate	167	mg/L	10.0	2.3	10		08/14/19 17:56	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P221 **Lab ID: 60310412022** Collected: 07/31/19 15:15 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Barium	135	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:35	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:35	7440-41-7	
Boron	570	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:35	7440-42-8	
Calcium	68300	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:35	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:35	7440-48-4	
Iron	2390	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:35	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:35	7439-92-1	
Lithium	20.9	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:35	7439-93-2	
Magnesium	12000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:35	7439-95-4	
Manganese	525	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:35	7439-96-5	
Molybdenum	35.3	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:35	7439-98-7	
Potassium	5970	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:35	7440-09-7	
Sodium	58400	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:35	7440-23-5	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:35	7440-36-0	
Arsenic	13.0	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:35	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:35	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:35	7440-47-3	
Selenium	0.088J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:35	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:35	7440-28-0	
7470 Mercury Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	0.32	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:44	7439-97-6	
2320B Alkalinity Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	195	mg/L	20.0	6.5	1		08/14/19 15:31		
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	469	mg/L	10.0	10.0	1		08/07/19 13:12		
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	25.5	mg/L	5.0	1.1	5		08/15/19 09:37	16887-00-6	
Fluoride	0.79	mg/L	0.20	0.085	1		08/14/19 18:12	16984-48-8	
Sulfate	145	mg/L	10.0	2.3	10		08/14/19 18:29	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P22D **Lab ID: 60310412023** Collected: 08/01/19 09:15 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	62.1	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:37	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:37	7440-41-7	
Boron	9400	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:37	7440-42-8	M1
Calcium	21100	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:37	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:37	7440-48-4	
Iron	1130	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:37	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:37	7439-92-1	
Lithium	21.0	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:37	7439-93-2	
Magnesium	2470	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:37	7439-95-4	
Manganese	74.4	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:37	7439-96-5	
Molybdenum	376	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:37	7439-98-7	
Potassium	4350	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:37	7440-09-7	
Sodium	163000	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:37	7440-23-5	M1
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.10J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:37	7440-36-0	
Arsenic	13.8	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:37	7440-38-2	
Cadmium	0.21J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:37	7440-43-9	
Chromium	0.97J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:37	7440-47-3	
Selenium	0.86J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:37	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:37	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	0.54	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:46	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	277	mg/L	20.0	6.5	1		08/15/19 11:06		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	545	mg/L	10.0	10.0	1		08/07/19 13:14		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.5	mg/L	5.0	1.1	5		08/15/19 09:53	16887-00-6	
Fluoride	2.1	mg/L	0.20	0.085	1		08/14/19 18:46	16984-48-8	
Sulfate	96.6	mg/L	5.0	1.2	5		08/15/19 09:53	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P30S **Lab ID: 60310412024** Collected: 07/31/19 13:10 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	94.9	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:48	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:48	7440-41-7	
Boron	513	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:48	7440-42-8	
Calcium	141000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:48	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:48	7440-48-4	
Iron	572	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:48	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:48	7439-92-1	
Lithium	39.8	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:48	7439-93-2	
Magnesium	27000	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:48	7439-95-4	
Manganese	48.0	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:48	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:48	7439-98-7	
Potassium	5890	ug/L	500	79.0	1	08/07/19 10:30	08/08/19 11:27	7440-09-7	
Sodium	53300	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:48	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.10J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:48	7440-36-0	
Arsenic	2.0	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:48	7440-38-2	
Cadmium	0.034J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:48	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:48	7440-47-3	
Selenium	0.47J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:48	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:48	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 10:58	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	386	mg/L	20.0	6.5	1		08/14/19 15:41		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	728	mg/L	10.0	10.0	1		08/07/19 13:12		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	33.9	mg/L	5.0	1.1	5		08/14/19 21:18	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.085	1		08/14/19 21:01	16984-48-8	
Sulfate	147	mg/L	20.0	4.6	20		08/14/19 21:35	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-2 **Lab ID: 60310412025** Collected: 07/31/19 09:15 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	137	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:50	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:50	7440-41-7	
Boron	591	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:50	7440-42-8	
Calcium	69500	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:50	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:50	7440-48-4	
Iron	2380	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:50	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:50	7439-92-1	
Lithium	22.4	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:50	7439-93-2	
Magnesium	12400	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:50	7439-95-4	
Manganese	493	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:50	7439-96-5	
Molybdenum	37.0	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:50	7439-98-7	
Potassium	6050	ug/L	500	79.0	1	08/07/19 10:30	08/08/19 11:29	7440-09-7	
Sodium	59700	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:50	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:50	7440-36-0	
Arsenic	12.5	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:50	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:50	7440-43-9	
Chromium	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:50	7440-47-3	
Selenium	0.088J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:50	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:50	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	0.043J	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:00	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	183	mg/L	20.0	6.5	1		08/14/19 15:46		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	466	mg/L	10.0	10.0	1		08/07/19 13:13		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.7	mg/L	2.0	0.44	2		08/14/19 22:08	16887-00-6	
Fluoride	0.79	mg/L	0.20	0.085	1		08/14/19 21:52	16984-48-8	
Sulfate	147	mg/L	10.0	2.3	10		08/15/19 19:01	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-3 **Lab ID: 60310412026** Collected: 07/31/19 09:15 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	145	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:52	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:52	7440-41-7	
Boron	401	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:52	7440-42-8	
Calcium	161000	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:52	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:52	7440-48-4	
Iron	440	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:52	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:52	7439-92-1	
Lithium	42.1	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:52	7439-93-2	
Magnesium	34600	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:52	7439-95-4	
Manganese	361	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:52	7439-96-5	
Molybdenum	8.1J	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:52	7439-98-7	
Potassium	6790	ug/L	500	79.0	1	08/07/19 10:30	08/08/19 11:32	7440-09-7	
Sodium	51600	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:52	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.085J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:52	7440-36-0	
Arsenic	0.96J	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:52	7440-38-2	
Cadmium	0.089J	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:52	7440-43-9	
Chromium	0.13J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:52	7440-47-3	
Selenium	0.15J	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:52	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:52	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:02	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	454	mg/L	20.0	6.5	1		08/14/19 15:52		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	781	mg/L	10.0	10.0	1		08/07/19 13:13		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	32.5	mg/L	2.0	0.44	2		08/14/19 23:33	16887-00-6	
Fluoride	0.40	mg/L	0.20	0.085	1		08/14/19 23:16	16984-48-8	
Sulfate	159	mg/L	20.0	4.6	20		08/14/19 23:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-FB-3 **Lab ID: 60310412027** Collected: 07/31/19 13:20 Received: 08/02/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	<1.4	ug/L	5.0	1.4	1	08/07/19 10:30	08/07/19 17:54	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	08/07/19 10:30	08/07/19 17:54	7440-41-7	
Boron	<10.7	ug/L	100	10.7	1	08/07/19 10:30	08/07/19 17:54	7440-42-8	
Calcium	56.4J	ug/L	200	50.0	1	08/07/19 10:30	08/07/19 17:54	7440-70-2	
Cobalt	<0.84	ug/L	5.0	0.84	1	08/07/19 10:30	08/07/19 17:54	7440-48-4	
Iron	<14.0	ug/L	50.0	14.0	1	08/07/19 10:30	08/07/19 17:54	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/07/19 10:30	08/07/19 17:54	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	08/07/19 10:30	08/07/19 17:54	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	08/07/19 10:30	08/07/19 17:54	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	08/07/19 10:30	08/07/19 17:54	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/07/19 10:30	08/07/19 17:54	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	08/07/19 10:30	08/07/19 17:54	7440-09-7	
Sodium	<144	ug/L	500	144	1	08/07/19 10:30	08/07/19 17:54	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:46	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	08/07/19 13:30	08/08/19 14:46	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	08/07/19 13:30	08/08/19 14:46	7440-43-9	
Chromium	0.082J	ug/L	1.0	0.078	1	08/07/19 13:30	08/08/19 14:46	7440-47-3	
Selenium	<0.085	ug/L	1.0	0.085	1	08/07/19 13:30	08/08/19 14:46	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/07/19 13:30	08/08/19 14:46	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/08/19 12:18	08/09/19 11:05	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		08/14/19 15:57		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		08/07/19 13:13		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	0.46J	mg/L	1.0	0.22	1		08/15/19 00:06	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		08/15/19 00:06	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		08/15/19 00:06	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P01S **Lab ID: 60310412032** Collected: 08/15/19 15:25 Received: 08/16/19 03:25 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	256	ug/L	5.0	1.4	1	08/19/19 09:27	08/20/19 20:00	7440-39-3	
Beryllium	0.31J	ug/L	1.0	0.25	1	08/19/19 09:27	08/20/19 20:00	7440-41-7	B
Boron	189	ug/L	100	10.7	1	08/19/19 09:27	08/20/19 20:00	7440-42-8	
Calcium	160000	ug/L	200	50.0	1	08/19/19 09:27	08/20/19 20:00	7440-70-2	
Cobalt	1.9J	ug/L	5.0	0.84	1	08/19/19 09:27	08/20/19 20:00	7440-48-4	
Iron	3530	ug/L	50.0	14.0	1	08/19/19 09:27	08/20/19 20:00	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	08/19/19 09:27	08/20/19 20:00	7439-92-1	
Lithium	29.4	ug/L	10.0	5.9	1	08/19/19 09:27	08/20/19 20:00	7439-93-2	
Magnesium	31700	ug/L	50.0	13.0	1	08/19/19 09:27	08/20/19 20:00	7439-95-4	
Manganese	363	ug/L	5.0	2.1	1	08/19/19 09:27	08/20/19 20:00	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	08/19/19 09:27	08/20/19 20:00	7439-98-7	
Potassium	5660	ug/L	500	79.0	1	08/19/19 09:27	08/20/19 20:00	7440-09-7	
Sodium	21000	ug/L	500	144	1	08/19/19 09:27	08/20/19 20:00	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	08/19/19 10:11	08/20/19 12:30	7440-36-0	
Arsenic	11.3	ug/L	1.0	0.065	1	08/19/19 10:11	08/20/19 12:30	7440-38-2	
Cadmium	0.063J	ug/L	0.50	0.033	1	08/19/19 10:11	08/20/19 12:30	7440-43-9	
Chromium	0.25J	ug/L	1.0	0.078	1	08/19/19 10:11	08/20/19 12:30	7440-47-3	
Selenium	1.0	ug/L	1.0	0.085	1	08/19/19 10:11	08/20/19 12:30	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	08/19/19 10:11	08/20/19 12:30	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.037	ug/L	0.20	0.037	1	08/19/19 13:57	08/19/19 16:44	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	459	mg/L	20.0	6.5	1		08/27/19 21:51		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	643	mg/L	10.0	10.0	1		08/22/19 18:25		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	26.2	mg/L	10.0	2.2	10		09/05/19 03:14	16887-00-6	
Fluoride	0.13J	mg/L	0.20	0.085	1		09/05/19 02:59	16984-48-8	
Sulfate	96.2	mg/L	10.0	2.3	10		09/05/19 03:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601745 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004

METHOD BLANK: 2461609 Matrix: Water
 Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/08/19 15:13	

LABORATORY CONTROL SAMPLE: 2461610

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461611 2461612

Parameter	Units	60309737003		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Mercury	ug/L	ND	5	5	5.1	4.9	103	99	75-125	4	20		

MATRIX SPIKE SAMPLE: 2461613

Parameter	Units	60310411001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.037	5	5.1	101	75-125	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601748 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013

METHOD BLANK: 2461624 Matrix: Water
 Associated Lab Samples: 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/08/19 16:29	

LABORATORY CONTROL SAMPLE: 2461625

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461626 2461627

Parameter	Units	60310412011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.037	5	5	5.1	5.2	102	104	75-125	2	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601918 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60310412014, 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

METHOD BLANK: 2462389 Matrix: Water
 Associated Lab Samples: 60310412014, 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/09/19 10:03	

LABORATORY CONTROL SAMPLE: 2462390

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462391 2462392

Parameter	Units	60310412023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	0.54	5	5	5.0	4.8	90	86	75-125	4	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603980	Analysis Method: EPA 7470
QC Batch Method: EPA 7470	Analysis Description: 7470 Mercury
Associated Lab Samples: 60310412032	

METHOD BLANK: 2469762 Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.037	0.20	0.037	08/19/19 16:30	

LABORATORY CONTROL SAMPLE: 2469763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2469764 2469765

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60311893003 Result	Spike Conc.	Spike Conc.	Conc.								
Mercury	ug/L	ND	5	5	5	4.9	5.0	98	99	75-125	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	601401	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
Associated Lab Samples:	60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412011, 60310412013, 60310412014		

METHOD BLANK:	2460487	Matrix:	Water
Associated Lab Samples:	60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412011, 60310412013, 60310412014		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/07/19 14:31	
Beryllium	ug/L	<0.25	1.0	0.25	08/07/19 14:31	
Boron	ug/L	<10.7	100	10.7	08/07/19 14:31	
Calcium	ug/L	<50.0	200	50.0	08/07/19 14:31	
Cobalt	ug/L	<0.84	5.0	0.84	08/07/19 14:31	
Iron	ug/L	59.9	50.0	14.0	08/07/19 14:31	
Lead	ug/L	<3.4	10.0	3.4	08/07/19 14:31	
Lithium	ug/L	<5.9	10.0	5.9	08/07/19 14:31	
Magnesium	ug/L	<13.0	50.0	13.0	08/07/19 14:31	
Manganese	ug/L	<2.1	5.0	2.1	08/07/19 14:31	
Molybdenum	ug/L	<2.6	20.0	2.6	08/07/19 14:31	
Potassium	ug/L	<79.0	500	79.0	08/07/19 14:31	
Sodium	ug/L	<144	500	144	08/07/19 14:31	

LABORATORY CONTROL SAMPLE: 2460488

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	998	100	85-115	
Beryllium	ug/L	1000	1010	101	85-115	
Boron	ug/L	1000	970	97	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Cobalt	ug/L	1000	987	99	85-115	
Iron	ug/L	10000	10200	102	85-115	
Lead	ug/L	1000	1060	106	85-115	
Lithium	ug/L	1000	992	99	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Molybdenum	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460489 2460490

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60310411001 Result	Spike Conc.	Spike Conc.	MS Result						
Barium	ug/L	16.4	1000	1000	994	998	98	98	70-130	0	20
Beryllium	ug/L	<0.25	1000	1000	1010	1010	101	101	70-130	0	20

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460489												2460490	
Parameter	Units	60310411001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Boron	ug/L	2980	1000	1000	3980	4030	100	105	70-130	1	20		
Calcium	ug/L	27300	10000	10000	37800	38500	106	112	70-130	2	20		
Cobalt	ug/L	<0.84	1000	1000	967	975	97	98	70-130	1	20		
Iron	ug/L	24.2J	10000	10000	10100	10100	101	101	70-130	0	20		
Lead	ug/L	<3.4	1000	1000	1030	1040	103	104	70-130	1	20		
Lithium	ug/L	<5.9	1000	1000	979	980	98	98	70-130	0	20		
Magnesium	ug/L	1240	10000	10000	11100	11200	99	99	70-130	1	20		
Manganese	ug/L	4.8J	1000	1000	972	982	97	98	70-130	1	20		
Molybdenum	ug/L	135	1000	1000	1140	1160	101	102	70-130	1	20		
Potassium	ug/L	5940	10000	10000	16000	16200	101	103	70-130	1	20		
Sodium	ug/L	125000	10000	10000	137000	140000	114	141	70-130	2	20	M1	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2460491												2460492	
Parameter	Units	60310412011 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Barium	ug/L	112	1000	1000	1090	1090	98	98	70-130	0	20		
Beryllium	ug/L	0.25J	1000	1000	997	1000	100	100	70-130	1	20		
Boron	ug/L	7480	1000	1000	8350	8570	88	110	70-130	3	20		
Calcium	ug/L	50000	10000	10000	59300	60500	93	105	70-130	2	20		
Cobalt	ug/L	<0.84	1000	1000	967	977	97	98	70-130	1	20		
Iron	ug/L	3230	10000	10000	13200	13300	100	100	70-130	0	20		
Lead	ug/L	<3.4	1000	1000	1030	1020	103	102	70-130	0	20		
Lithium	ug/L	38.3	1000	1000	1040	1030	100	99	70-130	1	20		
Magnesium	ug/L	10900	10000	10000	20600	20800	97	100	70-130	1	20		
Manganese	ug/L	497	1000	1000	1460	1480	96	98	70-130	1	20		
Molybdenum	ug/L	648	1000	1000	1650	1680	100	103	70-130	2	20		
Potassium	ug/L	7090	10000	10000	17200	17300	102	102	70-130	0	20		
Sodium	ug/L	129000	10000	10000	138000	140000	87	112	70-130	2	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	601592	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
Associated Lab Samples:	60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027		

METHOD BLANK:	2461196	Matrix:	Water
Associated Lab Samples:	60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/07/19 16:55	
Beryllium	ug/L	<0.25	1.0	0.25	08/07/19 16:55	
Boron	ug/L	<10.7	100	10.7	08/07/19 16:55	
Calcium	ug/L	<50.0	200	50.0	08/07/19 16:55	
Cobalt	ug/L	<0.84	5.0	0.84	08/07/19 16:55	
Iron	ug/L	<14.0	50.0	14.0	08/07/19 16:55	
Lead	ug/L	<3.4	10.0	3.4	08/07/19 16:55	
Lithium	ug/L	<5.9	10.0	5.9	08/07/19 16:55	
Magnesium	ug/L	<13.0	50.0	13.0	08/07/19 16:55	
Manganese	ug/L	<2.1	5.0	2.1	08/07/19 16:55	
Molybdenum	ug/L	<2.6	20.0	2.6	08/07/19 16:55	
Potassium	ug/L	<79.0	500	79.0	08/07/19 16:55	
Sodium	ug/L	176J	500	144	08/07/19 16:55	

LABORATORY CONTROL SAMPLE: 2461197

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	951	95	85-115	
Beryllium	ug/L	1000	943	94	85-115	
Boron	ug/L	1000	900	90	85-115	
Calcium	ug/L	10000	9780	98	85-115	
Cobalt	ug/L	1000	964	96	85-115	
Iron	ug/L	10000	9560	96	85-115	
Lead	ug/L	1000	1020	102	85-115	
Lithium	ug/L	1000	982	98	85-115	
Magnesium	ug/L	10000	9830	98	85-115	
Manganese	ug/L	1000	960	96	85-115	
Molybdenum	ug/L	1000	990	99	85-115	
Potassium	ug/L	10000	9810	98	85-115	
Sodium	ug/L	10000	10200	102	85-115	

MATRIX SPIKE SAMPLE: 2461198

Parameter	Units	60310873002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	46.9	1000	1060	102	70-130	
Beryllium	ug/L	ND	1000	987	99	70-130	
Boron	ug/L	432	1000	1430	100	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

MATRIX SPIKE SAMPLE: 2461198		60310873002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Calcium	ug/L	152000	10000	164000	127	70-130	
Cobalt	ug/L	ND	1000	977	98	70-130	
Iron	ug/L	ND	10000	10000	100	70-130	
Lead	ug/L	ND	1000	1030	103	70-130	
Lithium	ug/L	29.7	1000	1090	106	70-130	
Magnesium	ug/L	152000	10000	167000	147	70-130	M1
Manganese	ug/L	ND	1000	987	98	70-130	
Molybdenum	ug/L	ND	1000	1060	106	70-130	
Potassium	ug/L	14000	10000	25000	110	70-130	
Sodium	ug/L	116000	10000	128000	118	70-130	

MATRIX SPIKE SAMPLE: 2461199		60310412023	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	ug/L	62.1	1000	1020	96	70-130	
Beryllium	ug/L	<0.25	1000	966	97	70-130	
Boron	ug/L	9400	1000	10700	131	70-130	M1
Calcium	ug/L	21100	10000	32000	108	70-130	
Cobalt	ug/L	<0.84	1000	958	96	70-130	
Iron	ug/L	1130	10000	10900	98	70-130	
Lead	ug/L	<3.4	1000	995	99	70-130	
Lithium	ug/L	21.0	1000	1020	100	70-130	
Magnesium	ug/L	2470	10000	12400	100	70-130	
Manganese	ug/L	74.4	1000	1060	98	70-130	
Molybdenum	ug/L	376	1000	1410	103	70-130	
Potassium	ug/L	4350	10000	14700	103	70-130	
Sodium	ug/L	163000	10000	181000	178	70-130	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601954 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60310412008, 60310412009, 60310412010, 60310412012

METHOD BLANK: 2462491 Matrix: Water
 Associated Lab Samples: 60310412008, 60310412009, 60310412010, 60310412012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/09/19 19:07	
Beryllium	ug/L	<0.25	1.0	0.25	08/09/19 19:07	
Boron	ug/L	<10.7	100	10.7	08/09/19 19:07	
Calcium	ug/L	56.0J	200	50.0	08/09/19 19:07	
Cobalt	ug/L	<0.84	5.0	0.84	08/09/19 19:07	
Iron	ug/L	<14.0	50.0	14.0	08/12/19 14:09	
Lead	ug/L	<3.4	10.0	3.4	08/09/19 19:07	
Lithium	ug/L	<5.9	10.0	5.9	08/09/19 19:07	
Magnesium	ug/L	53.9	50.0	13.0	08/09/19 19:07	
Manganese	ug/L	<2.1	5.0	2.1	08/09/19 19:07	
Molybdenum	ug/L	<2.6	20.0	2.6	08/09/19 19:07	
Potassium	ug/L	<79.0	500	79.0	08/09/19 19:07	
Sodium	ug/L	<144	500	144	08/09/19 19:07	

LABORATORY CONTROL SAMPLE: 2462492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	915	92	85-115	
Beryllium	ug/L	1000	905	91	85-115	
Boron	ug/L	1000	923	92	85-115	
Calcium	ug/L	10000	9410	94	85-115	
Cobalt	ug/L	1000	928	93	85-115	
Iron	ug/L	10000	8860	89	85-115	
Lead	ug/L	1000	985	99	85-115	
Lithium	ug/L	1000	965	97	85-115	
Magnesium	ug/L	10000	9600	96	85-115	
Manganese	ug/L	1000	948	95	85-115	
Molybdenum	ug/L	1000	958	96	85-115	
Potassium	ug/L	10000	9630	96	85-115	
Sodium	ug/L	10000	9760	98	85-115	

MATRIX SPIKE SAMPLE: 2462493

Parameter	Units	60311085001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	0.031 mg/L	1000	983	95	70-130	
Beryllium	ug/L	<0.0010 mg/L	1000	930	93	70-130	
Boron	ug/L	0.37 mg/L	1000	1380	101	70-130	
Calcium	ug/L	160 mg/L	10000	185000	243	70-130 M1	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

MATRIX SPIKE SAMPLE: 2462493		60311085001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	ug/L	<5.0	1000	923	92	70-130	
Iron	ug/L	62.8	10000	10400	103	70-130	
Lead	ug/L	<0.010 mg/L	1000	967	96	70-130	
Lithium	ug/L	0.011 mg/L	1000	1030	102	70-130	
Magnesium	ug/L	42400	10000	55800	134	70-130	M1
Manganese	ug/L	132	1000	1100	97	70-130	
Molybdenum	ug/L	<20.0	1000	998	100	70-130	
Potassium	ug/L	1490	10000	11800	103	70-130	
Sodium	ug/L	70800	10000	88100	173	70-130	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2462494		2462495										
Parameter	Units	60310790007	MS	MSD	MS	MSD	MS	MSD	% Rec	Max		
		Result	Spike	Spike	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	ug/L	63.4	1000	1000	972	999	91	94	70-130	3	20	
Beryllium	ug/L		1000	1000	846	877	85	88	70-130	4	20	
Boron	ug/L		1000	1000	15400	15800	90	128	70-130	2	20	
Calcium	ug/L		10000	10000	275000	285000	-18	83	70-130	4	20	M1
Cobalt	ug/L		1000	1000	883	900	88	90	70-130	2	20	
Iron	ug/L		10000	10000	8230	8550	81	84	70-130	4	20	
Lead	ug/L		1000	1000	915	937	91	94	70-130	2	20	
Lithium	ug/L	44.8	1000	1000	1070	1000	102	96	70-130	6	20	
Magnesium	ug/L		10000	10000	63800	66700	73	102	70-130	4	20	
Manganese	ug/L		1000	1000	2510	2620	86	96	70-130	4	20	
Molybdenum	ug/L	1140	1000	1000	2130	2140	98	100	70-130	1	20	
Potassium	ug/L		10000	10000	14800	15000	97	100	70-130	2	20	
Sodium	ug/L		10000	10000	172000	159000	240	117	70-130	7	20	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603943 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60310412032

METHOD BLANK: 2469675 Matrix: Water
 Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	08/20/19 19:11	
Beryllium	ug/L	0.30J	1.0	0.25	08/20/19 19:11	
Boron	ug/L	<10.7	100	10.7	08/20/19 19:11	
Calcium	ug/L	<50.0	200	50.0	08/20/19 19:11	
Cobalt	ug/L	<0.84	5.0	0.84	08/20/19 19:11	
Iron	ug/L	<14.0	50.0	14.0	08/20/19 19:11	
Lead	ug/L	<3.4	10.0	3.4	08/20/19 19:11	
Lithium	ug/L	<5.9	10.0	5.9	08/20/19 19:11	
Magnesium	ug/L	<13.0	50.0	13.0	08/20/19 19:11	
Manganese	ug/L	<2.1	5.0	2.1	08/20/19 19:11	
Molybdenum	ug/L	<2.6	20.0	2.6	08/20/19 19:11	
Potassium	ug/L	<79.0	500	79.0	08/20/19 19:11	
Sodium	ug/L	<144	500	144	08/20/19 19:11	

LABORATORY CONTROL SAMPLE: 2469676

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	957	96	85-115	
Beryllium	ug/L	1000	959	96	85-115	
Boron	ug/L	1000	930	93	85-115	
Calcium	ug/L	10000	9390	94	85-115	
Cobalt	ug/L	1000	988	99	85-115	
Iron	ug/L	10000	9480	95	85-115	
Lead	ug/L	1000	1040	104	85-115	
Lithium	ug/L	1000	991	99	85-115	
Magnesium	ug/L	10000	9680	97	85-115	
Manganese	ug/L	1000	976	98	85-115	
Molybdenum	ug/L	1000	991	99	85-115	
Potassium	ug/L	10000	9520	95	85-115	
Sodium	ug/L	10000	9850	98	85-115	

MATRIX SPIKE SAMPLE: 2469677

Parameter	Units	60312020003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	558	1000	1480	92	70-130	
Beryllium	ug/L	<0.25	1000	940	94	70-130	
Boron	ug/L	381	1000	1310	93	70-130	
Calcium	ug/L	75100	10000	79700	45	70-130 M1	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

MATRIX SPIKE SAMPLE: 2469677

Parameter	Units	60312020003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	ug/L	<0.84	1000	963	96	70-130	
Iron	ug/L	38400	10000	45200	68	70-130	M1
Lead	ug/L	<3.4	1000	1000	100	70-130	
Lithium	ug/L	<5.9	1000	992	99	70-130	
Magnesium	ug/L	30900	10000	38400	76	70-130	
Manganese	ug/L	4440	1000	5150	70	70-130	
Molybdenum	ug/L	<2.6	1000	994	99	70-130	
Potassium	ug/L	1170	10000	10600	94	70-130	
Sodium	ug/L	37100	10000	45000	79	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2469678 2469679

Parameter	Units	60311920002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	ug/L	64.6	1000	1000	1040	1050	98	99	70-130	1	20	
Beryllium	ug/L	0.45J	1000	1000	954	967	95	97	70-130	1	20	
Boron	ug/L	2410	1000	1000	3370	3440	95	103	70-130	2	20	
Calcium	ug/L	221000	10000	10000	229000	234000	79	136	70-130	2	20	M1
Cobalt	ug/L	<0.84	1000	1000	963	968	96	97	70-130	1	20	
Iron	ug/L	15900	10000	10000	25100	25500	93	96	70-130	1	20	
Lead	ug/L	<3.4	1000	1000	1000	1000	100	100	70-130	0	20	
Lithium	ug/L	43.3	1000	1000	1060	1070	102	103	70-130	0	20	
Magnesium	ug/L	62400	10000	10000	71800	73200	94	108	70-130	2	20	
Manganese	ug/L	584	1000	1000	1540	1570	96	98	70-130	2	20	
Molybdenum	ug/L	107	1000	1000	1020	1020	91	92	70-130	0	20	
Potassium	ug/L	8230	10000	10000	18100	18400	99	102	70-130	2	20	
Sodium	ug/L	196000	10000	10000	205000	213000	93	171	70-130	4	20	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	600688	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Samples:	60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014		

METHOD BLANK:	2458313	Matrix:	Water
Associated Lab Samples:	60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	0.12J	1.0	0.078	08/07/19 15:30	
Arsenic	ug/L	<0.065	1.0	0.065	08/07/19 15:30	
Cadmium	ug/L	<0.033	0.50	0.033	08/07/19 15:30	
Chromium	ug/L	<0.078	1.0	0.078	08/08/19 10:12	
Selenium	ug/L	<0.085	1.0	0.085	08/07/19 15:30	
Thallium	ug/L	<0.099	1.0	0.099	08/07/19 15:30	

LABORATORY CONTROL SAMPLE: 2458314

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.5	99	85-115	
Arsenic	ug/L	40	40.6	102	85-115	
Cadmium	ug/L	40	40.2	100	85-115	
Chromium	ug/L	40	38.9	97	85-115	
Selenium	ug/L	40	43.4	109	85-115	
Thallium	ug/L	40	36.9	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2458315 2458316

Parameter	Units	60310411001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Spike Conc.	MSD Spike Conc.	MS Result						
Antimony	ug/L	0.62J	40	40	39.6	40.4	98	100	70-130	2	20	
Arsenic	ug/L	10.7	40	40	50.3	51.7	99	102	70-130	3	20	
Cadmium	ug/L	0.052J	40	40	38.4	39.2	96	98	70-130	2	20	
Chromium	ug/L	<0.078	40	40	34.5	35.1	86	88	70-130	2	20	
Selenium	ug/L	0.70J	40	40	40.2	41.2	99	101	70-130	2	20	
Thallium	ug/L	<0.099	40	40	37.3	38.1	93	95	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2458317 2458318

Parameter	Units	60310412011 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Spike Conc.	MSD Spike Conc.	MS Result						
Antimony	ug/L	<0.078	40	40	39.9	39.8	100	99	70-130	0	20	
Arsenic	ug/L	1.2	40	40	42.3	42.5	103	103	70-130	1	20	
Cadmium	ug/L	0.19J	40	40	39.1	38.7	97	96	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameter	Units	2458317		2458318		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60310412011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							
Chromium	ug/L	<0.078	40	40	34.3	35.0	86	87	70-130	2	20	
Selenium	ug/L	0.27J	40	40	41.5	41.0	103	102	70-130	1	20	
Thallium	ug/L	<0.099	40	40	38.3	38.0	96	95	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	601684	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Samples:	60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027		

METHOD BLANK:	2461362	Matrix:	Water
Associated Lab Samples:	60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/08/19 14:01	
Arsenic	ug/L	<0.065	1.0	0.065	08/08/19 14:01	
Cadmium	ug/L	<0.033	0.50	0.033	08/08/19 14:01	
Chromium	ug/L	<0.078	1.0	0.078	08/08/19 14:01	
Selenium	ug/L	<0.085	1.0	0.085	08/08/19 14:01	
Thallium	ug/L	<0.099	1.0	0.099	08/08/19 14:01	

LABORATORY CONTROL SAMPLE: 2461363

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.9	97	85-115	
Arsenic	ug/L	40	38.2	96	85-115	
Cadmium	ug/L	40	38.4	96	85-115	
Chromium	ug/L	40	36.5	91	85-115	
Selenium	ug/L	40	40.0	100	85-115	
Thallium	ug/L	40	35.1	88	85-115	

MATRIX SPIKE SAMPLE: 2461364

Parameter	Units	60310411008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.094J	40	41.3	103	70-130	
Arsenic	ug/L	115	40	156	104	70-130	
Cadmium	ug/L	<0.033	40	38.8	97	70-130	
Chromium	ug/L	0.14J	40	37.6	94	70-130	
Selenium	ug/L	0.73J	40	40.8	100	70-130	
Thallium	ug/L	<0.099	40	33.6	84	70-130	

MATRIX SPIKE SAMPLE: 2461365

Parameter	Units	60310412023 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	0.10J	40	42.5	106	70-130	
Arsenic	ug/L	13.8	40	54.7	102	70-130	
Cadmium	ug/L	0.21J	40	40.2	100	70-130	
Chromium	ug/L	0.97J	40	35.9	87	70-130	
Selenium	ug/L	0.86J	40	40.3	99	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

MATRIX SPIKE SAMPLE:		2461365					
Parameter	Units	60310412023 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Thallium	ug/L	<0.099	40	34.2	86	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60310412

QC Batch: 603985 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60310412032

METHOD BLANK: 2469777 Matrix: Water
Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	08/20/19 11:55	
Arsenic	ug/L	<0.065	1.0	0.065	08/20/19 11:55	
Cadmium	ug/L	<0.033	0.50	0.033	08/20/19 11:55	
Chromium	ug/L	<0.078	1.0	0.078	08/20/19 11:55	
Selenium	ug/L	<0.085	1.0	0.085	08/20/19 11:55	
Thallium	ug/L	<0.099	1.0	0.099	08/20/19 11:55	

LABORATORY CONTROL SAMPLE: 2469778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.5	96	85-115	
Arsenic	ug/L	40	37.8	94	85-115	
Cadmium	ug/L	40	38.6	97	85-115	
Chromium	ug/L	40	40.2	101	85-115	
Selenium	ug/L	40	39.0	97	85-115	
Thallium	ug/L	40	36.6	91	85-115	

MATRIX SPIKE SAMPLE: 2469779

Parameter	Units	60312020003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	40.4	101	70-130	
Arsenic	ug/L	4.3	40	43.0	97	70-130	
Cadmium	ug/L	<0.033	40	38.6	96	70-130	
Chromium	ug/L	0.097J	40	41.9	104	70-130	
Selenium	ug/L	<0.085	40	38.6	96	70-130	
Thallium	ug/L	<0.099	40	38.3	96	70-130	

MATRIX SPIKE SAMPLE: 2469780

Parameter	Units	60311920002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	38.9	97	70-130	
Arsenic	ug/L	4.0	40	43.0	98	70-130	
Cadmium	ug/L	<0.033	40	36.4	91	70-130	
Chromium	ug/L	0.084J	40	39.5	98	70-130	
Selenium	ug/L	<0.085	40	37.3	93	70-130	
Thallium	ug/L	<0.099	40	39.7	99	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 602800

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014

METHOD BLANK: 2465347

Matrix: Water

Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	08/13/19 14:51	

LABORATORY CONTROL SAMPLE: 2465348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	490	98	90-110	

SAMPLE DUPLICATE: 2465349

Parameter	Units	60310412001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	375	384	2	10	

SAMPLE DUPLICATE: 2465350

Parameter	Units	60310412011 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	122	130	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603184 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024, 60310412025, 60310412026, 60310412027

METHOD BLANK: 2466673 Matrix: Water
 Associated Lab Samples: 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024, 60310412025, 60310412026, 60310412027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/14/19 14:04	

LABORATORY CONTROL SAMPLE: 2466674

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	497	99	90-110	

SAMPLE DUPLICATE: 2466675

Parameter	Units	60310411008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	693	700	1	10	

SAMPLE DUPLICATE: 2466676

Parameter	Units	60310412022 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	195	185	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603364

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60310412023

METHOD BLANK: 2467297

Matrix: Water

Associated Lab Samples: 60310412023

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/15/19 10:55	

LABORATORY CONTROL SAMPLE: 2467298

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	486	97	90-110	

SAMPLE DUPLICATE: 2467299

Parameter	Units	60310412023 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	277	296	7	10	

SAMPLE DUPLICATE: 2467300

Parameter	Units	60310791002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	186	187	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 606001

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60310412032

METHOD BLANK: 2476839

Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	08/27/19 19:38	

LABORATORY CONTROL SAMPLE: 2476840

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	489	98	90-110	

SAMPLE DUPLICATE: 2476841

Parameter	Units	60312038007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	403	457	12	10	D6

SAMPLE DUPLICATE: 2476842

Parameter	Units	60312415002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	538	548	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 600971

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013

METHOD BLANK: 2459397

Matrix: Water

Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/05/19 12:36	

LABORATORY CONTROL SAMPLE: 2459398

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 2459399

Parameter	Units	60310288001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1540	1590	3	10	

SAMPLE DUPLICATE: 2459400

Parameter	Units	60310412011 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	630	630	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601288	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310412014	

METHOD BLANK: 2460094 Matrix: Water

Associated Lab Samples: 60310412014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/06/19 15:23	

LABORATORY CONTROL SAMPLE: 2460095

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

SAMPLE DUPLICATE: 2460096

Parameter	Units	60310411001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	493	492	0	10	

SAMPLE DUPLICATE: 2460097

Parameter	Units	60310629007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4180	4010	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 601524

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

METHOD BLANK: 2460999

Matrix: Water

Associated Lab Samples: 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/07/19 13:10	

LABORATORY CONTROL SAMPLE: 2461000

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	982	98	80-120	

SAMPLE DUPLICATE: 2461001

Parameter	Units	60310791002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	822	809	2	10	

SAMPLE DUPLICATE: 2461002

Parameter	Units	60310412023 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	545	600	10	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	604897	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples:	60310412032		

METHOD BLANK: 2472721 Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/22/19 18:25	

LABORATORY CONTROL SAMPLE: 2472722

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	500	502	100	80-120	

SAMPLE DUPLICATE: 2472723

Parameter	Units	60312388003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	454	463	2	10	H3

SAMPLE DUPLICATE: 2472724

Parameter	Units	60312038003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	825	847	3	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 602370 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005

METHOD BLANK: 2463833 Matrix: Water
 Associated Lab Samples: 60310412001, 60310412002, 60310412003, 60310412004, 60310412005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/09/19 17:18	
Fluoride	mg/L	<0.085	0.20	0.085	08/09/19 17:18	
Sulfate	mg/L	<0.23	1.0	0.23	08/09/19 17:18	

LABORATORY CONTROL SAMPLE: 2463834

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	2.5	99	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2463835 2463836

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60310411001 Result	Spike Conc.	Spike Conc.	Result								
Chloride	mg/L	22.5	10	10	33.4	33.1	109	106	80-120	1	15		
Fluoride	mg/L	0.86	2.5	2.5	3.4	3.5	102	104	80-120	2	15		
Sulfate	mg/L	217	100	100	318	317	101	100	80-120	0	15		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60310412

QC Batch: 602701 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014

METHOD BLANK: 2465010 Matrix: Water
Associated Lab Samples: 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412011, 60310412012, 60310412013, 60310412014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/12/19 18:28	
Fluoride	mg/L	<0.085	0.20	0.085	08/12/19 18:28	
Sulfate	mg/L	<0.23	1.0	0.23	08/12/19 18:28	

LABORATORY CONTROL SAMPLE: 2465011

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.5	98	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE SAMPLE: 2465012

Parameter	Units	60310394001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	ND	2000	1940	87	80-120	
Fluoride	mg/L	ND	1000	1110	105	80-120	
Sulfate	mg/L	6010	2000	8210	110	80-120 E	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2465013 2465014

Parameter	Units	60310412011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	28.0	10	10	38.8	38.7	109	107	80-120	0	15	
Fluoride	mg/L	0.57	2.5	2.5	3.1	3.3	101	109	80-120	6	15	
Sulfate	mg/L	283	100	100	377	376	94	93	80-120	0	15	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 602824

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60310412008, 60310412009

METHOD BLANK: 2465411

Matrix: Water

Associated Lab Samples: 60310412008, 60310412009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/13/19 11:38	
Sulfate	mg/L	<0.23	1.0	0.23	08/13/19 11:38	

LABORATORY CONTROL SAMPLE: 2465412

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE SAMPLE: 2465415

Parameter	Units	60310797001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	96.4J	1000	957	86	80-120	
Sulfate	mg/L	2910	1000	3990	108	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603125 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60310412018, 60310412019, 60310412020

METHOD BLANK: 2466414 Matrix: Water

Associated Lab Samples: 60310412015, 60310412016, 60310412018, 60310412019, 60310412020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 12:29	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 12:29	

LABORATORY CONTROL SAMPLE: 2466415

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466416 2466417

Parameter	Units	60309975004		MS		MSD		% Rec	% Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result						
Chloride	mg/L	3940	2000	2000	5870	5890	97	98	80-120	0	15		
Fluoride	mg/L	ND	1000	1000	981	984	98	98	80-120	0	15		

MATRIX SPIKE SAMPLE: 2466418

Parameter	Units	60310411006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	22.1	10	32.0	99	80-120	
Fluoride	mg/L	0.88	2.5	3.4	102	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 603127 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

METHOD BLANK: 2466421 Matrix: Water
 Associated Lab Samples: 60310412021, 60310412022, 60310412023, 60310412024, 60310412025, 60310412026, 60310412027

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 11:57	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 11:57	
Sulfate	mg/L	<0.23	1.0	0.23	08/14/19 11:57	

LABORATORY CONTROL SAMPLE: 2466422

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466423 2466424

Parameter	Units	60310412023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	25.5	25	25	50.0	49.4	98	96	80-120	1	15	
Fluoride	mg/L	2.1	2.5	2.5	4.6	4.7	101	102	80-120	1	15	
Sulfate	mg/L	96.6	25	25	122	120	100	94	80-120	1	15 E	

MATRIX SPIKE SAMPLE: 2466425

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

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	603455	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
Associated Lab Samples:	60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412025		

METHOD BLANK: 2467640 Matrix: Water
Associated Lab Samples: 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412025

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/15/19 13:49	
Fluoride	mg/L	<0.085	0.20	0.085	08/15/19 13:49	
Sulfate	mg/L	<0.23	1.0	0.23	08/15/19 13:49	

LABORATORY CONTROL SAMPLE: 2467641

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2467642 2467643

Parameter	Units	60310792004		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result	% Rec	% Rec						
Chloride	mg/L	20.6	50	50	68.0	68.3	92	92	80-120	0	15				
Fluoride	mg/L	0.36	25	25	26.5	26.2	101	100	80-120	1	15				
Sulfate	mg/L	171	50	50	218	229	96	116	80-120	5	15 E				

MATRIX SPIKE SAMPLE: 2467644

Parameter	Units	60310412025 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	25.7	50	73.0	92	80-120	
Fluoride	mg/L	1.7J	25	27.0	101	80-120	
Sulfate	mg/L	147	50	198	103	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 607314	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310412032	

METHOD BLANK: 2481724 Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	09/04/19 23:20	
Fluoride	mg/L	<0.085	0.20	0.085	09/04/19 23:20	
Sulfate	mg/L	<0.23	1.0	0.23	09/04/19 23:20	

LABORATORY CONTROL SAMPLE: 2481725

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.2	103	90-110	
Fluoride	mg/L	2.5	2.7	106	90-110	
Sulfate	mg/L	5	5.2	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481726 2481727

Parameter	Units	60313163001		MS		MSD		% Rec	% Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result						
Chloride	mg/L	2120	2000	2000	4210	4250	104	107	80-120	1	15		
Fluoride	mg/L	ND	1000	1000	1100	1110	110	111	80-120	1	15		
Sulfate	mg/L	ND	2000	2000	2190	2200	105	105	80-120	1	15		

MATRIX SPIKE SAMPLE: 2481728

Parameter	Units	60313661005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	900	250	1150	101	80-120	E
Fluoride	mg/L	ND	125	143	109	80-120	
Sulfate	mg/L	59.8	250	321	104	80-120	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P051 **Lab ID: 60310412001** Collected: 07/30/19 15:05 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.359 ± 0.331 (0.195) C:NA T:96%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.358 ± 0.464 (0.990) C:88% T:82%	pCi/L	08/19/19 18:23	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P10S **Lab ID: 60310412002** Collected: 07/30/19 15:00 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0879 ± 0.826 (1.59) C:NA T:92%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.465 ± 0.397 (0.799) C:87% T:89%	pCi/L	08/19/19 18:23	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P29S **Lab ID: 60310412003** Collected: 07/30/19 10:00 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.771 ± 0.849 (1.36) C:NA T:84%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.649 ± 0.374 (0.681) C:75% T:86%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P29D **Lab ID: 60310412004** Collected: 07/30/19 11:25 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.934 ± 0.620 (0.723) C:NA T:93%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.704 ± 0.336 (0.548) C:78% T:87%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P31S **Lab ID: 60310412005** Collected: 07/30/19 13:30 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.388 ± 0.357 (0.210) C:NA T:94%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.590 ± 0.331 (0.593) C:82% T:88%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.154 ± 0.524 (1.16) C:NA T:90%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.166 ± 0.338 (0.744) C:84% T:80%	pCi/L	08/19/19 11:39	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.399 ± 0.416 (0.587) C:NA T:87%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	1.68 ± 0.533 (0.694) C:77% T:84%	pCi/L	08/19/19 11:39	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-1 **Lab ID: 60310412008** Collected: 07/30/19 08:00 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.965 ± 0.665 (0.710) C:NA T:79%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.144 ± 0.513 (1.16) C:79% T:53%	pCi/L	08/19/19 15:06	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-17S **Lab ID: 60310412009** Collected: 07/30/19 11:20 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.628 ± 0.631 (0.983) C:NA T:93%	pCi/L	08/20/19 16:59	13982-63-3	
Radium-228	EPA 904.0	0.269 ± 0.378 (0.812) C:77% T:81%	pCi/L	08/19/19 15:06	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-171 **Lab ID: 60310412010** Collected: 07/30/19 10:00 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.217 ± 0.496 (0.799) C:NA T:71%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	0.0758 ± 0.481 (1.10) C:69% T:60%	pCi/L	08/19/19 15:06	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.586 ± 0.633 (1.02) C:NA T:88%	pCi/L	08/20/19 16:24	13982-63-3	
Radium-228	EPA 904.0	0.0603 ± 0.391 (0.898) C:76% T:88%	pCi/L	08/19/19 18:23	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-19I **Lab ID: 60310412012** Collected: 07/30/19 13:25 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.478 (1.04) C:NA T:85%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	0.816 ± 0.786 (1.61) C:75% T:37%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-19S **Lab ID: 60310412013** Collected: 07/30/19 15:35 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.473 ± 0.538 (0.849) C:NA T:90%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	1.09 ± 0.411 (0.579) C:76% T:85%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-19D **Lab ID: 60310412014** Collected: 07/30/19 14:32 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.235 ± 0.358 (0.576) C:NA T:94%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	0.972 ± 0.433 (0.702) C:73% T:83%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P03S **Lab ID: 60310412015** Collected: 07/31/19 15:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.521 (1.08) C:NA T:95%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	0.416 ± 0.364 (0.736) C:72% T:89%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P03D **Lab ID: 60310412016** Collected: 07/31/19 14:20 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.25 ± 0.872 (1.17) C:NA T:88%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	1.08 ± 0.429 (0.663) C:77% T:87%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P05S **Lab ID: 60310412017** Collected: 07/31/19 10:50 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.669 ± 0.700 (1.10) C:NA T:93%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	0.758 ± 0.330 (0.531) C:99% T:82%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P21S **Lab ID: 60310412018** Collected: 07/31/19 14:05 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.29 ± 0.855 (1.13) C:NA T:90%	pCi/L	08/20/19 17:13	13982-63-3	
Radium-228	EPA 904.0	1.11 ± 0.441 (0.680) C:79% T:84%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P211 **Lab ID: 60310412019** Collected: 07/31/19 12:17 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.364 ± 0.335 (0.197) C:NA T:94%	pCi/L	08/20/19 17:28	13982-63-3	
Radium-228	EPA 904.0	0.0131 ± 0.277 (0.648) C:75% T:87%	pCi/L	08/19/19 15:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P21D **Lab ID: 60310412020** Collected: 07/31/19 13:25 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.948 ± 0.664 (0.801) C:NA T:88%	pCi/L	08/20/19 17:28	13982-63-3	
Radium-228	EPA 904.0	0.331 ± 0.338 (0.699) C:78% T:86%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P22S **Lab ID: 60310412021** Collected: 07/31/19 17:30 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.308 ± 0.371 (0.567) C:NA T:96%	pCi/L	08/20/19 17:28	13982-63-3	
Radium-228	EPA 904.0	0.763 ± 0.383 (0.677) C:81% T:91%	pCi/L	08/19/19 11:41	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P221 **Lab ID: 60310412022** Collected: 07/31/19 15:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.578 ± 0.813 (1.38) C:NA T:94%	pCi/L	08/20/19 17:28	13982-63-3	
Radium-228	EPA 904.0	0.341 ± 0.332 (0.680) C:78% T:83%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P22D **Lab ID: 60310412023** Collected: 08/01/19 09:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0772 ± 0.693 (1.34) C:NA T:77%	pCi/L	08/20/19 16:37	13982-63-3	
Radium-228	EPA 904.0	0.224 ± 0.514 (1.14) C:65% T:81%	pCi/L	08/19/19 18:26	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P30S **Lab ID: 60310412024** Collected: 07/31/19 13:10 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.625 (1.32) C:NA T:88%	pCi/L	08/20/19 17:28	13982-63-3	
Radium-228	EPA 904.0	0.399 ± 0.299 (0.582) C:85% T:85%	pCi/L	08/19/19 11:42	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-2 **Lab ID: 60310412025** Collected: 07/31/19 09:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.496 ± 0.547 (0.806) C:NA T:102%	pCi/L	08/19/19 11:23	13982-63-3	
Radium-228	EPA 904.0	-0.103 ± 0.333 (0.799) C:73% T:84%	pCi/L	08/19/19 15:03	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-DUP-3 **Lab ID: 60310412026** Collected: 07/31/19 09:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.506 ± 0.612 (0.920) C:NA T:93%	pCi/L	08/19/19 11:51	13982-63-3	
Radium-228	EPA 904.0	0.462 ± 0.418 (0.857) C:75% T:85%	pCi/L	08/19/19 15:05	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-NE-FB-3 **Lab ID: 60310412027** Collected: 07/31/19 13:20 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.485 ± 0.587 (0.881) C:NA T:88%	pCi/L	08/19/19 11:23	13982-63-3	
Radium-228	EPA 904.0	0.0580 ± 0.350 (0.798) C:78% T:86%	pCi/L	08/19/19 15:04	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P-17D MS **Lab ID: 60310412028** Collected: 07/30/19 10:20 Received: 07/31/19 02:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	125.50 %REC ± NA (NA) C:NA T:NA	pCi/L	08/20/19 16:37	13982-63-3	
Radium-228	EPA 904.0	107.51 %REC ± NA (NA) C:NA T:NA	pCi/L	08/19/19 18:33	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	101.27 %REC NA (NA) C:NA T:NA	21.37 RPD ± pCi/L	08/20/19 16:37	13982-63-3	
Radium-228	EPA 904.0	102.85 %REC NA (NA) C:NA T:NA	4.44 RPD ± pCi/L	08/19/19 20:00	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P22D MS **Lab ID: 60310412030** Collected: 08/01/19 09:15 Received: 08/02/19 02:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	128.36 %REC ± NA (NA) C:NA T:NA	pCi/L	08/20/19 16:48	13982-63-3	
Radium-228	EPA 904.0	101.10 %REC ± NA (NA) C:NA T:NA	pCi/L	08/19/19 20:00	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	105.01 %REC 20.02 RPD ± NA (NA) C:NA T:NA	pCi/L	08/20/19 16:37	13982-63-3	
Radium-228	EPA 904.0	97.26 %REC 3.87 RPD ± NA (NA) C:NA T:NA	pCi/L	08/19/19 20:00	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Sample: R-P01S **Lab ID: 60310412032** Collected: 08/15/19 15:25 Received: 08/16/19 03:25 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.607 ± 0.599 (0.911) C:NA T:91%	pCi/L	08/27/19 11:44	13982-63-3	
Radium-228	EPA 904.0	0.250 ± 0.305 (0.643) C:79% T:91%	pCi/L	08/26/19 16:44	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 357922

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60310412032

METHOD BLANK: 1738177

Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.127 ± 0.306 (0.592) C:NA T:98%	pCi/L	08/27/19 10:49	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	356700	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60310412001, 60310412002, 60310412011, 60310412023, 60310412028, 60310412029, 60310412030, 60310412031		

METHOD BLANK:	1732232	Matrix:	Water
Associated Lab Samples:	60310412001, 60310412002, 60310412011, 60310412023, 60310412028, 60310412029, 60310412030, 60310412031		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.317 ± 0.353 (0.736) C:75% T:85%	pCi/L	08/19/19 16:54	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 357926

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60310412032

METHOD BLANK: 1738190

Matrix: Water

Associated Lab Samples: 60310412032

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.505 ± 0.334 (0.641) C:82% T:92%	pCi/L	08/26/19 13:32	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	356702	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60310412025, 60310412026, 60310412027		

METHOD BLANK:	1732234	Matrix:	Water
Associated Lab Samples:	60310412025, 60310412026, 60310412027		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.101 ± 0.305 (0.542) C:NA T:84%	pCi/L	08/19/19 11:16	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	356699	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412012, 60310412013, 60310412014, 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024		

METHOD BLANK:	1732230	Matrix:	Water
Associated Lab Samples:	60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009, 60310412010, 60310412012, 60310412013, 60310412014, 60310412015, 60310412016, 60310412017, 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.784 ± 0.549 (0.662) C:NA T:89%	pCi/L	08/20/19 16:59	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 356703 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60310412025, 60310412026, 60310412027

METHOD BLANK: 1732235 Matrix: Water

Associated Lab Samples: 60310412025, 60310412026, 60310412027

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.401 ± 0.401 (0.830) C:78% T:76%	pCi/L	08/19/19 15:03	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch: 356701 Analysis Method: EPA 904.0
 QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
 Associated Lab Samples: 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009,
 60310412010, 60310412012, 60310412013, 60310412014, 60310412015, 60310412016, 60310412017,
 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024

METHOD BLANK: 1732233 Matrix: Water
 Associated Lab Samples: 60310412003, 60310412004, 60310412005, 60310412006, 60310412007, 60310412008, 60310412009,
 60310412010, 60310412012, 60310412013, 60310412014, 60310412015, 60310412016, 60310412017,
 60310412018, 60310412019, 60310412020, 60310412021, 60310412022, 60310412024

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.365 ± 0.354 (0.727) C:79% T:84%	pCi/L	08/19/19 11:38	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

QC Batch:	356697	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60310412001, 60310412002, 60310412011, 60310412023, 60310412028, 60310412029, 60310412030, 60310412031		

METHOD BLANK:	1732222	Matrix:	Water
Associated Lab Samples:	60310412001, 60310412002, 60310412011, 60310412023, 60310412028, 60310412029, 60310412030, 60310412031		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.125 ± 0.300 (0.580) C:NA T:94%	pCi/L	08/20/19 16:11	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

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

H3 Sample was received or analysis requested beyond the recognized method holding time.

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412001	R-P05I	EPA 200.7	601401	EPA 200.7	601452
60310412002	R-P10S	EPA 200.7	601401	EPA 200.7	601452
60310412003	R-P29S	EPA 200.7	601401	EPA 200.7	601452
60310412004	R-P29D	EPA 200.7	601401	EPA 200.7	601452
60310412005	R-P31S	EPA 200.7	601401	EPA 200.7	601452
60310412006	R-NE-FB-1	EPA 200.7	601401	EPA 200.7	601452
60310412007	R-NE-FB-2	EPA 200.7	601401	EPA 200.7	601452
60310412008	R-NE-DUP-1	EPA 200.7	601954	EPA 200.7	602073
60310412009	R-P-17S	EPA 200.7	601954	EPA 200.7	602073
60310412010	R-P-17I	EPA 200.7	601954	EPA 200.7	602073
60310412011	R-P-17D	EPA 200.7	601401	EPA 200.7	601452
60310412012	R-P-19I	EPA 200.7	601954	EPA 200.7	602073
60310412013	R-P-19S	EPA 200.7	601401	EPA 200.7	601452
60310412014	R-P-19D	EPA 200.7	601401	EPA 200.7	601452
60310412015	R-P03S	EPA 200.7	601592	EPA 200.7	601656
60310412016	R-P03D	EPA 200.7	601592	EPA 200.7	601656
60310412017	R-P05S	EPA 200.7	601592	EPA 200.7	601656
60310412018	R-P21S	EPA 200.7	601592	EPA 200.7	601656
60310412019	R-P21I	EPA 200.7	601592	EPA 200.7	601656
60310412020	R-P21D	EPA 200.7	601592	EPA 200.7	601656
60310412021	R-P22S	EPA 200.7	601592	EPA 200.7	601656
60310412022	R-P22I	EPA 200.7	601592	EPA 200.7	601656
60310412023	R-P22D	EPA 200.7	601592	EPA 200.7	601656
60310412024	R-P30S	EPA 200.7	601592	EPA 200.7	601656
60310412025	R-NE-DUP-2	EPA 200.7	601592	EPA 200.7	601656
60310412026	R-NE-DUP-3	EPA 200.7	601592	EPA 200.7	601656
60310412027	R-NE-FB-3	EPA 200.7	601592	EPA 200.7	601656
60310412032	R-P01S	EPA 200.7	603943	EPA 200.7	604004
60310412001	R-P05I	EPA 200.8	600688	EPA 200.8	600908
60310412002	R-P10S	EPA 200.8	600688	EPA 200.8	600908
60310412003	R-P29S	EPA 200.8	600688	EPA 200.8	600908
60310412004	R-P29D	EPA 200.8	600688	EPA 200.8	600908
60310412005	R-P31S	EPA 200.8	600688	EPA 200.8	600908
60310412006	R-NE-FB-1	EPA 200.8	600688	EPA 200.8	600908
60310412007	R-NE-FB-2	EPA 200.8	600688	EPA 200.8	600908
60310412008	R-NE-DUP-1	EPA 200.8	600688	EPA 200.8	600908
60310412009	R-P-17S	EPA 200.8	600688	EPA 200.8	600908
60310412010	R-P-17I	EPA 200.8	600688	EPA 200.8	600908
60310412011	R-P-17D	EPA 200.8	600688	EPA 200.8	600908
60310412012	R-P-19I	EPA 200.8	600688	EPA 200.8	600908
60310412013	R-P-19S	EPA 200.8	600688	EPA 200.8	600908
60310412014	R-P-19D	EPA 200.8	600688	EPA 200.8	600908
60310412015	R-P03S	EPA 200.8	601684	EPA 200.8	601734
60310412016	R-P03D	EPA 200.8	601684	EPA 200.8	601734
60310412017	R-P05S	EPA 200.8	601684	EPA 200.8	601734

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412018	R-P21S	EPA 200.8	601684	EPA 200.8	601734
60310412019	R-P21I	EPA 200.8	601684	EPA 200.8	601734
60310412020	R-P21D	EPA 200.8	601684	EPA 200.8	601734
60310412021	R-P22S	EPA 200.8	601684	EPA 200.8	601734
60310412022	R-P22I	EPA 200.8	601684	EPA 200.8	601734
60310412023	R-P22D	EPA 200.8	601684	EPA 200.8	601734
60310412024	R-P30S	EPA 200.8	601684	EPA 200.8	601734
60310412025	R-NE-DUP-2	EPA 200.8	601684	EPA 200.8	601734
60310412026	R-NE-DUP-3	EPA 200.8	601684	EPA 200.8	601734
60310412027	R-NE-FB-3	EPA 200.8	601684	EPA 200.8	601734
60310412032	R-P01S	EPA 200.8	603985	EPA 200.8	604011
60310412001	R-P05I	EPA 7470	601745	EPA 7470	601803
60310412002	R-P10S	EPA 7470	601745	EPA 7470	601803
60310412003	R-P29S	EPA 7470	601745	EPA 7470	601803
60310412004	R-P29D	EPA 7470	601745	EPA 7470	601803
60310412005	R-P31S	EPA 7470	601748	EPA 7470	601804
60310412006	R-NE-FB-1	EPA 7470	601748	EPA 7470	601804
60310412007	R-NE-FB-2	EPA 7470	601748	EPA 7470	601804
60310412008	R-NE-DUP-1	EPA 7470	601748	EPA 7470	601804
60310412009	R-P-17S	EPA 7470	601748	EPA 7470	601804
60310412010	R-P-17I	EPA 7470	601748	EPA 7470	601804
60310412011	R-P-17D	EPA 7470	601748	EPA 7470	601804
60310412012	R-P-19I	EPA 7470	601748	EPA 7470	601804
60310412013	R-P-19S	EPA 7470	601748	EPA 7470	601804
60310412014	R-P-19D	EPA 7470	601918	EPA 7470	601997
60310412015	R-P03S	EPA 7470	601918	EPA 7470	601997
60310412016	R-P03D	EPA 7470	601918	EPA 7470	601997
60310412017	R-P05S	EPA 7470	601918	EPA 7470	601997
60310412018	R-P21S	EPA 7470	601918	EPA 7470	601997
60310412019	R-P21I	EPA 7470	601918	EPA 7470	601997
60310412020	R-P21D	EPA 7470	601918	EPA 7470	601997
60310412021	R-P22S	EPA 7470	601918	EPA 7470	601997
60310412022	R-P22I	EPA 7470	601918	EPA 7470	601997
60310412023	R-P22D	EPA 7470	601918	EPA 7470	601997
60310412024	R-P30S	EPA 7470	601918	EPA 7470	601997
60310412025	R-NE-DUP-2	EPA 7470	601918	EPA 7470	601997
60310412026	R-NE-DUP-3	EPA 7470	601918	EPA 7470	601997
60310412027	R-NE-FB-3	EPA 7470	601918	EPA 7470	601997
60310412032	R-P01S	EPA 7470	603980	EPA 7470	604017
60310412001	R-P05I	EPA 903.1	356697		
60310412002	R-P10S	EPA 903.1	356697		
60310412003	R-P29S	EPA 903.1	356699		
60310412004	R-P29D	EPA 903.1	356699		
60310412005	R-P31S	EPA 903.1	356699		
60310412006	R-NE-FB-1	EPA 903.1	356699		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412007	R-NE-FB-2	EPA 903.1	356699		
60310412008	R-NE-DUP-1	EPA 903.1	356699		
60310412009	R-P-17S	EPA 903.1	356699		
60310412010	R-P-17I	EPA 903.1	356699		
60310412011	R-P-17D	EPA 903.1	356697		
60310412012	R-P-19I	EPA 903.1	356699		
60310412013	R-P-19S	EPA 903.1	356699		
60310412014	R-P-19D	EPA 903.1	356699		
60310412015	R-P03S	EPA 903.1	356699		
60310412016	R-P03D	EPA 903.1	356699		
60310412017	R-P05S	EPA 903.1	356699		
60310412018	R-P21S	EPA 903.1	356699		
60310412019	R-P21I	EPA 903.1	356699		
60310412020	R-P21D	EPA 903.1	356699		
60310412021	R-P22S	EPA 903.1	356699		
60310412022	R-P22I	EPA 903.1	356699		
60310412023	R-P22D	EPA 903.1	356697		
60310412024	R-P30S	EPA 903.1	356699		
60310412025	R-NE-DUP-2	EPA 903.1	356702		
60310412026	R-NE-DUP-3	EPA 903.1	356702		
60310412027	R-NE-FB-3	EPA 903.1	356702		
60310412028	R-P-17D MS	EPA 903.1	356697		
60310412029	R-P-17-D MSD	EPA 903.1	356697		
60310412030	R-P22D MS	EPA 903.1	356697		
60310412031	R-P22D MSD	EPA 903.1	356697		
60310412032	R-P01S	EPA 903.1	357922		
60310412001	R-P05I	EPA 904.0	356700		
60310412002	R-P10S	EPA 904.0	356700		
60310412003	R-P29S	EPA 904.0	356701		
60310412004	R-P29D	EPA 904.0	356701		
60310412005	R-P31S	EPA 904.0	356701		
60310412006	R-NE-FB-1	EPA 904.0	356701		
60310412007	R-NE-FB-2	EPA 904.0	356701		
60310412008	R-NE-DUP-1	EPA 904.0	356701		
60310412009	R-P-17S	EPA 904.0	356701		
60310412010	R-P-17I	EPA 904.0	356701		
60310412011	R-P-17D	EPA 904.0	356700		
60310412012	R-P-19I	EPA 904.0	356701		
60310412013	R-P-19S	EPA 904.0	356701		
60310412014	R-P-19D	EPA 904.0	356701		
60310412015	R-P03S	EPA 904.0	356701		
60310412016	R-P03D	EPA 904.0	356701		
60310412017	R-P05S	EPA 904.0	356701		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412018	R-P21S	EPA 904.0	356701		
60310412019	R-P21I	EPA 904.0	356701		
60310412020	R-P21D	EPA 904.0	356701		
60310412021	R-P22S	EPA 904.0	356701		
60310412022	R-P22I	EPA 904.0	356701		
60310412023	R-P22D	EPA 904.0	356700		
60310412024	R-P30S	EPA 904.0	356701		
60310412025	R-NE-DUP-2	EPA 904.0	356703		
60310412026	R-NE-DUP-3	EPA 904.0	356703		
60310412027	R-NE-FB-3	EPA 904.0	356703		
60310412028	R-P-17D MS	EPA 904.0	356700		
60310412029	R-P-17-D MSD	EPA 904.0	356700		
60310412030	R-P22D MS	EPA 904.0	356700		
60310412031	R-P22D MSD	EPA 904.0	356700		
60310412032	R-P01S	EPA 904.0	357926		
60310412001	R-P05I	SM 2320B	602800		
60310412002	R-P10S	SM 2320B	602800		
60310412003	R-P29S	SM 2320B	602800		
60310412004	R-P29D	SM 2320B	602800		
60310412005	R-P31S	SM 2320B	602800		
60310412006	R-NE-FB-1	SM 2320B	602800		
60310412007	R-NE-FB-2	SM 2320B	602800		
60310412008	R-NE-DUP-1	SM 2320B	602800		
60310412009	R-P-17S	SM 2320B	602800		
60310412010	R-P-17I	SM 2320B	602800		
60310412011	R-P-17D	SM 2320B	602800		
60310412012	R-P-19I	SM 2320B	602800		
60310412013	R-P-19S	SM 2320B	602800		
60310412014	R-P-19D	SM 2320B	602800		
60310412015	R-P03S	SM 2320B	603184		
60310412016	R-P03D	SM 2320B	603184		
60310412017	R-P05S	SM 2320B	603184		
60310412018	R-P21S	SM 2320B	603184		
60310412019	R-P21I	SM 2320B	603184		
60310412020	R-P21D	SM 2320B	603184		
60310412021	R-P22S	SM 2320B	603184		
60310412022	R-P22I	SM 2320B	603184		
60310412023	R-P22D	SM 2320B	603364		
60310412024	R-P30S	SM 2320B	603184		
60310412025	R-NE-DUP-2	SM 2320B	603184		
60310412026	R-NE-DUP-3	SM 2320B	603184		
60310412027	R-NE-FB-3	SM 2320B	603184		
60310412032	R-P01S	SM 2320B	606001		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412001	R-P05I	SM 2540C	600971		
60310412002	R-P10S	SM 2540C	600971		
60310412003	R-P29S	SM 2540C	600971		
60310412004	R-P29D	SM 2540C	600971		
60310412005	R-P31S	SM 2540C	600971		
60310412006	R-NE-FB-1	SM 2540C	600971		
60310412007	R-NE-FB-2	SM 2540C	600971		
60310412008	R-NE-DUP-1	SM 2540C	600971		
60310412009	R-P-17S	SM 2540C	600971		
60310412010	R-P-17I	SM 2540C	600971		
60310412011	R-P-17D	SM 2540C	600971		
60310412012	R-P-19I	SM 2540C	600971		
60310412013	R-P-19S	SM 2540C	600971		
60310412014	R-P-19D	SM 2540C	601288		
60310412015	R-P03S	SM 2540C	601524		
60310412016	R-P03D	SM 2540C	601524		
60310412017	R-P05S	SM 2540C	601524		
60310412018	R-P21S	SM 2540C	601524		
60310412019	R-P21I	SM 2540C	601524		
60310412020	R-P21D	SM 2540C	601524		
60310412021	R-P22S	SM 2540C	601524		
60310412022	R-P22I	SM 2540C	601524		
60310412023	R-P22D	SM 2540C	601524		
60310412024	R-P30S	SM 2540C	601524		
60310412025	R-NE-DUP-2	SM 2540C	601524		
60310412026	R-NE-DUP-3	SM 2540C	601524		
60310412027	R-NE-FB-3	SM 2540C	601524		
60310412032	R-P01S	SM 2540C	604897		
60310412001	R-P05I	EPA 300.0	602370		
60310412002	R-P10S	EPA 300.0	602370		
60310412003	R-P29S	EPA 300.0	602370		
60310412004	R-P29D	EPA 300.0	602370		
60310412005	R-P31S	EPA 300.0	602370		
60310412006	R-NE-FB-1	EPA 300.0	602701		
60310412007	R-NE-FB-2	EPA 300.0	602701		
60310412008	R-NE-DUP-1	EPA 300.0	602701		
60310412008	R-NE-DUP-1	EPA 300.0	602824		
60310412009	R-P-17S	EPA 300.0	602701		
60310412009	R-P-17S	EPA 300.0	602824		
60310412010	R-P-17I	EPA 300.0	602701		
60310412011	R-P-17D	EPA 300.0	602701		
60310412012	R-P-19I	EPA 300.0	602701		
60310412013	R-P-19S	EPA 300.0	602701		
60310412014	R-P-19D	EPA 300.0	602701		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60310412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310412015	R-P03S	EPA 300.0	603455		
60310412016	R-P03D	EPA 300.0	603455		
60310412017	R-P05S	EPA 300.0	603455		
60310412018	R-P21S	EPA 300.0	603125		
60310412018	R-P21S	EPA 300.0	603455		
60310412019	R-P21I	EPA 300.0	603125		
60310412019	R-P21I	EPA 300.0	603455		
60310412020	R-P21D	EPA 300.0	603125		
60310412020	R-P21D	EPA 300.0	603455		
60310412021	R-P22S	EPA 300.0	603127		
60310412022	R-P22I	EPA 300.0	603127		
60310412023	R-P22D	EPA 300.0	603127		
60310412024	R-P30S	EPA 300.0	603127		
60310412025	R-NE-DUP-2	EPA 300.0	603127		
60310412025	R-NE-DUP-2	EPA 300.0	603455		
60310412026	R-NE-DUP-3	EPA 300.0	603127		
60310412027	R-NE-FB-3	EPA 300.0	603127		
60310412032	R-P01S	EPA 300.0	607314		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60310412



Client Name: Golder Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other EPIC

Thermometer Used: 7200 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 23.6 Corr. Factor 40.0 Corrected 23.6

Date and initials of person examining contents: 7-31-19

Temperature should be above freezing to 6°C 22.6, 24.0, 0-7, 0.5 22.6, 24.0, 0-7, 0.5

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>coolers that had no ice had BPIN containers</u>
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Church Date: 8/1/19



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 3

Section A Required Client Information:

Company: **Golder Associates**
 Address: **13515 Barrett Parkway Drive, Site 260**
 Email To: jeffrey_ingram@golder.com
 Phone: **636-724-9191** Fax: **636-724-9323**
 Requested Due Date/TAT: **Standard**

Report To: **Jeffrey Ingram**
 Copy To: **Ryan Feldmann/Eric Schneider**
 Purchase Order No.:
 Project Name: **Ameren Rush Energy Center**
 Project Number: **153-1406-01.0002 (COC #12)**

Company Name: **Ryan Feldmann/Eric Schneider**
 Address:
 Site Location: **MO**
 STATE: **MO**

REGULATORY AGENCY: **NFDES** **GROUND WATER** **DRINKING WATER**
UST **RCRA** **OTHER**

Section B Required Project Information:

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

Section C Invoice Information:

Report To: **Jeffrey Ingram**
 Copy To: **Ryan Feldmann/Eric Schneider**
 Purchase Order No.:
 Project Name: **Ameren Rush Energy Center**
 Project Number: **153-1406-01.0002 (COC #12)**

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER PRODUCT WW SOILSOLID SL OIL OL AR AR OT OT TS TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives NaOH HCl HNO ₃ H ₂ SO ₄ Unpreserved	Analysis Test Metals* Mercury Chloride/Fluoride/Sulfate TDS Alkalinity Radium 226 Radium 228 Residual Chlorine (Y/N)	Requested Analysis Filtered (Y/N)	Pace Project No. / Lab I.D.	
				COMPOSITE START	COMPOSITE END/GRAB											
1		WT G	G													
2		WT G	G													
3		WT G	G													
4		WT G	G													
5		WT G	G			7/30/15	1505			5	2					001
6		WT G	G													
7		WT G	G													
8		WT G	G			7/30/15	1500			5	2					002
9		WT G	G													
10		WT G	G													
11		WT G	G													
12		WT G	G													

REINQUISHED BY / AFFILIATION: **Ryan Feldmann** DATE: **7/30/15** TIME: **1750**

ACCEPTED BY / AFFILIATION: **W. J. P. 1155** DATE: **7/31/15** TIME: **0235**

Temp in °C: **22.4**
24.0
20.7
20.3

Received on Ice (Y/N): **Y**
 Custody Sealed Cooler (Y/N): **Y**
 Samples In/Out (Y/N): **Y**

SAMPLER NAME AND SIGNATURE: **Ryan Feldmann**
 PRINT Name of SAMPLER: **Ryan Feldmann** DATE Signed (MM/DD/YYYY): **07/30/15**
 SIGNATURE of SAMPLER: *[Signature]*



CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 3

Section A
 Required Client Information:
 Company: Golder Associates
 Address: 13515 Barrett Parkway Drive, Ste 260
Baltimore, MD 21042
 Email To: jeffrey.ingram@golder.com
 Phone: 636-724-9191 Fax: 636-724-9323
 Requested Due Date/TAT: Standard

Section B
 Required Project Information:
 Report To: Jeffrey Ingram
 Copy To: Ryan Feldmann/Eric Schneider
 Purchase Order No.:
 Project Name: Ameren Rush Energy Center
 Project Number: 153-1406-01.0002 (COC #12)

Section C
 Invoice Information:
 Attention:
 Company Name:
 Address:
 Face Quote Reference:
 Face Project Manager:
 Face Profile #

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 USF RCRA OTHER
 Site Location MO
 STATE: MO

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW PRODUCT P SOILSOLID OIL OL AIR AR OT OT TS	RELINQUISHED WT / AFFILIATION	DATE	TIME	# OF CONTAINERS	Preservatives H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other	Analysis Test Metals* Mercury Chloride/Fluoride/Sulfate Alkalinity Radium 226 Radium 228	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	R-P211	WT G								
2	R-P21D	WT G								
3	R-P22S	WT G								
4	R-P22I	WT G								
5	R-P22D	WT G								
6	R-P29S	WT G	7/31/19	1600	523					003
7	R-P29D	WT G	J	1125	523					004
8	R-P30S	WT G	7/30/19	1330	523					005
9	R-P31S	WT G								
10	R-NE-DUP-1	WT G								
11	R-NE-DUP-2	WT G								
12	R-NE-DUP-3	WT G								

ADDITIONAL COMMENTS
 *EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na
 *EPA 200.8: Sb, As, Cd, Cr, Se, Ti
 B. Golder 7/30
 W. J. 7/30
 22.9
 24.0
 20.3

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Ryan Feldmann
 SIGNATURE of SAMPLER: [Signature]
 DATE Signed (MM/DD/YYYY): 7/30/19



CHAIN-OF-CUSTODY / Analytical Request Document

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Page: **3** of **3**

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Goldier Associates	Report To:	Jeffrey Ingram	Attention:	
Address:	13515 Barrett Parkway Drive, Site 260 Ballwin, MO 63021	Copy To:	Ryan Feldmann/Eric Schneider	Company Name:	
Email To:	jeffrey_ingram@goldier.com	Purchase Order No.:		Address:	
Phone:	636-724-9191	Fax:	636-724-9323	Project Name:	Ameren Rush Energy Center
Requested Due Date/TAT:	Standard	Project Number:	153-1406-01.0002 (COC #12)	Manager:	Jamie Church
				Pace Profile #:	9285

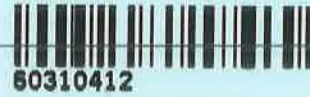
ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW PRODUCT LIQUID PL SOLID OIL SL WATER W WASTE WATER W PRODUCT LIQUID PL SOLID OIL SL	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	PRESERVATIVES	ANALYSIS TESTS	DATE	TIME	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	
		COMPOSITE START	COMPOSITE END/STOPS														
1	R-NE-FB-1 ↓		7/30/19 1310	G	WT G	5	H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₈ Methanol Other	Metals* Mercury Chloride/Fluoride/Sulfate TDS Alkalinity Radium 226 Radium 228	7/30/19	1310	7/31/19	0635	WZCPA/169	23:4	N	Y	Y
2	R-NE-FB-2 ↓		1510	G	WT G	1											
3	R-NE-FB-3 ↓		7/30/19	G	WT G	5											
4	R-NE-DUP-1 R-P-175 R-P-176 R-P-177 R-P-178 R-P-179 R-P-180 R-P-181 R-P-182 R-P-183 R-P-184		1120 1600 1616 1325 1535 437	G	WT G	5 1 15 5 1 1 1 1 1 1											

Section D Required Client Information		Requested Analysis Filtered (Y/N)	
SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE		Residual Chlorine (Y/N) <input type="checkbox"/> Pace Project No./ Lab I.D.	
ADDITIONAL COMMENTS *EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl		Temp in °C: 23.4, 24.0, 24.0, 20.7, 20.5	
Relinquished By: <i>Ryan Feldmann</i> Date: 7/30/19 Time: 17:50		Received on: 7/31/19 Temp: 23.4 Sealed/Cooled: Y Custody: Y Samples Intact: Y	
Signature of Sampler: <i>Ryan Feldmann</i> Date Signed (MM/DD/YYYY): 07/30/19			



Sample Condition Upon Receipt

WO#: 60310412



Client Name: Colder Assoc.

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other Zpic

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 22.2 Corr. Factor 10.0 Corrected 22.2

Date and initials of person examining contents: 8-2-19

Temperature should be above freezing to 6°C 21.6, 0.4, 0.2 21.6, 0.2, 0.4

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	All coolers with no
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	ICE Had samples for
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Radion in them.
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All 2BP1W, B13N, BP20, BP30
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Received extra samples
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	R-NE-Dup 7/31/19 no time
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	R-P-215 7/31/19 at 1905
Samples contain multiple phases? Matrix: <u>wt</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Clark Date: 8/5/19

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

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	Section D Requested Client Information:
Company: Golder Associates	Report To: Jeffrey Ingram	Attention:	Project Name: Ameren Rush Energy Center
Address: 13515 Barrett Parkway Drive, Site 260	Copy To: Ryan Feldmann/Eric Schneider	Company Name:	Project Number: 153-1406-01.0002 (COC #12)
Ballwin, MO 63021	Purchase Order No.:	Address:	Project Name: Jamie Church
Email To: jeffrey_ingram@golder.com		Pace Quote Reference	Face Profile # 9285
Phone: 636-724-9191 Fax: 636-724-9323		Face Project Manager:	
Requested Due Date/TAT: Standard			

REGULATORY AGENCY
NPDES GROUND WATER
UST RCRA OTHER DRINKING WATER

ITEM #	Valid Matrix Codes		COLLECTED			PRESERVED		Requested Analysis Filtered (Y/N)											Pace Project No./Lab I.D.						
	MATRIX	CODE	COMPOSITE START	COMPOSITE END/GRAB	DATE	TIME	DATE	TIME	Residual Chlorine (Y/N)	Mercury	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Radium 226	Radium 228										
1	R-P01S	DW			7/31	1515																			
2	R-P03S	WW			7/31	1420																			80310412
3	R-P03D	P			7/31	1050																			APRIL 5, 6 PM 015
4	R-P05S	SL			7/31	1050																			↓ ↓ D10
5	R-P05I	OL																							
6	R-P08S	WP																							
7	R-P08D	AR																							
8	R-P10S	OT																							
9	R-P13S	TS																							
10	R-P13I																								
11	R-P13D																								
12	R-P21S				7/31	1405																			D18

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		SAMPLE CONDITIONS								
	DATE	TIME	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed (Y/N)	Samples Intact (Y/N)					
*EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na *EPA 200.8: Sb, As, Cd, Cr, Se, Tl	8/1/19	12:20	8/1/19	12:22	8-19	12:22					8.2		
	8/1/19	12:22pm	8/1/19	12:22pm	8:19	02:45	20.2						

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Andrew Adkins
SIGNATURE of SAMPLER: *Andrew Adkins*
DATE Signed (MM/DD/YYYY): 8/1/19

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information: Company: Golder Associates Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021 Email To: jeffrey_ingram@golder.com Phone: 636-724-9191 Fax: 636-724-9323 Requested Due Date/TAT: Standard	Section B Required Project Information: Report To: Jeffrey Ingram Copy To: Ryan Feldmann/Eric Schneider Purchase Order No.: Project Name: Ameren Rush Energy Center Project Number: 153-1406-01.0002 (COC #12)	Section C Invoice Information: Attention: Company Name: Address: Pace Quote Reference: Pace Project Manager: Pace Profile #: 9285
REGULATORY AGENCY NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>		
Site Location STATE: MO		

Page: **2** of **3**

ITEM #	Section D Required Client Information SAMPLE ID (A-Z, 0-9 / -) <small>Sample IDs MUST BE UNIQUE</small>	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WP AR TS	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives HCl HNO ₃ H ₂ SO ₄ Unpreserved	Analysis Test Metals* Mercury Chloride/Fluoride/Sulfate TDS Alkalinity Radium 226 Radium 228	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START DATE TIME	COMPOSITE END/GRAB DATE TIME							
1	R-P211	SP30	7/31 12:17	7/31 12:17		5	3	Y	Y	Y	0031012
2	R-P21D		7/31 13:25	7/31 13:25		5	3	Y	Y	Y	2BP10, SP20, SP30, SP40
3	R-P22S		7/31 17:30	7/31 17:30		5	3	Y	Y	Y	020
4	R-P22J		7/31 15:15	7/31 15:15		5	3	Y	Y	Y	021
5	R-P22D		8/1/19 09:15	8/1/19 09:15		15	6	Y	Y	Y	022
6	R-P29S										023
7	R-P29D										
8	R-P30S	SP30	7/31 13:10	7/31 13:10		5	3	Y	Y	Y	2BP10, SP20, SP30, SP40
9	R-P31S										
10	R-NE-DUP-1										
11	R-NE-DUP-2	SP30	7/31	7/31		5	3	Y	Y	Y	2BP10, SP20, SP30, SP40
12	R-NE-DUP-3										

ADDITIONAL COMMENTS *EPA 200.7, 8, Ca, Ba, B6, Co, Pb, Li, Mn, Fe, Mg, Mn, K, Na *EPA 200.8, Sb, As, Cd, Cr, Se, Tl		ACCEPTED BY / AFFILIATION Angelo McGowan 8/1/19 12:21 PM		DATE 8-1-19 12:21 PM		TEMP IN °C 21.45		SAMPLE CONDITIONS Sealed Cooler (Y/N) Custody (Y/N) Reception (Y/N)		Samples In-lab (Y/N)	
RELINQUISHED BY / AFFILIATION Jeffrey Ingam / Golder 8/1/19 13:22 PM		DATE 8-1-19 13:22 PM		DATE SIGNED (MM/DD/YYYY) 8/1/19		SIGNATURE OF SAMPLER: <i>Jeffrey Ingram</i>		SAMPLER NAME AND SIGNATURE Andrew Atkins		DATE SIGNED (MM/DD/YYYY) 8/1/19	



CHAIN-OF-CUSTODY / Analytical Request Document

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Page: **3** of **3**

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates	Report To: Jeffrey Ingram	Company Name: Ryan Feldmann/Eric Schneider	Attention:	Company Name:	
Address: 13515 Barrett Parkway Drive, Ste 260 Bailwin, MO 63021	Purchase Order No.:	Address:		Address:	
Email To: jeffrey_ingram@golder.com	Project Name: Ameren Rush Energy Center	Pace Quote Reference:		Pace Project Manager:	Jamie Church
Phone: 636-724-9191	Project Number: 153-1406-01 0002 (COC #12)	Pace Profile #:		Site Location:	MO
Requested Due Date/TAT: Standard				STATE:	

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER OW WASTE WATER WT PRODUCT P SOLID SL OIL OL WP AR OT TS	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		# OF CONTAINERS	Preservatives HCl NaOH Na2S2O8 Methanol Other	Requested Analysis Filtered (Y/N)	Pace Project No. / Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB				
1	R-NE-FB-1	WT G	DATE	TIME				
2	R-NE-FB-2	WT G						
3	R-NE-FB-3 BP30	WT G	7/31	1320	5			00310412
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		ACCEPTED BY / AFFILIATION		SAMPLE CONDITIONS	
	DATE	TIME	DATE	TIME	Received on	Temp in C
	8/11/19	1220	8/11/19	1220	Y	Y
	8/11/19	1222	8/21/19	0845	Y	Y

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER: Arden Akin	DATE Signed (MM/DD/YY): 8/11/19
SIGNATURE of SAMPLER: <i>[Signature]</i>	DATE Signed (MM/DD/YY): 8/11/19



Sample Condition Upon Receipt

WO#: 60310412



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: T295 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 1.7 Corr. Factor -0.2 Corrected 1.5

Date and initials of person examining contents: NS 8/16/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Church Date: 8/17/19

Project Manager Review: _____ Date: _____



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Goldier Associates	Report To: Jeffrey Ingram	Company Name:	Attention:	Page: <u>1</u> of <u>1</u>	
Address: 13515 Barrett Parkway Drive, Ste 260	Copy To: Ryan Feldmann/Eric Schneider	Address:	REGULATORY AGENCY:		
Ballwin, MO 63021		Purchase Order No.:	NPDES <input checked="" type="checkbox"/> GROUND WATER		
Email To: jeffrey_ingram@goldier.com		Project Name: Ameren Rush Energy Center	UST <input type="checkbox"/>	DRINKING WATER <input type="checkbox"/>	OTHER <input type="checkbox"/>
Phone: 636-724-9191	Fax: 636-724-9323	Project Number: 153-1406-01.0002 (COC #12)	Site Location:	RCRA <input type="checkbox"/>	
Requested Due Date/FAT: Standard		Pace Profile #: 9285	STATE:	MO	

Valid Matrix Codes	MATRIX CODE	COLLECTED	SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see yield codes to left)	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)
DRINKING WATER	DW	COMPOSITE START	WT G	WT G				
WATER	WT	COMPOSITE END/SPG	WT G	WT G				
WASTE WATER	WW		WT G	WT G				
LIQUID	LQ		WT G	WT G				
SOL/SOLID	SL		WT G	WT G				
OIL	OL		WT G	WT G				
	WP		WT G	WT G				
	AR		WT G	WT G				
	OT		WT G	WT G				
	TS		WT G	WT G				

ITEM #	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1	R-P01S	WT G	8/20	9:15/14	8/25	15:25	Eric Schneider / Goldier	8/15/19	1800		Y	Y	Y
2	R-P03S	WT G											
3	R-P03D	WT G											
4	R-P05S	WT G											
5	R-P05I	WT G											
6	R-P08S	WT G											
7	R-P08D	WT G											
8	R-P10S	WT G											
9	R-P13S	WT G											
10	R-P13I	WT G											
11	R-P13D	WT G											
12	R-P21S	WT G											

ADDITIONAL COMMENTS	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
EPA 200.7: B, Ca, Ba, Be, Co, Pb, Li, Mo, Fe, Mg, Mn, K, Na EPA 200.8: Sb, As, Cd, Cr, Se, Tl	8/15/19	1800	Eric Schneider / Goldier	8/15/19	03:25		Y	Y	Y

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER: ERIC SCHNEIDER	DATE Signed (MM/DD/YY): 08/15/19
SIGNATURE of SAMPLER: <i>[Signature]</i>	

MEMORANDUM**DATE** October 1, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC** Amanda Derhake, Jeff Ingram**FROM** Tommy Goodwin**EMAIL** Tommy_Goodwin@golder.com**DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60310412**

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - Rush Island - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 10/1/2019

Laboratory: Pace Analytical - KS

SDG #: 60310412

Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 7470 (Hg); EPA 903.1/904.0 (Rads); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-P05I, R-P10S, R-P29S, R-P29D, R-P31S, R-NE-FB-1, R-NE-FB-2, R-NE-DUP-1, R-P-17S, R-P-17I, R-P-17D, R-P-19I, R-P-19S, R-P-19D, R-P03S, R-P03D, R-P05S, R-P21S, R-P21I, R-P21D, R-P22S, R-P22I, R-P22D, R-P30S, R-NE-DUP-2, R-NE-DUP-3, R-NE-FB-3, R-P-17D MS, R-P-17D MSD, R-P22D MS, R-P22D MSD, R-P01S

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>7/30-8/1/19 and 8/15/19</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (<u>grab</u> composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies:	<u></u>			

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DUP-1 @ P17I, DUP-2 @ P22I, DUP-3 @ P22S FB-1 @ P31S, FB-2 @ P10S, FB-3 @ P30S
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-01, -11, -22, -23: Alk, TDS
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments/Notes:

MB: -01-07,-11,-13-14: Fe (59.9); -08-10,-12: Ca (56.0), Mg (53.9); -15-27: Na (176); -32: Be (0.30); -01-14: Sb (0.12);
-03-10,-12-22, 24: Ra-226 (0.784),

FB-1: Ca (92.5), Cr (0.16); FB-2: Ca (52.9), TDS (6.0), Ra-228 (1.68); FB-3: Ca (56.4), Cr (0.082), Cl (0.46)

MS/MSD: -412023: B (MS-H), Na (MS-H);

DUP-1: Ra-226 (200); DUP-2: Hg (153); DUP-3: Fe (20), Cr (44), Ra-228 (200)

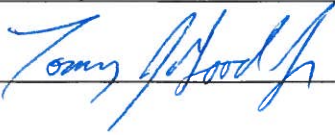
Max Lab DUP RPD: 10% (Limit 10%)

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
R-NE-DUP-1	Magnesium (Mg)	-	J	Analyte Detected in Method Blank (MB); 10x Blank > Result > PQL
"	Antimony (Sb)	1.0	U	Analyte Detected in MB; PQL > Result > MDL
"	Radium-226 (Ra-226)	-	J	Analyte Detected in MB; FD Exceeded RPD Limit; Result > MDC
R-P31S	Chromium (Cr)	1.0	U	Analyte Detected in Field Blank (FB); PQL > Result > MDL
R-P-17S	Sb	1.0	U	Analyte Detected in MB; PQL > Result > MDL
R-P-17I	Sb	1.0	U	"
"	Mg	-	J	Analyte Detected in MB; 10x Blank > Result > PQL
R-NE-DUP-2	Mercury (Hg)	-	J	FD Exceeded RPD Limit; Result > MDL
R-P-19I	Mg	50.0	U	Analyte Detected in MB; PQL > Result > MDL
R-P-22S	Iron (Fe)	-	J	FD Exceeded RPD Limit; Result > MDL
"	Radium-228 (Ra-228)	-	J	"
R-P-22I	Hg	-	J	"
R-P-22D	Boron (B)	-	J	MS Exceeded Calibration Range - %Rec High
"	Sodium (Na)	-	J	"
R-NE-DUP-3	Fe	-	J	FD Exceeded RPD Limit; Result > MDL
R-P01S	Beryllium (Be)	1.0	U	Analyte Detected in MB; PQL > Result > MDL
R-P29D	Ra-226	-	J	Analyte Detected in MB; 10x Blank > Result > MDC
R-P31S	"	-	J	"
R-P21D	"	-	J	"
R-P03D	"	-	J	"
R-P21S	"	-	J	"
R-P21I	"	-	J	"

Signature: 

Date: 10/1/2019

October 03, 2019

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

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60314968

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on September 14, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

ANAB DOD-ELAP Rad Accreditation #: L2417

Alabama Certification #: 41590

Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification #: PA01547

Connecticut Certification #: PH-0694

Delaware Certification

EPA Region 4 DW Rad

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification

Florida: Cert E871149 SEKS WET

Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: KY90133

KY WW Permit #: KY0098221

KY WW Permit #: KY0000221

Louisiana DHH/TNI Certification #: LA180012

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: 2017020

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification #: 9991

Missouri Certification #: 235

Montana Certification #: Cert0082

Nebraska Certification #: NE-OS-29-14

Nevada Certification #: PA014572018-1

New Hampshire/TNI Certification #: 297617

New Jersey/TNI Certification #: PA051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Ohio EPA Rad Approval: #41249

Oregon/TNI Certification #: PA200002-010

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: 02867

Texas/TNI Certification #: T104704188-17-3

Utah/TNI Certification #: PA014572017-9

USDA Soil Permit #: P330-17-00091

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 9526

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Approve List for Rad

Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 19-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-18-11

Utah Certification #: KS000212018-8

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60314968001	R-MW-7(r)	Water	09/13/19 10:15	09/14/19 02:30

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60314968001	R-MW-7(r)	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	HKC	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	LDB	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	MJK	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Sample: R-MW-7(r) **Lab ID: 60314968001** Collected: 09/13/19 10:15 Received: 09/14/19 02:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	236	ug/L	5.0	1.4	1	10/01/19 09:50	10/02/19 15:30	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/01/19 09:50	10/02/19 15:30	7440-41-7	
Boron	2310	ug/L	100	10.7	1	10/01/19 09:50	10/02/19 15:30	7440-42-8	
Calcium	67700	ug/L	200	50.0	1	10/01/19 09:50	10/02/19 15:30	7440-70-2	
Cobalt	1.2J	ug/L	5.0	0.84	1	10/01/19 09:50	10/02/19 15:30	7440-48-4	
Iron	3810	ug/L	50.0	14.0	1	10/01/19 09:50	10/02/19 15:30	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	10/01/19 09:50	10/02/19 15:30	7439-92-1	
Lithium	61.8	ug/L	10.0	5.9	1	10/01/19 09:50	10/02/19 15:30	7439-93-2	
Magnesium	22600	ug/L	50.0	13.0	1	10/01/19 09:50	10/02/19 15:30	7439-95-4	
Manganese	510	ug/L	5.0	2.1	1	10/01/19 09:50	10/02/19 15:30	7439-96-5	
Molybdenum	74.4	ug/L	20.0	2.6	1	10/01/19 09:50	10/02/19 15:30	7439-98-7	
Potassium	12600	ug/L	500	79.0	1	10/01/19 09:50	10/02/19 15:30	7440-09-7	
Zinc	6.8J	ug/L	50.0	6.1	1	10/01/19 09:50	10/02/19 15:30	7440-66-6	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.15J	ug/L	1.0	0.078	1	09/30/19 14:10	10/01/19 14:55	7440-36-0	
Arsenic	35.3	ug/L	1.0	0.065	1	09/30/19 14:10	10/01/19 14:55	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	09/30/19 14:10	10/01/19 14:55	7440-43-9	
Chromium	0.25J	ug/L	1.0	0.078	1	09/30/19 14:10	10/01/19 14:55	7440-47-3	
Selenium	0.13J	ug/L	1.0	0.085	1	09/30/19 14:10	10/01/19 14:55	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	09/30/19 14:10	10/01/19 14:55	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.089	ug/L	0.20	0.089	1	09/17/19 14:50	09/18/19 10:29	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	260	mg/L	20.0	6.5	1		09/27/19 09:16		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	480	mg/L	10.0	10.0	1		09/17/19 09:52		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	68.3	mg/L	10.0	2.2	10		10/01/19 19:13	16887-00-6	
Fluoride	0.19J	mg/L	0.20	0.085	1		10/01/19 18:57	16984-48-8	
Sulfate	39.4	mg/L	10.0	2.3	10		10/01/19 19:13	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 609934

Analysis Method: EPA 7470

QC Batch Method: EPA 7470

Analysis Description: 7470 Mercury

Associated Lab Samples: 60314968001

METHOD BLANK: 2491693

Matrix: Water

Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.089	0.20	0.089	09/18/19 10:06	

LABORATORY CONTROL SAMPLE: 2491694

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2491695 2491696

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		60314953003 Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Mercury	ug/L	ND	5	5	5.1	5.1	102	102	75-125	0	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60314968

QC Batch: 612667 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60314968001

METHOD BLANK: 2502286 Matrix: Water
Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	10/02/19 15:22	
Beryllium	ug/L	<0.25	1.0	0.25	10/02/19 15:22	
Boron	ug/L	<10.7	100	10.7	10/02/19 15:22	
Calcium	ug/L	<50.0	200	50.0	10/02/19 15:22	
Cobalt	ug/L	<0.84	5.0	0.84	10/02/19 15:22	
Iron	ug/L	<14.0	50.0	14.0	10/02/19 15:22	
Lead	ug/L	4.0J	10.0	3.4	10/02/19 15:22	
Lithium	ug/L	<5.9	10.0	5.9	10/02/19 15:22	
Magnesium	ug/L	<13.0	50.0	13.0	10/02/19 15:22	
Manganese	ug/L	<2.1	5.0	2.1	10/02/19 15:22	
Molybdenum	ug/L	<2.6	20.0	2.6	10/02/19 15:22	
Potassium	ug/L	<79.0	500	79.0	10/02/19 15:22	
Zinc	ug/L	<6.1	50.0	6.1	10/02/19 15:22	

LABORATORY CONTROL SAMPLE: 2502287

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Beryllium	ug/L	1000	1000	100	85-115	
Boron	ug/L	1000	971	97	85-115	
Calcium	ug/L	10000	10300	103	85-115	
Cobalt	ug/L	1000	1020	102	85-115	
Iron	ug/L	10000	10200	102	85-115	
Lead	ug/L	1000	1090	109	85-115	
Lithium	ug/L	1000	1010	101	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	984	98	85-115	
Molybdenum	ug/L	1000	1040	104	85-115	
Potassium	ug/L	10000	10300	103	85-115	
Zinc	ug/L	1000	1020	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502288 2502289

Parameter	Units	60315777002 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Barium	ug/L	ND	1000	1000	1010	1040	101	104	70-130	3	20	
Beryllium	ug/L	ND	1000	1000	1000	1040	100	104	70-130	3	20	
Boron	ug/L	ND	1000	1000	1040	1040	101	101	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502288		2502289		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60315777002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Calcium	ug/L	68200	10000	10000	77500	77800	92	96	70-130	0	20		
Cobalt	ug/L	ND	1000	1000	988	1000	99	100	70-130	2	20		
Iron	ug/L	ND	10000	10000	9970	10200	99	102	70-130	3	20		
Lead	ug/L	ND	1000	1000	1040	1050	103	105	70-130	2	20		
Lithium	ug/L	11.1	1000	1000	1020	1050	101	104	70-130	3	20		
Magnesium	ug/L	15300	10000	10000	25000	25000	97	96	70-130	0	20		
Manganese	ug/L	ND	1000	1000	976	986	98	99	70-130	1	20		
Molybdenum	ug/L	ND	1000	1000	1040	1060	104	106	70-130	2	20		
Potassium	ug/L	11100	10000	10000	21700	22000	106	109	70-130	1	20		
Zinc	ug/L	ND	1000	1000	1000	1020	100	101	70-130	1	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60314968

QC Batch: 612474 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60314968001

METHOD BLANK: 2501850 Matrix: Water
Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	10/01/19 14:48	
Arsenic	ug/L	<0.065	1.0	0.065	10/01/19 14:48	
Cadmium	ug/L	<0.033	0.50	0.033	10/01/19 14:48	
Chromium	ug/L	<0.078	1.0	0.078	10/01/19 14:48	
Selenium	ug/L	<0.085	1.0	0.085	10/01/19 14:48	
Thallium	ug/L	<0.099	1.0	0.099	10/01/19 14:48	

LABORATORY CONTROL SAMPLE: 2501851

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.5	96	85-115	
Arsenic	ug/L	40	37.8	94	85-115	
Cadmium	ug/L	40	38.7	97	85-115	
Chromium	ug/L	40	38.7	97	85-115	
Selenium	ug/L	40	38.5	96	85-115	
Thallium	ug/L	40	36.5	91	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2501852 2501853

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60314968001 Result	Spike Conc.	Spike Conc.	Conc.								
Antimony	ug/L	0.15J	40	40	40	38.5	38.4	96	96	70-130	0	20	
Arsenic	ug/L	35.3	40	40	40	72.6	72.5	93	93	70-130	0	20	
Cadmium	ug/L	<0.033	40	40	40	37.0	37.0	93	93	70-130	0	20	
Chromium	ug/L	0.25J	40	40	40	37.9	38.4	94	96	70-130	1	20	
Selenium	ug/L	0.13J	40	40	40	36.3	35.9	90	89	70-130	1	20	
Thallium	ug/L	<0.099	40	40	40	37.7	37.9	94	95	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 612048	Analysis Method: SM 2320B
QC Batch Method: SM 2320B	Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60314968001	

METHOD BLANK: 2499995 Matrix: Water

Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	09/27/19 09:05	

LABORATORY CONTROL SAMPLE: 2499996

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	494	99	90-110	

SAMPLE DUPLICATE: 2499997

Parameter	Units	60314968001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	260	266	2	10	

SAMPLE DUPLICATE: 2499998

Parameter	Units	60315614003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	916	919	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 609756

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60314968001

METHOD BLANK: 2491030

Matrix: Water

Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	09/17/19 09:49	

LABORATORY CONTROL SAMPLE: 2491031

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1040	104	80-120	

SAMPLE DUPLICATE: 2491032

Parameter	Units	60314889001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1570	1550	1	10	

SAMPLE DUPLICATE: 2491033

Parameter	Units	60314890001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1450	1480	2	10	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 612752	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60314968001	

METHOD BLANK: 2502589 Matrix: Water
Associated Lab Samples: 60314968001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/01/19 17:02	
Fluoride	mg/L	<0.085	0.20	0.085	10/01/19 17:02	
Sulfate	mg/L	<0.23	1.0	0.23	10/01/19 17:02	

LABORATORY CONTROL SAMPLE: 2502590

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	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2502591 2502592

Parameter	Units	2502591		2502592		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60314999003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Chloride	mg/L	91.9	50	50	144	141	104	99	80-120	2	15
Fluoride	mg/L	ND	25	25	24.4	24.3	95	95	80-120	0	15
Sulfate	mg/L	66.5	50	50	116	114	99	95	80-120	2	15

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Sample: R-MW-7(r) **Lab ID: 60314968001** Collected: 09/13/19 10:15 Received: 09/14/19 02:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.494 ± 0.665 (1.12) C:NA T:90%	pCi/L	10/01/19 11:13	13982-63-3	
Radium-228	EPA 904.0	0.347 ± 0.372 (0.773) C:76% T:80%	pCi/L	10/01/19 14:05	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 362051

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60314968001

METHOD BLANK: 1756639

Matrix: Water

Associated Lab Samples: 60314968001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.307 ± 0.370 (0.779) C:77% T:74%	pCi/L	10/01/19 14:05	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

QC Batch: 362052

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60314968001

METHOD BLANK: 1756645

Matrix: Water

Associated Lab Samples: 60314968001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.277 ± 0.393 (0.665) C:NA T:81%	pCi/L	10/01/19 10:59	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60314968

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60314968001	R-MW-7(r)	EPA 200.7	612667	EPA 200.7	612732
60314968001	R-MW-7(r)	EPA 200.8	612474	EPA 200.8	612570
60314968001	R-MW-7(r)	EPA 7470	609934	EPA 7470	609956
60314968001	R-MW-7(r)	EPA 903.1	362052		
60314968001	R-MW-7(r)	EPA 904.0	362051		
60314968001	R-MW-7(r)	SM 2320B	612048		
60314968001	R-MW-7(r)	SM 2540C	609756		
60314968001	R-MW-7(r)	EPA 300.0	612752		

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Sample Condition Upon Receipt

WO#: 60314968



Client Name: Golder

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

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 1.0 Corr. Factor 0.0 Corrected 1.0

Date and initials of person examining contents:

paq/14/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>UT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Janni Chank _____ 9/16/19 _____

Project Manager Review: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

<p>Section A Required Client Information:</p> <p>Company: Golder Associates Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021 Email To: jeffrey_instgram@golder.com Phone: 636-724-9181 Fax: 636-724-9323 Requested Due Date/TAT: Standard</p>	<p>Section B Required Project Information:</p> <p>Report To: Jeffrey Ingram Copy To: Ryan Feldmann/Eric Schneider Purchase Order No.: Project Name: Ameren Project Number: 153140601.0007</p>	<p>Section C Invoice Information:</p> <p>Attention: Company Name: Address: Pace Quote Reference: Pace Project Manager: Jamie Church Pace Profile #: 9285</p>	<p>REGULATORY AGENCY</p> <p>NPDES: _____ GROUND WATER: _____ DRINKING WATER: _____ UST: _____ RCHA: _____ OTHER: _____</p> <p>Site Location: _____ STATE: MO</p>
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Page: 1 of 1



ITEM #	Section D Required Client Information		Valid Matrix Codes		COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	SAMPLER TEMP AT COLLECTION	Requested Analysis Filtered (Y/N)										SAMPLE CONDITIONS													
	DRINKING WATER	WASTE WATER	PRODUCT	SOILSOLID	SL	LIQ				WP	AR	OT	TS	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Radium 226	Radium 228	Residual Chlorine (Y/N)	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)									
1	WT	G			DATE	TIME	G	WT	7/13/19	1605	UNPRESERVED	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other		Y													
2	WT	G			DATE	TIME	G	WT																									
3	WT	G			DATE	TIME	G	WT																									
4	WT	G			DATE	TIME	G	WT																									
5	WT	G			DATE	TIME	G	WT																									
6	WT	G			DATE	TIME	G	WT																									
7	WT	G			DATE	TIME	G	WT																									
8	WT	G			DATE	TIME	G	WT																									
9	WT	G			DATE	TIME	G	WT																									
10	WT	G			DATE	TIME	G	WT																									
11	WT	G			DATE	TIME	G	WT																									
12	WT	G			DATE	TIME	G	WT																									
		ADDITIONAL COMMENTS			RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION			DATE	TIME	SAMPLE CONDITIONS																			
		Angele Miller			Angele Miller		7/13/19	1605	Eric Schneider			9/13	1605	Received on Ice (Y/N) Y Custody Sealed Cooler (Y/N) Y Samples Intact (Y/N) Y																			
		Angele Miller			Angele Miller		9/13	1606	Eric Schneider			9/13/19	1005	Received on Ice (Y/N) Y Custody Sealed Cooler (Y/N) Y Samples Intact (Y/N) Y																			

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER: Eric Schneider	
SIGNATURE of SAMPLER: <i>[Signature]</i>	
DATE Signed (MM/DD/YYYY): 09/13/19	



MEMORANDUM

DATE January 13, 2020

Project No. 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin

EMAIL Tommy_Goodwin@golder.com

DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60314968

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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - Rush Island - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/13/2020

Laboratory: Pace Analytical - KS

SDG #: 60314968

Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 7470 (Hg); EPA 903.1/904.0 (Rads); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-MW-7(r)

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>9/13/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u></u>
e) Sample type indicated (<u>grab</u> /composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u></u>
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u></u>
Note Deficiencies: <u></u>				
<u></u>				
<u></u>				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u></u>
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u></u>

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-68001 (Alk)
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments/Notes:

MB: -68001: Pb (4.0),

Max Lab Duplicate RPD: 2% (Limit: 10%)

Dilution: Chloride and Sulfate analyzed at a dilution.

October 28, 2019

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

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60316743

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on October 02, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-19-12
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60316743001	R-MW-7-R	Water	09/30/19 14:25	10/02/19 03:05

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60316743001	R-MW-7-R	EPA 200.7	EMR	13	PASI-K
		EPA 200.8	JGP	6	PASI-K
		EPA 7470	HKC	1	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	MJK	1	PASI-K
		EPA 300.0	MGS	3	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Sample: R-MW-7-R **Lab ID: 60316743001** Collected: 09/30/19 14:25 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	215	ug/L	5.0	1.4	1	10/11/19 08:55	10/11/19 16:26	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/11/19 08:55	10/11/19 16:26	7440-41-7	
Boron	2190	ug/L	100	10.7	1	10/11/19 08:55	10/11/19 16:26	7440-42-8	
Calcium	73100	ug/L	200	50.0	1	10/11/19 08:55	10/11/19 16:26	7440-70-2	
Cobalt	0.92J	ug/L	5.0	0.84	1	10/11/19 08:55	10/11/19 16:26	7440-48-4	
Iron	1890	ug/L	50.0	14.0	1	10/11/19 08:55	10/11/19 16:26	7439-89-6	
Lead	<3.4	ug/L	10.0	3.4	1	10/11/19 08:55	10/11/19 16:26	7439-92-1	
Lithium	68.1	ug/L	10.0	5.9	1	10/11/19 08:55	10/11/19 16:26	7439-93-2	
Magnesium	22600	ug/L	50.0	13.0	1	10/11/19 08:55	10/11/19 16:26	7439-95-4	
Manganese	499	ug/L	5.0	2.1	1	10/11/19 08:55	10/11/19 16:26	7439-96-5	
Molybdenum	130	ug/L	20.0	2.6	1	10/11/19 08:55	10/11/19 16:26	7439-98-7	
Potassium	21500	ug/L	500	79.0	1	10/11/19 08:55	10/11/19 16:26	7440-09-7	
Sodium	90100	ug/L	500	144	1	10/11/19 08:55	10/11/19 16:26	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.18J	ug/L	1.0	0.078	1	10/04/19 10:30	10/08/19 15:24	7440-36-0	
Arsenic	12.4	ug/L	1.0	0.065	1	10/04/19 10:30	10/08/19 15:24	7440-38-2	
Cadmium	0.053J	ug/L	0.50	0.033	1	10/04/19 10:30	10/08/19 15:24	7440-43-9	
Chromium	0.19J	ug/L	1.0	0.078	1	10/04/19 10:30	10/08/19 15:24	7440-47-3	
Selenium	0.12J	ug/L	1.0	0.085	1	10/04/19 10:30	10/08/19 15:24	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	10/04/19 10:30	10/08/19 15:24	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.089	ug/L	0.20	0.089	1	10/03/19 10:59	10/04/19 11:26	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	278	mg/L	20.0	6.5	1		10/08/19 12:09		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	125	mg/L	10.0	2.2	10		10/07/19 21:49	16887-00-6	
Fluoride	0.24	mg/L	0.20	0.085	1		10/04/19 22:10	16984-48-8	
Sulfate	60.2	mg/L	5.0	1.2	5		10/04/19 21:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch:	613260	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
Associated Lab Samples:	60316743001		

METHOD BLANK: 2504530 Matrix: Water
Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.089	0.20	0.089	10/04/19 11:12	

LABORATORY CONTROL SAMPLE: 2504531

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2504532 2504533

Parameter	Units	60316489002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.9	4.9	98	98	75-125	0	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 615045 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60316743001

METHOD BLANK: 2510981 Matrix: Water

Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	10/11/19 16:22	
Beryllium	ug/L	<0.25	1.0	0.25	10/11/19 16:22	
Boron	ug/L	<10.7	100	10.7	10/11/19 16:22	
Calcium	ug/L	<50.0	200	50.0	10/11/19 16:22	
Cobalt	ug/L	<0.84	5.0	0.84	10/11/19 16:22	
Iron	ug/L	<14.0	50.0	14.0	10/11/19 16:22	
Lead	ug/L	<3.4	10.0	3.4	10/11/19 16:22	
Lithium	ug/L	<5.9	10.0	5.9	10/11/19 16:22	
Magnesium	ug/L	<13.0	50.0	13.0	10/11/19 16:22	
Manganese	ug/L	<2.1	5.0	2.1	10/11/19 16:22	
Molybdenum	ug/L	<2.6	20.0	2.6	10/11/19 16:22	
Potassium	ug/L	<79.0	500	79.0	10/11/19 16:22	
Sodium	ug/L	<144	500	144	10/11/19 16:22	

LABORATORY CONTROL SAMPLE: 2510982

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	995	100	85-115	
Beryllium	ug/L	1000	1010	101	85-115	
Boron	ug/L	1000	940	94	85-115	
Calcium	ug/L	10000	10500	105	85-115	
Cobalt	ug/L	1000	1010	101	85-115	
Iron	ug/L	10000	10500	105	85-115	
Lead	ug/L	1000	1070	107	85-115	
Lithium	ug/L	1000	984	98	85-115	
Magnesium	ug/L	10000	10100	101	85-115	
Manganese	ug/L	1000	936	94	85-115	
Molybdenum	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	10300	103	85-115	
Sodium	ug/L	10000	9950	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2510983 2510984

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		60316743001 Result	Spike Conc.	Spike Conc.	Result							Result
Barium	ug/L	215	1000	1000	1180	1210	97	99	70-130	2	20	
Beryllium	ug/L	<0.25	1000	1000	1000	1010	100	101	70-130	1	20	
Boron	ug/L	2190	1000	1000	3110	3180	92	98	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2510983		2510984		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60316743001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Calcium	ug/L	73100	10000	10000	80900	83900	78	108	70-130	4	20		
Cobalt	ug/L	0.92J	1000	1000	956	972	96	97	70-130	2	20		
Iron	ug/L	1890	10000	10000	12000	12200	102	104	70-130	2	20		
Lead	ug/L	<3.4	1000	1000	1010	1030	101	103	70-130	1	20		
Lithium	ug/L	68.1	1000	1000	1040	1060	97	99	70-130	2	20		
Magnesium	ug/L	22600	10000	10000	32000	32600	94	100	70-130	2	20		
Manganese	ug/L	499	1000	1000	1420	1450	92	95	70-130	2	20		
Molybdenum	ug/L	130	1000	1000	1110	1130	98	100	70-130	2	20		
Potassium	ug/L	21500	10000	10000	31100	32200	96	107	70-130	3	20		
Sodium	ug/L	90100	10000	10000	97500	102000	74	116	70-130	4	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60316743

QC Batch: 613546 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60316743001

METHOD BLANK: 2505583 Matrix: Water
Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	10/08/19 15:13	
Arsenic	ug/L	<0.065	1.0	0.065	10/08/19 15:13	
Cadmium	ug/L	<0.033	0.50	0.033	10/08/19 15:13	
Chromium	ug/L	<0.078	1.0	0.078	10/08/19 15:13	
Selenium	ug/L	<0.085	1.0	0.085	10/08/19 15:13	
Thallium	ug/L	<0.099	1.0	0.099	10/08/19 15:13	

LABORATORY CONTROL SAMPLE: 2505584

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.0	98	85-115	
Arsenic	ug/L	40	38.9	97	85-115	
Cadmium	ug/L	40	39.6	99	85-115	
Chromium	ug/L	40	39.9	100	85-115	
Selenium	ug/L	40	39.2	98	85-115	
Thallium	ug/L	40	37.8	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2505585 2505586

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60316717006 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	ND	40	40	39.9	38.3	99	95	70-130	4	20
Arsenic	ug/L	1.3	40	40	41.5	40.0	100	97	70-130	4	20
Cadmium	ug/L	ND	40	40	37.5	35.8	94	89	70-130	5	20
Chromium	ug/L	ND	40	40	40.8	38.5	100	94	70-130	6	20
Selenium	ug/L	ND	40	40	38.8	37.6	95	92	70-130	3	20
Thallium	ug/L	ND	40	40	34.8	33.4	87	84	70-130	4	20

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 614053

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60316743001

METHOD BLANK: 2507566

Matrix: Water

Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	10/08/19 10:32	

LABORATORY CONTROL SAMPLE: 2507567

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	491	98	90-110	

SAMPLE DUPLICATE: 2507568

Parameter	Units	60316283005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	117	122	3	10	

SAMPLE DUPLICATE: 2507570

Parameter	Units	60317066004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	364	373	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 613636	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60316743001	

METHOD BLANK: 2506081 Matrix: Water
Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.085	0.20	0.085	10/04/19 11:02	
Sulfate	mg/L	<0.23	1.0	0.23	10/04/19 11:02	

LABORATORY CONTROL SAMPLE: 2506082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2506083 2506084

Parameter	Units	60316718001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Result	Spike Conc.	MSD Result						
Fluoride	mg/L	ND	25	25	26.0	24.3	99	92	80-120	7	15	
Sulfate	mg/L	598	250	250	824	819	90	88	80-120	1	15	

MATRIX SPIKE SAMPLE: 2506085

Parameter	Units	60316773003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.24	2.5	2.6	96	80-120	
Sulfate	mg/L	57.7	25	82.7	100	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 613937	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60316743001	

METHOD BLANK: 2507245 Matrix: Water
Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/07/19 16:39	

LABORATORY CONTROL SAMPLE: 2507246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2507247 2507248

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		60317056001	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Chloride	mg/L	3.2J	25	25	25.1	25.2	88	88	80-120	1	15		

MATRIX SPIKE SAMPLE: 2507249

Parameter	Units	60316674006	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	4220	2000	6550	116	80-120	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.546 ± 0.626 (0.370) C:NA T:85%	pCi/L	10/18/19 14:42	13982-63-3	
Radium-228	EPA 904.0	0.732 ± 0.463 (0.887) C:80% T:91%	pCi/L	10/18/19 11:05	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 364993

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60316743001

METHOD BLANK: 1770501

Matrix: Water

Associated Lab Samples: 60316743001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.0114 ± 0.291 (0.676) C:80% T:90%	pCi/L	10/18/19 11:06	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

QC Batch: 364994

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60316743001

METHOD BLANK: 1770504

Matrix: Water

Associated Lab Samples: 60316743001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0434 ± 0.225 (0.467) C:NA T:81%	pCi/L	10/18/19 14:21	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60316743

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60316743001	R-MW-7-R	EPA 200.7	615045	EPA 200.7	615152
60316743001	R-MW-7-R	EPA 200.8	613546	EPA 200.8	613615
60316743001	R-MW-7-R	EPA 7470	613260	EPA 7470	613304
60316743001	R-MW-7-R	EPA 903.1	364994		
60316743001	R-MW-7-R	EPA 904.0	364993		
60316743001	R-MW-7-R	SM 2320B	614053		
60316743001	R-MW-7-R	EPA 300.0	613636		
60316743001	R-MW-7-R	EPA 300.0	613937		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60316743
Barcode with number 60316743

Client Name: Golder Associates

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No []

Custody Seal on Cooler/Box Present: Yes [] No [] Seals intact: Yes [] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [] 2PIC

Thermometer Used: T301 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 1.4 Corr. Factor 10.0 Corrected 1.4

Date and initials of person examining contents: VB 10/2/19

Temperature should be above freezing to 6°C

Table with 2 columns: Question and Answer (Yes/No/N/A). Rows include Chain of Custody present, Samples arrived within holding time, Short Hold Time analyses, Rush Turn Around Time requested, Sufficient volume, Correct containers used, Pace containers used, Containers intact, Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?, Filtered volume received for dissolved tests?, Sample labels match COC: Date / time / ID / analyses, Samples contain multiple phases? Matrix: WT, Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO), Cyanide water sample checks: Lead acetate strip turns dark? (Record only), Potassium iodide test strip turns blue/purple? (Preserve), Trip Blank present, Headspace in VOA vials (>6mm), Samples from USDA Regulated Area: State, Additional labels attached to 5035A / TX1005 vials in the field?

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

Person Contacted: Janni Chank Date/Time: 10/3/19

Comments/ Resolution:

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.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Golder Associates		Report To: Jeffrey Ingram		Attention:	
Address: 13515 Barrett Parkway Drive, Ste 260		Copy To: Ryan Feldmann / Eric Schneider		Company Name:	
Ballwin, MO 63021		Purchase Order No.:		Address:	
Email To: Jeffrey.Ingram@golder.com		Project Name: Ameren Rush Island Energy Center		Pace Quote Reference:	
Phone: 636-724-9191 Fax: 636-724-9323		Project Number: 153-1406-01.0002A (COC #4)		Pace Project Manager: Jamie Church	
Requested Due Date/TAT: Standard				Pace Profile #: 9285	
				Site Location: MO	
				STATE:	

Page: () of ()

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW PRODUCT P OIL SOL/SOLID SL OIL WP AR OT TS	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
		COMPOSITE START	COMPOSITE END/GRAB									
1	R-MW-1 R-MW-7-R		9/30/14 1425	G	WT	<i>Matt Holden</i>	10/1/19	1738	<i>Nathaniel Pace</i>	10/2/19 0305	1:4	Y Y Y Y
2	R-MW-2			G	WT							
3	R-MW-3			G	WT							
4	R-MW-4			G	WT							
5	R-MW-5			G	WT							
6	R-MW-6			G	WT							
7	R-MW-7			G	WT							
8	R-MW-B1			G	WT							
9	R-MW-B2			G	WT							
10	R-DUP-1			G	WT							
11	R-FB-1			G	WT							
12				G	WT							

ITEM #	Requested Analysis Filtered (Y/N)	Requested Analysis	Requested Analysis Filtered (Y/N)	Temp in °C	Received on	Custody	Sealed Cooler	Samples Intact
		Residual Chlorine (Y/N)						
		Metals*						
		Mercury						
		Chloride/Fluoride/Sulfate						
		Alkalinity						
		Total Phosphorus						
		Radium 226						
		Radium 228						

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: *Eric Schneider*

SIGNATURE of SAMPLER: *[Signature]*

DATE Signed (MM/DD/YY): 10/1/19

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

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



MEMORANDUM

DATE January 13, 2020

Project No. 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin

EMAIL Tommy_Goodwin@golder.com

DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60316743

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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - Rush Island - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/13/2020

Laboratory: Pace Analytical - KS

SDG #: 60316743

Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 7470 (Hg); EPA 903.1/904.0 (Rads); SM 2320B (Alk); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-MW-7-R

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>9/30/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (<u>grab</u> /composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

Dilution: Chloride and Sulfate analyzed at a dilution; no qualification necessary.

October 28, 2019

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

RE: Project: AMEREN RUSH ISLAND-RCPA
Pace Project No.: 60316773

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on October 02, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 19-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212018-8

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60316773001	R-MW-6	Water	09/30/19 12:45	10/02/19 03:05
60316773002	R-MW-FB-1	Water	09/30/19 14:25	10/02/19 03:05
60316773003	R-MW-DUP-1	Water	09/30/19 08:00	10/02/19 03:05
60316743001	R-MW-7-R	Water	09/30/19 14:25	10/02/19 03:05

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60316773001	R-MW-6	EPA 200.7	EMR	1	PASI-K
60316773002	R-MW-FB-1	EPA 200.7	EMR	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
		EPA 200.7	EMR	2	PASI-K
60316773003	R-MW-DUP-1	SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
		EPA 200.7	EMR	2	PASI-K
60316743001	R-MW-7-R	SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Sample: R-MW-6 **Lab ID: 60316773001** Collected: 09/30/19 12:45 Received: 10/02/19 03:05 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	95500	ug/L	200	50.0	1	10/04/19 13:39	10/07/19 13:37	7440-70-2	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Sample: R-MW-FB-1 **Lab ID: 60316773002** Collected: 09/30/19 14:25 Received: 10/02/19 03:05 Matrix: Water

Parameters	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	<10.7	ug/L	100	10.7	1	10/04/19 13:39	10/07/19 13:39	7440-42-8	
Calcium	<50.0	ug/L	200	50.0	1	10/04/19 13:39	10/07/19 13:39	7440-70-2	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		10/07/19 14:49		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.22	mg/L	1.0	0.22	1		10/04/19 22:27	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		10/04/19 22:27	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		10/04/19 22:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Sample: R-MW-DUP-1 **Lab ID: 60316773003** Collected: 09/30/19 08:00 Received: 10/02/19 03:05 Matrix: Water

Parameters	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	2200	ug/L	100	10.7	1	10/04/19 13:39	10/07/19 13:41	7440-42-8	
Calcium	65700	ug/L	200	50.0	1	10/04/19 13:39	10/07/19 13:41	7440-70-2	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	595	mg/L	10.0	10.0	1		10/03/19 14:29		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	122	mg/L	10.0	2.2	10		10/07/19 22:05	16887-00-6	
Fluoride	0.24	mg/L	0.20	0.085	1		10/04/19 23:00	16984-48-8	
Sulfate	57.7	mg/L	5.0	1.2	5		10/04/19 23:32	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Sample: R-MW-7-R **Lab ID: 60316743001** Collected: 09/30/19 14:25 Received: 10/02/19 03:05 Matrix: Water

Parameters	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	2190	ug/L	100	10.7	1	10/11/19 08:55	10/11/19 16:26	7440-42-8	
Calcium	73100	ug/L	200	50.0	1	10/11/19 08:55	10/11/19 16:26	7440-70-2	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	576	mg/L	13.3	13.3	1		10/03/19 14:29		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	125	mg/L	10.0	2.2	10		10/07/19 21:49	16887-00-6	
Fluoride	0.24	mg/L	0.20	0.085	1		10/04/19 22:10	16984-48-8	
Sulfate	60.2	mg/L	5.0	1.2	5		10/04/19 21:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

QC Batch: 613571 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60316773001, 60316773002, 60316773003

METHOD BLANK: 2505826 Matrix: Water

Associated Lab Samples: 60316773001, 60316773002, 60316773003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	10/07/19 13:10	
Calcium	ug/L	<50.0	200	50.0	10/07/19 13:10	

LABORATORY CONTROL SAMPLE: 2505827

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	942	94	85-115	
Calcium	ug/L	10000	9650	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2505828 2505829

Parameter	Units	60316528004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	1540	1000	1000	2380	2570	84	103	70-130	8	20	
Calcium	ug/L	54400	10000	10000	63100	66200	87	118	70-130	5	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

QC Batch: 615045 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60316743001

METHOD BLANK: 2510981 Matrix: Water

Associated Lab Samples: 60316743001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	10/11/19 16:22	
Calcium	ug/L	<50.0	200	50.0	10/11/19 16:22	

LABORATORY CONTROL SAMPLE: 2510982

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	940	94	85-115	
Calcium	ug/L	10000	10500	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2510983 2510984

Parameter	Units	60316743001		2510983		2510984		% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Boron	ug/L	2190	1000	3110	3180	92	98	70-130	2	20	
Calcium	ug/L	73100	10000	80900	83900	78	108	70-130	4	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA
Pace Project No.: 60316773

QC Batch: 613248 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60316743001, 60316773003

METHOD BLANK: 2504492 Matrix: Water
Associated Lab Samples: 60316743001, 60316773003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	32.0	5.0	5.0	10/03/19 14:26	

LABORATORY CONTROL SAMPLE: 2504493

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1080	108	80-120	

SAMPLE DUPLICATE: 2504494

Parameter	Units	60316686001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	465	441	5	10	

SAMPLE DUPLICATE: 2504495

Parameter	Units	60316686008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	5810	5580	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

QC Batch:	613882	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples:	60316773002		

METHOD BLANK: 2507137 Matrix: Water
Associated Lab Samples: 60316773002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	10/07/19 14:48	

LABORATORY CONTROL SAMPLE: 2507138

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

SAMPLE DUPLICATE: 2507140

Parameter	Units	60316914006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	6710	6830	2	10	

SAMPLE DUPLICATE: 2507298

Parameter	Units	60316686016 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	240	238	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

QC Batch: 613636 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60316743001, 60316773002, 60316773003

METHOD BLANK: 2506081 Matrix: Water

Associated Lab Samples: 60316743001, 60316773002, 60316773003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/04/19 11:02	
Fluoride	mg/L	<0.085	0.20	0.085	10/04/19 11:02	
Sulfate	mg/L	<0.23	1.0	0.23	10/04/19 11:02	

LABORATORY CONTROL SAMPLE: 2506082

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2506083 2506084

Parameter	Units	60316718001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	151	50	50	208	177	115	52	80-120	16	15	E,M1, R1
Fluoride	mg/L	ND	25	25	26.0	24.3	99	92	80-120	7	15	
Sulfate	mg/L	598	250	250	824	819	90	88	80-120	1	15	

MATRIX SPIKE SAMPLE: 2506085

Parameter	Units	60316773003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	131	25	158	108	80-120	E
Fluoride	mg/L	0.24	2.5	2.6	96	80-120	
Sulfate	mg/L	57.7	25	82.7	100	80-120	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND-RCPA
Pace Project No.: 60316773

QC Batch: 613937 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60316743001, 60316773003

METHOD BLANK: 2507245 Matrix: Water
Associated Lab Samples: 60316743001, 60316773003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/07/19 16:39	

LABORATORY CONTROL SAMPLE: 2507246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2507247 2507248

Parameter	Units	60317056001		60317056001		60317056001		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Result	MS Spike Conc.	MSD Spike Conc.	MS % Rec	MSD % Rec				
Chloride	mg/L	3.2J	25	25	25.1	25.2	88	88	80-120	1	15

MATRIX SPIKE SAMPLE: 2507249

Parameter	Units	60316674006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	4220	2000	6550	116	80-120	

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

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QUALIFIERS

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

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

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

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND-RCPA

Pace Project No.: 60316773

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60316743001	R-MW-7-R	EPA 200.7	615045	EPA 200.7	615152
60316773001	R-MW-6	EPA 200.7	613571	EPA 200.7	613672
60316773002	R-MW-FB-1	EPA 200.7	613571	EPA 200.7	613672
60316773003	R-MW-DUP-1	EPA 200.7	613571	EPA 200.7	613672
60316743001	R-MW-7-R	SM 2540C	613248		
60316773002	R-MW-FB-1	SM 2540C	613882		
60316773003	R-MW-DUP-1	SM 2540C	613248		
60316743001	R-MW-7-R	EPA 300.0	613636		
60316743001	R-MW-7-R	EPA 300.0	613937		
60316773002	R-MW-FB-1	EPA 300.0	613636		
60316773003	R-MW-DUP-1	EPA 300.0	613636		
60316773003	R-MW-DUP-1	EPA 300.0	613937		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60316773
Barcode
60316773

Client Name: Golder Associates

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] 2PIC

Thermometer Used: T301 Type of Ice: Wet [x] Blue [] None []

Cooler Temperature (°C): As-read 1.4 Corr. Factor 10.0 Corrected 1.4

Date and initials of person examining contents: VB 10/2/19

Temperature should be above freezing to 6°C

Table with 3 columns: Question, Yes/No/N/A checkboxes, and handwritten notes. Includes rows for Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match COC, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached to 5035A / TX1005 vials.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 10/3/19

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	Page: <u>1</u> of <u>1</u>
Company: Golder Associates	Report To: Jeffrey Ingram	Attention: _____	
Address: 13515 Barrett Parkway Drive, Ste 260 Ballwin, MO 63021	Copy To: Ryan Feldmann/Eric Schneider	Company Name: _____	
Email To: jeffrey.ingram@golder.com	Purchase Order No.: _____	Address: _____	
Phone: 636-724-9191 Fax: 636-724-9323	Project Name: Ameren - KCPA	Pace Quote Reference: _____	
Requested Due Date/TAT: Standard	Project Number: 153140601.0002A	Pace Project Manager: Jamie Church	
		Pace Profile #: 9285	

ITEM #	Valid Matrix Codes MATRIX CODE DW WW P SL OL WP AR OT TS	Requested Client Information SAMPLE ID (A-Z, 0-9 / - / -) Sample IDs MUST BE UNIQUE	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB						
1	DRINKING WATER	R-MW-6	DATE: 9/24/19	TIME: 1245		1	Unpreserved			001
2	WASTE WATER	R-MW-7-R	DATE: 10/1/19	TIME: 1425		2	H ₂ SO ₄			002
3	WASTE WATER	R-MW-FB-1	DATE: 10/1/19	TIME: 1454		2	HNO ₃			003
4	WASTE WATER	R-MW-FB-DUP-1	DATE: 10/1/19	TIME: 1454		2	HCl			
5	WASTE WATER						NaOH			
6	WASTE WATER						Na ₂ S ₂ O ₃			
7	WASTE WATER						Methanol			
8	WASTE WATER						Other			
9	WASTE WATER						Analysis Test			
10	WASTE WATER						200.7 Boron			
11	WASTE WATER						200.7 Calcium			
12	WASTE WATER						Chloride			
							Fluoride			
							Sulfate			
							TDS			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<i>Eric Schneider</i>	10/11/19	1738	<i>Eric Schneider</i>	10/21/19	0305	Y Y Y Y

Temp in °C	Samples Intact (Y/N)
Received on	Sealed Cooler (Y/N)
Ice (Y/N)	Custody
SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: <i>Eric Schneider</i> SIGNATURE of SAMPLER: <i>[Signature]</i> DATE Signed (MM/DD/YYYY): <i>10/11/19</i>	



GOLDER

MEMORANDUM

DATE January 13, 2020

Project No. 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin

EMAIL Tommy_Goodwin@golder.com

DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60316773

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

- None.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - Rush Island - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/13/2020

Laboratory: Pace Analytical - KS

SDG #: 60316773

Analytical Method (type and no.): EPA 200.7 (Metals); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-MW-6, R-MW-FB-1, R-MW-DUP-1, R-MW-7-R

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>9/30/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
e) Sample type indicated (<u>grab</u> /composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DUP-1 @ R-MW-7-R
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FB-1 @ R-MW-7-R
b) Were field dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments/Notes:

-43001, -73003: TDS (32.0)

Dilution: Chloride and Sulfate diluted in several samples; no qualification is necessary.

November 13, 2019

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

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60318735

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on October 19, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

ANAB DOD-ELAP Rad Accreditation #: L2417

Alabama Certification #: 41590

Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification #: PA01547

Connecticut Certification #: PH-0694

Delaware Certification

EPA Region 4 DW Rad

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Florida: Cert E871149 SEKS WET

Guam Certification

Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: KY90133

KY WW Permit #: KY0098221

KY WW Permit #: KY0000221

Louisiana DHH/TNI Certification #: LA180012

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: 2017020

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification #: 9991

Missouri Certification #: 235

Montana Certification #: Cert0082

Nebraska Certification #: NE-OS-29-14

Nevada Certification #: PA014572018-1

New Hampshire/TNI Certification #: 297617

New Jersey/TNI Certification #: PA051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Ohio EPA Rad Approval: #41249

Oregon/TNI Certification #: PA200002-010

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: 02867

Texas/TNI Certification #: T104704188-17-3

Utah/TNI Certification #: PA014572017-9

USDA Soil Permit #: P330-17-00091

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 9526

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Approve List for Rad

Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 19-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212018-8

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60318735001	R-P-19-I	Water	10/17/19 11:50	10/19/19 03:50
60318735002	R-P-17-I	Water	10/17/19 10:45	10/19/19 03:50

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60318735001	R-P-19-I	EPA 200.7	EMR	6	PASI-K
		EPA 200.8	EMR	4	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB, MJK	3	PASI-K
60318735002	R-P-17-I	EPA 200.7	EMR	6	PASI-K
		EPA 200.8	EMR	4	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB, MJK	3	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Sample: R-P-19-I **Lab ID: 60318735001** Collected: 10/17/19 11:50 Received: 10/19/19 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	14.2	ug/L	5.0	1.4	1	10/23/19 08:55	10/24/19 15:10	7440-39-3	
Boron	5260	ug/L	100	10.7	1	10/23/19 08:55	10/24/19 15:10	7440-42-8	
Calcium	7340	ug/L	200	50.0	1	10/23/19 08:55	10/24/19 15:10	7440-70-2	
Lead	9.7J	ug/L	10.0	3.4	1	10/23/19 08:55	10/24/19 15:10	7439-92-1	
Lithium	12.3	ug/L	10.0	5.9	1	10/23/19 08:55	10/24/19 15:10	7439-93-2	
Molybdenum	302	ug/L	20.0	2.6	1	10/23/19 08:55	10/24/19 15:10	7439-98-7	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	5.3	ug/L	1.0	0.078	1	10/23/19 15:03	10/29/19 17:13	7440-36-0	
Arsenic	290	ug/L	1.0	0.065	1	10/23/19 15:03	10/29/19 17:13	7440-38-2	
Cadmium	0.53	ug/L	0.50	0.033	1	10/23/19 15:03	10/29/19 17:13	7440-43-9	
Selenium	2.4	ug/L	1.0	0.085	1	10/23/19 15:03	10/29/19 17:13	7782-49-2	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	988	mg/L	13.3	13.3	1		10/24/19 09:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.5	mg/L	2.0	0.44	2		11/13/19 01:44	16887-00-6	
Fluoride	1.0	mg/L	0.20	0.085	1		11/11/19 22:31	16984-48-8	
Sulfate	316	mg/L	20.0	4.6	20		11/11/19 22:48	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Sample: R-P-17-I **Lab ID: 60318735002** Collected: 10/17/19 10:45 Received: 10/19/19 03:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	12.0	ug/L	5.0	1.4	1	10/23/19 08:55	10/24/19 15:16	7440-39-3	
Boron	2430	ug/L	100	10.7	1	10/23/19 08:55	10/24/19 15:16	7440-42-8	
Calcium	6740	ug/L	200	50.0	1	10/23/19 08:55	10/24/19 15:16	7440-70-2	
Lead	40.5	ug/L	10.0	3.4	1	10/23/19 08:55	10/24/19 15:16	7439-92-1	
Lithium	<5.9	ug/L	10.0	5.9	1	10/23/19 08:55	10/24/19 15:16	7439-93-2	
Molybdenum	116	ug/L	20.0	2.6	1	10/23/19 08:55	10/24/19 15:16	7439-98-7	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.88J	ug/L	1.0	0.078	1	10/23/19 15:03	10/29/19 17:19	7440-36-0	
Arsenic	99.7	ug/L	1.0	0.065	1	10/23/19 15:03	10/29/19 17:19	7440-38-2	
Cadmium	0.96	ug/L	0.50	0.033	1	10/23/19 15:03	10/29/19 17:19	7440-43-9	
Selenium	3.5	ug/L	1.0	0.085	1	10/23/19 15:03	10/29/19 17:19	7782-49-2	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	858	mg/L	10.0	10.0	1		10/24/19 09:37		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	22.6	mg/L	2.0	0.44	2		11/13/19 02:01	16887-00-6	
Fluoride	1.6	mg/L	0.20	0.085	1		11/11/19 23:55	16984-48-8	
Sulfate	250	mg/L	20.0	4.6	20		11/11/19 23:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

QC Batch: 617629 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 2520187 Matrix: Water

Associated Lab Samples: 60318735001, 60318735002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	10/24/19 14:50	
Boron	ug/L	<10.7	100	10.7	10/24/19 14:50	
Calcium	ug/L	<50.0	200	50.0	10/24/19 14:50	
Lead	ug/L	<3.4	10.0	3.4	10/24/19 14:50	
Lithium	ug/L	<5.9	10.0	5.9	10/24/19 14:50	
Molybdenum	ug/L	<2.6	20.0	2.6	10/24/19 14:50	

LABORATORY CONTROL SAMPLE: 2520188

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	990	99	85-115	
Boron	ug/L	1000	962	96	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Lead	ug/L	1000	1070	107	85-115	
Lithium	ug/L	1000	979	98	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	

MATRIX SPIKE SAMPLE: 2520189

Parameter	Units	60318736001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	155	1000	1130	97	70-130	
Boron	ug/L	9440	1000	10200	81	70-130	
Calcium	ug/L	87100	10000	96300	92	70-130	
Lead	ug/L	<3.4	1000	1030	103	70-130	
Lithium	ug/L	28.8	1000	994	97	70-130	
Molybdenum	ug/L	292	1000	1290	100	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2520190 2520191

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60318735001 Result	Spike Conc.	Spike Conc.	MS Conc.							
Barium	ug/L	14.2	1000	1000	998	996	98	98	70-130	0	20	
Boron	ug/L	5260	1000	1000	6480	6410	122	114	70-130	1	20	
Calcium	ug/L	7340	10000	10000	17700	17700	103	103	70-130	0	20	
Lead	ug/L	9.7J	1000	1000	1030	1030	102	102	70-130	1	20	
Lithium	ug/L	12.3	1000	1000	989	985	98	97	70-130	0	20	
Molybdenum	ug/L	302	1000	1000	1320	1320	101	102	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

QC Batch: 617826 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 2520917 Matrix: Water

Associated Lab Samples: 60318735001, 60318735002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	10/29/19 16:55	
Arsenic	ug/L	<0.065	1.0	0.065	10/29/19 16:55	
Cadmium	ug/L	<0.033	0.50	0.033	10/29/19 16:55	
Selenium	ug/L	<0.085	1.0	0.085	10/29/19 16:55	

LABORATORY CONTROL SAMPLE: 2520918

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	36.2	91	85-115	
Arsenic	ug/L	40	35.9	90	85-115	
Cadmium	ug/L	40	35.9	90	85-115	
Selenium	ug/L	40	37.0	92	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2520919 2520920

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60318737002 Result	Spike Conc.	Spike Conc.	Result						
Antimony	ug/L	<0.078	40	40	38.4	38.4	96	96	70-130	0	20
Arsenic	ug/L	2.3	40	40	40.3	40.5	95	96	70-130	1	20
Cadmium	ug/L	0.13J	40	40	34.3	34.4	85	86	70-130	0	20
Selenium	ug/L	<0.085	40	40	36.6	36.5	91	91	70-130	0	20

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

QC Batch: 617744

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 2520622

Matrix: Water

Associated Lab Samples: 60318735001, 60318735002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	10/24/19 09:35	

LABORATORY CONTROL SAMPLE: 2520623

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	977	98	80-120	

SAMPLE DUPLICATE: 2520624

Parameter	Units	60318634006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	640	636	1	10	

SAMPLE DUPLICATE: 2520625

Parameter	Units	60318741004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	625	618	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60318735

QC Batch: 621676 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 2535170 Matrix: Water
Associated Lab Samples: 60318735001, 60318735002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/11/19 19:42	
Fluoride	mg/L	<0.085	0.20	0.085	11/11/19 19:42	
Sulfate	mg/L	<0.23	1.0	0.23	11/11/19 19:42	

METHOD BLANK: 2535876 Matrix: Water
Associated Lab Samples: 60318735001, 60318735002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/12/19 21:35	
Fluoride	mg/L	<0.085	0.20	0.085	11/12/19 21:35	
Sulfate	mg/L	<0.23	1.0	0.23	11/12/19 21:35	

LABORATORY CONTROL SAMPLE: 2535171

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

LABORATORY CONTROL SAMPLE: 2535877

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.6	106	90-110	
Sulfate	mg/L	5	5.3	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2535172 2535173

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60318734001 Result	Spike Conc.	Spike Conc.	Result						
Chloride	mg/L	76.3	100	100	176	168	100	92	80-120	5	15
Fluoride	mg/L	0.29	2.5	2.5	2.7	2.6	96	94	80-120	2	15
Sulfate	mg/L	198	100	100	319	290	121	92	80-120	9	15 M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

MATRIX SPIKE SAMPLE:		2535174					
Parameter	Units	60319962005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	4.3	5	9.3	99	80-120	
Fluoride	mg/L	ND	2.5	2.9	116	80-120	
Sulfate	mg/L	17.9	5	23.5	111	80-120	E

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Sample: R-P-19-I **Lab ID: 60318735001** Collected: 10/17/19 11:50 Received: 10/19/19 03:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.370 (0.801) C:NA T:87%	pCi/L	11/11/19 13:45	13982-63-3	
Radium-228	EPA 904.0	1.13 ± 0.839 (1.64) C:66% T:51%	pCi/L	11/08/19 17:08	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Sample: R-P-17-I **Lab ID: 60318735002** Collected: 10/17/19 10:45 Received: 10/19/19 03:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0745 ± 0.438 (0.894) C:NA T:81%	pCi/L	11/11/19 13:58	13982-63-3	
Radium-228	EPA 904.0	0.722 ± 0.762 (1.59) C:65% T:62%	pCi/L	11/08/19 17:08	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

QC Batch: 368390

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 1787310

Matrix: Water

Associated Lab Samples: 60318735001, 60318735002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.306 (0.647) C:NA T:87%	pCi/L	11/11/19 13:45	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

QC Batch: 368389

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60318735001, 60318735002

METHOD BLANK: 1787305

Matrix: Water

Associated Lab Samples: 60318735001, 60318735002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.274 ± 0.426 (0.922) C:70% T:83%	pCi/L	11/08/19 12:59	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

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

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60318735

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60318735001	R-P-19-I	EPA 200.7	617629	EPA 200.7	617750
60318735002	R-P-17-I	EPA 200.7	617629	EPA 200.7	617750
60318735001	R-P-19-I	EPA 200.8	617826	EPA 200.8	617909
60318735002	R-P-17-I	EPA 200.8	617826	EPA 200.8	617909
60318735001	R-P-19-I	EPA 903.1	368390		
60318735002	R-P-17-I	EPA 903.1	368390		
60318735001	R-P-19-I	EPA 904.0	368389		
60318735002	R-P-17-I	EPA 904.0	368389		
60318735001	R-P-19-I	SM 2540C	617744		
60318735002	R-P-17-I	SM 2540C	617744		
60318735001	R-P-19-I	EPA 300.0	621676		
60318735002	R-P-17-I	EPA 300.0	621676		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60318735
Barcode: 60318735

Client Name: Corder

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 [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [x] Foam [] None [] Other []

Thermometer Used: 2-796 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 2.1, 1.0 Corr. Factor 0.24 Corrected 2.5, 1.4

Date and initials of person examining contents: 10/19/19

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Requirement and Yes/No/N/A checkboxes. Rows include Chain of Custody, Short Hold Time, Rush Turn Around Time, Containers used, etc.

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

Person Contacted: Date/Time:

Comments/ Resolution:

10/21/19

Project Manager Review: Janni Church Date:



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information: Company: Golder Associates Address: 13515 Barrett Parkway Drive, Suite 280 City: Ballwin, MO 63021 Email To: madcock@golder.com Phone: 314-984-8800 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 Groundwater Sampling Project Number: 153-1406		Section C Invoice Information: Attention: Company Name: Address: Pace Quote Reference: Pace Project Manager: Jamie Church Pace Profile #: 9285 Site Location: MO STATE:	
Section D Required Client Information SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE 1 R-P-19-I 2 R-P-17-I		Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WW WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WP WP AR AR OT OT TS TS			

ITEM #	Valid Matrix Codes	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
		COMPOSITE START	COMPOSITE END/GRAB									
1				G	WT		10/18/19	11:35	A. McManis	10/18	11:36	Received on
2				G	WT		10/17/19	10:45	ALL DE	10/20/19	5:30	Temp in °C
3				G	WT							Ice (Y/N)
4				G	WT							Custody Sealed
5				G	WT							Cooler (Y/N)
6				G	WT							Samples Intact (Y/N)
7				G	WT							
8				G	WT							
9				G	WT							
10				G	WT							
11				G	WT							
12				G	WT							

Requested Analysis Filtered (Y/N) Metals* <input type="checkbox"/> Chloride/Fluoride/Sulfate <input type="checkbox"/> TDS <input type="checkbox"/> Radium 226 & 228 <input type="checkbox"/> Residual Chlorine (Y/N) <input type="checkbox"/>											
Requested Analysis Test H ₂ SO ₄ <input type="checkbox"/> HNO ₃ <input type="checkbox"/> HCl <input type="checkbox"/> NaOH <input type="checkbox"/> Na ₂ S ₂ O ₃ <input type="checkbox"/> Methanol <input type="checkbox"/> Other <input type="checkbox"/>											
# OF CONTAINERS Unpreserved <input type="checkbox"/> 4 <input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 3											
SAMPLE TEMP AT COLLECTION SAMPLE TEMP AT COLLECTION											
ADDITIONAL COMMENTS Katherine Bartels/Golder Pace Project No./ Lab I.D. 260318735 001 002											
SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: Katherine Bartels SIGNATURE of SAMPLER: <i>[Signature]</i> DATE Signed (MM/DD/YYYY): 10/18/19											



MEMORANDUM

DATE January 6, 2020

Project No. 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin

EMAIL Tommy_Goodwin@golder.com

DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60318735

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).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - Rush Island - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/6/2020

Laboratory: Pace Analytical - KS

SDG #: 60318735

Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 903.1/904.0 (Rads); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-P-19-I, R-P-17-I

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/17/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
e) Sample type indicated (<u>grab</u> composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

Dilution: Chloride and Sulfate diluted in several samples; no qualification is necessary.

December 09, 2019

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

RE: Project: AMEREN RUSH ENERGY CTR RCPA
Pace Project No.: 60320950

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between November 09, 2019 and November 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

ANAB DOD-ELAP Rad Accreditation #: L2417

Alabama Certification #: 41590

Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification #: PA01547

Connecticut Certification #: PH-0694

Delaware Certification

EPA Region 4 DW Rad

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Florida: Cert E871149 SEKS WET

Guam Certification

Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: KY90133

KY WW Permit #: KY0098221

KY WW Permit #: KY0000221

Louisiana DHH/TNI Certification #: LA180012

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: 2017020

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification #: 9991

Missouri Certification #: 235

Montana Certification #: Cert0082

Nebraska Certification #: NE-OS-29-14

Nevada Certification #: PA014572018-1

New Hampshire/TNI Certification #: 297617

New Jersey/TNI Certification #: PA051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Ohio EPA Rad Approval: #41249

Oregon/TNI Certification #: PA200002-010

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: 02867

Texas/TNI Certification #: T104704188-17-3

Utah/TNI Certification #: PA014572017-9

USDA Soil Permit #: P330-17-00091

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 9526

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Approve List for Rad

Wyoming Certification #: 8TMS-L

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 19-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212018-8

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60320950001	R-MW-1	Water	11/11/19 10:19	11/13/19 02:53
60320950002	R-MW-3	Water	11/11/19 14:15	11/13/19 02:53
60320950003	R-MW-4	Water	11/11/19 16:50	11/13/19 02:53
60320950004	R-MW-5	Water	11/11/19 16:10	11/13/19 02:53
60320950005	R-MW-6	Water	11/11/19 10:30	11/13/19 02:53
60320950006	R-MW-7(r)	Water	11/11/19 12:05	11/13/19 02:53
60320950007	R-P-17I	Water	11/11/19 11:58	11/13/19 02:53
60320950008	R-MW-B1	Water	11/11/19 14:45	11/13/19 02:53
60320950009	R-MW-B2	Water	11/11/19 13:55	11/13/19 02:53
60320950010	R-DUP-2	Water	11/11/19 13:55	11/13/19 02:53
60320950011	R-FB-1	Water	11/11/19 10:43	11/13/19 02:53
60320950012	R-FB-2	Water	11/11/19 12:35	11/13/19 02:53
60320950013	R-MW-1 MS	Water	11/11/19 10:19	11/13/19 02:53
60320950014	R-MW-1 MSD	Water	11/11/19 10:19	11/13/19 02:53
60320739001	R-MW-2	Water	11/08/19 14:23	11/09/19 02:55
60320739002	R-P-19I	Water	11/08/19 13:03	11/09/19 02:55
60320739003	R-DUP-1	Water	11/08/19 08:00	11/09/19 02:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60320950001	R-MW-1	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950002	R-MW-3	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950003	R-MW-4	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950004	R-MW-5	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950005	R-MW-6	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950006	R-MW-7(r)	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60320950007	R-P-17I	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
60320950008	R-MW-B1	SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
60320950009	R-MW-B2	EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60320950010	R-DUP-2	SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60320950011	R-FB-1	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60320950012	R-FB-2	SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	LRS	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
60320950013	R-MW-1 MS	SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60320950014	R-MW-1 MSD	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
60320739001	R-MW-2	EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
60320739002	R-P-19I	EPA 200.8	JGP	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	5	PASI-K
60320739003	R-DUP-1	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
		EPA 200.7	HKC	10	PASI-K
		EPA 200.8	JGP	5	PASI-K
		EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-1 **Lab ID: 60320950001** Collected: 11/11/19 10:19 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	18.8	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:21	7440-39-3	
Boron	3170	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:21	7440-42-8	
Calcium	27200	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:21	7440-70-2	
Iron	32.7J	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:21	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:21	7439-93-2	
Magnesium	1590	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:21	7439-95-4	
Manganese	6.8	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:21	7439-96-5	
Molybdenum	133	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:21	7439-98-7	
Potassium	5940	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:21	7440-09-7	
Sodium	156000	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:21	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.59J	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:07	7440-36-0	
Arsenic	12.6	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:07	7440-38-2	
Cadmium	0.065J	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:07	7440-43-9	
Lead	0.16J	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:07	7439-92-1	B
Selenium	0.60J	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:07	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	153	mg/L	20.0	6.5	1		11/19/19 11:53		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	529	mg/L	10.0	10.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	21.5	mg/L	2.0	0.44	2		12/04/19 14:02	16887-00-6	
Fluoride	0.74	mg/L	0.20	0.085	1		12/04/19 11:48	16984-48-8	
Sulfate	125	mg/L	20.0	4.6	20		12/04/19 12:38	14808-79-8	M1,R1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-3 **Lab ID: 60320950002** Collected: 11/11/19 14:15 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	13.0	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:28	7440-39-3	
Boron	13000	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:28	7440-42-8	
Calcium	5420	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:28	7440-70-2	
Iron	312	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:28	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:28	7439-93-2	
Magnesium	64.9	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:28	7439-95-4	
Manganese	10.4	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:28	7439-96-5	
Molybdenum	1050	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:28	7439-98-7	
Potassium	1640	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:28	7440-09-7	
Sodium	217000	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:28	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.11J	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:15	7440-36-0	
Arsenic	49.1	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:15	7440-38-2	
Cadmium	0.54	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:15	7440-43-9	
Lead	4.9	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:15	7439-92-1	
Selenium	0.54J	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:15	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	347	mg/L	20.0	6.5	1		11/19/19 12:04		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	649	mg/L	10.0	10.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	28.6	mg/L	2.0	0.44	2		12/04/19 15:10	16887-00-6	
Fluoride	1.1	mg/L	0.20	0.085	1		12/04/19 14:53	16984-48-8	
Sulfate	117	mg/L	20.0	4.6	20		12/04/19 15:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-4 **Lab ID: 60320950003** Collected: 11/11/19 16:50 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	294	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:30	7440-39-3	
Boron	3580	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:30	7440-42-8	
Calcium	78200	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:30	7440-70-2	
Iron	5600	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:30	7439-89-6	
Lithium	33.6	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:30	7439-93-2	
Magnesium	14800	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:30	7439-95-4	
Manganese	279	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:30	7439-96-5	
Molybdenum	96.4	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:30	7439-98-7	
Potassium	5080	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:30	7440-09-7	
Sodium	53100	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:30	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:17	7440-36-0	
Arsenic	10.3	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:17	7440-38-2	
Cadmium	0.048J	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:17	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:17	7439-92-1	
Selenium	0.13J	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:17	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	285	mg/L	20.0	6.5	1		11/19/19 12:09		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	415	mg/L	5.0	5.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	20.5	mg/L	5.0	1.1	5		12/04/19 16:00	16887-00-6	
Fluoride	0.75	mg/L	0.20	0.085	1		12/04/19 15:44	16984-48-8	
Sulfate	59.6	mg/L	5.0	1.2	5		12/04/19 16:00	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-5 **Lab ID: 60320950004** Collected: 11/11/19 16:10 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	397	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:33	7440-39-3	
Boron	109	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:33	7440-42-8	
Calcium	139000	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:33	7440-70-2	
Iron	11900	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:33	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:33	7439-93-2	
Magnesium	17800	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:33	7439-95-4	
Manganese	470	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:33	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:33	7439-98-7	
Potassium	2230	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:33	7440-09-7	
Sodium	5010	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:33	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:18	7440-36-0	
Arsenic	2.6	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:18	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:18	7440-43-9	
Lead	0.23J	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:18	7439-92-1	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:18	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	384	mg/L	20.0	6.5	1		11/19/19 12:15		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	424	mg/L	5.0	5.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	5.6	mg/L	1.0	0.22	1		12/04/19 16:51	16887-00-6	
Fluoride	0.16J	mg/L	0.20	0.085	1		12/04/19 16:51	16984-48-8	
Sulfate	4.7	mg/L	1.0	0.23	1		12/04/19 16:51	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-6 **Lab ID: 60320950005** Collected: 11/11/19 10:30 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	179	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:36	7440-39-3	
Boron	1490	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:36	7440-42-8	
Calcium	92600	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:36	7440-70-2	
Iron	1000	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:36	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:36	7439-93-2	
Magnesium	13200	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:36	7439-95-4	
Manganese	241	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:36	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:36	7439-98-7	
Potassium	1830	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:36	7440-09-7	
Sodium	19800	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:36	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:20	7440-36-0	
Arsenic	2.1	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:20	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:20	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:20	7439-92-1	
Selenium	0.17J	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:20	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	304	mg/L	20.0	6.5	1		11/19/19 12:20		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	354	mg/L	5.0	5.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	9.5	mg/L	1.0	0.22	1		12/04/19 17:08	16887-00-6	
Fluoride	0.20	mg/L	0.20	0.085	1		12/04/19 17:08	16984-48-8	
Sulfate	17.8	mg/L	1.0	0.23	1		12/04/19 17:08	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-7(r) **Lab ID: 60320950006** Collected: 11/11/19 12:05 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	171	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:43	7440-39-3	
Boron	2610	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:43	7440-42-8	
Calcium	71400	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:43	7440-70-2	
Iron	2740	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:43	7439-89-6	
Lithium	47.8	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:43	7439-93-2	
Magnesium	20700	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:43	7439-95-4	
Manganese	536	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:43	7439-96-5	
Molybdenum	143	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:43	7439-98-7	
Potassium	18200	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:43	7440-09-7	
Sodium	68600	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:43	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:21	7440-36-0	
Arsenic	18.5	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:21	7440-38-2	
Cadmium	0.076J	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:21	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:21	7439-92-1	
Selenium	0.10J	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:21	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	296	mg/L	20.0	6.5	1		11/19/19 12:25		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	483	mg/L	10.0	10.0	1		11/14/19 07:55		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	77.2	mg/L	10.0	2.2	10		12/04/19 17:58	16887-00-6	
Fluoride	0.29	mg/L	0.20	0.085	1		12/04/19 17:41	16984-48-8	
Sulfate	26.7	mg/L	10.0	2.3	10		12/04/19 17:58	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-P-17I **Lab ID: 60320950007** Collected: 11/11/19 11:58 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	26.7	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:46	7440-39-3	
Boron	2630	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:46	7440-42-8	
Calcium	9240	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:46	7440-70-2	
Iron	614	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:46	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:46	7439-93-2	
Magnesium	585	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:46	7439-95-4	
Manganese	17.9	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:46	7439-96-5	
Molybdenum	125	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:46	7439-98-7	
Potassium	1750	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:46	7440-09-7	
Sodium	255000	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:46	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.80J	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:24	7440-36-0	
Arsenic	92.5	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:24	7440-38-2	
Cadmium	0.90	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:24	7440-43-9	
Lead	33.1	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:24	7439-92-1	
Selenium	3.1	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:24	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	249	mg/L	20.0	6.5	1		11/19/19 12:31		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	855	mg/L	10.0	10.0	1		11/14/19 07:56		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	25.8	mg/L	2.0	0.44	2		12/05/19 10:15	16887-00-6	
Fluoride	2.0	mg/L	0.20	0.085	1		12/04/19 18:15	16984-48-8	
Sulfate	316	mg/L	20.0	4.6	20		12/04/19 18:32	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-B1 **Lab ID: 60320950008** Collected: 11/11/19 14:45 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	423	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:48	7440-39-3	
Boron	104	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:48	7440-42-8	
Calcium	133000	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:48	7440-70-2	
Iron	22200	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:48	7439-89-6	
Lithium	48.6	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:48	7439-93-2	
Magnesium	41500	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:48	7439-95-4	
Manganese	1090	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:48	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:48	7439-98-7	
Potassium	8310	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:48	7440-09-7	
Sodium	29000	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:48	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:26	7440-36-0	
Arsenic	27.1	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:26	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:26	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:26	7439-92-1	
Selenium	<0.085	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:26	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	442	mg/L	20.0	6.5	1		11/19/19 12:36		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	611	mg/L	10.0	10.0	1		11/14/19 07:56		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	45.5	mg/L	5.0	1.1	5		12/04/19 19:06	16887-00-6	
Fluoride	0.19J	mg/L	0.20	0.085	1		12/04/19 18:49	16984-48-8	
Sulfate	41.7	mg/L	5.0	1.2	5		12/04/19 19:06	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-B2 **Lab ID: 60320950009** Collected: 11/11/19 13:55 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	391	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:51	7440-39-3	
Boron	39.1J	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:51	7440-42-8	
Calcium	106000	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:51	7440-70-2	
Iron	9040	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:51	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:51	7439-93-2	
Magnesium	18600	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:51	7439-95-4	
Manganese	238	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:51	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:51	7439-98-7	
Potassium	2060	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:51	7440-09-7	
Sodium	20600	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:51	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:28	7440-36-0	
Arsenic	3.1	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:28	7440-38-2	
Cadmium	0.047J	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:28	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:28	7439-92-1	
Selenium	<0.085	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:28	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	330	mg/L	20.0	6.5	1		11/19/19 12:42		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	389	mg/L	5.0	5.0	1		11/14/19 07:56		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	30.3	mg/L	5.0	1.1	5		12/04/19 19:22	16887-00-6	
Fluoride	0.18J	mg/L	0.20	0.085	1		12/04/19 20:13	16984-48-8	
Sulfate	12.0	mg/L	1.0	0.23	1		12/04/19 20:13	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-DUP-2 **Lab ID: 60320950010** Collected: 11/11/19 13:55 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	20.6	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:54	7440-39-3	
Boron	2590	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:54	7440-42-8	
Calcium	8700	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:54	7440-70-2	
Iron	578	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:54	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:54	7439-93-2	
Magnesium	524	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:54	7439-95-4	
Manganese	12.0	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:54	7439-96-5	
Molybdenum	127	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:54	7439-98-7	
Potassium	1710	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:54	7440-09-7	
Sodium	250000	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:54	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	0.86J	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:29	7440-36-0	
Arsenic	94.7	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:29	7440-38-2	
Cadmium	0.90	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:29	7440-43-9	
Lead	36.2	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:29	7439-92-1	
Selenium	3.2	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:29	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	249	mg/L	20.0	6.5	1		11/19/19 12:58		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	831	mg/L	10.0	10.0	1		11/14/19 07:56		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.9	mg/L	2.0	0.44	2		12/04/19 20:47	16887-00-6	
Fluoride	2.0	mg/L	0.20	0.085	1		12/04/19 20:30	16984-48-8	
Sulfate	292	mg/L	20.0	4.6	20		12/04/19 21:04	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-FB-1 **Lab ID:** 60320950011 Collected: 11/11/19 10:43 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	<1.4	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 15:56	7440-39-3	
Boron	<10.7	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 15:56	7440-42-8	
Calcium	<50.0	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 15:56	7440-70-2	
Iron	<14.0	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 15:56	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 15:56	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 15:56	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 15:56	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 15:56	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 15:56	7440-09-7	
Sodium	218J	ug/L	500	144	1	11/15/19 15:22	11/18/19 15:56	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:34	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:34	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:34	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:34	7439-92-1	
Selenium	<0.085	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:34	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		11/19/19 13:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	<5.0	mg/L	5.0	5.0	1		11/14/19 07:56		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.22	mg/L	1.0	0.22	1		12/04/19 21:20	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		12/04/19 21:20	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		12/04/19 21:20	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-FB-2 **Lab ID: 60320950012** Collected: 11/11/19 12:35 Received: 11/13/19 02:53 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	<1.4	ug/L	5.0	1.4	1	11/15/19 15:22	11/18/19 16:01	7440-39-3	
Boron	<10.7	ug/L	100	10.7	1	11/15/19 15:22	11/18/19 16:01	7440-42-8	
Calcium	<50.0	ug/L	200	50.0	1	11/15/19 15:22	11/18/19 16:01	7440-70-2	
Iron	<14.0	ug/L	50.0	14.0	1	11/15/19 15:22	11/18/19 16:01	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/15/19 15:22	11/18/19 16:01	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	11/15/19 15:22	11/18/19 16:01	7439-95-4	
Manganese	<2.1	ug/L	5.0	2.1	1	11/15/19 15:22	11/18/19 16:01	7439-96-5	
Molybdenum	<2.6	ug/L	20.0	2.6	1	11/15/19 15:22	11/18/19 16:01	7439-98-7	
Potassium	<79.0	ug/L	500	79.0	1	11/15/19 15:22	11/18/19 16:01	7440-09-7	
Sodium	<144	ug/L	500	144	1	11/15/19 15:22	11/18/19 16:01	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	<0.078	ug/L	1.0	0.078	1	11/14/19 10:43	11/15/19 12:36	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	11/14/19 10:43	11/15/19 12:36	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/14/19 10:43	11/15/19 12:36	7440-43-9	
Lead	<0.13	ug/L	1.0	0.13	1	11/14/19 10:43	11/15/19 12:36	7439-92-1	
Selenium	<0.085	ug/L	1.0	0.085	1	11/14/19 10:43	11/15/19 12:36	7782-49-2	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<6.5	mg/L	20.0	6.5	1		11/19/19 18:00		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	5.5	mg/L	5.0	5.0	1		11/14/19 07:57		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	<0.22	mg/L	1.0	0.22	1		12/04/19 21:37	16887-00-6	
Fluoride	<0.085	mg/L	0.20	0.085	1		12/04/19 21:37	16984-48-8	
Sulfate	<0.23	mg/L	1.0	0.23	1		12/04/19 21:37	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-2 **Lab ID: 60320739001** Collected: 11/08/19 14:23 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	8.6	ug/L	5.0	1.4	1	11/25/19 15:55	11/27/19 16:33	7440-39-3	
Boron	3760	ug/L	100	10.7	1	11/25/19 15:55	11/27/19 16:33	7440-42-8	
Calcium	9000	ug/L	200	50.0	1	11/25/19 15:55	11/27/19 16:33	7440-70-2	
Iron	74.3	ug/L	50.0	14.0	1	11/25/19 15:55	11/27/19 16:33	7439-89-6	
Lithium	<5.9	ug/L	10.0	5.9	1	11/25/19 15:55	11/27/19 16:33	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	11/25/19 15:55	11/27/19 16:33	7439-95-4	
Manganese	4.4J	ug/L	5.0	2.1	1	11/25/19 15:55	11/27/19 16:33	7439-96-5	
Molybdenum	164	ug/L	20.0	2.6	1	11/25/19 15:55	11/27/19 16:33	7439-98-7	
Potassium	3070	ug/L	500	79.0	1	11/25/19 15:55	11/27/19 16:33	7440-09-7	
Sodium	217000	ug/L	500	144	1	11/25/19 15:55	11/27/19 16:33	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	3.5	ug/L	1.0	0.078	1	11/12/19 17:15	11/13/19 12:44	7440-36-0	
Arsenic	236	ug/L	1.0	0.065	1	11/12/19 17:15	11/13/19 12:44	7440-38-2	
Cadmium	0.31J	ug/L	0.50	0.033	1	11/12/19 17:15	11/13/19 12:44	7440-43-9	
Selenium	1.2	ug/L	1.0	0.085	1	11/12/19 17:15	11/13/19 12:44	7782-49-2	M1
Thallium	<0.099	ug/L	1.0	0.099	1	11/12/19 17:15	11/13/19 12:44	7440-28-0	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	205	mg/L	20.0	6.5	1		11/13/19 14:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	777	mg/L	10.0	10.0	1		11/13/19 13:46		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.9	mg/L	2.0	0.44	2		12/03/19 18:27	16887-00-6	
Fluoride	1.0	mg/L	0.20	0.085	1		12/03/19 18:43	16984-48-8	
Sulfate	267	mg/L	20.0	4.6	20		12/03/19 17:40	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-P-191 **Lab ID: 60320739002** Collected: 11/08/19 13:03 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	15.6	ug/L	5.0	1.4	1	11/25/19 15:55	11/27/19 16:35	7440-39-3	
Boron	5710	ug/L	100	10.7	1	11/25/19 15:55	11/27/19 16:35	7440-42-8	
Calcium	7960	ug/L	200	50.0	1	11/25/19 15:55	11/27/19 16:35	7440-70-2	
Iron	211	ug/L	50.0	14.0	1	11/25/19 15:55	11/27/19 16:35	7439-89-6	
Lithium	13.5	ug/L	10.0	5.9	1	11/25/19 15:55	11/27/19 16:35	7439-93-2	
Magnesium	40.3J	ug/L	50.0	13.0	1	11/25/19 15:55	11/27/19 16:35	7439-95-4	
Manganese	6.8	ug/L	5.0	2.1	1	11/25/19 15:55	11/27/19 16:35	7439-96-5	
Molybdenum	317	ug/L	20.0	2.6	1	11/25/19 15:55	11/27/19 16:35	7439-98-7	
Potassium	12300	ug/L	500	79.0	1	11/25/19 15:55	11/27/19 16:35	7440-09-7	
Sodium	294000	ug/L	500	144	1	11/25/19 15:55	11/27/19 16:35	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	5.0	ug/L	1.0	0.078	1	11/12/19 17:15	11/13/19 12:51	7440-36-0	
Arsenic	287	ug/L	1.0	0.065	1	11/12/19 17:15	11/13/19 12:51	7440-38-2	
Cadmium	0.56	ug/L	0.50	0.033	1	11/12/19 17:15	11/13/19 12:51	7440-43-9	
Selenium	2.3	ug/L	1.0	0.085	1	11/12/19 17:15	11/13/19 12:51	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/12/19 17:15	11/13/19 12:51	7440-28-0	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	288	mg/L	20.0	6.5	1		11/19/19 11:00		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	1040	mg/L	13.3	13.3	1		11/13/19 13:46		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	22.9	mg/L	2.0	0.44	2		12/03/19 19:15	16887-00-6	
Fluoride	1.6	mg/L	0.20	0.085	1		12/03/19 18:59	16984-48-8	
Sulfate	365	mg/L	20.0	4.6	20		12/03/19 19:31	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-DUP-1 **Lab ID: 60320739003** Collected: 11/08/19 08:00 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium	14.3	ug/L	5.0	1.4	1	11/25/19 15:55	11/27/19 16:37	7440-39-3	
Boron	5610	ug/L	100	10.7	1	11/25/19 15:55	11/27/19 16:37	7440-42-8	
Calcium	7800	ug/L	200	50.0	1	11/25/19 15:55	11/27/19 16:37	7440-70-2	
Iron	102	ug/L	50.0	14.0	1	11/25/19 15:55	11/27/19 16:37	7439-89-6	
Lithium	11.7	ug/L	10.0	5.9	1	11/25/19 15:55	11/27/19 16:37	7439-93-2	
Magnesium	<13.0	ug/L	50.0	13.0	1	11/25/19 15:55	11/27/19 16:37	7439-95-4	
Manganese	3.3J	ug/L	5.0	2.1	1	11/25/19 15:55	11/27/19 16:37	7439-96-5	
Molybdenum	315	ug/L	20.0	2.6	1	11/25/19 15:55	11/27/19 16:37	7439-98-7	
Potassium	12200	ug/L	500	79.0	1	11/25/19 15:55	11/27/19 16:37	7440-09-7	
Sodium	293000	ug/L	500	144	1	11/25/19 15:55	11/27/19 16:37	7440-23-5	
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony	5.4	ug/L	1.0	0.078	1	11/12/19 17:15	11/13/19 12:53	7440-36-0	
Arsenic	293	ug/L	1.0	0.065	1	11/12/19 17:15	11/13/19 12:53	7440-38-2	
Cadmium	0.59	ug/L	0.50	0.033	1	11/12/19 17:15	11/13/19 12:53	7440-43-9	
Selenium	2.4	ug/L	1.0	0.085	1	11/12/19 17:15	11/13/19 12:53	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/12/19 17:15	11/13/19 12:53	7440-28-0	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	293	mg/L	20.0	6.5	1		11/19/19 11:12		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	1030	mg/L	10.0	10.0	1		11/14/19 07:54		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	23.0	mg/L	2.0	0.44	2		12/03/19 20:02	16887-00-6	
Fluoride	1.5	mg/L	0.20	0.085	1		12/03/19 19:46	16984-48-8	
Sulfate	323	mg/L	50.0	11.5	50		12/04/19 13:07	14808-79-8	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch:	622754	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012		

METHOD BLANK:	2539090	Matrix:	Water
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	11/18/19 15:18	
Boron	ug/L	<10.7	100	10.7	11/18/19 15:18	
Calcium	ug/L	<50.0	200	50.0	11/18/19 15:18	
Iron	ug/L	<14.0	50.0	14.0	11/18/19 15:18	
Lithium	ug/L	<5.9	10.0	5.9	11/18/19 15:18	
Magnesium	ug/L	<13.0	50.0	13.0	11/18/19 15:18	
Manganese	ug/L	<2.1	5.0	2.1	11/18/19 15:18	
Molybdenum	ug/L	<2.6	20.0	2.6	11/18/19 15:18	
Potassium	ug/L	<79.0	500	79.0	11/18/19 15:18	
Sodium	ug/L	<144	500	144	11/18/19 15:18	

LABORATORY CONTROL SAMPLE: 2539091

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	1020	102	85-115	
Boron	ug/L	1000	999	100	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	9920	99	85-115	
Lithium	ug/L	1000	981	98	85-115	
Magnesium	ug/L	10000	9960	100	85-115	
Manganese	ug/L	1000	994	99	85-115	
Molybdenum	ug/L	1000	1100	110	85-115	
Potassium	ug/L	10000	9990	100	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2539093 2539094

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		60320950001 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Barium	ug/L	18.8	1000	1000	1060	1060	104	104	70-130	0	20	
Boron	ug/L	3170	1000	1000	4200	4120	103	95	70-130	2	20	
Calcium	ug/L	27200	10000	10000	38100	37600	109	104	70-130	1	20	
Iron	ug/L	32.7J	10000	10000	10100	10200	101	101	70-130	0	20	
Lithium	ug/L	<5.9	1000	1000	964	969	96	97	70-130	0	20	
Magnesium	ug/L	1590	10000	10000	11200	11200	96	96	70-130	1	20	
Manganese	ug/L	6.8	1000	1000	993	985	99	98	70-130	1	20	
Molybdenum	ug/L	133	1000	1000	1250	1230	112	110	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2539093												2539094	
Parameter	Units	60320950001	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Potassium	ug/L	5940	10000	10000	16600	16500	107	105	70-130	1	20		
Sodium	ug/L	156000	10000	10000	168000	165000	123	96	70-130	2	20		

MATRIX SPIKE SAMPLE: 2539095											
Parameter	Units	60320950009	Spike	MS	MS	% Rec	Qualifiers				
		Result	Conc.	Result	% Rec	Limits					
Barium	ug/L	391	1000	1410	101	70-130					
Boron	ug/L	39.1J	1000	1050	101	70-130					
Calcium	ug/L	106000	10000	114000	77	70-130					
Iron	ug/L	9040	10000	18800	97	70-130					
Lithium	ug/L	<5.9	1000	982	98	70-130					
Magnesium	ug/L	18600	10000	27700	91	70-130					
Manganese	ug/L	238	1000	1210	97	70-130					
Molybdenum	ug/L	<2.6	1000	1100	110	70-130					
Potassium	ug/L	2060	10000	12400	103	70-130					
Sodium	ug/L	20600	10000	29700	91	70-130					

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 624660 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60320739001, 60320739002, 60320739003

METHOD BLANK: 2547136 Matrix: Water

Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Barium	ug/L	<1.4	5.0	1.4	11/27/19 16:20	
Boron	ug/L	29.2J	100	10.7	11/27/19 16:20	
Calcium	ug/L	<50.0	200	50.0	11/27/19 16:20	
Iron	ug/L	<14.0	50.0	14.0	11/27/19 16:20	
Lithium	ug/L	<5.9	10.0	5.9	11/27/19 16:20	
Magnesium	ug/L	<13.0	50.0	13.0	11/27/19 16:20	
Manganese	ug/L	<2.1	5.0	2.1	11/27/19 16:20	
Molybdenum	ug/L	<2.6	20.0	2.6	11/27/19 16:20	
Potassium	ug/L	<79.0	500	79.0	11/27/19 16:20	
Sodium	ug/L	<144	500	144	11/27/19 16:20	

LABORATORY CONTROL SAMPLE: 2547137

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	ug/L	1000	999	100	85-115	
Boron	ug/L	1000	1020	102	85-115	
Calcium	ug/L	10000	10100	101	85-115	
Iron	ug/L	10000	10000	100	85-115	
Lithium	ug/L	1000	1000	100	85-115	
Magnesium	ug/L	10000	9970	100	85-115	
Manganese	ug/L	1000	980	98	85-115	
Molybdenum	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	9970	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547138 2547139

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		60320431002 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Barium	ug/L	131	1000	1000	1110	1140	98	101	70-130	2	20	
Boron	ug/L	11000	1000	1000	12000	12000	107	108	70-130	0	20	
Calcium	ug/L	266000	10000	10000	266000	270000	3	45	70-130	2	20	M1
Iron	ug/L	13500	10000	10000	22700	23200	92	97	70-130	2	20	
Lithium	ug/L	18.8	1000	1000	1000	1040	99	102	70-130	3	20	
Magnesium	ug/L	30700	10000	10000	38700	39500	80	88	70-130	2	20	
Manganese	ug/L	2390	1000	1000	3360	3350	97	96	70-130	0	20	
Molybdenum	ug/L	342	1000	1000	1370	1380	102	104	70-130	1	20	
Potassium	ug/L	8160	10000	10000	17800	18400	96	102	70-130	3	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547138												2547139	
Parameter	Units	60320431002 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max	Qual	
			Spike Conc.	Spike Conc.							RPD		
Sodium	ug/L	161000	10000	10000	167000	167000	57	63	70-130	0	20	M1	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 621913 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60320739001, 60320739002, 60320739003

METHOD BLANK: 2535904 Matrix: Water

Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/13/19 12:42	
Arsenic	ug/L	<0.065	1.0	0.065	11/13/19 12:42	
Cadmium	ug/L	<0.033	0.50	0.033	11/13/19 12:42	
Selenium	ug/L	<0.085	1.0	0.085	11/13/19 12:42	
Thallium	ug/L	<0.099	1.0	0.099	11/13/19 12:42	

LABORATORY CONTROL SAMPLE: 2535905

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.8	97	85-115	
Arsenic	ug/L	40	39.1	98	85-115	
Cadmium	ug/L	40	39.4	99	85-115	
Selenium	ug/L	40	39.2	98	85-115	
Thallium	ug/L	40	38.5	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2535906 2535907

Parameter	Units	60320739001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Antimony	ug/L	3.5	40	40	43.5	42.7	100	98	70-130	2	20		
Arsenic	ug/L	236	40	40	286	282	125	115	70-130	1	20		
Cadmium	ug/L	0.31J	40	40	38.3	37.6	95	93	70-130	2	20		
Selenium	ug/L	1.2	40	40	16.6	16.9	38	39	70-130	2	20	M1	
Thallium	ug/L	<0.099	40	40	40.2	39.1	100	98	70-130	3	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 622244 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012

METHOD BLANK: 2536937 Matrix: Water
 Associated Lab Samples: 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/15/19 11:56	
Arsenic	ug/L	<0.065	1.0	0.065	11/15/19 11:56	
Cadmium	ug/L	<0.033	0.50	0.033	11/15/19 11:56	
Lead	ug/L	0.15J	1.0	0.13	11/15/19 11:56	
Selenium	ug/L	<0.085	1.0	0.085	11/15/19 11:56	

LABORATORY CONTROL SAMPLE: 2536938

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.7	99	85-115	
Arsenic	ug/L	40	38.9	97	85-115	
Cadmium	ug/L	40	40.0	100	85-115	
Lead	ug/L	40	41.6	104	85-115	
Selenium	ug/L	40	38.4	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2536939 2536940

Parameter	Units	60320950001		60320950006		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	0.59J	40	40	39.7	39.4	98	97	70-130	1	20		
Arsenic	ug/L	12.6	40	40	52.2	52.0	99	99	70-130	0	20		
Cadmium	ug/L	0.065J	40	40	38.0	37.7	95	94	70-130	1	20		
Lead	ug/L	0.16J	40	40	43.2	42.8	108	107	70-130	1	20		
Selenium	ug/L	0.60J	40	40	37.5	37.4	92	92	70-130	0	20		

MATRIX SPIKE SAMPLE: 2536941

Parameter	Units	60320950006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	39.2	98	70-130	
Arsenic	ug/L	18.5	40	58.1	99	70-130	
Cadmium	ug/L	0.076J	40	38.2	95	70-130	
Lead	ug/L	<0.13	40	42.9	107	70-130	
Selenium	ug/L	0.10J	40	37.3	93	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 622137

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60320739001

METHOD BLANK: 2536730

Matrix: Water

Associated Lab Samples: 60320739001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	11/13/19 13:43	

LABORATORY CONTROL SAMPLE: 2536731

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	520	104	90-110	

SAMPLE DUPLICATE: 2536732

Parameter	Units	60320431007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	501	502	0	10	

SAMPLE DUPLICATE: 2536733

Parameter	Units	60320742008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	691	694	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 623208

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60320739002, 60320739003, 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011

METHOD BLANK: 2541256

Matrix: Water

Associated Lab Samples: 60320739002, 60320739003, 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	11/19/19 10:48	

LABORATORY CONTROL SAMPLE: 2541257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	513	103	90-110	

SAMPLE DUPLICATE: 2541258

Parameter	Units	60320739002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	288	304	5	10	

SAMPLE DUPLICATE: 2541261

Parameter	Units	60320950001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	153	156	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 623388

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60320950012

METHOD BLANK: 2542095

Matrix: Water

Associated Lab Samples: 60320950012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<6.5	20.0	6.5	11/19/19 17:18	

LABORATORY CONTROL SAMPLE: 2542096

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	502	100	90-110	

SAMPLE DUPLICATE: 2542099

Parameter	Units	60321509010 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	123	124	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 622003

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60320739001, 60320739002

METHOD BLANK: 2536188

Matrix: Water

Associated Lab Samples: 60320739001, 60320739002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/13/19 13:43	

LABORATORY CONTROL SAMPLE: 2536189

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 2536190

Parameter	Units	60320741001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1820	1980	8	10	

SAMPLE DUPLICATE: 2536191

Parameter	Units	60320739001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	777	794	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 622278

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60320739003, 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012

METHOD BLANK: 2537098

Matrix: Water

Associated Lab Samples: 60320739003, 60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/14/19 07:53	

LABORATORY CONTROL SAMPLE: 2537099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 2537100

Parameter	Units	60320950001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	529	565	7	10	

SAMPLE DUPLICATE: 2537101

Parameter	Units	60320950010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	831	839	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch: 625695 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60320739001, 60320739002, 60320739003

METHOD BLANK: 2550774 Matrix: Water

Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/03/19 11:13	
Fluoride	mg/L	<0.085	0.20	0.085	12/03/19 11:13	
Sulfate	mg/L	<0.23	1.0	0.23	12/03/19 11:13	

METHOD BLANK: 2551878 Matrix: Water

Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/04/19 09:14	
Fluoride	mg/L	<0.085	0.20	0.085	12/04/19 09:14	
Sulfate	mg/L	<0.23	1.0	0.23	12/04/19 09:14	

METHOD BLANK: 2552874 Matrix: Water

Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/05/19 09:19	
Fluoride	mg/L	<0.085	0.20	0.085	12/05/19 09:19	
Sulfate	mg/L	<0.23	1.0	0.23	12/05/19 09:19	

LABORATORY CONTROL SAMPLE: 2550775

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

LABORATORY CONTROL SAMPLE: 2551879

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	2.4	97	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

LABORATORY CONTROL SAMPLE: 2552875

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2550776 2550777

Parameter	Units	60320842004		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Conc.	Result	Result	% Rec	% Rec					
Chloride	mg/L	6.9	5	5	12.1	12.1	104	103	80-120	0	15		
Fluoride	mg/L	0.19J	2.5	2.5	2.8	2.9	104	106	80-120	2	15		
Sulfate	mg/L	192	250	250	440	439	99	99	80-120	0	15		

MATRIX SPIKE SAMPLE: 2550778

Parameter	Units	60321710005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	52400	25000	81000	114	80-120	
Fluoride	mg/L	ND	12500	12900	104	80-120	
Sulfate	mg/L	8910	25000	32600	95	80-120	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch:	625953	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012		

METHOD BLANK:	2551524	Matrix:	Water
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/04/19 09:17	
Fluoride	mg/L	<0.085	0.20	0.085	12/04/19 09:17	
Sulfate	mg/L	<0.23	1.0	0.23	12/04/19 09:17	

METHOD BLANK:	2552886	Matrix:	Water
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/05/19 09:21	
Fluoride	mg/L	<0.085	0.20	0.085	12/05/19 09:21	
Sulfate	mg/L	<0.23	1.0	0.23	12/05/19 09:21	

LABORATORY CONTROL SAMPLE:	2551525					
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	2.5	2.5	102	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

LABORATORY CONTROL SAMPLE:	2552887					
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.6	102	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:	2551526	2551527									
Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Spike Conc.	Result	Result						
Chloride	mg/L	21.5	10	10	32.4	32.0	109	105	80-120	1	15
Fluoride	mg/L	0.74	2.5	2.5	3.5	3.4	108	106	80-120	2	15
Sulfate	mg/L	125	100	100	246	189	121	64	80-120	26	15 M1,R1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Parameter	Units	2551528			2551529			% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		60321788006	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec							
Chloride	mg/L	20.2	10	10	30.6	31.1	105	109	80-120	1	15			
Fluoride	mg/L	0.11J	2.5	2.5	2.9	2.8	112	108	80-120	4	15			
Sulfate	mg/L	557	250	250	795	777	95	88	80-120	2	15			

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-1 **Lab ID: 60320950001** Collected: 11/11/19 10:19 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.137 ± 0.625 (1.15) C:NA T:86%	pCi/L	12/06/19 13:08	13982-63-3	
Radium-228	EPA 904.0	0.196 ± 0.355 (0.777) C:73% T:83%	pCi/L	12/05/19 15:18	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-3 **Lab ID: 60320950002** Collected: 11/11/19 14:15 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.121 ± 0.387 (0.747) C:NA T:86%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	1.29 ± 0.660 (1.20) C:69% T:79%	pCi/L	12/05/19 15:20	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-4 **Lab ID: 60320950003** Collected: 11/11/19 16:50 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.306 ± 0.480 (0.802) C:NA T:91%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	0.778 ± 0.492 (0.945) C:72% T:86%	pCi/L	12/05/19 15:20	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-5 **Lab ID: 60320950004** Collected: 11/11/19 16:10 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.256 ± 0.497 (0.867) C:NA T:84%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	0.281 ± 0.434 (0.939) C:74% T:87%	pCi/L	12/05/19 15:20	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-6 **Lab ID: 60320950005** Collected: 11/11/19 10:30 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.425 ± 0.552 (0.884) C:NA T:90%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	1.36 ± 0.500 (0.740) C:70% T:94%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-7(r)		Lab ID: 60320950006	Collected: 11/11/19 12:05	Received: 11/13/19 02:53	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.246 ± 0.477 (0.833)		pCi/L	12/06/19 13:24	13982-63-3	
		C:NA T:87%					
Radium-228	EPA 904.0	0.619 ± 0.399 (0.758)		pCi/L	12/05/19 15:15	15262-20-1	
		C:73% T:89%					

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-P-171 **Lab ID: 60320950007** Collected: 11/11/19 11:58 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0872 ± 0.488 (0.937) C:NA T:93%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	0.334 ± 0.459 (0.982) C:69% T:74%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-B1 **Lab ID: 60320950008** Collected: 11/11/19 14:45 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.684 ± 0.545 (0.707) C:NA T:88%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	1.26 ± 0.513 (0.826) C:73% T:88%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-B2 **Lab ID: 60320950009** Collected: 11/11/19 13:55 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.300 ± 0.615 (1.05) C:NA T:95%	pCi/L	12/06/19 13:24	13982-63-3	
Radium-228	EPA 904.0	1.05 ± 0.440 (0.712) C:75% T:95%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-DUP-2 **Lab ID: 60320950010** Collected: 11/11/19 13:55 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0602 ± 0.360 (0.587) C:NA T:89%	pCi/L	12/06/19 13:39	13982-63-3	
Radium-228	EPA 904.0	0.119 ± 0.379 (0.853) C:70% T:81%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-FB-1 **Lab ID: 60320950011** Collected: 11/11/19 10:43 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.381 ± 0.377 (0.513) C:NA T:95%	pCi/L	12/06/19 13:39	13982-63-3	
Radium-228	EPA 904.0	0.752 ± 0.409 (0.736) C:75% T:87%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-FB-2 **Lab ID: 60320950012** Collected: 11/11/19 12:35 Received: 11/13/19 02:53 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.308 ± 0.491 (1.11) C:NA T:84%	pCi/L	12/06/19 13:39	13982-63-3	
Radium-228	EPA 904.0	0.785 ± 0.473 (0.880) C:73% T:79%	pCi/L	12/05/19 15:15	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	116.72 %REC ± NA (NA) C:NA T:NA	pCi/L	12/06/19 13:39	13982-63-3	
Radium-228	EPA 904.0	107.71 %REC ± NA (NA) C:NA T:NA	pCi/L	12/05/19 15:16	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-1 MSD		Lab ID: 60320950014	Collected: 11/11/19 10:19	Received: 11/13/19 02:53	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	92.62 %REC	23.02 RPD ±	pCi/L	12/06/19 13:39	13982-63-3	
		NA (NA)					
		C:NA T:NA					
Radium-228	EPA 904.0	90.68 %REC	17.17 RPD ±	pCi/L	12/05/19 15:16	15262-20-1	
		NA (NA)					
		C:NA T:NA					

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-MW-2 **Lab ID: 60320739001** Collected: 11/08/19 14:23 Received: 11/09/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.281 ± 0.293 (0.414) C:NA T:99%	pCi/L	12/04/19 12:22	13982-63-3	
Radium-228	EPA 904.0	1.14 ± 0.548 (0.942) C:78% T:68%	pCi/L	12/03/19 15:26	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-P-19I **Lab ID: 60320739002** Collected: 11/08/19 13:03 Received: 11/09/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.170 ± 0.429 (0.797) C:NA T:90%	pCi/L	12/04/19 12:22	13982-63-3	
Radium-228	EPA 904.0	0.467 ± 0.578 (1.23) C:75% T:55%	pCi/L	12/03/19 15:26	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Sample: R-DUP-1 **Lab ID: 60320739003** Collected: 11/08/19 08:00 Received: 11/09/19 02:55 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.297 (0.605) C:NA T:84%	pCi/L	12/04/19 12:22	13982-63-3	
Radium-228	EPA 904.0	1.05 ± 0.562 (0.975) C:74% T:60%	pCi/L	12/03/19 15:30	15262-20-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch:	371676	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012, 60320950013, 60320950014		

METHOD BLANK:	1803436	Matrix:	Water
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012, 60320950013, 60320950014		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.485 ± 0.342 (0.656) C:77% T:86%	pCi/L	12/05/19 15:18	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch:	371675	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012, 60320950013, 60320950014		

METHOD BLANK:	1803435	Matrix:	Water
Associated Lab Samples:	60320950001, 60320950002, 60320950003, 60320950004, 60320950005, 60320950006, 60320950007, 60320950008, 60320950009, 60320950010, 60320950011, 60320950012, 60320950013, 60320950014		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.125 ± 0.397 (0.731) C:NA T:87%	pCi/L	12/06/19 13:08	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

QC Batch:	371021	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60320739001, 60320739002, 60320739003		

METHOD BLANK:	1800173	Matrix:	Water
Associated Lab Samples:	60320739001, 60320739002, 60320739003		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.208 ± 0.238 (0.497) C:81% T:97%	pCi/L	12/03/19 11:45	

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QUALIFIERS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-PA Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

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

R1 RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60320739001	R-MW-2	EPA 200.7	624660	EPA 200.7	624740
60320739002	R-P-19I	EPA 200.7	624660	EPA 200.7	624740
60320739003	R-DUP-1	EPA 200.7	624660	EPA 200.7	624740
60320950001	R-MW-1	EPA 200.7	622754	EPA 200.7	622784
60320950002	R-MW-3	EPA 200.7	622754	EPA 200.7	622784
60320950003	R-MW-4	EPA 200.7	622754	EPA 200.7	622784
60320950004	R-MW-5	EPA 200.7	622754	EPA 200.7	622784
60320950005	R-MW-6	EPA 200.7	622754	EPA 200.7	622784
60320950006	R-MW-7(r)	EPA 200.7	622754	EPA 200.7	622784
60320950007	R-P-17I	EPA 200.7	622754	EPA 200.7	622784
60320950008	R-MW-B1	EPA 200.7	622754	EPA 200.7	622784
60320950009	R-MW-B2	EPA 200.7	622754	EPA 200.7	622784
60320950010	R-DUP-2	EPA 200.7	622754	EPA 200.7	622784
60320950011	R-FB-1	EPA 200.7	622754	EPA 200.7	622784
60320950012	R-FB-2	EPA 200.7	622754	EPA 200.7	622784
60320739001	R-MW-2	EPA 200.8	621913	EPA 200.8	621975
60320739002	R-P-19I	EPA 200.8	621913	EPA 200.8	621975
60320739003	R-DUP-1	EPA 200.8	621913	EPA 200.8	621975
60320950001	R-MW-1	EPA 200.8	622244	EPA 200.8	622361
60320950002	R-MW-3	EPA 200.8	622244	EPA 200.8	622361
60320950003	R-MW-4	EPA 200.8	622244	EPA 200.8	622361
60320950004	R-MW-5	EPA 200.8	622244	EPA 200.8	622361
60320950005	R-MW-6	EPA 200.8	622244	EPA 200.8	622361
60320950006	R-MW-7(r)	EPA 200.8	622244	EPA 200.8	622361
60320950007	R-P-17I	EPA 200.8	622244	EPA 200.8	622361
60320950008	R-MW-B1	EPA 200.8	622244	EPA 200.8	622361
60320950009	R-MW-B2	EPA 200.8	622244	EPA 200.8	622361
60320950010	R-DUP-2	EPA 200.8	622244	EPA 200.8	622361
60320950011	R-FB-1	EPA 200.8	622244	EPA 200.8	622361
60320950012	R-FB-2	EPA 200.8	622244	EPA 200.8	622361
60320739001	R-MW-2	EPA 903.1	371020		
60320739002	R-P-19I	EPA 903.1	371020		
60320739003	R-DUP-1	EPA 903.1	371020		
60320950001	R-MW-1	EPA 903.1	371675		
60320950002	R-MW-3	EPA 903.1	371675		
60320950003	R-MW-4	EPA 903.1	371675		
60320950004	R-MW-5	EPA 903.1	371675		
60320950005	R-MW-6	EPA 903.1	371675		
60320950006	R-MW-7(r)	EPA 903.1	371675		
60320950007	R-P-17I	EPA 903.1	371675		
60320950008	R-MW-B1	EPA 903.1	371675		
60320950009	R-MW-B2	EPA 903.1	371675		
60320950010	R-DUP-2	EPA 903.1	371675		
60320950011	R-FB-1	EPA 903.1	371675		
60320950012	R-FB-2	EPA 903.1	371675		
60320950013	R-MW-1 MS	EPA 903.1	371675		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60320950014	R-MW-1 MSD	EPA 903.1	371675		
60320739001	R-MW-2	EPA 904.0	371021		
60320739002	R-P-19I	EPA 904.0	371021		
60320739003	R-DUP-1	EPA 904.0	371021		
60320950001	R-MW-1	EPA 904.0	371676		
60320950002	R-MW-3	EPA 904.0	371676		
60320950003	R-MW-4	EPA 904.0	371676		
60320950004	R-MW-5	EPA 904.0	371676		
60320950005	R-MW-6	EPA 904.0	371676		
60320950006	R-MW-7(r)	EPA 904.0	371676		
60320950007	R-P-17I	EPA 904.0	371676		
60320950008	R-MW-B1	EPA 904.0	371676		
60320950009	R-MW-B2	EPA 904.0	371676		
60320950010	R-DUP-2	EPA 904.0	371676		
60320950011	R-FB-1	EPA 904.0	371676		
60320950012	R-FB-2	EPA 904.0	371676		
60320950013	R-MW-1 MS	EPA 904.0	371676		
60320950014	R-MW-1 MSD	EPA 904.0	371676		
60320739001	R-MW-2	SM 2320B	622137		
60320739002	R-P-19I	SM 2320B	623208		
60320739003	R-DUP-1	SM 2320B	623208		
60320950001	R-MW-1	SM 2320B	623208		
60320950002	R-MW-3	SM 2320B	623208		
60320950003	R-MW-4	SM 2320B	623208		
60320950004	R-MW-5	SM 2320B	623208		
60320950005	R-MW-6	SM 2320B	623208		
60320950006	R-MW-7(r)	SM 2320B	623208		
60320950007	R-P-17I	SM 2320B	623208		
60320950008	R-MW-B1	SM 2320B	623208		
60320950009	R-MW-B2	SM 2320B	623208		
60320950010	R-DUP-2	SM 2320B	623208		
60320950011	R-FB-1	SM 2320B	623208		
60320950012	R-FB-2	SM 2320B	623388		
60320739001	R-MW-2	SM 2540C	622003		
60320739002	R-P-19I	SM 2540C	622003		
60320739003	R-DUP-1	SM 2540C	622278		
60320950001	R-MW-1	SM 2540C	622278		
60320950002	R-MW-3	SM 2540C	622278		
60320950003	R-MW-4	SM 2540C	622278		
60320950004	R-MW-5	SM 2540C	622278		
60320950005	R-MW-6	SM 2540C	622278		
60320950006	R-MW-7(r)	SM 2540C	622278		
60320950007	R-P-17I	SM 2540C	622278		
60320950008	R-MW-B1	SM 2540C	622278		
60320950009	R-MW-B2	SM 2540C	622278		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320950

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60320950010	R-DUP-2	SM 2540C	622278		
60320950011	R-FB-1	SM 2540C	622278		
60320950012	R-FB-2	SM 2540C	622278		
60320739001	R-MW-2	EPA 300.0	625695		
60320739002	R-P-19I	EPA 300.0	625695		
60320739003	R-DUP-1	EPA 300.0	625695		
60320950001	R-MW-1	EPA 300.0	625953		
60320950002	R-MW-3	EPA 300.0	625953		
60320950003	R-MW-4	EPA 300.0	625953		
60320950004	R-MW-5	EPA 300.0	625953		
60320950005	R-MW-6	EPA 300.0	625953		
60320950006	R-MW-7(r)	EPA 300.0	625953		
60320950007	R-P-17I	EPA 300.0	625953		
60320950008	R-MW-B1	EPA 300.0	625953		
60320950009	R-MW-B2	EPA 300.0	625953		
60320950010	R-DUP-2	EPA 300.0	625953		
60320950011	R-FB-1	EPA 300.0	625953		
60320950012	R-FB-2	EPA 300.0	625953		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60320950
Barcode: 60320950

Client Name: Colder

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] Zp/C

Thermometer Used: T296 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 2.4 Corr. Factor +0.0 Corrected 2.4

Date and initials of person examining contents: 11-12-19 KAL

Temperature should be above freezing to 6°C 0.8, 0.5, 1.2 0.8, 0.5, 1.2

Table with 2 columns: Question/Requirement and Yes/No/N/A checkboxes. Rows include Chain of Custody, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: 11 Date:



Sample Condition Upon Receipt

WO#: 60320739
Barcode
60320739

Client Name: Golder Associates

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [x] No []

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] 2 PIC

Thermometer Used: T298 Type of Ice: Wet [x] Blue [] None []

Cooler Temperature (°C): As-read 2.3, 3.1 Corr. Factor 10.0 Corrected 2.3, 3.1

Date and initials of person examining contents: WS 11/9/19

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Checklist item and Yes/No/N/A options. Items include Chain of Custody, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, etc.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Jamai Chank Date: 11/10/19

MEMORANDUM**DATE** Januray 6, 2020**Project No.** 153140601**TO** Project File
Golder Associates**CC** Amanda Derhake, Jeff Ingram**FROM** Tommy Goodwin**EMAIL** Tommy_Goodwin@golder.com**DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60320950**

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

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/6/2020

Laboratory: Pace Analytical - KS

SDG #: 60320950

Analytical Method (type and no.): EPA 200.7/200.8 (Metals); EPA 903.1/904.0 (Rads); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)

Matrix: Air Soil/Sed. Water Waste

Sample Names R-MW-1, R-MW-3, R-MW-4, R-MW-5, R-MW-6, R-MW-7(r), R-P-17I, R-MW-B1, R-MW-B2, R-DUP-2, R-FB-1, R-FB-2, R-MW-1 MS, R-MW-1 MSD, R-MW-2, R-P-19I, R-DUP-1

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>11/8-11/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
e) Sample type indicated (<u>grab</u> /composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DUP-1 @ R-P-191 , DUP-2 @ R-P-171
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FB-1 @ R-MW-6, FB-2 @ R-MW-7(R)
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-39002 (Alk); -95001 (Alk, TDS); -39001 (TDS); -95010 (TDS)
				See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes

Comments/Notes:

MB: -39001-02: B (29.2); -50001-12: Pb (0.15)

FB-1: Na (218); Ra-228 (0.752);

DUP-1: Fe (70), Mg (200), Mn (69), Ra-228 (200); DUP-2: Ba (26), Mn (39)

Max Lab Duplicate RPD: 7% (Limit: 10%)

MS/MSD: -39001: Se (MS/MSD-L); -50001: SO4 (MS-H/MSD-L&RPD);

Dilution: Chloride and Sulfate diluted in several samples; no qualification is necessary.

January 23, 2020

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

RE: Project: AMEREN RUSH ENERGY CTR RCPA
Pace Project No.: 60320739

Dear Jeffrey Ingram:

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

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 19-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212018-8

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ENERGY CTR RCPA
Pace Project No.: 60320739

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60320739001	R-MW-2	Water	11/08/19 14:23	11/09/19 02:55
60320739002	R-P-19I	Water	11/08/19 13:03	11/09/19 02:55
60320739003	R-DUP-1	Water	11/08/19 08:00	11/09/19 02:55

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60320739001	R-MW-2	EPA 200.7	HKC	1	PASI-K
60320739002	R-P-19I	EPA 200.7	HKC	1	PASI-K
60320739003	R-DUP-1	EPA 200.7	HKC	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Sample: R-MW-2 **Lab ID: 60320739001** Collected: 11/08/19 14:23 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Lead	11.0	ug/L	10.0	3.4	1	11/25/19 15:55	11/27/19 16:33	7439-92-1	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Sample: R-P-19I **Lab ID: 60320739002** Collected: 11/08/19 13:03 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Lead	17.2	ug/L	10.0	3.4	1	11/25/19 15:55	11/27/19 16:35	7439-92-1	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Sample: R-DUP-1 **Lab ID: 60320739003** Collected: 11/08/19 08:00 Received: 11/09/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Lead	15.1	ug/L	10.0	3.4	1	11/25/19 15:55	11/27/19 16:37	7439-92-1	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

QC Batch: 624660 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60320739001, 60320739002, 60320739003

METHOD BLANK: 2547136 Matrix: Water
 Associated Lab Samples: 60320739001, 60320739002, 60320739003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Lead	ug/L	<3.4	10.0	3.4	11/27/19 16:20	

LABORATORY CONTROL SAMPLE: 2547137

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Lead	ug/L	1000	1050	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547138 2547139

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60320431002 Result	Spike Conc.	Spike Conc.	Conc.								
Lead	ug/L	<3.4	1000	1000	1000	1000	1020	100	102	70-130	2	20	

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

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QUALIFIERS

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ENERGY CTR RCPA

Pace Project No.: 60320739

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60320739001	R-MW-2	EPA 200.7	624660	EPA 200.7	624740
60320739002	R-P-19I	EPA 200.7	624660	EPA 200.7	624740
60320739003	R-DUP-1	EPA 200.7	624660	EPA 200.7	624740

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60320739
Barcode
60320739

Client Name: Golder Associates

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [x] No []

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] 2 PIC

Thermometer Used: T298 Type of Ice: Wet [x] Blue [] None []

Cooler Temperature (°C): As-read 2.3, 3.1 Corr. Factor 10.0 Corrected 2.3, 3.1

Date and initials of person examining contents: WS 11/9/19

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Checklist item and Answer (Yes/No/N/A). Items include Chain of Custody, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, etc.

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Jamai Chank Date: 11/10/19



GOLDER

MEMORANDUM

DATE January 29, 2020

Project No. 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin

EMAIL Tommy_Goodwin@golder.com

DATA VALIDATION SUMMARY, RUSH ISLAND ENERGY CENTER – DATA PACKAGE 60320739

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

- None.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 153140601
 Validation Date: 1/29/2020

Laboratory: Pace Analytical - KS
 Analytical Method (type and no.): EPA 200.7 (Metals);
 Matrix: Air Soil/Sed. Water Waste
 Sample Names R-MW-2, R-P-19I, R-DUP-1

SDG #: 60320739

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>11/8/2019</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (<u>grab</u> composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Sp.Cond, ORP, Temp, DO, Turb</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DUP-1 @ R-P-19I _____
b) Were field dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes _____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Notes _____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Notes _____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Comments/Notes:

Max Field DUP RPD: 13% (Limit 20%)

MS/MSD: For unrelated samples; no qualification is necessary.

APPENDIX E

**November 2018 Assessment
Monitoring Statistical Evaluation**

TECHNICAL MEMORANDUM

DATE February 28, 2019 **Project No.** 153-1406

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Paul Pike, Charlie Henderson

FROM Mark Haddock - Golder Associates **EMAIL** mhaddock@golder.com

ASSESSMENT MONITORING STATISTICAL EVALUATION FOR THE RCPA SURFACE IMPOUNDMENT, RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY MISSOURI

This Technical Memorandum provides the results of the Assessment Monitoring Statistical Evaluation from the November 2018 sampling event for the RCPA Surface Impoundment at the Rush Island Energy Center located in Jefferson County Missouri. Included in this memorandum is a brief summary of constituents that are present at a Statistically Significant Level (SSL), a list of site-specific Groundwater Protection Standards (**Table 1**), and the Sanitas Technologies™ (Sanitas) statistical software output for each of the tested Appendix IV parameters (**Appendix A** and **Appendix B**).

The Appendix IV constituents were evaluated for SSLs using the methods and procedures outlined in the Groundwater Monitoring Plan's (GMP) Statistical Analysis Plan (SAP). The following outliers were removed prior to the calculation of confidence limits:

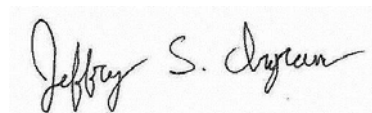
- Arsenic
 - MW-7 on 3/10/2016: Result is statistically lower than other values at the same well.
 - MW-4 on 3/11/2016 and 5/2/2016: results are statistically higher than other values at the same well. High results were collected during the first two sampling events and data has since stabilized.
- Barium
 - MW-1 on 3/10/2016: result is statistically higher than other values at the same well. High result was collected during first sampling event and data has since stabilized.
 - MW-5 on 3/11/2016: result is statistically higher than other values at the same well. High result was collected during first sampling event and data has since stabilized.

No new SSLs were identified in the November 2018 sampling event. A summary of continuing SSLs at corresponding wells is as follows:

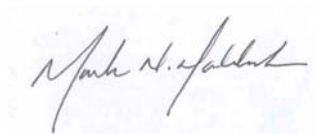
- Arsenic at MW-2, MW-3, and MW-7
- Molybdenum at MW-2, MW-3, and MW-7

Golder appreciates this opportunity to provide hydrogeological and engineering support services to Ameren. If you have any questions or comments regarding the information provided, please call our office at (314) 984-8800.

Sincerely,



Jeffrey Ingram, R.G.
Project Geologist



Mark Haddock, P.E., R.G.
Principal, Practice Leader

JSI/SCP/MNH

Enclosures:

Table 1 – RCPA Groundwater Protection Standards

Appendix A – Sanitas Confidence Interval Statistical Output

Appendix B – Sanitas Trending Confidence Bands Statistical Output

**RCPA Groundwater Protection Standards
RCPA Surface Impoundment
Rush Island Energy Center, Jefferson County, MO**

Parameter	Units	MCL or Health Based GWPS	Site GWPS	Value to Return to Detection Monitoring ⁷
Antimony	µg/L	6	6	DQR
Arsenic	µg/L	10	30	30
Barium	µg/L	2000	2000	593.3
Beryllium	µg/L	4	4	DQR
Cadmium	µg/L	5	5	DQR
Chromium	µg/L	100	100	5.422
Cobalt	µg/L	6	6	DQR
Fluoride	mg/l	4	4	0.236
Lead	µg/L	15	15	DQR
Lithium	µg/L	40	64.7	64.7
Mercury	µg/L	2	2	DQR
Molybdenum	µg/L	100	100	DQR
Radium 226 + 228	pCi/L	5	5	3.068
Selenium	µg/L	50	50	DQR
Thallium	µg/L	2	2	DQR

Notes:

1. µg/L - micrograms per liter
2. mg/L - milligrams per liter
3. pCi/L - picocuries per liter

4. MCL - Maximum Contaminant Level. MCLs from United States Environmental Protection Agency (USEPA) 2012 Edition of the Drinking Water Standards and Health Advisories. Spring 2012.
<http://water.epa.gov/drink/contaminants/index.cfm>.

5. Health Based Groundwater Protection Standards (GWPS) were adopted for Appendix IV parameters without an MCL (i.e. cobalt, lithium, molybdenum, and lead). Information available at <https://www.epa.gov/coalash/coal-ash-rule>.

6. Values were calculated using statistical methods outlined for Detection Monitoring and are used for returning to Detection Monitoring based on available data to date.

7. DQR - Double Quantification Rule. If all baseline data are less than the Practical Quantitation Limit (PQL), then the DQR will be used. More information on the DQR is provided in the Statistical Analysis Plan.

8. Site GWPS is either the MCL/Health Based GWPS or based on background levels (calculated as described in the Statistical Analysis Plan for Assessment Monitoring), whichever is higher.

9. GWPS and background values calculated using baseline sampling results from monitoring wells MW-B1 and MW-B2.

Prepared by: JSI 10/3/2018

Checked by: TJG 10/4/2018

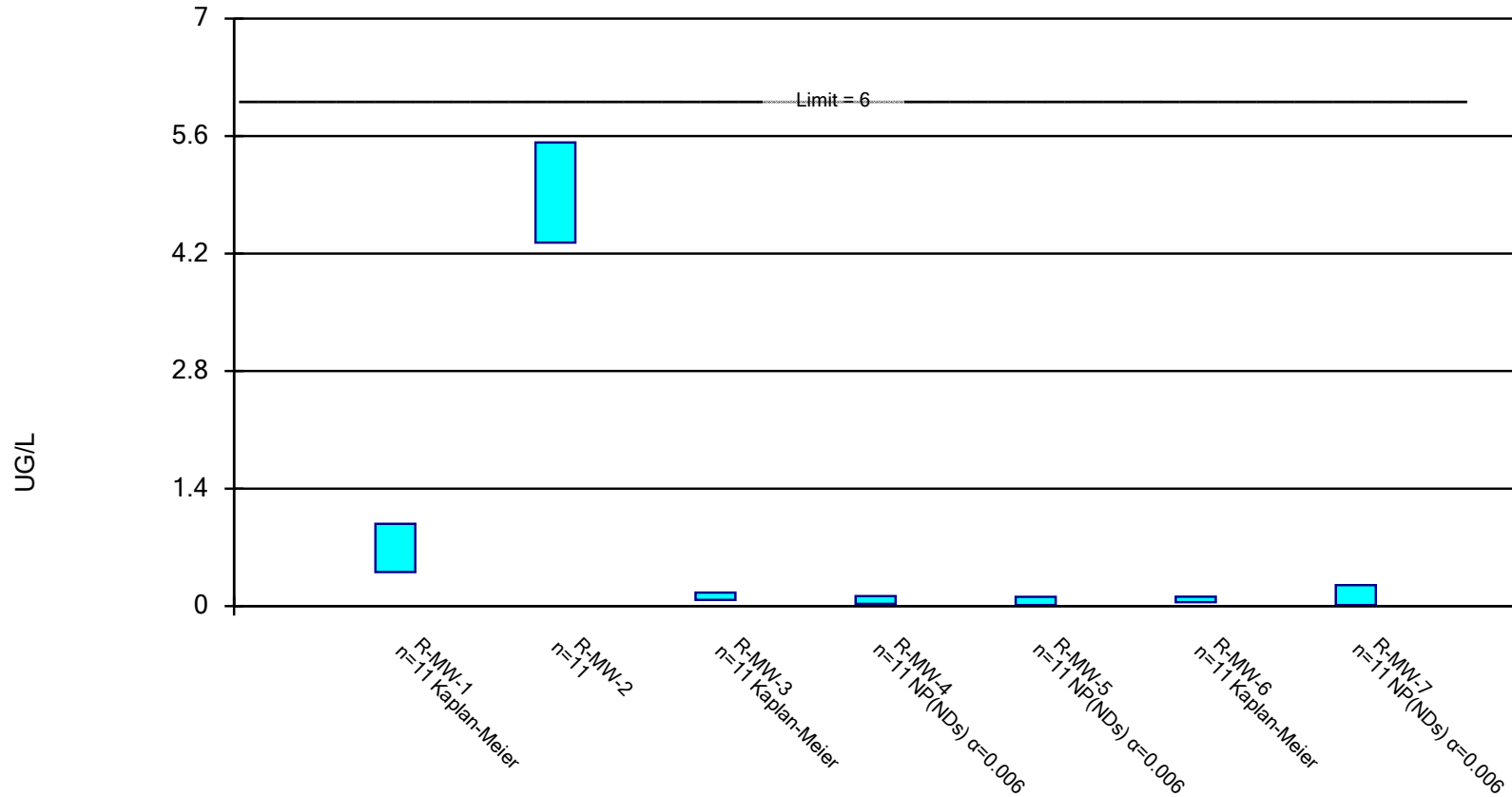
Reviewed by: MNH 10/10/2018

APPENDIX A

**Sanitas Confidence Interval
Statistical Output**

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

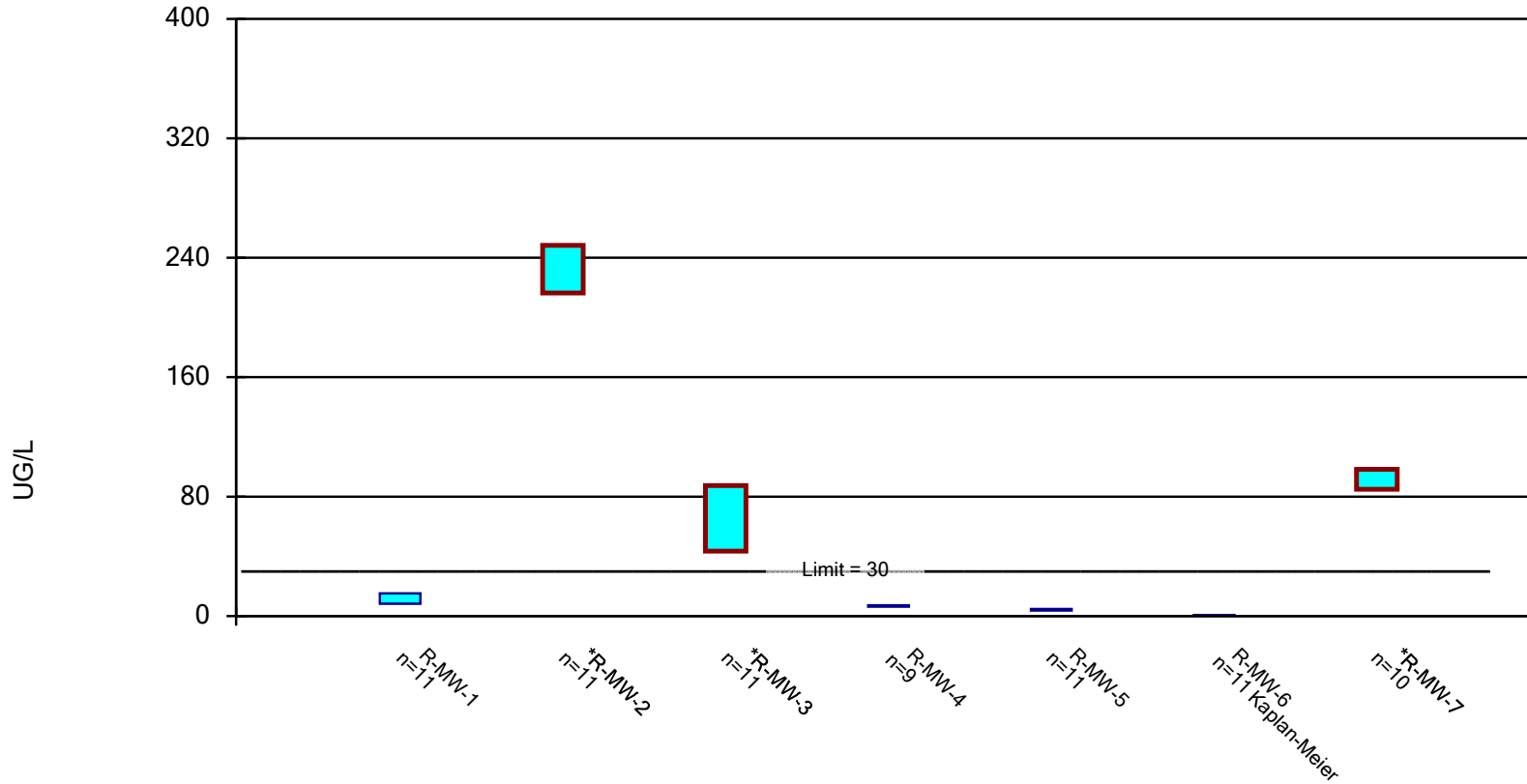


Constituent: ANTIMONY, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

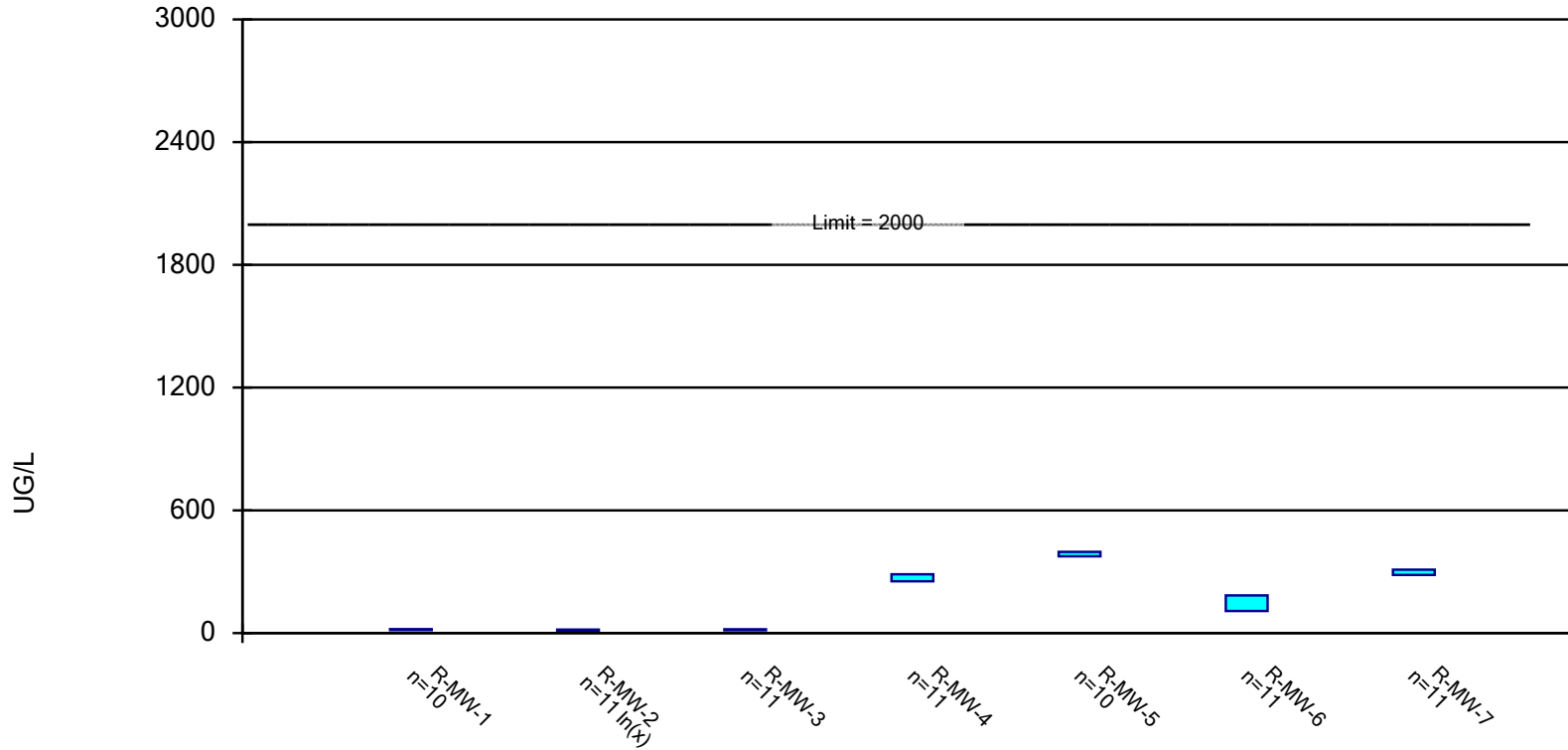


Constituent: ARSENIC, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

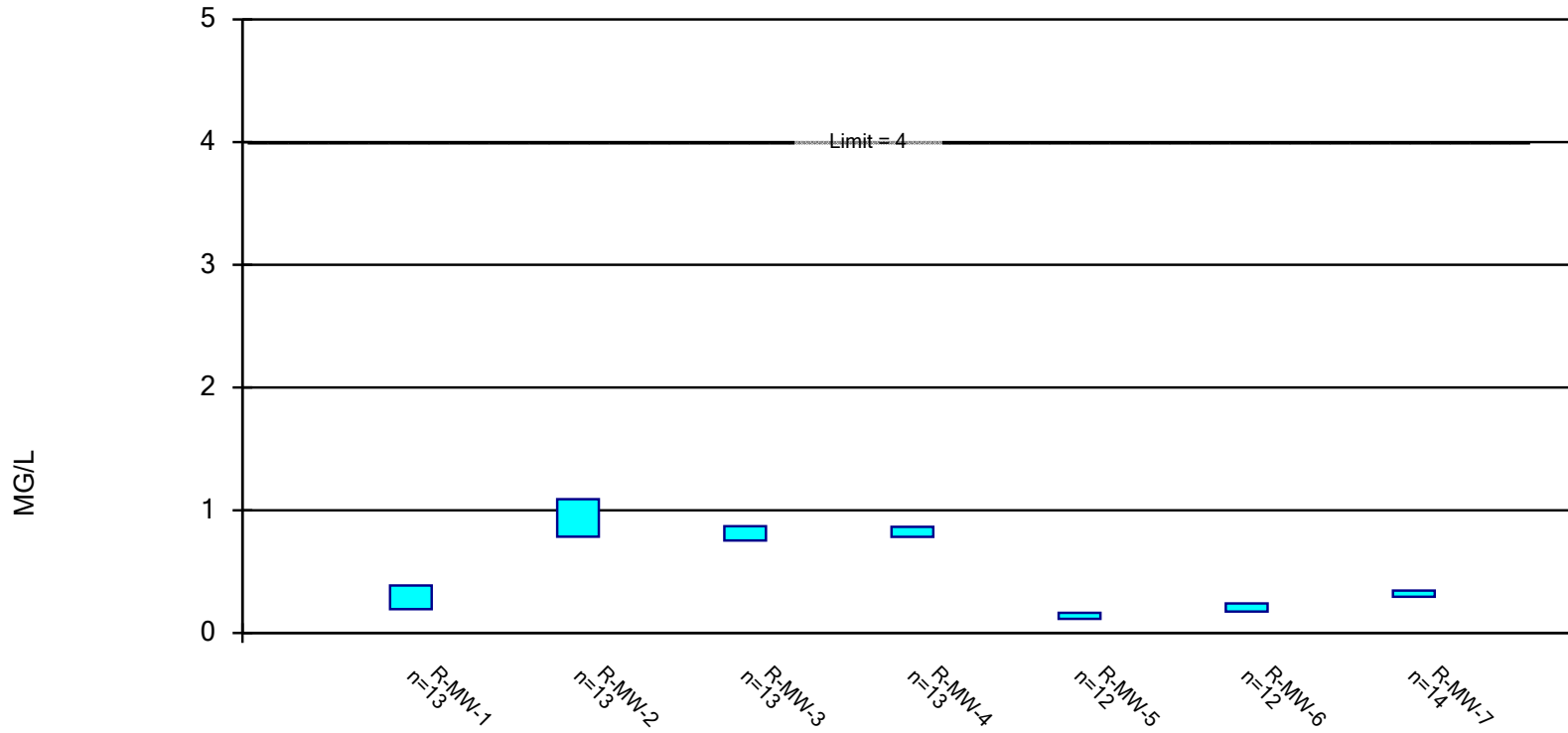


Constituent: BARIUM, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

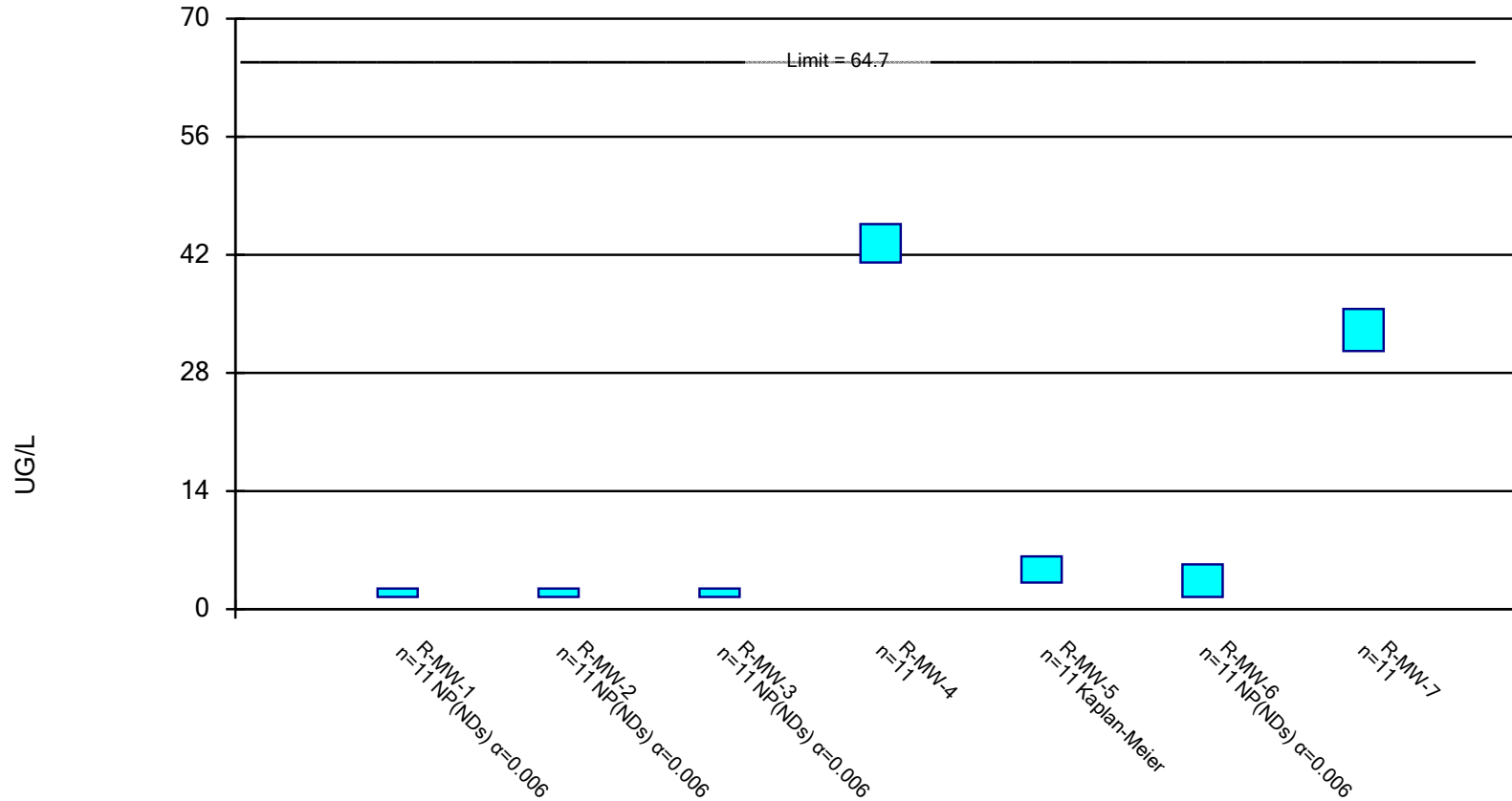


Constituent: FLUORIDE, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

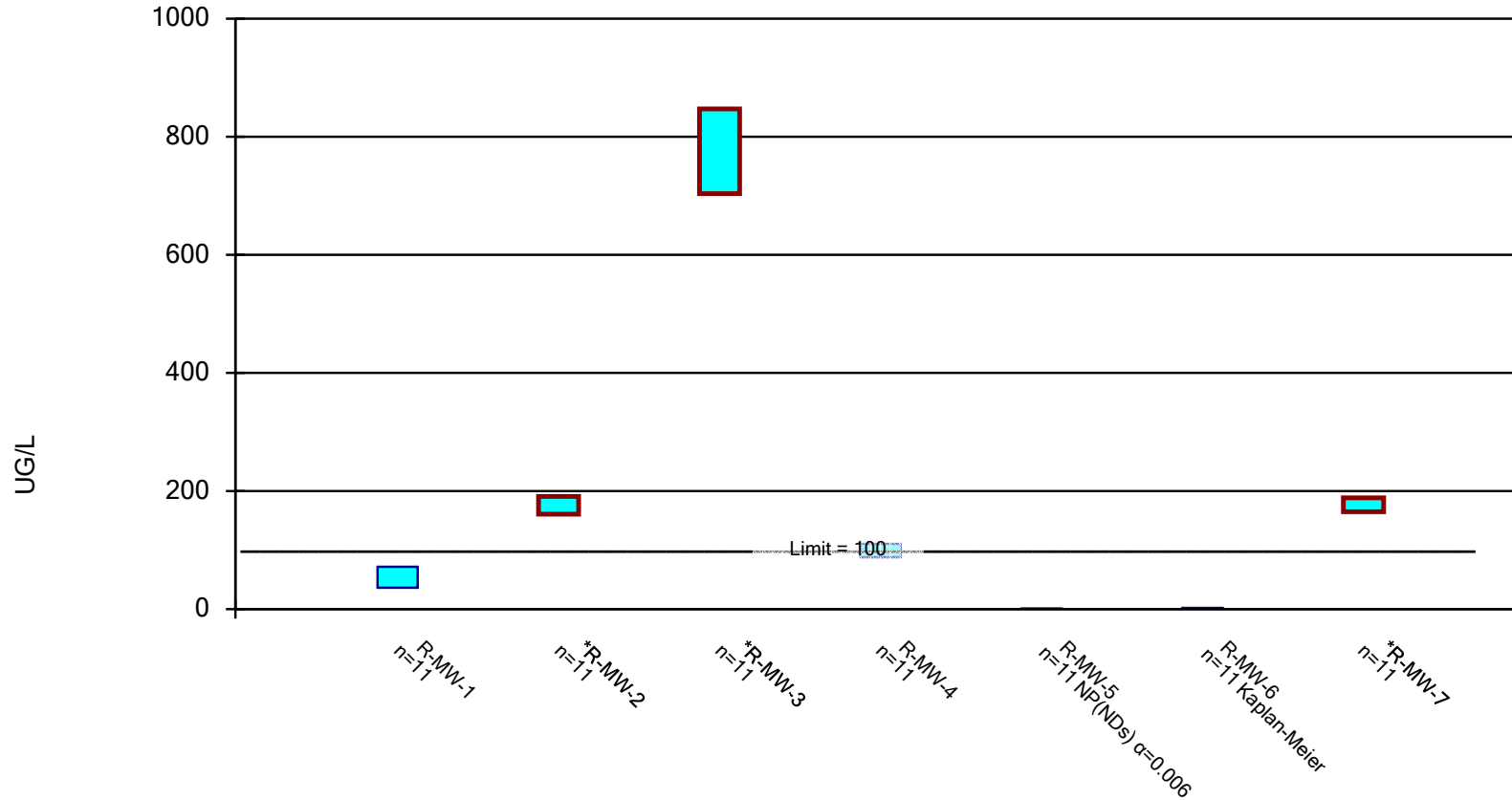


Constituent: LITHIUM, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

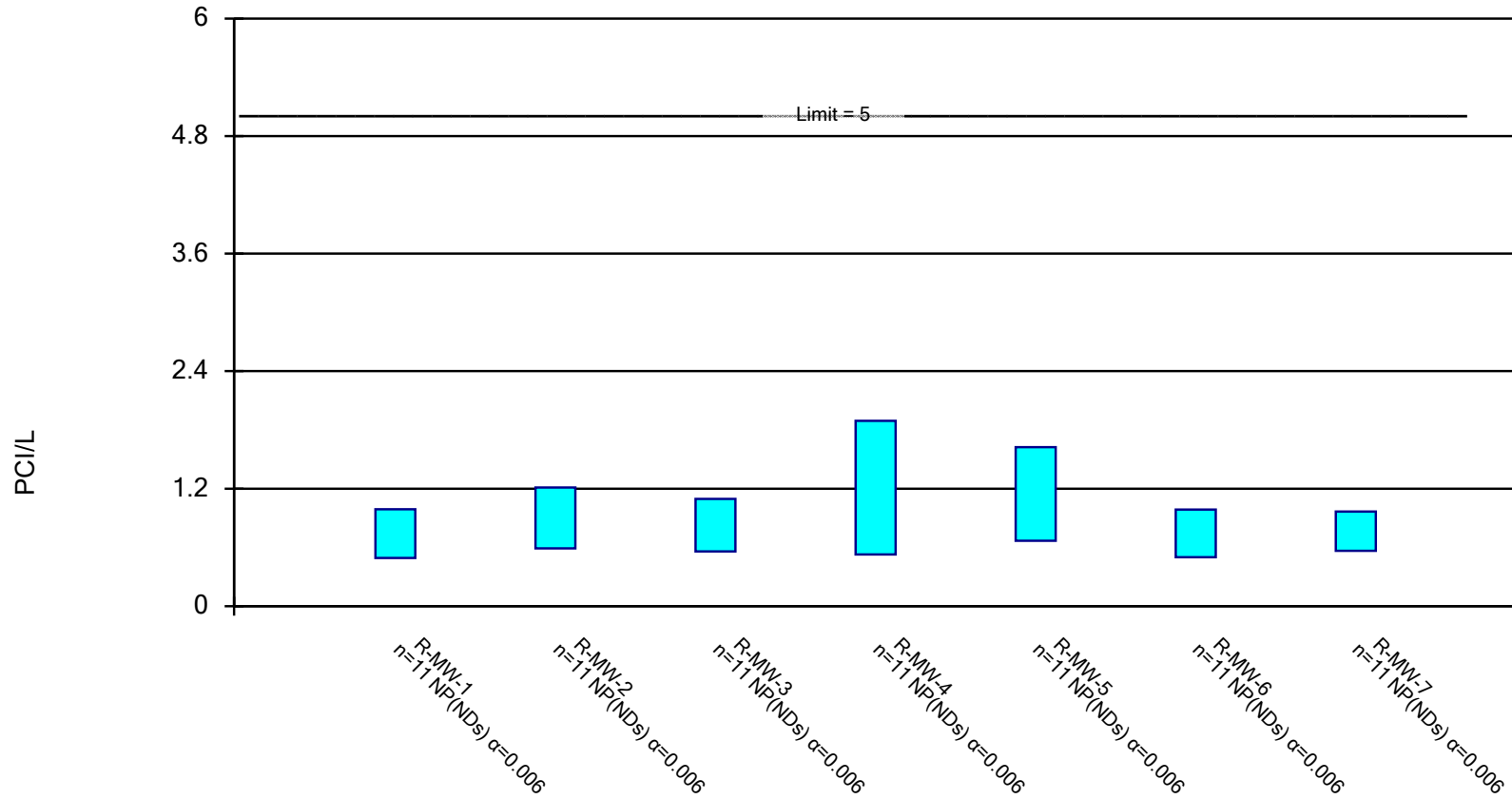


Constituent: MOLYBDENUM, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

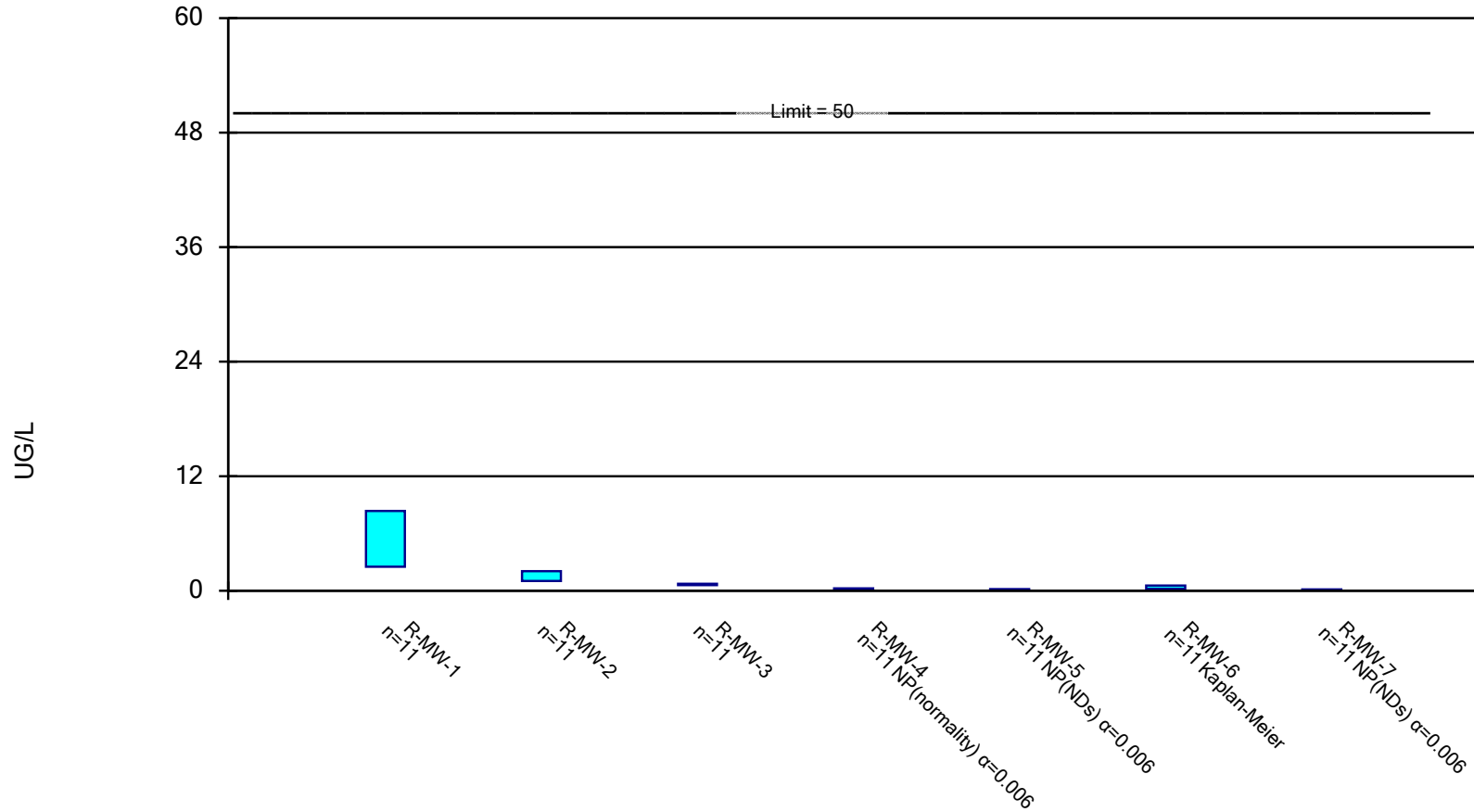


Constituent: RADIUM [226 + 228] Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: SELENIUM, TOTAL Analysis Run 2/15/2019 7:17 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Confidence Interval

Rush Island E.C. Client: Ameren Data: RIEC Data Printed 2/15/2019, 7:18 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
ANTIMONY, TOTAL (UG/L)	R-MW-1	0.9797	0.4057	6	No	11	18.18	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-2	5.524	4.331	6	No	11	0	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-3	0.1608	0.07318	6	No	11	27.27	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-4	0.12	0.0275	6	No	11	63.64	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	R-MW-5	0.11	0.013	6	No	11	81.82	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	R-MW-6	0.1114	0.0458	6	No	11	45.45	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-7	0.25	0.013	6	No	11	72.73	No	0.006	NP (NDs)
ARSENIC, TOTAL (UG/L)	R-MW-1	15.22	8.236	30	No	11	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-2	248.3	216.4	30	Yes	11	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-3	87.37	43.52	30	Yes	11	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-4	7.192	6.296	30	No	9	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-5	4.716	3.738	30	No	11	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-6	0.6828	0.1918	30	No	11	27.27	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-7	98.33	84.93	30	Yes	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-1	18.85	14.51	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-2	17.01	10	2000	No	11	0	ln(x)	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-3	18.23	13.7	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-4	287.6	253.3	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-5	397	374.8	2000	No	10	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-6	184.1	107.9	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-7	309.5	284.5	2000	No	11	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-1	0.3866	0.1934	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-2	1.09	0.7849	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-3	0.8702	0.7529	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-4	0.8647	0.7829	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-5	0.1642	0.115	4	No	12	8.333	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-6	0.2406	0.1744	4	No	12	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-7	0.3459	0.2955	4	No	14	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	R-MW-1	2.45	1.45	64.7	No	11	100	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-2	2.45	1.45	64.7	No	11	90.91	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-3	2.45	1.45	64.7	No	11	100	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-4	45.65	41.1	64.7	No	11	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	R-MW-5	6.255	3.145	64.7	No	11	45.45	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	R-MW-6	5.3	1.45	64.7	No	11	72.73	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-7	35.59	30.59	64.7	No	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-1	71.59	36.32	100	No	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-2	190.8	160.8	100	Yes	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-3	847.2	703.5	100	Yes	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-4	110.6	87.67	100	No	11	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-5	1	0.26	100	No	11	63.64	No	0.006	NP (NDs)
MOLYBDENUM, TOTAL (UG/L)	R-MW-6	2.018	0.6732	100	No	11	36.36	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-7	188.4	164.9	100	Yes	11	0	No	0.01	Param.
RADIUM [226 + 228] (PCI/L)	R-MW-1	0.99	0.493	5	No	11	100	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-2	1.211	0.59	5	No	11	100	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-3	1.094	0.559	5	No	11	90.91	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-4	1.892	0.5275	5	No	11	72.73	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-5	1.623	0.668	5	No	11	72.73	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-6	0.986	0.5	5	No	11	90.91	No	0.006	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-7	0.9655	0.5655	5	No	11	90.91	No	0.006	NP (NDs)
SELENIUM, TOTAL (UG/L)	R-MW-1	8.362	2.51	50	No	11	0	No	0.01	Param.

Confidence Interval

Rush Island E.C. Client: Ameren Data: RIEC Data Printed 2/15/2019, 7:18 AM

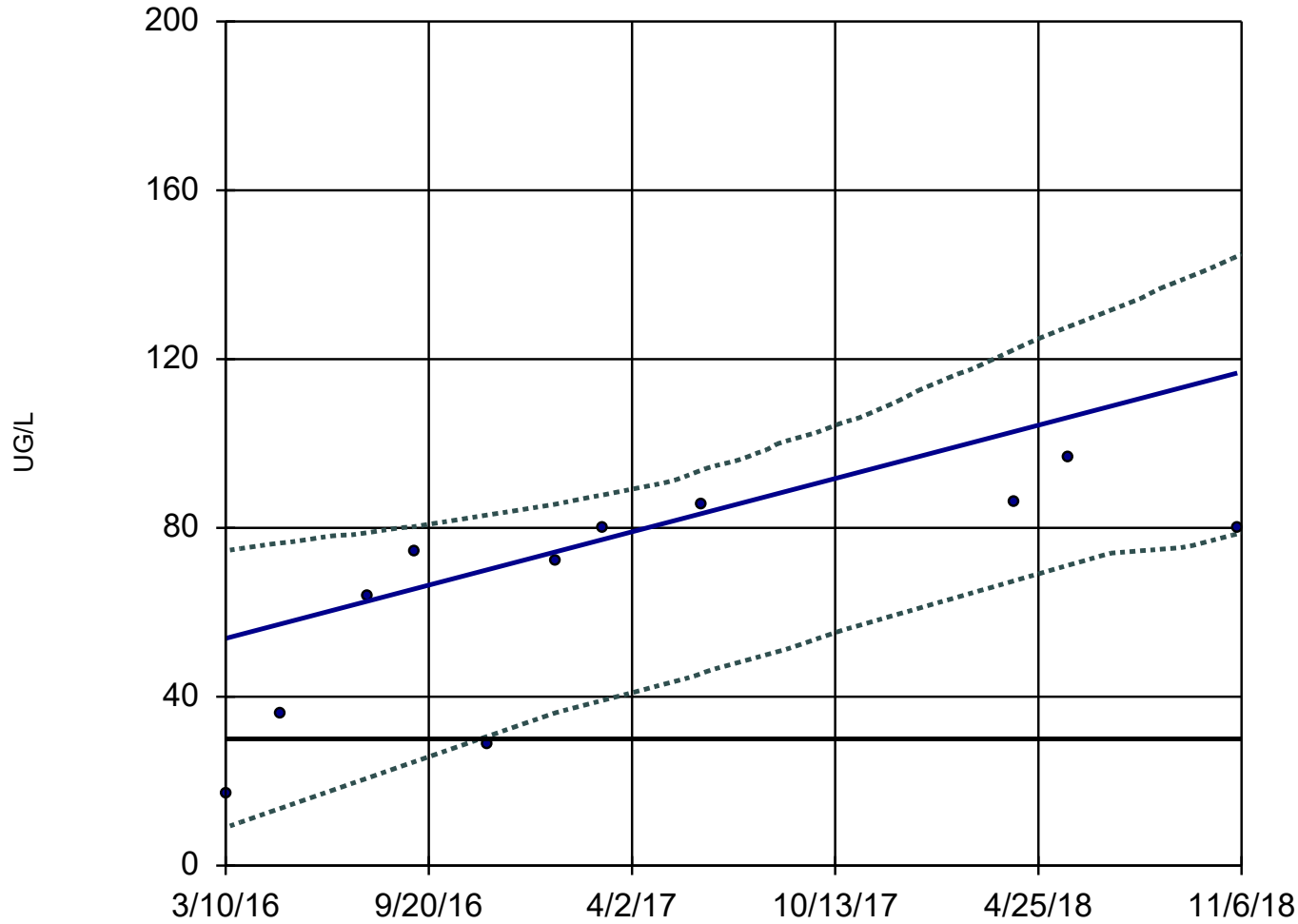
<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
SELENIUM, TOTAL (UG/L)	R-MW-2	2.05	1.026	50	No	11	0	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-3	0.7254	0.5928	50	No	11	0	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-4	0.24	0.09	50	No	11	45.45	No	0.006	NP (normality)
SELENIUM, TOTAL (UG/L)	R-MW-5	0.16	0.0425	50	No	11	90.91	No	0.006	NP (NDs)
SELENIUM, TOTAL (UG/L)	R-MW-6	0.5404	0.1949	50	No	11	18.18	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-7	0.14	0.0425	50	No	11	81.82	No	0.006	NP (NDs)

APPENDIX B

**Sanitas Trending Confidence
Bands Statistical Output**

Sen's Slope and 95% Confidence Band

R-MW-3



n = 11

Slope = 23.74
units per year.

Mann-Kendall
statistic = 39
critical = 31

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

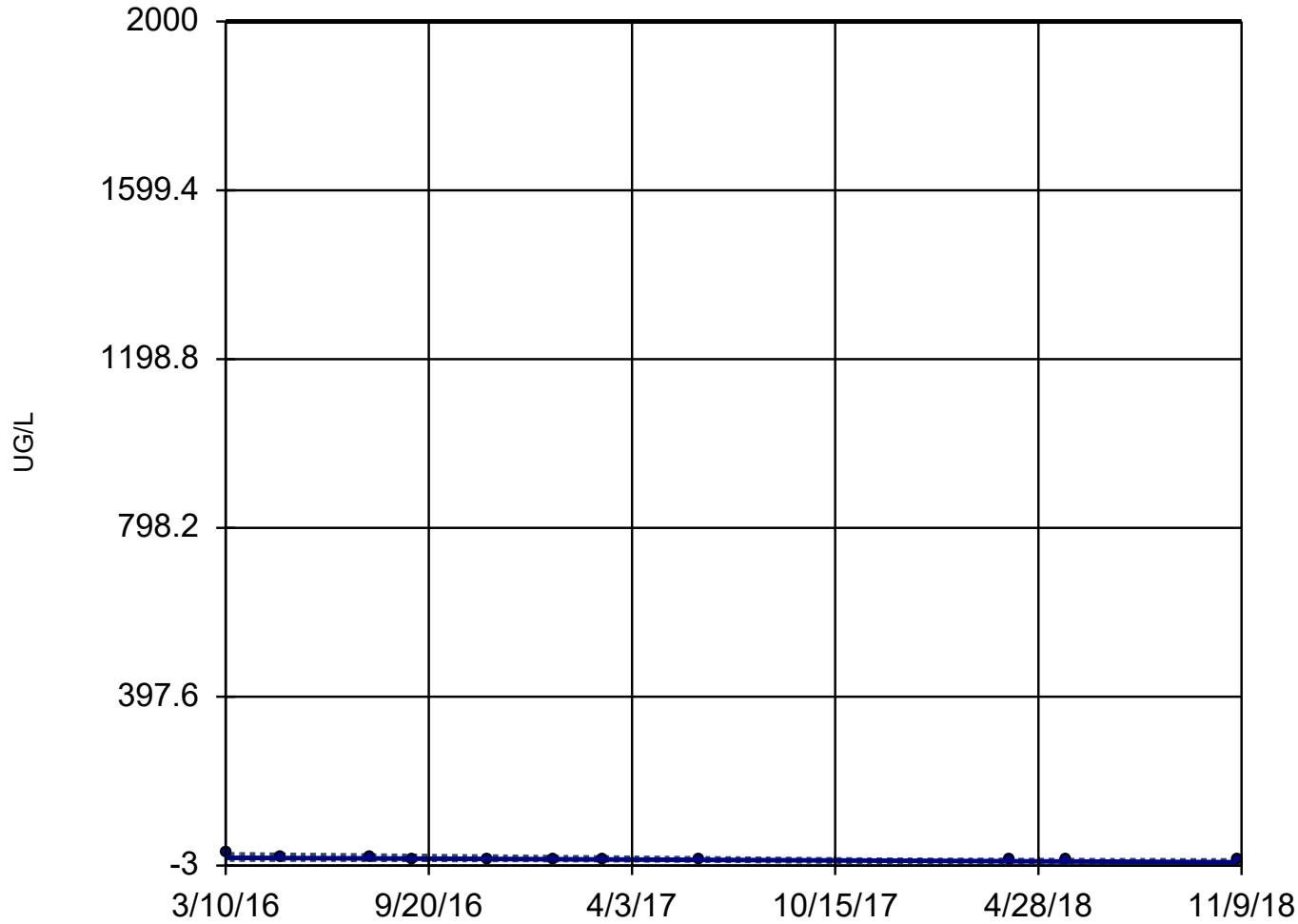
GWPS = 30.

Constituent: ARSENIC, TOTAL Analysis Run 2/15/2019 7:37 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Sen's Slope and 95% Confidence Band

R-MW-2



n = 11

Slope = -3.831
units per year.

Mann-Kendall
statistic = -49
critical = -31

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

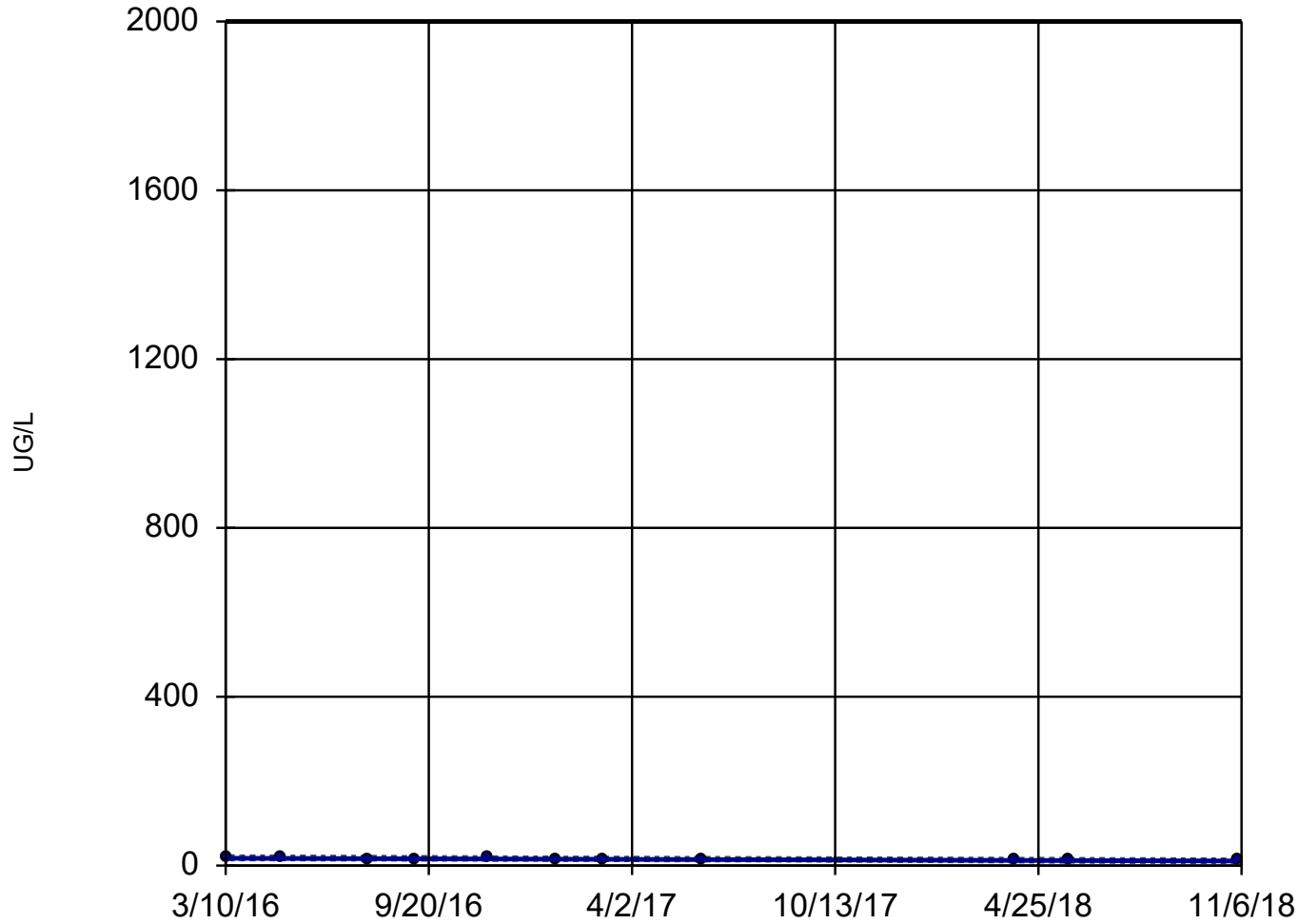
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 2/15/2019 7:37 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Sen's Slope and 95% Confidence Band

R-MW-3



n = 11

Slope = -2.475
units per year.

Mann-Kendall
statistic = -45
critical = -31

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

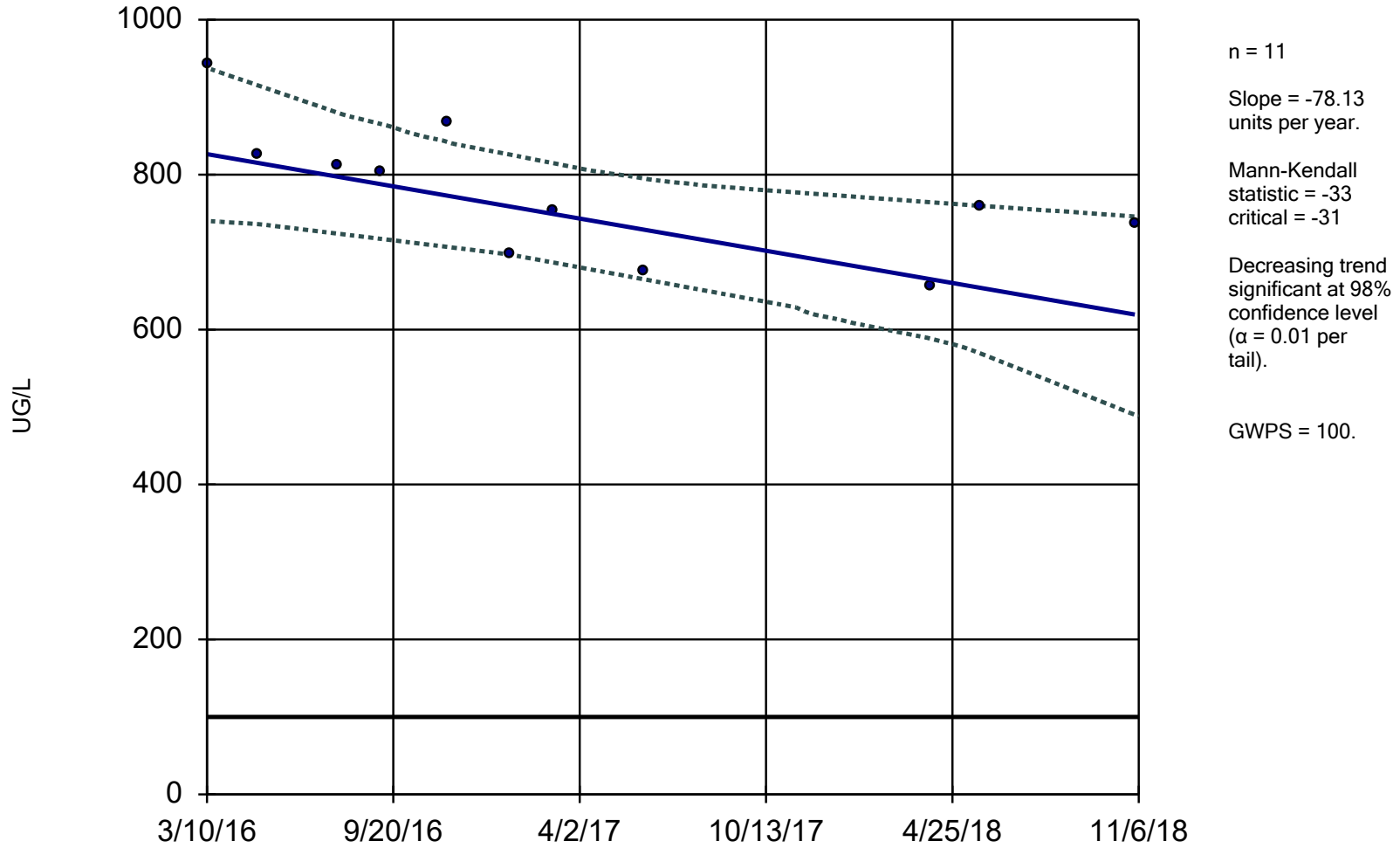
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 2/15/2019 7:37 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

Sen's Slope and 95% Confidence Band

R-MW-3



Constituent: MOLYBDENUM, TOTAL Analysis Run 2/15/2019 7:37 AM

Rush Island E.C. Client: Ameren Data: RIEC Data

APPENDIX F

**July-September 2019 Assessment
Monitoring Statistical Evaluation**

TECHNICAL MEMORANDUM

DATE November 22, 2019

Project No. 153-140601

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Paul Pike, Charlie Henderson

FROM Jeffrey Ingram - Golder Associates Inc.

EMAIL JIngram@Golder.com

ASSESSMENT MONITORING STATISTICAL EVALUATION FOR THE RCPA SURFACE IMPOUNDMENT, RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY MISSOURI

This Technical Memorandum provides the results of the Assessment Monitoring Statistical Evaluation from the July 2019 sampling event for the RCPA Surface Impoundment at the Rush Island Energy Center located in Jefferson County Missouri. Included in this memorandum is a brief summary of constituents that are present at a Statistically Significant Level (SSL), a list of site-specific Groundwater Protection Standards (**Table 1**), and the Sanitas Technologies™ (Sanitas) statistical software output for each of the tested Appendix IV parameters (**Appendix A** and **Appendix B**).

The Appendix IV constituents were evaluated for SSLs using the methods and procedures outlined in the Groundwater Monitoring Plan's (GMP) Statistical Analysis Plan (SAP). In addition to the outliers that were noted in previous statistical analysis, the following outliers were removed prior to the calculation of confidence limits:

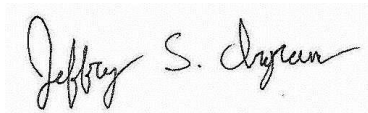
- Antimony - MW-5 on 6/8/2017 (0.048 J ug/L): Result is statistically higher than other values at the same well.
- Beryllium – MW-7 on 11/2/2018 (0.4 J ug/L): Result is statistically higher than other values at the same well.
- Fluoride – MW-3 on 9/6/2017 (0.63 mg/L): Result is statistically lower than other values at the same well.
- Lead – MW-7 on 3/10/2016 (3.7 ug/L): Result is statistically higher than other values at the same well.
- Selenium – MW-3 on 4/2/2018 (Non-detect): Result is statistically lower than other values at the same well.

No new SSLs were identified in the July 2019 sampling event. A summary of continuing SSLs at corresponding wells is as follows:

- Arsenic at MW-2, MW-3, and MW-7
- Molybdenum at MW-2, MW-3, and MW-7

Golder appreciates this opportunity to provide hydrogeological and engineering support services to Ameren. If you have any questions or comments regarding the information provided, please call our office at (314) 984-8800.

Sincerely,



Jeffrey Ingram, R.G.
Project Geologist

JSI/SCP



Sean Paulsen, P.G.
Associate, Senior Consultant

Enclosures:

Table 1 – RCPA Groundwater Protection Standards

Appendix A – Sanitas Confidence Interval Statistical Output

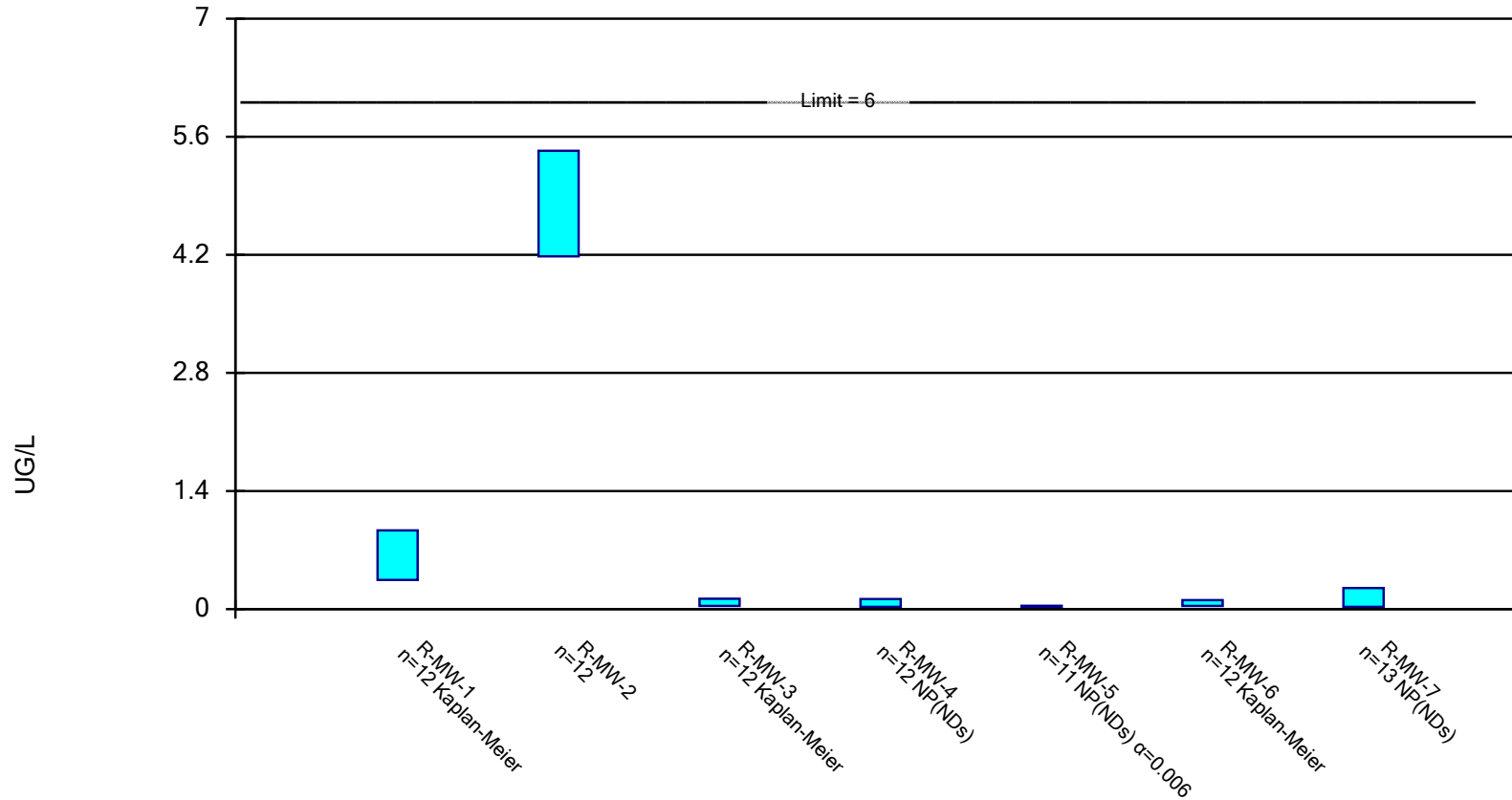
Appendix B – Sanitas Trending Confidence Bands Statistical Output

APPENDIX A

Sanitas Confidence Interval Statistical Output

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

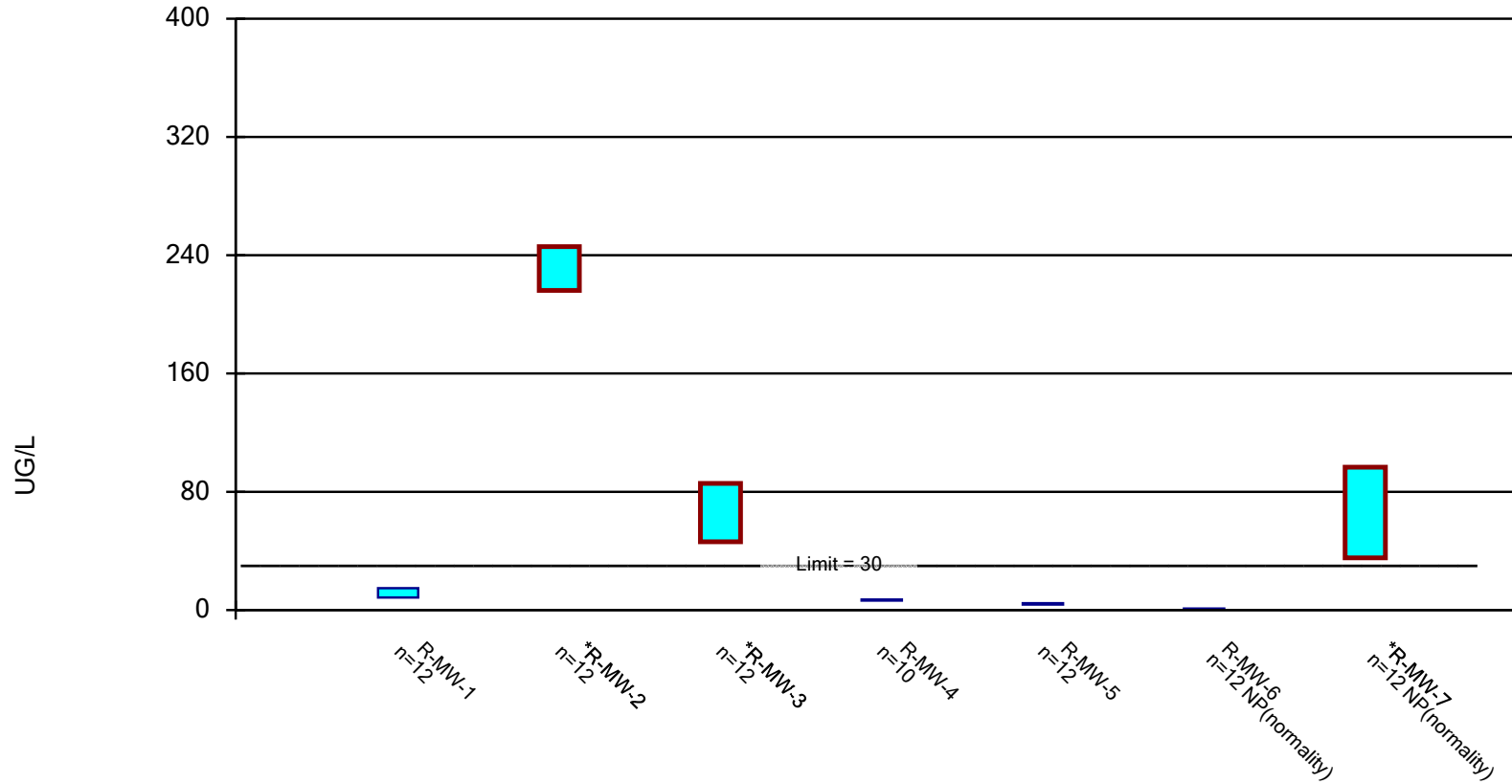


Constituent: ANTIMONY, TOTAL Analysis Run 11/22/2019 8:46 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

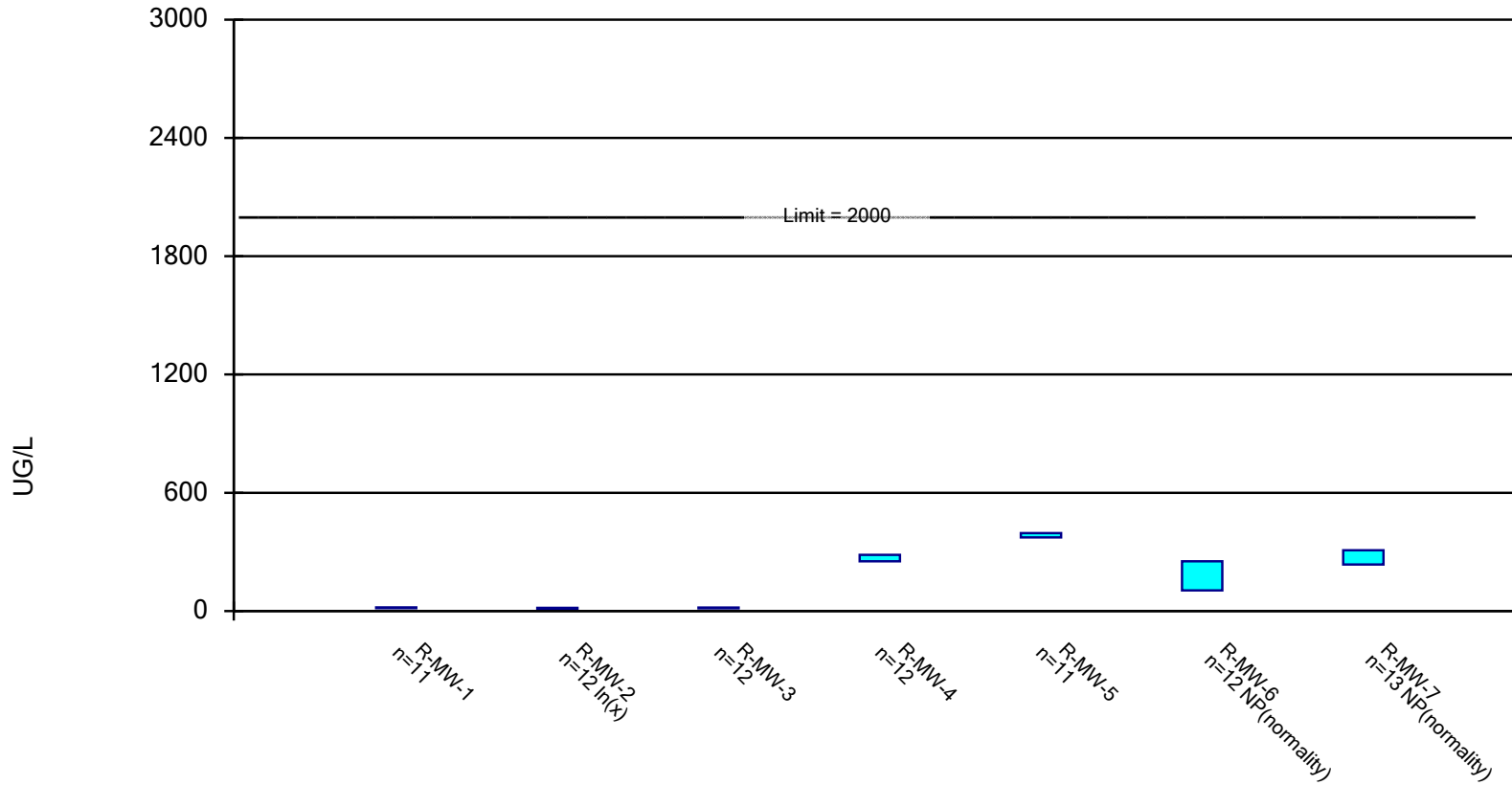


Constituent: ARSENIC, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

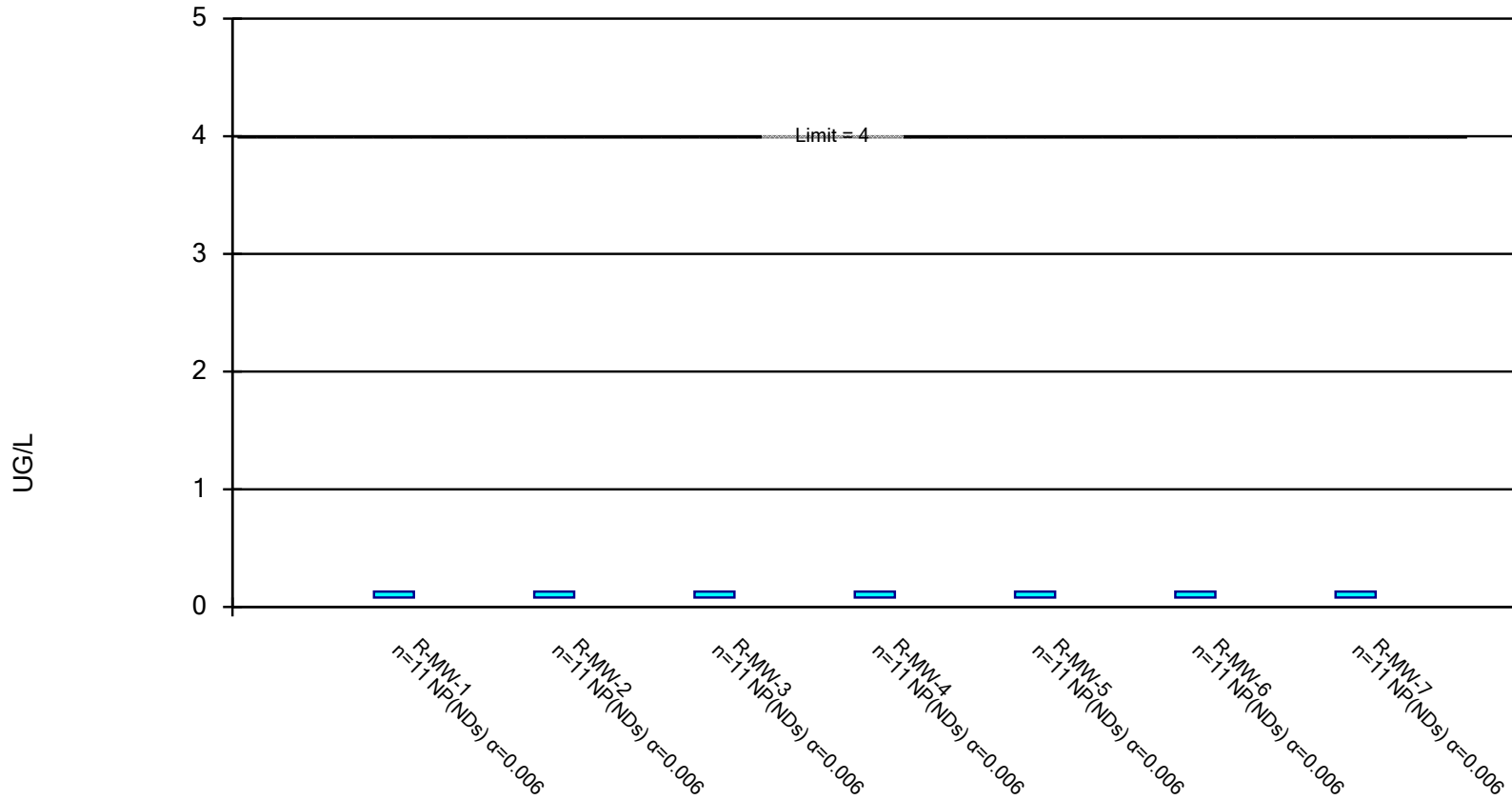


Constituent: BARIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

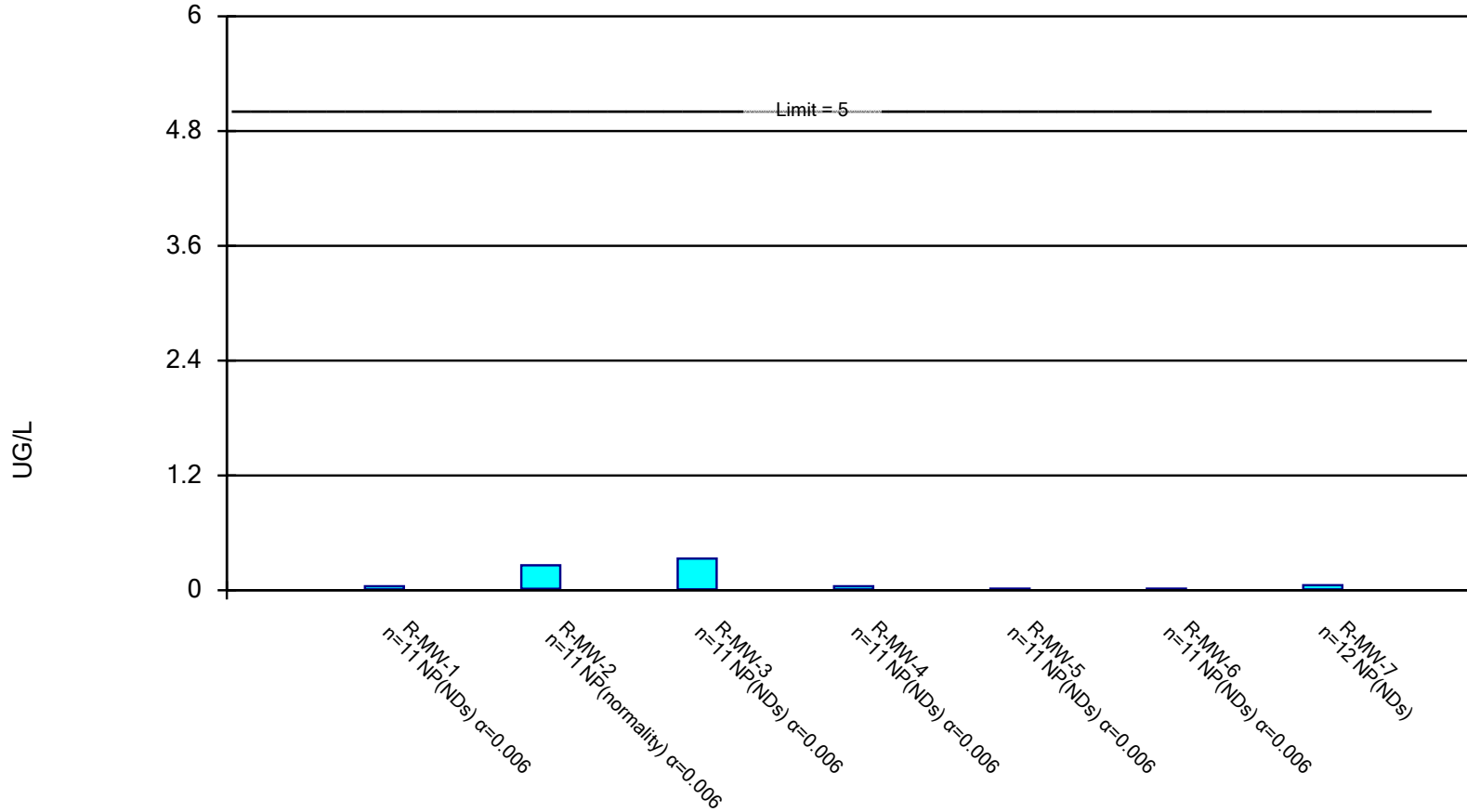


Constituent: BERYLLIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

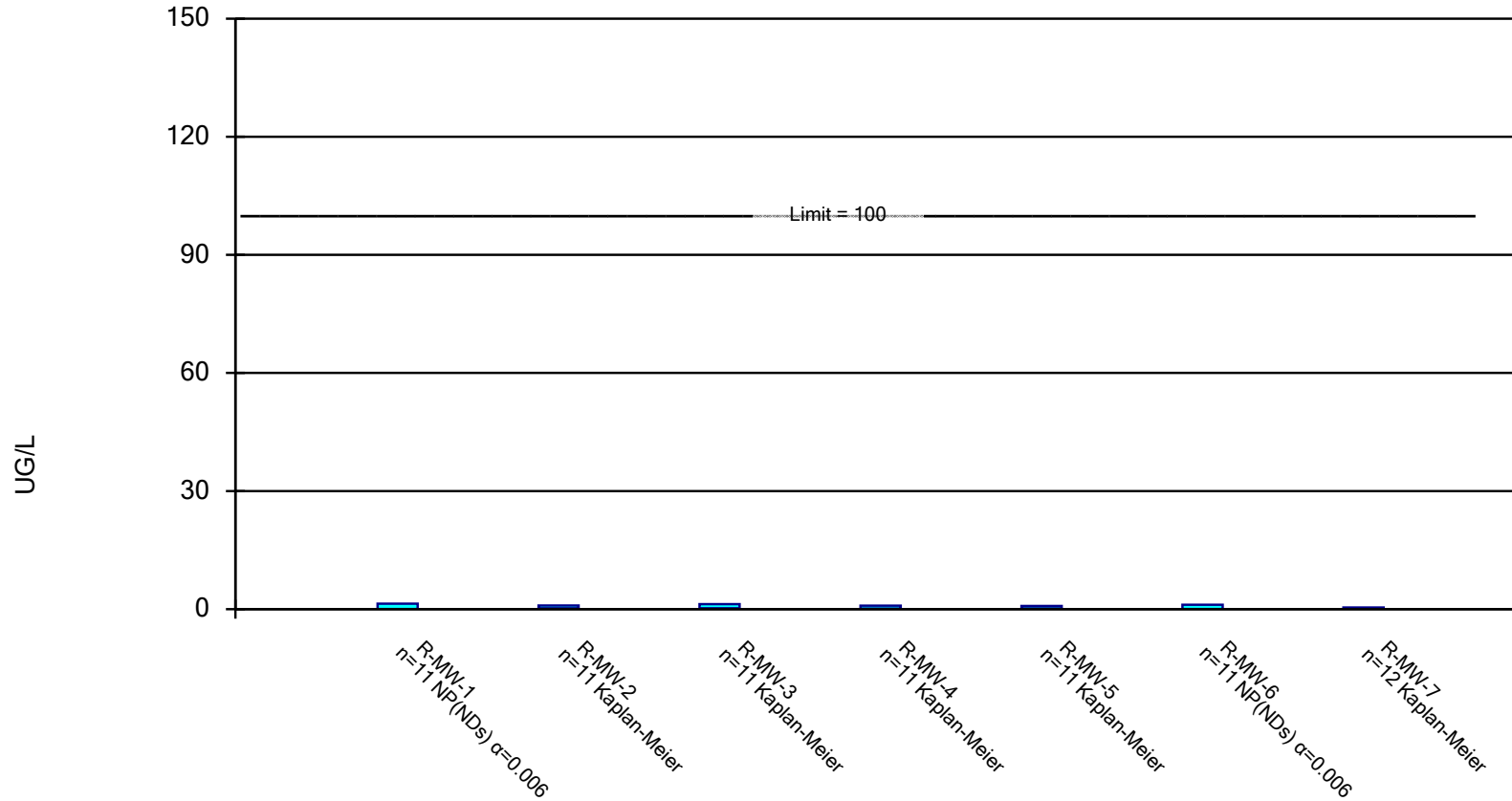


Constituent: CADMIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

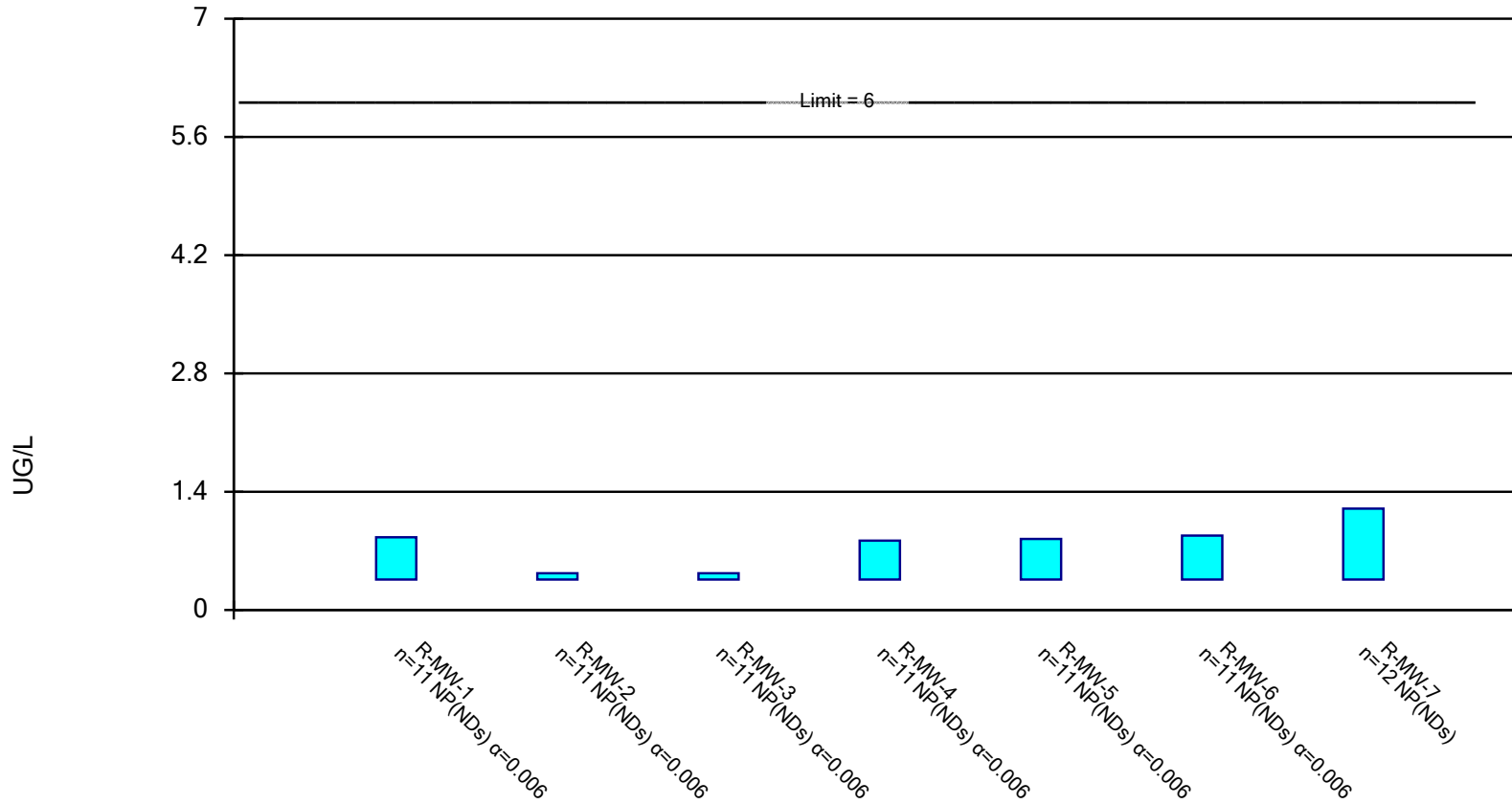


Constituent: CHROMIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

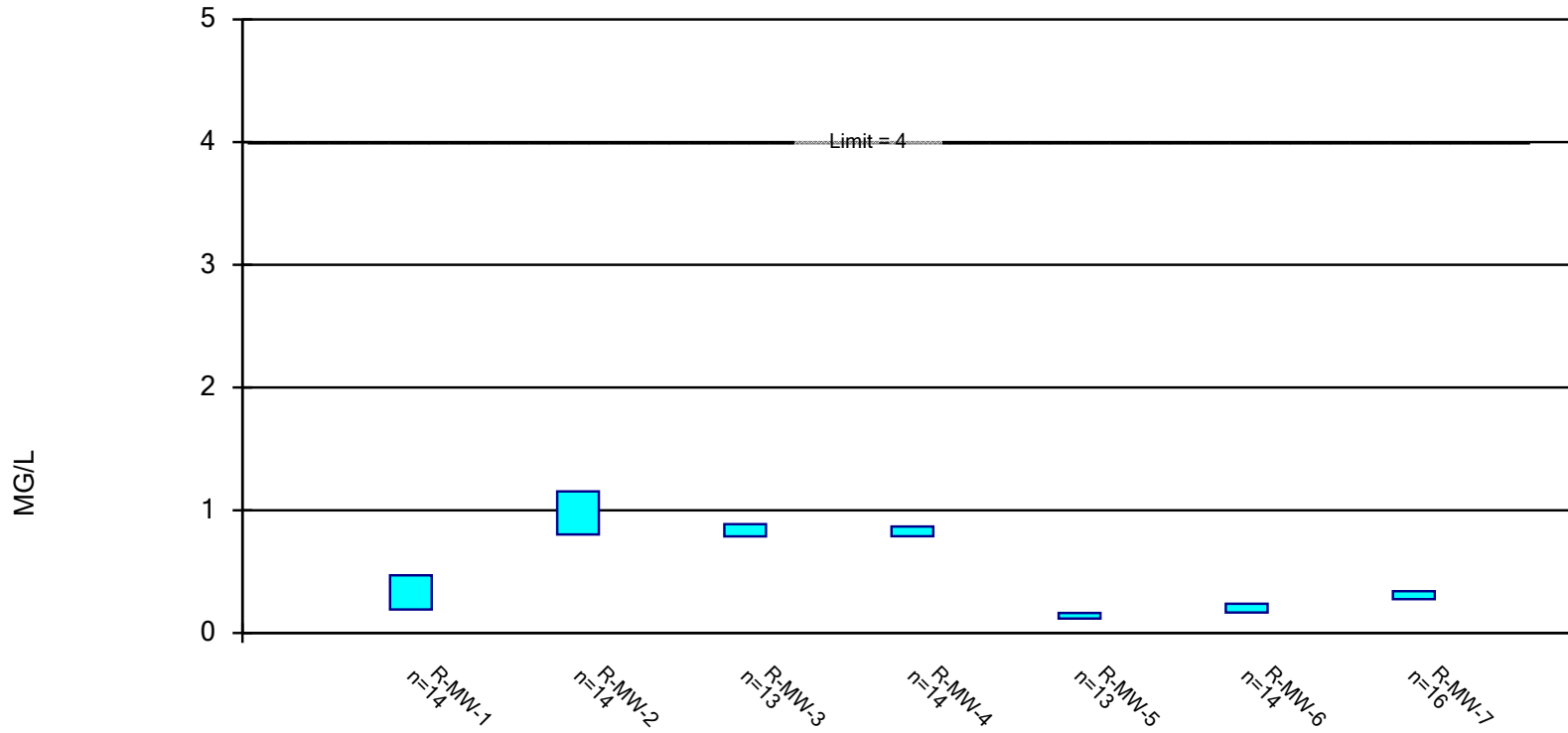


Constituent: COBALT, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

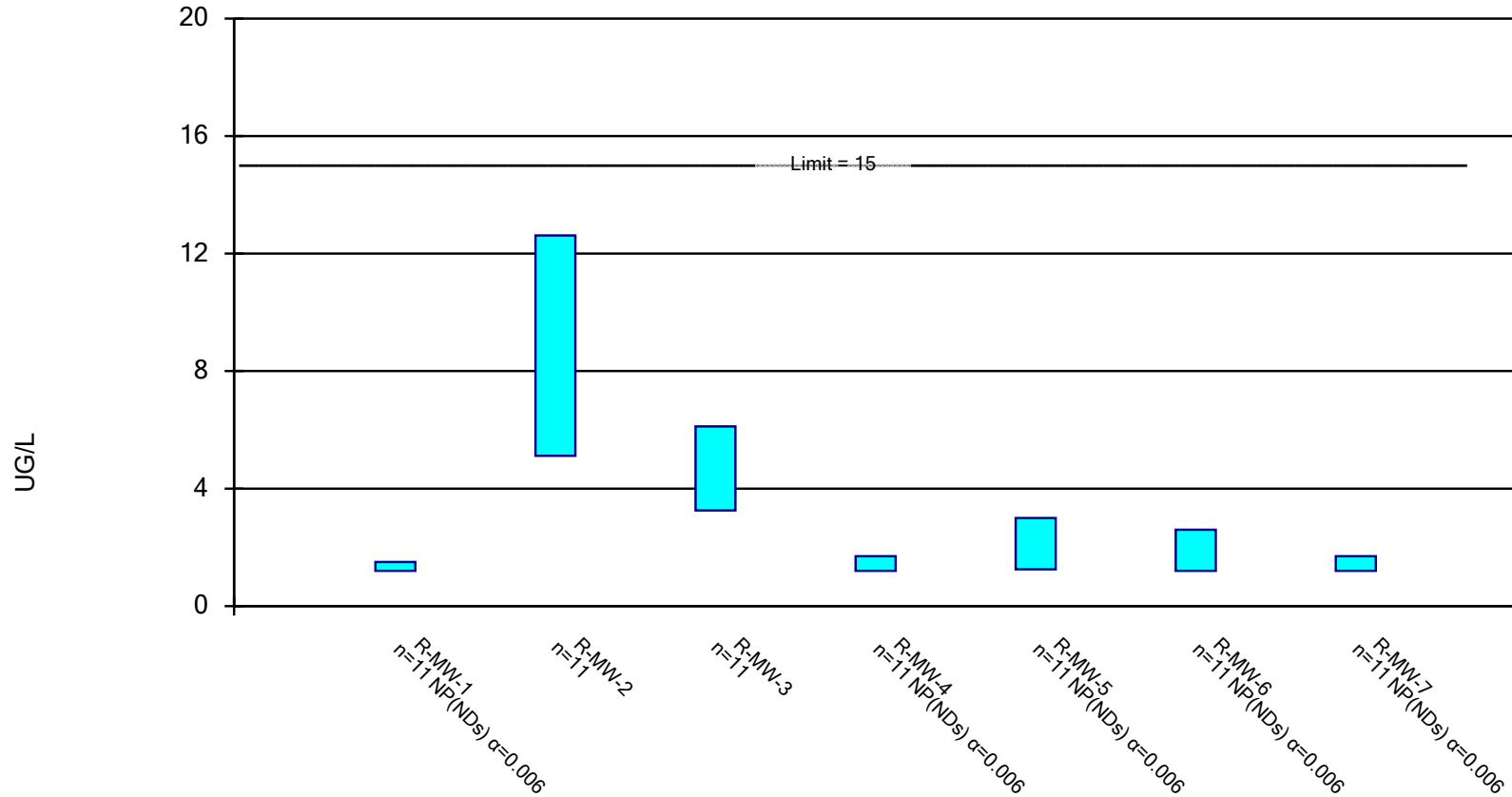


Constituent: FLUORIDE, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

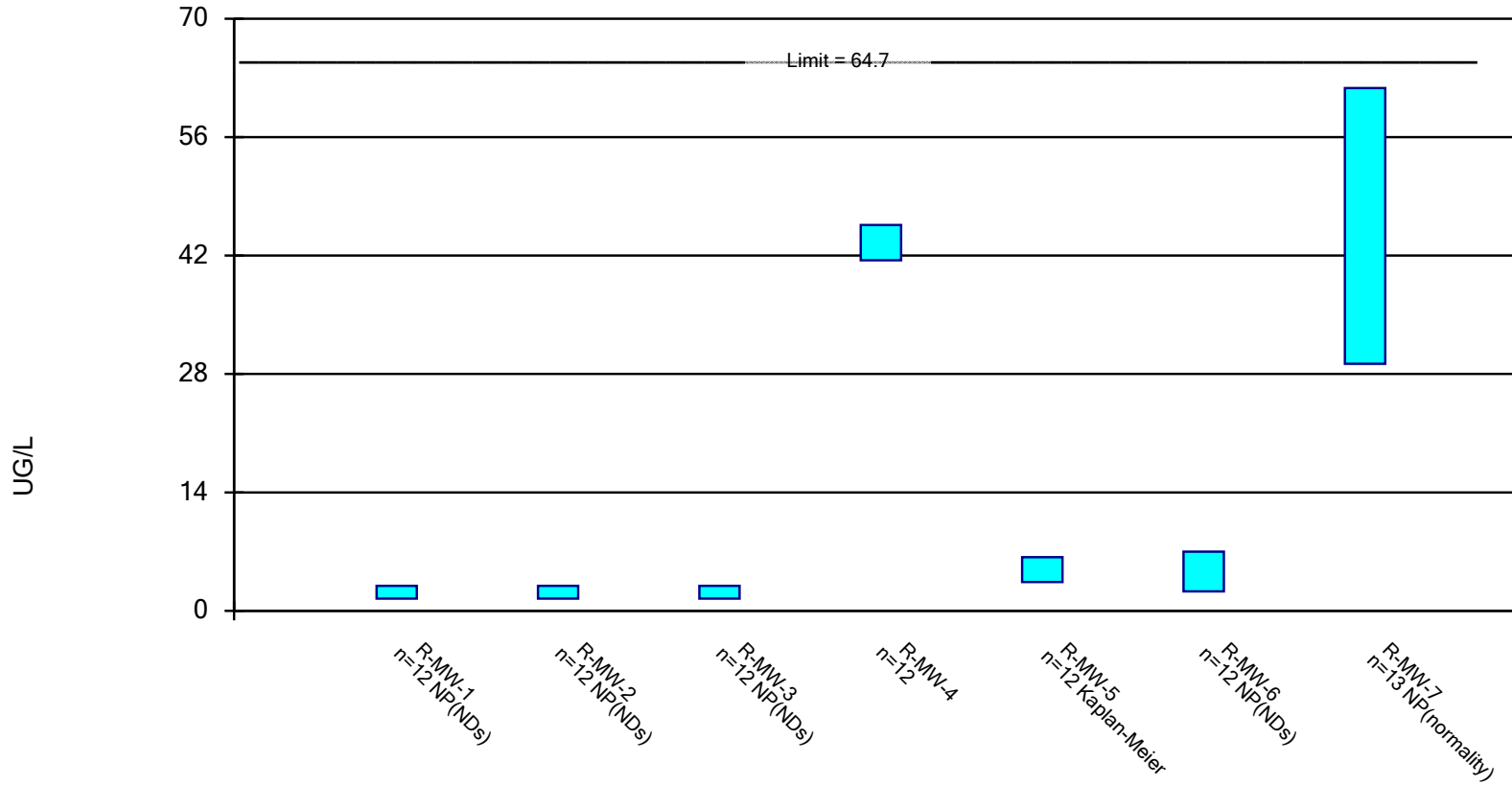
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: LEAD, TOTAL Analysis Run 11/22/2019 8:47 AM
Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

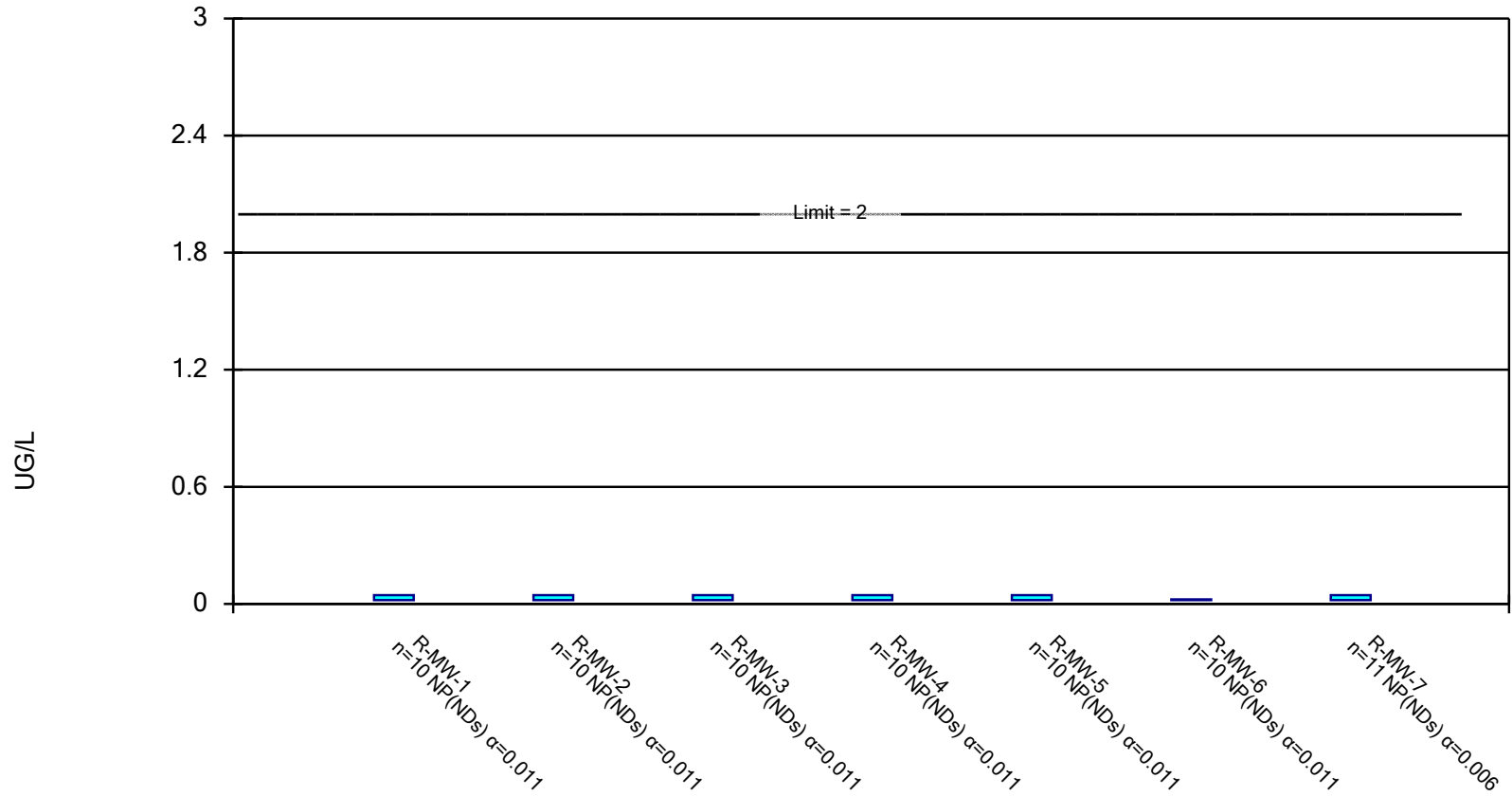


Constituent: LITHIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

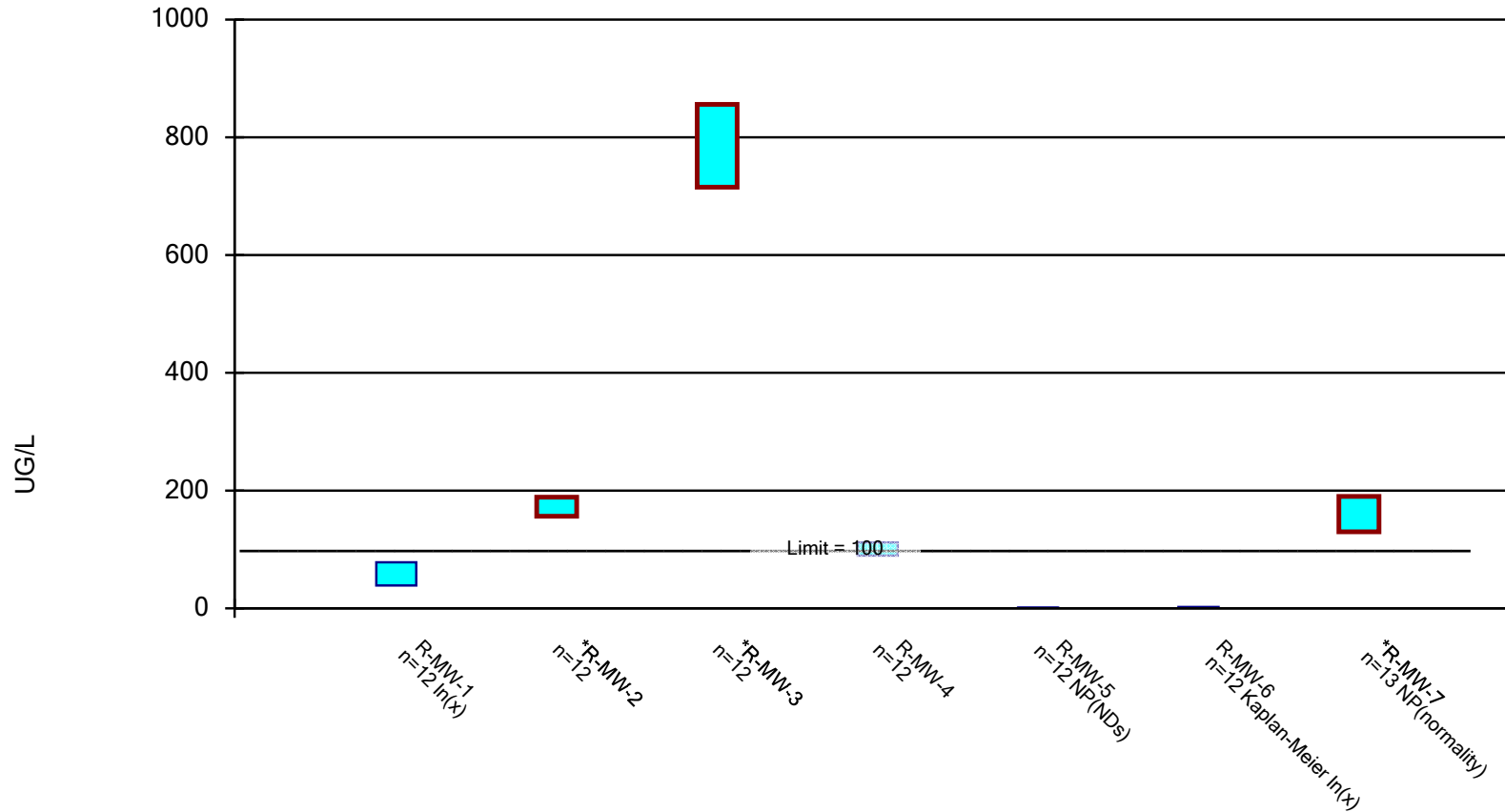


Constituent: MERCURY, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

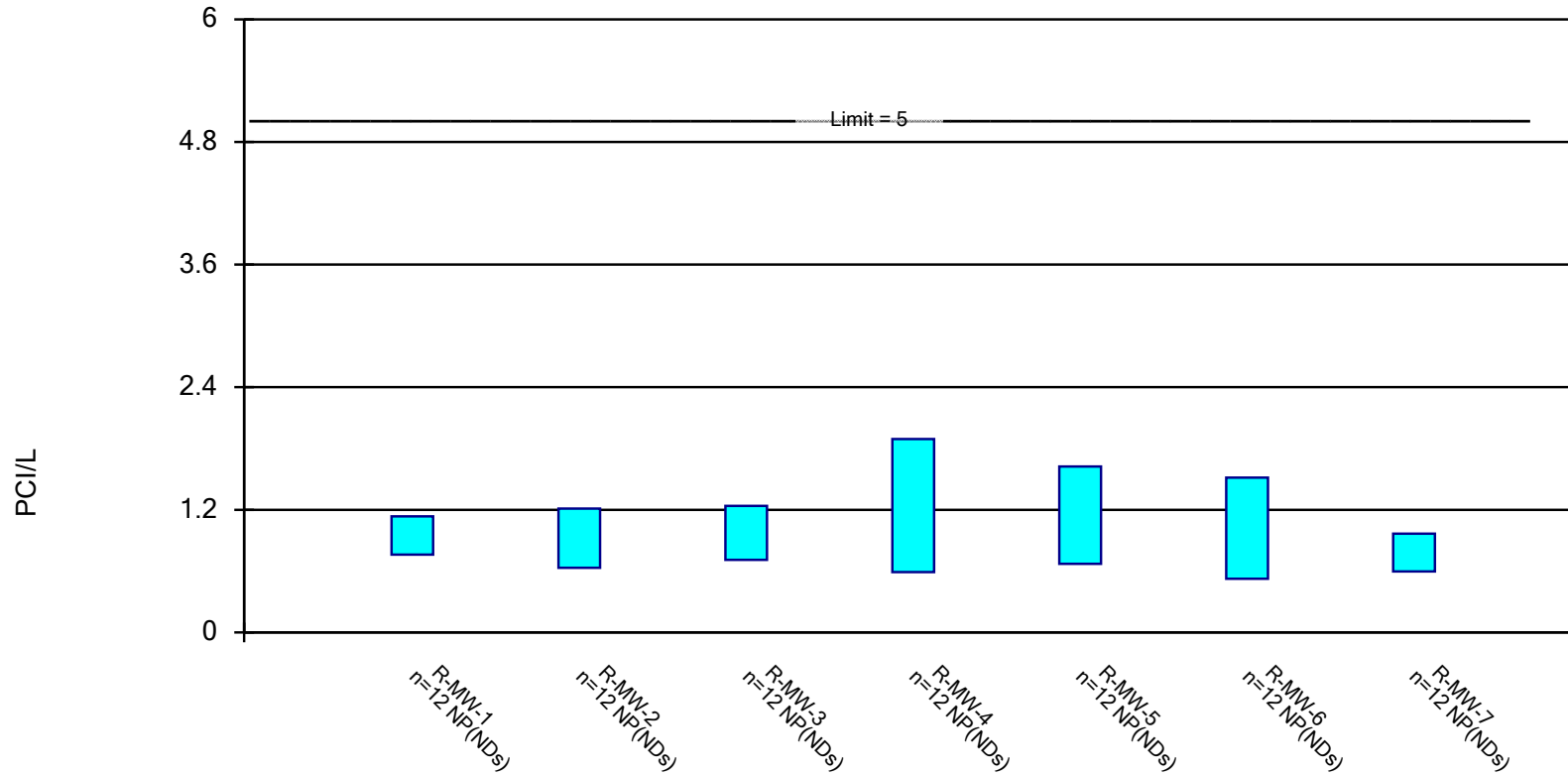


Constituent: MOLYBDENUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01.

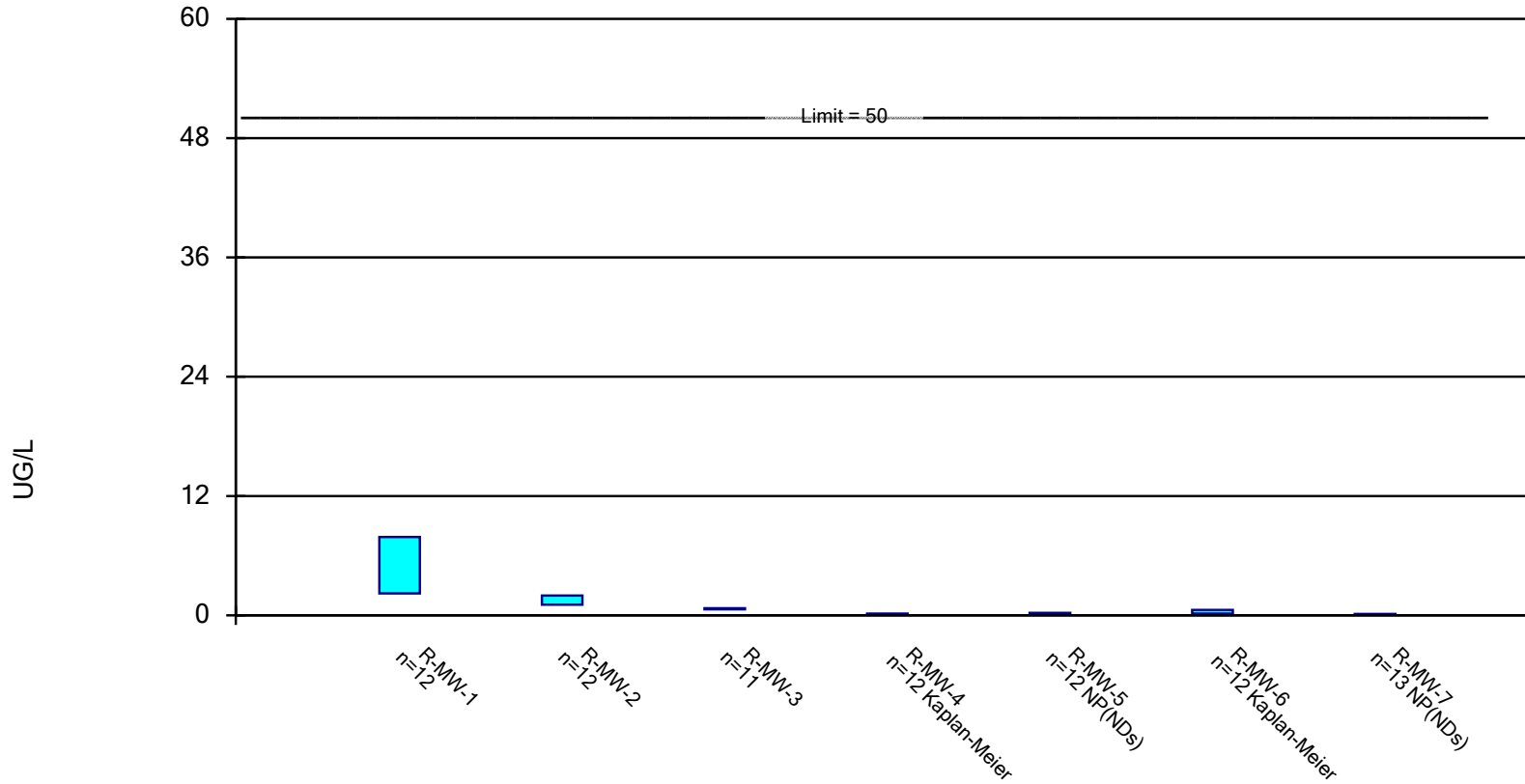


Constituent: RADIUM [226 + 228] Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

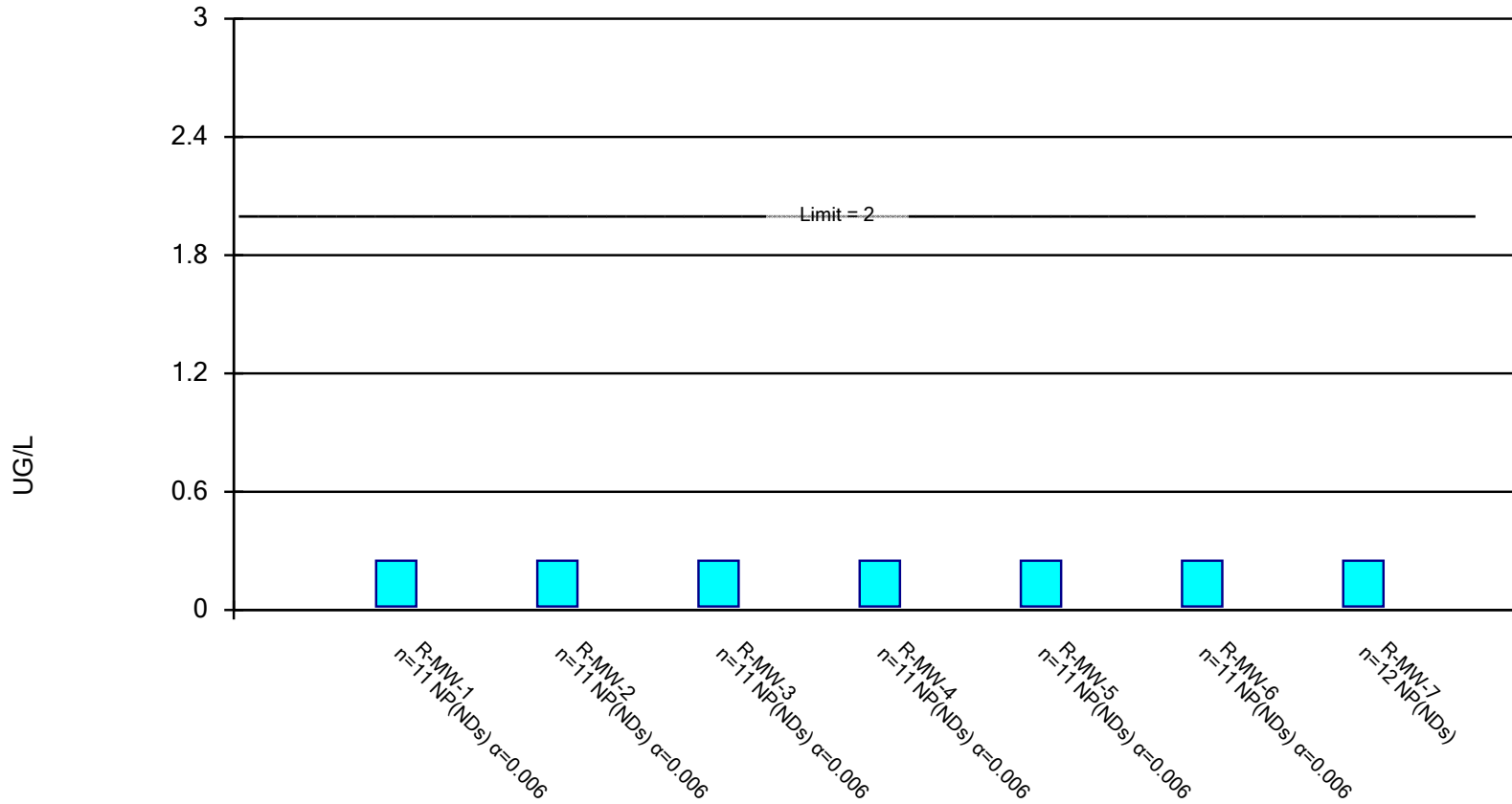


Constituent: SELENIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: THALLIUM, TOTAL Analysis Run 11/22/2019 8:47 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Confidence Interval

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:48 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
ANTIMONY, TOTAL (UG/L)	R-MW-1	0.933	0.3462	6	No	12	25	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-2	5.434	4.183	6	No	12	0	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-3	0.1222	0.03761	6	No	12	41.67	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-4	0.12	0.0275	6	No	12	75	No	0.01	NP (NDs)
ANTIMONY, TOTAL (UG/L)	R-MW-5	0.039	0.013	6	No	11	100	No	0.006	NP (NDs)
ANTIMONY, TOTAL (UG/L)	R-MW-6	0.1071	0.03813	6	No	12	50	No	0.01	Param.
ANTIMONY, TOTAL (UG/L)	R-MW-7	0.25	0.0275	6	No	13	69.23	No	0.01	NP (NDs)
ARSENIC, TOTAL (UG/L)	R-MW-1	14.78	8.499	30	No	12	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-2	245.8	216.2	30	Yes	12	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-3	85.65	46.2	30	Yes	12	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-4	7.141	6.359	30	No	10	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-5	4.637	3.663	30	No	12	0	No	0.01	Param.
ARSENIC, TOTAL (UG/L)	R-MW-6	0.97	0.0325	30	No	12	25	No	0.01	NP (normality)
ARSENIC, TOTAL (UG/L)	R-MW-7	96.6	35.3	30	Yes	12	0	No	0.01	NP (normality)
BARIUM, TOTAL (UG/L)	R-MW-1	18.58	14.73	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-2	16.29	9.839	2000	No	12	0	ln(x)	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-3	17.87	13.63	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-4	284.8	252	2000	No	12	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-5	395.1	373.3	2000	No	11	0	No	0.01	Param.
BARIUM, TOTAL (UG/L)	R-MW-6	252	105	2000	No	12	0	No	0.01	NP (normality)
BARIUM, TOTAL (UG/L)	R-MW-7	308	236	2000	No	13	0	No	0.01	NP (normality)
BERYLLIUM, TOTAL (UG/L)	R-MW-1	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-2	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-3	0.13	0.08	4	No	11	90.91	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-4	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-5	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-6	0.13	0.08	4	No	11	90.91	No	0.006	NP (NDs)
BERYLLIUM, TOTAL (UG/L)	R-MW-7	0.13	0.08	4	No	11	100	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-1	0.041	0.009	5	No	11	81.82	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-2	0.26	0.0145	5	No	11	27.27	No	0.006	NP (normality)
CADMIUM, TOTAL (UG/L)	R-MW-3	0.33	0.009	5	No	11	72.73	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-4	0.041	0.009	5	No	11	81.82	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-5	0.0165	0.009	5	No	11	100	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-6	0.0165	0.009	5	No	11	100	No	0.006	NP (NDs)
CADMIUM, TOTAL (UG/L)	R-MW-7	0.053	0.009	5	No	12	75	No	0.01	NP (NDs)
CHROMIUM, TOTAL (UG/L)	R-MW-1	1.4	0.039	100	No	11	54.55	No	0.006	NP (NDs)
CHROMIUM, TOTAL (UG/L)	R-MW-2	0.9174	0.2356	100	No	11	27.27	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	R-MW-3	1.256	0.2371	100	No	11	27.27	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	R-MW-4	0.889	0.1577	100	No	11	18.18	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	R-MW-5	0.8116	0.1367	100	No	11	18.18	No	0.01	Param.
CHROMIUM, TOTAL (UG/L)	R-MW-6	1.1	0.027	100	No	11	54.55	No	0.006	NP (NDs)
CHROMIUM, TOTAL (UG/L)	R-MW-7	0.4315	0.1054	100	No	12	33.33	No	0.01	Param.
COBALT, TOTAL (UG/L)	R-MW-1	0.86	0.36	6	No	11	81.82	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-2	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-3	0.435	0.36	6	No	11	100	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-4	0.82	0.36	6	No	11	72.73	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-5	0.84	0.36	6	No	11	81.82	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-6	0.88	0.36	6	No	11	81.82	No	0.006	NP (NDs)
COBALT, TOTAL (UG/L)	R-MW-7	1.2	0.36	6	No	12	75	No	0.01	NP (NDs)
FLUORIDE, TOTAL (MG/L)	R-MW-1	0.4702	0.1912	4	No	14	0	No	0.01	Param.

Confidence Interval

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:48 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
FLUORIDE, TOTAL (MG/L)	R-MW-2	1.154	0.8021	4	No	14	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-3	0.8874	0.7865	4	No	13	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-4	0.8668	0.7889	4	No	14	0	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-5	0.1628	0.118	4	No	13	7.692	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-6	0.2386	0.1664	4	No	14	7.143	No	0.01	Param.
FLUORIDE, TOTAL (MG/L)	R-MW-7	0.3399	0.2751	4	No	16	0	No	0.01	Param.
LEAD, TOTAL (UG/L)	R-MW-1	1.5	1.2	15	No	11	100	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	R-MW-2	12.62	5.118	15	No	11	9.091	No	0.01	Param.
LEAD, TOTAL (UG/L)	R-MW-3	6.117	3.255	15	No	11	9.091	No	0.01	Param.
LEAD, TOTAL (UG/L)	R-MW-4	1.7	1.2	15	No	11	90.91	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	R-MW-5	3	1.25	15	No	11	81.82	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	R-MW-6	2.6	1.2	15	No	11	81.82	No	0.006	NP (NDs)
LEAD, TOTAL (UG/L)	R-MW-7	1.7	1.2	15	No	11	100	No	0.006	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-1	2.95	1.45	64.7	No	12	100	No	0.01	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-2	2.95	1.45	64.7	No	12	91.67	No	0.01	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-3	2.95	1.45	64.7	No	12	100	No	0.01	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-4	45.61	41.44	64.7	No	12	0	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	R-MW-5	6.349	3.401	64.7	No	12	41.67	No	0.01	Param.
LITHIUM, TOTAL (UG/L)	R-MW-6	7	2.3	64.7	No	12	66.67	No	0.01	NP (NDs)
LITHIUM, TOTAL (UG/L)	R-MW-7	61.8	29.2	64.7	No	13	0	No	0.01	NP (normality)
MERCURY, TOTAL (UG/L)	R-MW-1	0.045	0.0195	2	No	10	90	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-2	0.045	0.0195	2	No	10	90	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-3	0.045	0.0195	2	No	10	90	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-4	0.045	0.0195	2	No	10	90	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-5	0.045	0.0195	2	No	10	90	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-6	0.023	0.0195	2	No	10	100	No	0.011	NP (NDs)
MERCURY, TOTAL (UG/L)	R-MW-7	0.0445	0.0195	2	No	11	100	No	0.006	NP (NDs)
MOLYBDENUM, TOTAL (UG/L)	R-MW-1	78.14	38.68	100	No	12	0	ln(x)	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-2	188.7	156.3	100	Yes	12	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-3	855.8	715.4	100	Yes	12	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-4	111.8	89.56	100	No	12	0	No	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-5	1.3	0.26	100	No	12	66.67	No	0.01	NP (NDs)
MOLYBDENUM, TOTAL (UG/L)	R-MW-6	2.296	0.6651	100	No	12	33.33	ln(x)	0.01	Param.
MOLYBDENUM, TOTAL (UG/L)	R-MW-7	190	130	100	Yes	13	0	No	0.01	NP (normality)
RADIUM [226 + 228] (PCI/L)	R-MW-1	1.135	0.7615	5	No	12	100	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-2	1.211	0.632	5	No	12	100	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-3	1.238	0.7095	5	No	12	91.67	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-4	1.892	0.59	5	No	12	75	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-5	1.623	0.671	5	No	12	75	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-6	1.515	0.525	5	No	12	83.33	No	0.01	NP (NDs)
RADIUM [226 + 228] (PCI/L)	R-MW-7	0.9655	0.5965	5	No	12	91.67	No	0.01	NP (NDs)
SELENIUM, TOTAL (UG/L)	R-MW-1	7.879	2.204	50	No	12	0	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-2	1.987	1.066	50	No	12	0	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-3	0.7047	0.5971	50	No	11	0	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-4	0.1657	0.0973	50	No	12	50	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-5	0.25	0.0425	50	No	12	100	No	0.01	NP (NDs)
SELENIUM, TOTAL (UG/L)	R-MW-6	0.5372	0.1693	50	No	12	25	No	0.01	Param.
SELENIUM, TOTAL (UG/L)	R-MW-7	0.13	0.043	50	No	13	76.92	No	0.01	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-1	0.25	0.018	2	No	11	90.91	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-2	0.25	0.018	2	No	11	100	No	0.006	NP (NDs)

Confidence Interval

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:48 AM

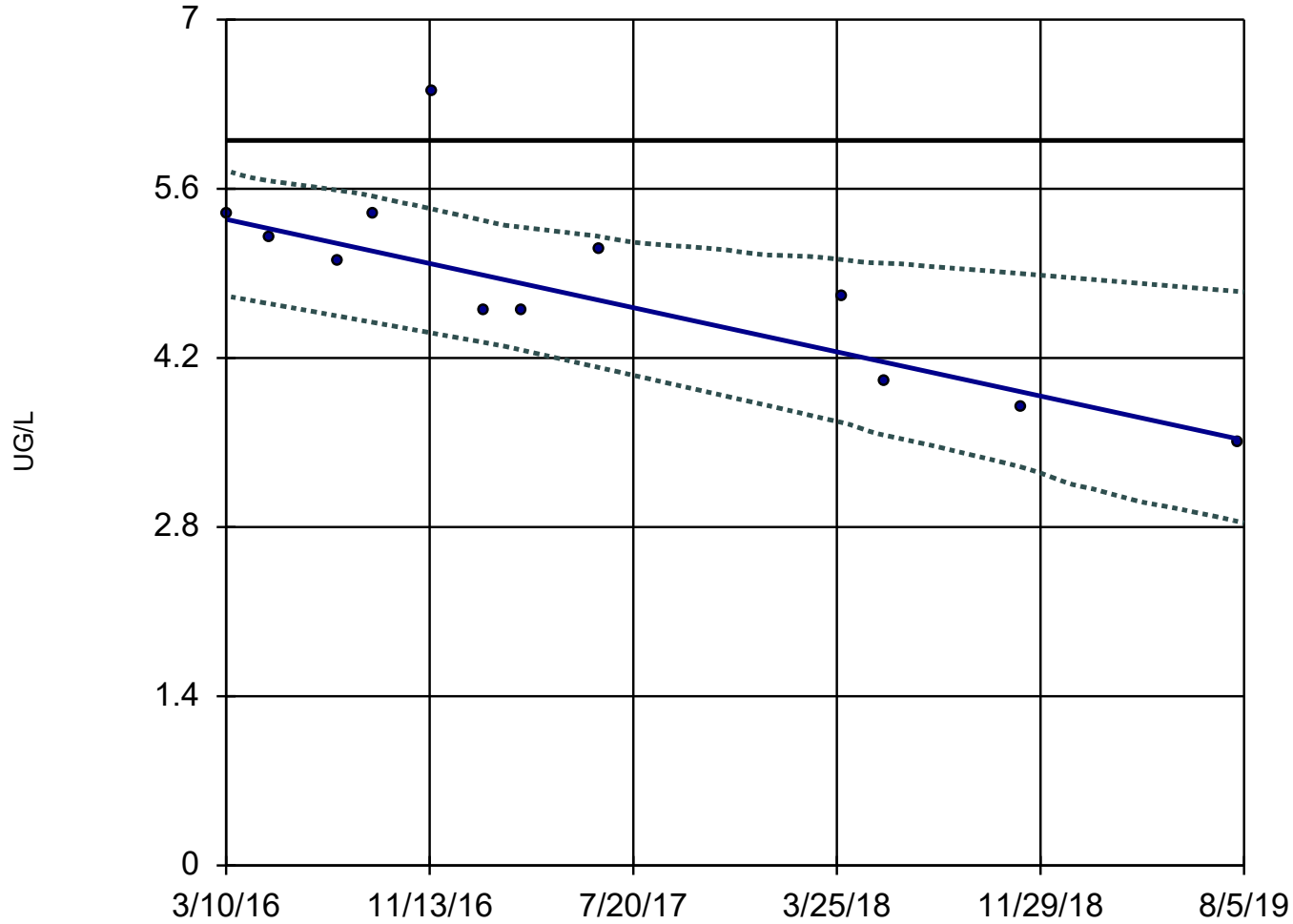
<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
THALLIUM, TOTAL (UG/L)	R-MW-3	0.25	0.018	2	No	11	100	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-4	0.25	0.018	2	No	11	100	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-5	0.25	0.018	2	No	11	100	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-6	0.25	0.018	2	No	11	90.91	No	0.006	NP (NDs)
THALLIUM, TOTAL (UG/L)	R-MW-7	0.25	0.018	2	No	12	91.67	No	0.01	NP (NDs)

APPENDIX B

Sanitas Trending Confidence Bands Statistical Output

Sen's Slope and 95% Confidence Band

R-MW-2



n = 12

Slope = -0.5368
units per year.

Mann-Kendall
statistic = -42
critical = -35

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

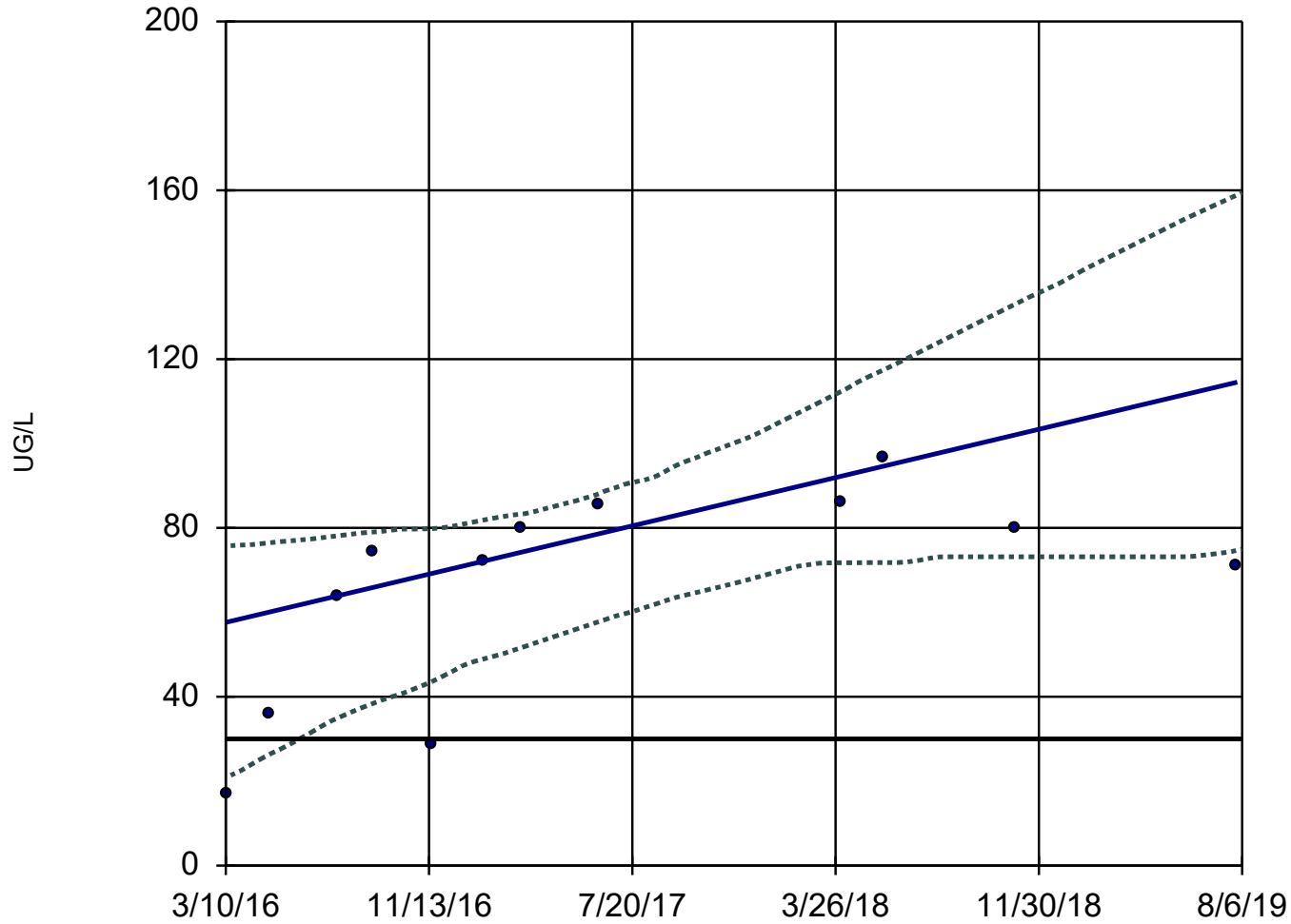
GWPS = 6.

Constituent: ANTIMONY, TOTAL Analysis Run 11/22/2019 8:53 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-3



n = 12

Slope = 16.78
units per year.

Mann-Kendall
statistic = 36
critical = 35

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

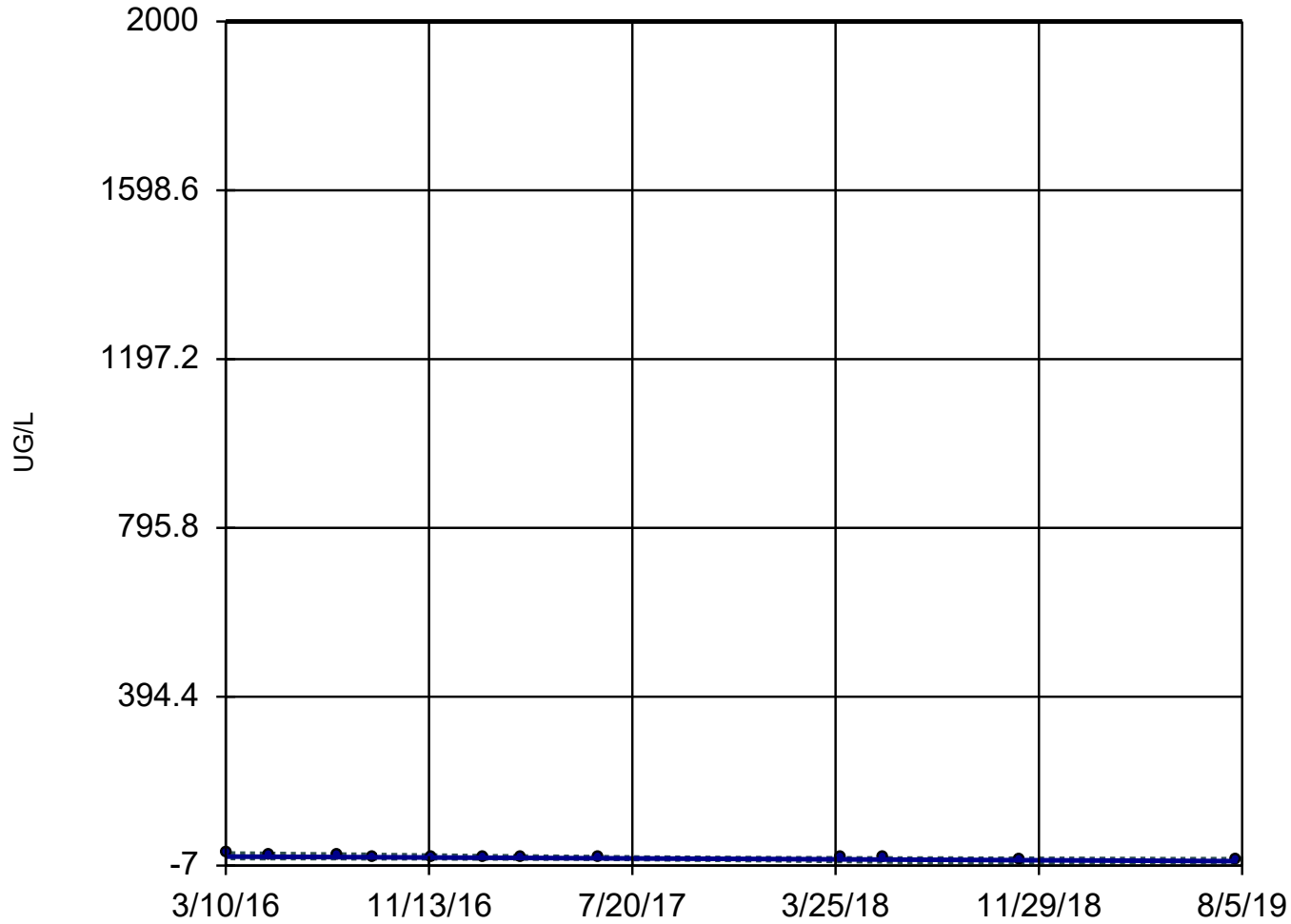
GWPS = 30.

Constituent: ARSENIC, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-2



n = 12

Slope = -3.209
units per year.

Mann-Kendall
statistic = -60
critical = -35

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

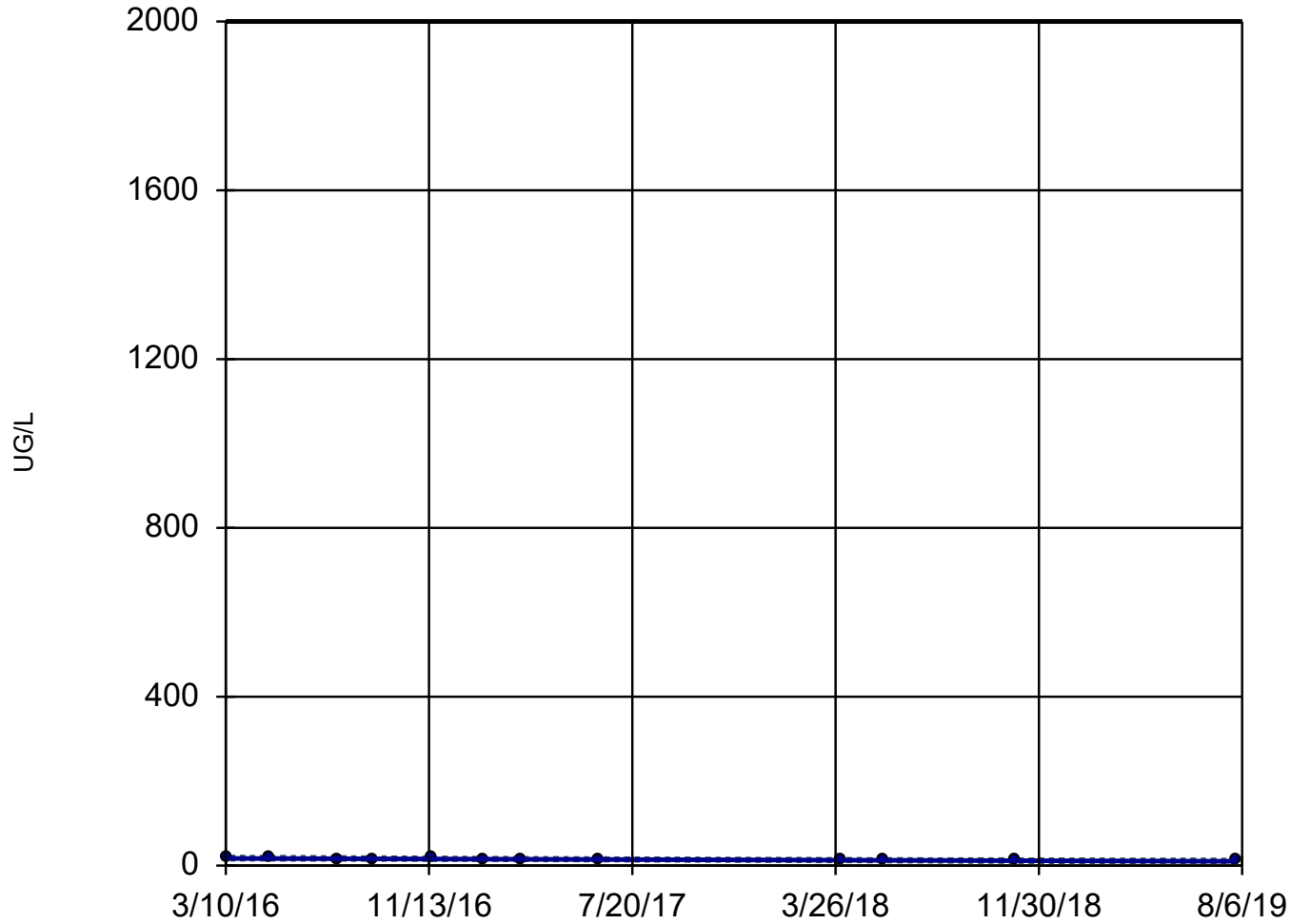
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-3



n = 12

Slope = -2.04
units per year.

Mann-Kendall
statistic = -52
critical = -35

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

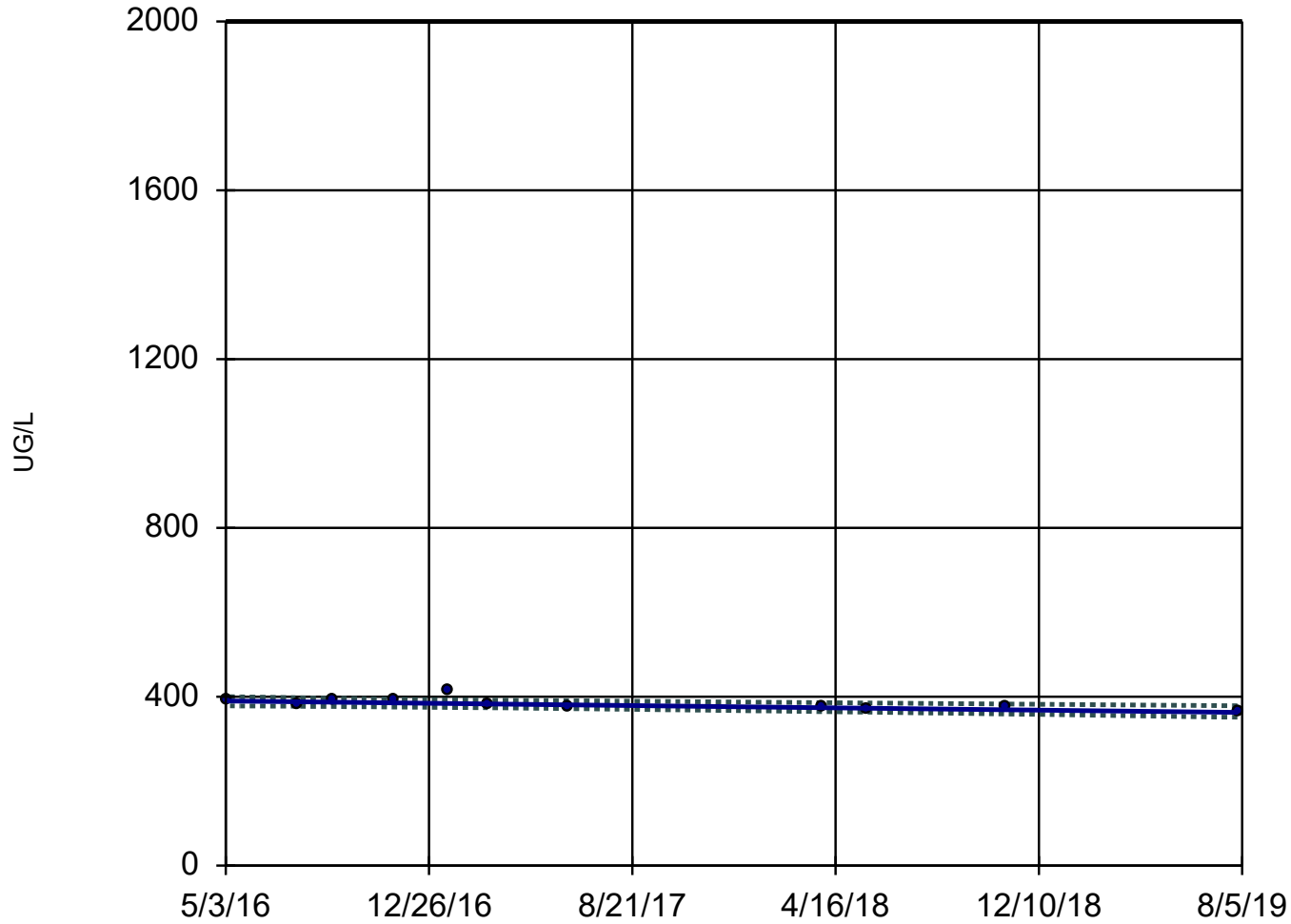
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-5



n = 11

Slope = -8.28
units per year.

Mann-Kendall
statistic = -32
critical = -31

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

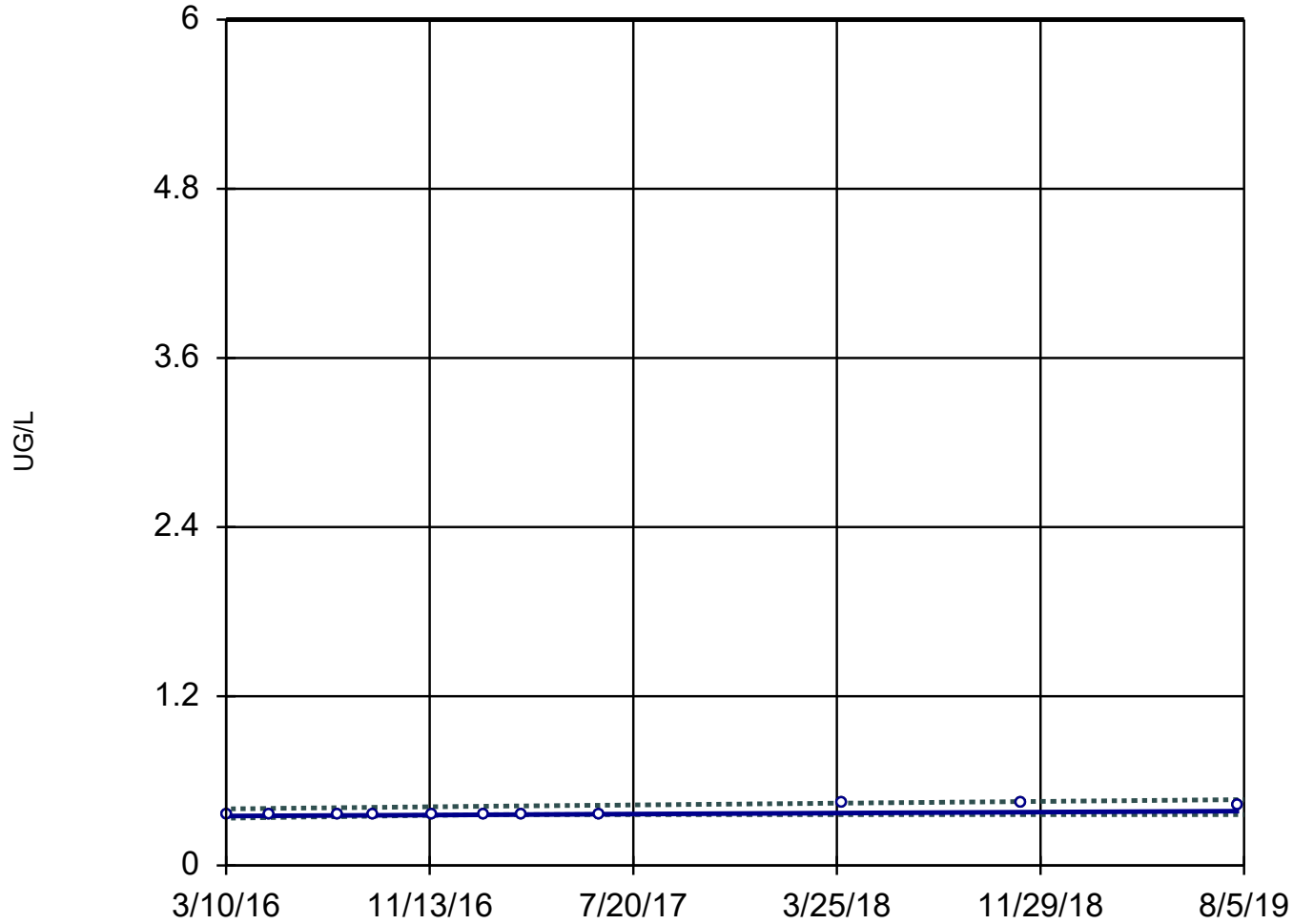
GWPS = 2000.

Constituent: BARIUM, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-2



n = 11

Slope = 0.01008
units per year.

Mann-Kendall
statistic = 34
critical = 31

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

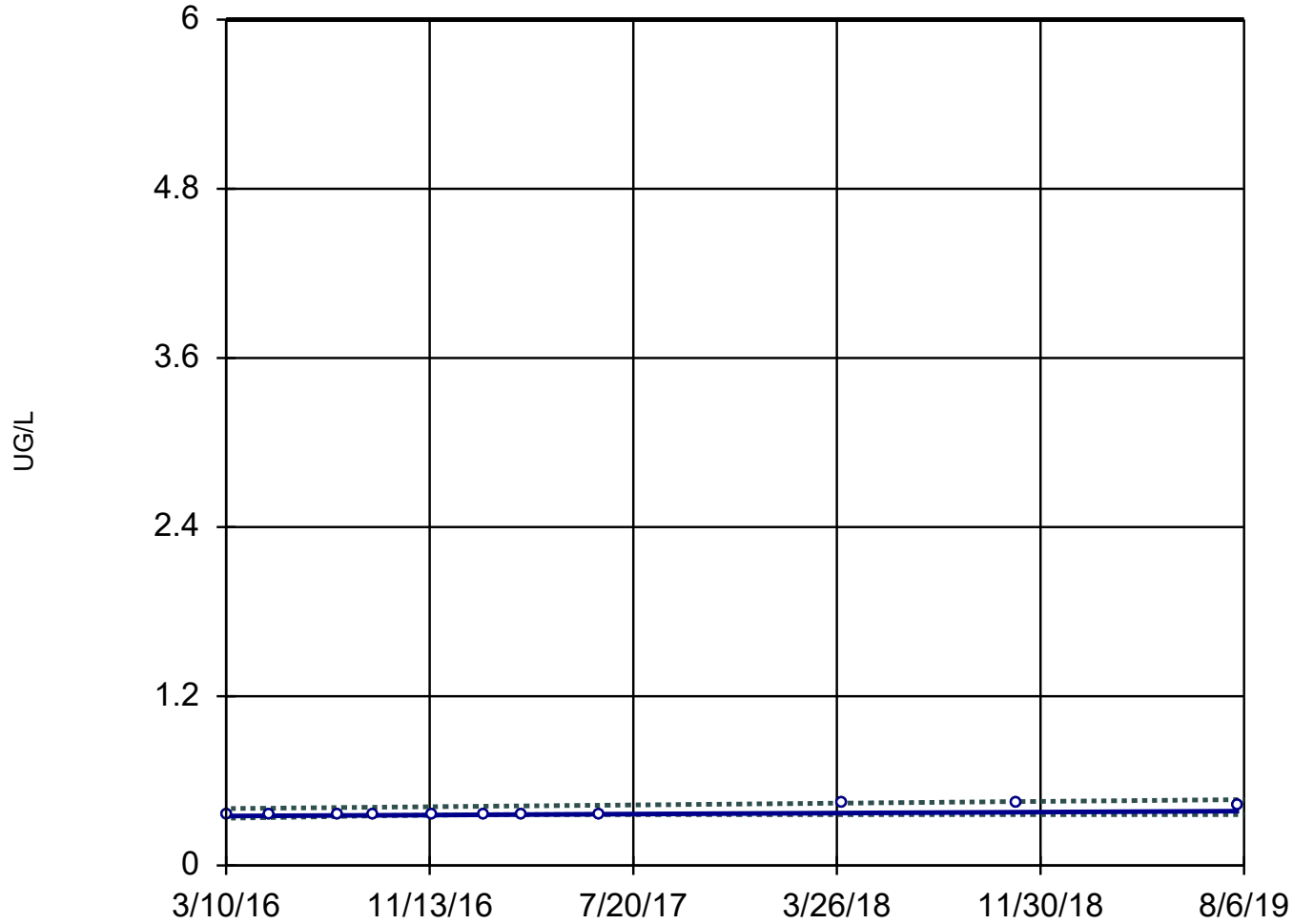
GWPS = 6.

Constituent: COBALT, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-3



n = 11

Slope = 0.01008
units per year.

Mann-Kendall
statistic = 34
critical = 31

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

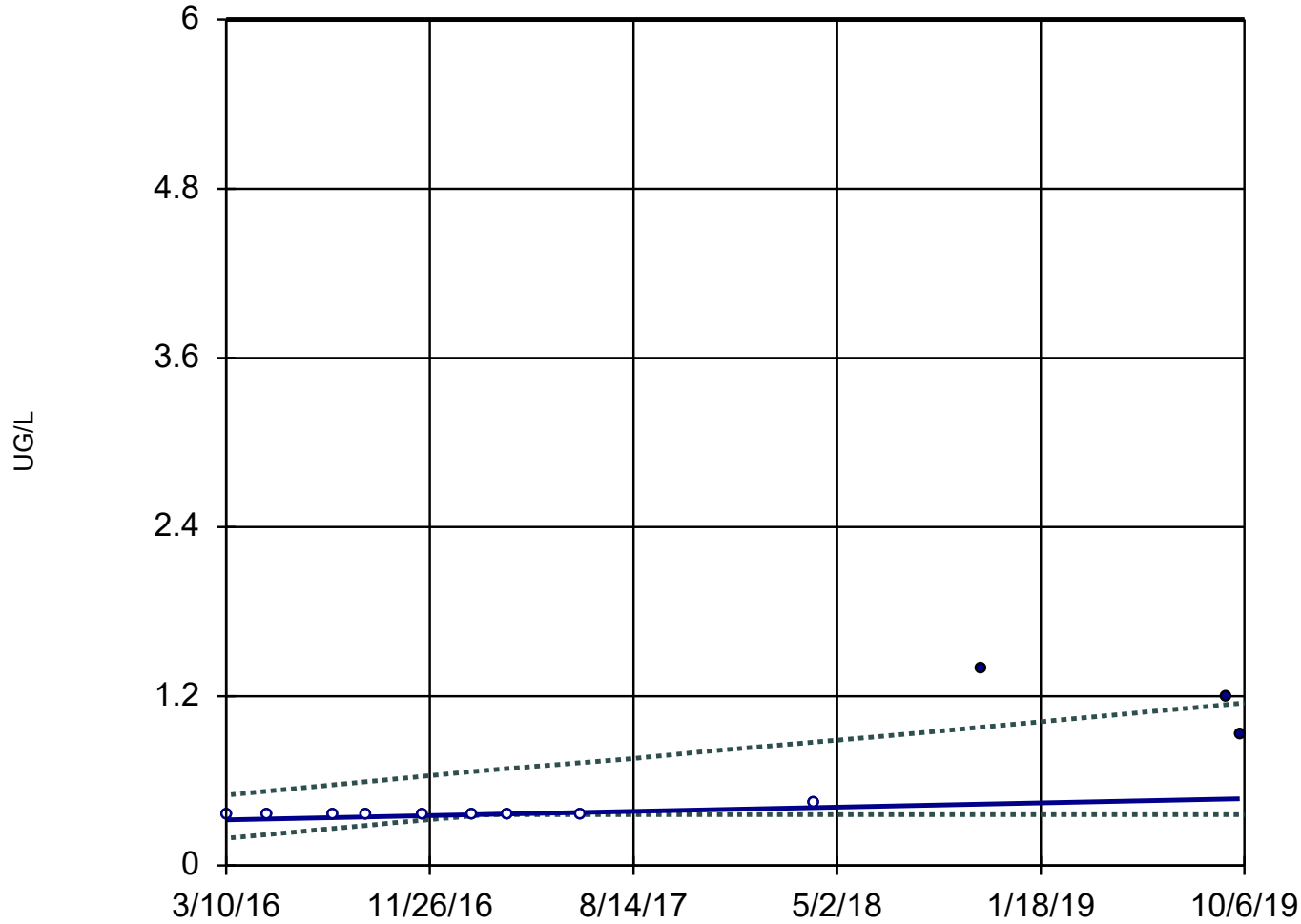
GWPS = 6.

Constituent: COBALT, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-7



n = 12

Slope = 0.04206
units per year.

Mann-Kendall
statistic = 44
critical = 35

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

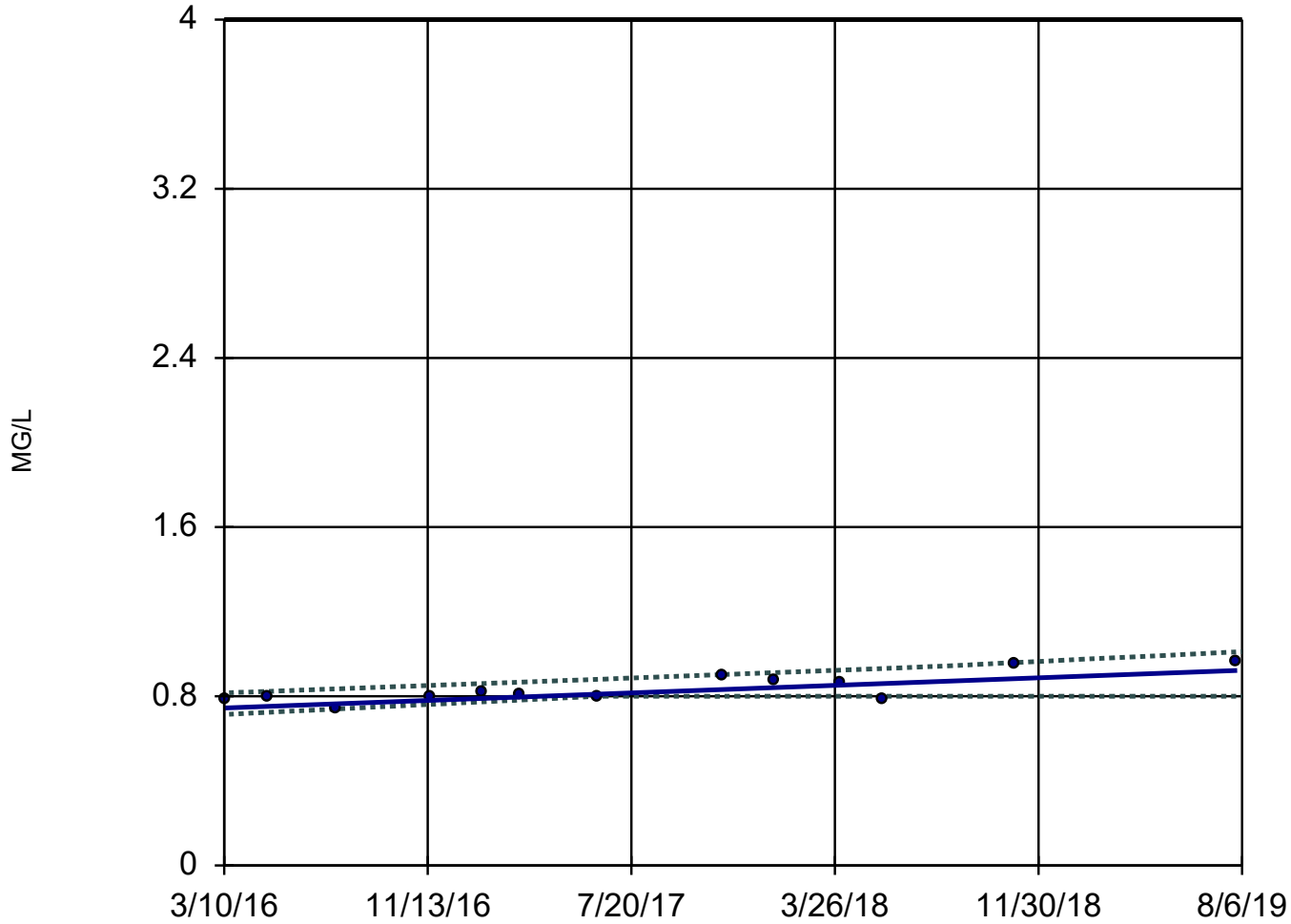
GWPS = 6.

Constituent: COBALT, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-3



n = 13

Slope = 0.05228
units per year.

Mann-Kendall
statistic = 42
critical = 39

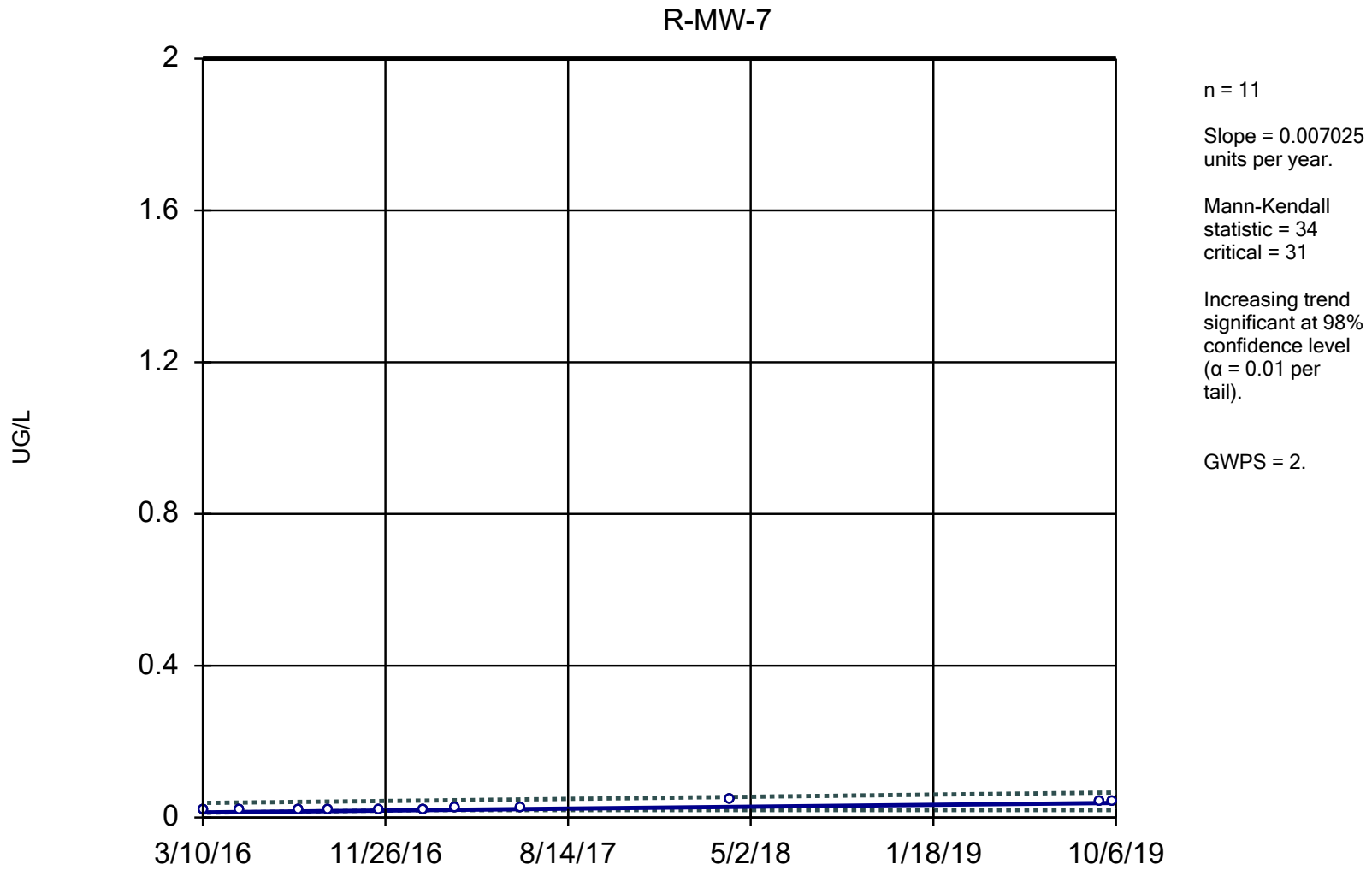
Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

GWPS = 4.

Constituent: FLUORIDE, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

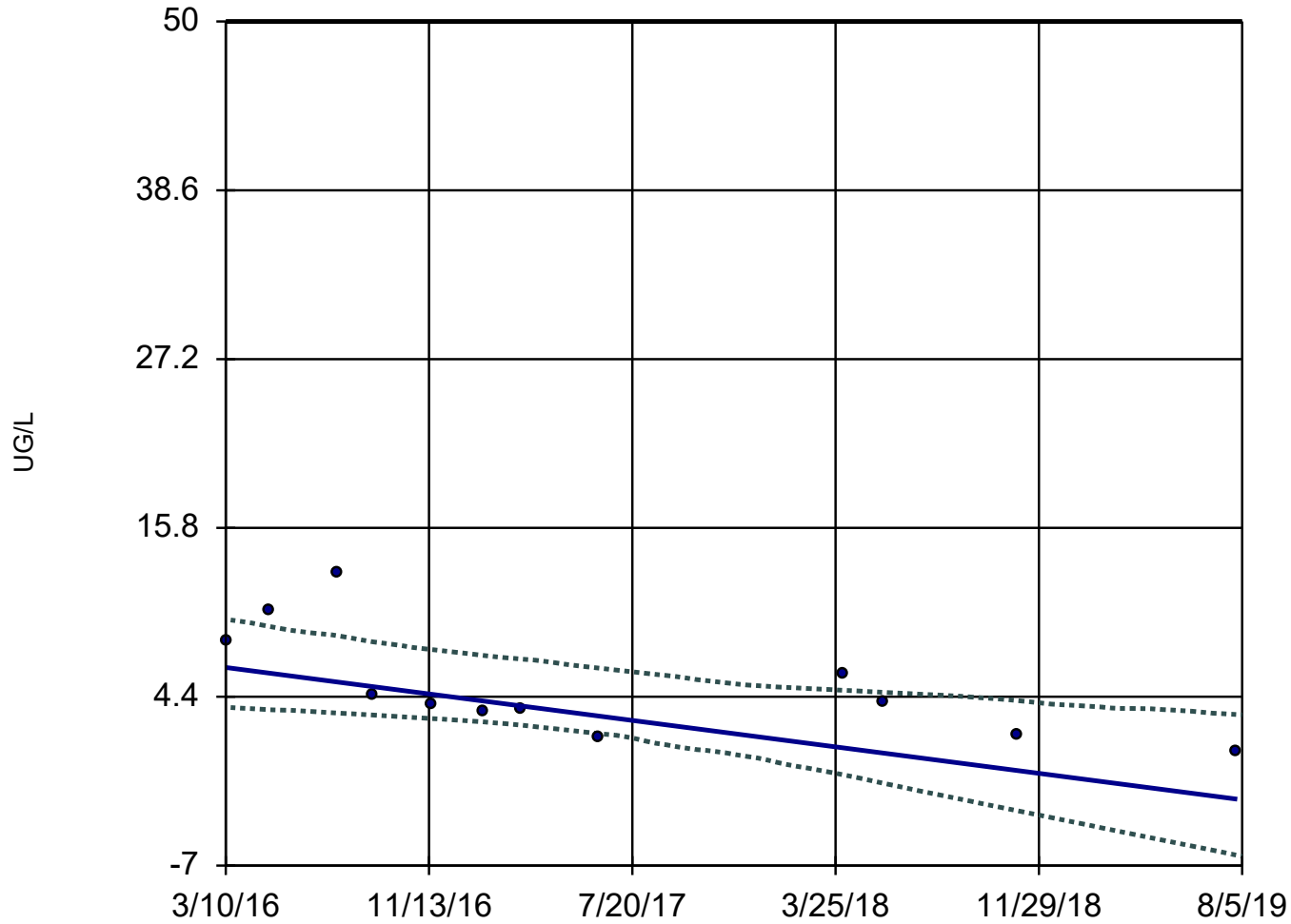


Constituent: MERCURY, TOTAL Analysis Run 11/22/2019 8:54 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Sen's Slope and 95% Confidence Band

R-MW-1



n = 12

Slope = -2.625
units per year.

Mann-Kendall
statistic = -38
critical = -35

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

GWPS = 50.

Constituent: SELENIUM, TOTAL Analysis Run 11/22/2019 8:55 AM

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS

Trend Test

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:56 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
ANTIMONY, TOTAL (UG/L)	R-MW-1	-0.01336	-2	-35	No	12	25	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-2	-0.5368	-42	-35	Yes	12	0	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-3	-0.00...	-2	-35	No	12	41.67	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-4	0.001165	11	35	No	12	75	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-5	0	5	31	No	11	100	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-6	0.005734	5	35	No	12	50	n/a	n/a	0.02	NP
ANTIMONY, TOTAL (UG/L)	R-MW-7	0.004198	9	39	No	13	69.23	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-1	1.151	20	35	No	12	0	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-2	-12.13	-35	-35	No	12	0	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-3	16.78	36	35	Yes	12	0	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-4	-0.1168	-8	-27	No	10	0	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-5	-0.2487	-19	-35	No	12	0	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-6	-0.09854	-8	-35	No	12	25	n/a	n/a	0.02	NP
ARSENIC, TOTAL (UG/L)	R-MW-7	-4.087	-20	-35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-1	-0.2039	-2	-31	No	11	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-2	-3.209	-60	-35	Yes	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-3	-2.04	-52	-35	Yes	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-4	-9.32	-23	-35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-5	-8.28	-32	-31	Yes	11	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-6	2.506	5	35	No	12	0	n/a	n/a	0.02	NP
BARIUM, TOTAL (UG/L)	R-MW-7	-12.17	-29	-39	No	13	0	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-1	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-2	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-3	0	-14	-31	No	11	90.91	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-4	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-5	-0.00...	-26	-31	No	11	100	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-6	0	-14	-31	No	11	90.91	n/a	n/a	0.02	NP
BERYLLIUM, TOTAL (UG/L)	R-MW-7	-0.00...	-24	-31	No	11	100	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-1	0	4	31	No	11	81.82	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-2	0	3	31	No	11	27.27	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-3	0.03132	18	31	No	11	72.73	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-4	0.000...	12	31	No	11	81.82	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-5	0	1	31	No	11	100	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-6	0	1	31	No	11	100	n/a	n/a	0.02	NP
CADMIUM, TOTAL (UG/L)	R-MW-7	0.000...	19	35	No	12	75	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-1	-0.1382	-29	-31	No	11	54.55	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-2	-0.2901	-27	-31	No	11	27.27	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-3	-0.4205	-25	-31	No	11	27.27	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-4	-0.2415	-21	-31	No	11	18.18	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-5	-0.1445	-23	-31	No	11	18.18	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-6	-0.1046	-21	-31	No	11	54.55	n/a	n/a	0.02	NP
CHROMIUM, TOTAL (UG/L)	R-MW-7	-0.1101	-22	-35	No	12	33.33	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-1	0.0185	30	31	No	11	81.82	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-2	0.01008	34	31	Yes	11	100	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-3	0.01008	34	31	Yes	11	100	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-4	0.02373	26	31	No	11	72.73	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-5	0.004551	9	31	No	11	81.82	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-6	0.0364	35	31	Yes	11	81.82	n/a	n/a	0.02	NP
COBALT, TOTAL (UG/L)	R-MW-7	0.04206	44	35	Yes	12	75	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-1	0.09436	30	44	No	14	0	n/a	n/a	0.02	NP

Trend Test

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:56 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
FLUORIDE, TOTAL (MG/L)	R-MW-2	0.1269	20	44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-3	0.05228	42	39	Yes	13	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-4	0.02373	27	44	No	14	0	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-5	0	-1	-39	No	13	7.692	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-6	0.01667	24	44	No	14	7.143	n/a	n/a	0.02	NP
FLUORIDE, TOTAL (MG/L)	R-MW-7	-0.00...	-6	-53	No	16	0	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-1	0	14	31	No	11	100	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-2	-1.031	-10	-31	No	11	9.091	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-3	0.5277	11	31	No	11	9.091	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-4	0	3	31	No	11	90.91	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-5	0.1101	17	31	No	11	81.82	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-6	0	1	31	No	11	81.82	n/a	n/a	0.02	NP
LEAD, TOTAL (UG/L)	R-MW-7	0.1305	22	31	No	11	100	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-1	0	-13	-35	No	12	100	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-2	0	-10	-35	No	12	91.67	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-3	0	-13	-35	No	12	100	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-4	0.0183	0	35	No	12	0	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-5	0.136	5	35	No	12	41.67	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-6	0	7	35	No	12	66.67	n/a	n/a	0.02	NP
LITHIUM, TOTAL (UG/L)	R-MW-7	1.746	18	39	No	13	0	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-1	0	10	27	No	10	90	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-2	0	10	27	No	10	90	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-3	0	10	27	No	10	90	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-4	0	10	27	No	10	90	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-5	0	10	27	No	10	90	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-6	0	11	27	No	10	100	n/a	n/a	0.02	NP
MERCURY, TOTAL (UG/L)	R-MW-7	0.007025	34	31	Yes	11	100	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-1	10.29	10	35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-2	-3.732	-6	-35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-3	-57.08	-24	-35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-4	0.7895	2	35	No	12	0	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-5	0	2	35	No	12	66.67	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-6	0.364	14	35	No	12	33.33	n/a	n/a	0.02	NP
MOLYBDENUM, TOTAL (UG/L)	R-MW-7	-10.18	-17	-39	No	13	0	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-1	0.04708	7	35	No	12	100	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-2	0.1023	16	35	No	12	100	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-3	0.02352	8	35	No	12	91.67	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-4	0.06648	16	35	No	12	75	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-5	0.1666	26	35	No	12	75	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-6	-0.01437	-2	-35	No	12	83.33	n/a	n/a	0.02	NP
RADIUM [226 + 228] (PCI/L)	R-MW-7	0.08694	28	35	No	12	91.67	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-1	-2.625	-38	-35	Yes	12	0	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-2	-0.1202	-12	-35	No	12	0	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-3	0.01887	11	31	No	11	0	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-4	0.02041	23	35	No	12	50	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-5	-0.0144	-34	-35	No	12	100	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-6	-0.01892	-11	-35	No	12	25	n/a	n/a	0.02	NP
SELENIUM, TOTAL (UG/L)	R-MW-7	0	5	39	No	13	76.92	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-1	-0.07568	-29	-31	No	11	90.91	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-2	-0.06659	-25	-31	No	11	100	n/a	n/a	0.02	NP

Trend Test

Rush Island E.C. Client: Ameren Data: RIEC DATA - STATS Printed 11/22/2019, 8:56 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
THALLIUM, TOTAL (UG/L)	R-MW-3	-0.06647	-25	-31	No	11	100	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-4	-0.06647	-25	-31	No	11	100	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-5	-0.06647	-25	-31	No	11	100	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-6	-0.07415	-29	-31	No	11	90.91	n/a	n/a	0.02	NP
THALLIUM, TOTAL (UG/L)	R-MW-7	-0.06129	-32	-35	No	12	91.67	n/a	n/a	0.02	NP

APPENDIX G

**Nature and Extent Technical
Memorandum**

Technical Memorandum

DATE January 2020

Project No. 153140601

TO Bill Kutosky
Ameren Missouri

CC Susan Knowles, Craig Giesmann, Charley Henderson, Paul Pike

FROM Jeffrey Ingram, Mark Haddock

EMAIL Jingram@Golder.com

NATURE AND EXTENT INVESTIGATION, RUSH ISLAND ENERGY CENTER, JEFFERSON COUNTY, MISSOURI

Dear Mr. Kutosky,

Golder Associates Inc. (Golder) is pleased to submit this Technical Memorandum summarizing recent groundwater sampling and groundwater level measurements near the Ameren Missouri (Ameren) Rush Island Energy Center (RIEC) in Jefferson County, Missouri. This technical memorandum provides the groundwater sampling results and groundwater level measurement results from this ongoing investigation of Coal Combustion Residuals (CCR) impacts from the RCPA Surface Impoundment to groundwater. A figure displaying the locations of the monitoring wells used for this investigation is provided as **Figure 1**.

1.0 PROJECT SCOPE OF WORK

The scope of work for this investigation included the following:

- Collect multiple samples in the nature and extent monitoring network for CCR Rule constituents
- Complete multiple rounds of groundwater elevation measurements to produce potentiometric surface maps
- Tabulate sampling results and prepare a technical memorandum

2.0 GROUNDWATER SAMPLING

Groundwater sampling was completed in November 2018 and July-August 2019. Sampling was completed using low flow sampling techniques and guidelines as provided in the RCPA Groundwater Monitoring Plan. Tables summarizing the analytical results are provided in **Tables 1** and **2**. Laboratory data report packets and data validation memos are included in the 2018 and 2019 RCPA Annual Reports.

Samples were collected from 27 piezometers that were previously installed onsite and were selected for nature and extent purposes. Well construction diagrams for these monitoring wells are provided in the 2019 Annual Report. Between the November 2018 and the July-August 2019 sampling event, five (5) of the monitoring wells (P08S, P08D, P13S, P13I and P13D) were abandoned due to construction at the RIEC.

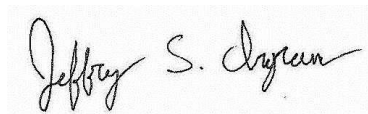
3.0 GROUNDWATER LEVEL MONITORING

Multiple rounds of water level measurements were collected from available monitoring wells. A table displaying the groundwater level monitoring results is provided in **Table 3**. Measurements were used to create site-wide potentiometric surface maps for evaluating groundwater flow direction. Potentiometric surface maps are provided in the 2018 and 2019 Annual Reports for the RCPA.

4.0 CLOSING

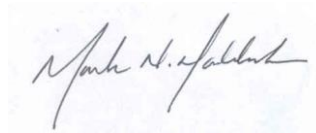
Golder appreciates the opportunity to serve as your consultant on this project. If you have any questions concerning this letter report or need additional information, please contact the undersigned at 314-984-8800.

GOLDER ASSOCIATES INC.



Jeffrey Ingram, R.G.
Project Geologist

JSI/MNH



Mark Haddock, P.E., R.G.
Principal, Practice Leader

Attachments or Enclosures:

Tables

- Table 1 – Nature and Extent Groundwater Sampling Analytical Results – November 2018
- Table 2 – Nature and Extent Groundwater Sampling Analytical Results – July-August 2019
- Table 3 – Summary of Groundwater Elevation Monitoring Results

Figures

- Figure 1 – Site Location and Monitoring Well and Piezometer Location Map

Tables

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Rush Island Nature and Extent Investigation
Rush Island Energy Center, Jefferson County, MO

Analyte	Units	P01S	P03D	P03S	P05I	P05S	P08D	P08S	P10S	P13D	P13I	P13S	P17D	P17I
Field Parameters														
DATE	NA	11/1/2018	11/5/2018	11/5/2018	11/1/2018	11/1/2018	11/5/2018	11/5/2018	11/5/2018	11/5/2018	11/5/2018	11/5/2018	11/5/2018	11/2/2018
DISSOLVED OXYGEN	mg/L	0.10	0.32	0.65	0.85	0.91	0.19	0.07	0.07	0.10	0.14	0.64	0.26	0.11
pH	SU	6.84	7.04	7.07	6.67	6.33	7.13	7.06	7.33	7.39	7.82	7.01	8.08	12.01
REDOX POTENTIAL	mV	-104.0	-128.3	-149.6	-0.3	-76.8	-87.0	-152.5	-99.5	-141.3	-170.4	-53.6	-100.2	-182.4
SPECIFIC CONDUCTIVITY	mS/cm	1.48	0.83	0.91	0.76	0.67	0.58	0.61	0.59	0.68	0.63	0.89	0.89	1.40
TURBIDITY	NTU	6.05	5.95	6.73	6.29	7.26	0.89	3.02	2.76	1.43	2.41	1.91	4.99	4.03
Appendix III Parameters														
BORON, TOTAL	µg/L	249	576	905	50.7 J	4,170	2,180	3,610	3,430	5,780	4,030	2,380	7,590	2,500
CALCIUM, TOTAL	µg/L	154,000	121,000	95,000	115,000	59,700	116,000	69,100	41,300	69,000	21,300	111,000	47,900	5,940
CHLORIDE, TOTAL	mg/L	27.7	11.3	18.5	2.7	25.3	10.8	19.2	22.4	24.9	27.2	26.7	27.2	23.0
FLUORIDE, TOTAL	mg/L	0.23	ND	0.21	0.25	0.36	0.29	0.45	0.53	0.32	1.1	0.40	0.58	2.1
SULFATE, TOTAL	mg/L	87.2	18.6	0.84 J	0.48 J	24.6	67.0	10.0	161	286	219	198	291	225
TOTAL DISSOLVED SOLIDS	mg/L	691 J	491 J	488	410 J	293 J	345 J	306 J	470 J	589 J	402 J	696 J	388	751
Appendix IV Parameters														
ANTIMONY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	0.99 J	ND	ND	0.11 J	ND	0.90 J
ARSENIC, TOTAL	µg/L	19.6	0.57 J	239	4.8	149	1.5	209	11.4	0.29 J	23.6	0.78 J	1.3	107
BARIUM, TOTAL	µg/L	290	471	253	526	157	99.0	220	89.2	86.6	46.9	67.7	117	13.0
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	0.084 J	0.40 J	0.096 J	0.061 J	0.23 J	1.1
CHROMIUM, TOTAL	µg/L	0.11 J	ND	ND	0.10 J	0.37 J	ND	ND	ND	ND	ND	ND	ND	1.4
COBALT, TOTAL	µg/L	1.9 J	3.7 J	ND	1.0 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
FLUORIDE, TOTAL	mg/L	0.23	ND	0.21	0.25	0.36	0.29	0.45	0.53	0.32	1.1	0.40	0.58	2.1
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31.2
LITHIUM, TOTAL	µg/L	27.8	25.5	10.4	ND	17.6	8.7 J	15.7	10.4	78.7	12.0	39.1	41.4	ND
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	ND	ND	5.1 J	ND	10.6 J	43.6	21.5	150	1,300	203	35.1	732	100
RADIUM [226 + 228]	pCi/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.400	ND
SELENIUM, TOTAL	µg/L	0.31 J	ND	0.20 J	ND	0.22 J	ND	0.22 J	0.20 J	0.13 J	0.34 J	0.089 J	0.24 J	6.5
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters														
ALKALINITY	mg/L	478	439	488	382	271	331	374	176	123	88.4	339	118	219
ALUMINUM, TOTAL	µg/L	ND	111	46.4 J	84.6 J	308	90.8	57.6 J	114	55.9 J	33.9 J	69.8 J	56.0 J	261
IRON, TOTAL	µg/L	8,250	11,000	14,700	8,150	8,790	1,420 J	10,200	670	3,240	403	32.6 J	3,280	502
MAGNESIUM, TOTAL	µg/L	32,000	26,100	38,500	17,800	20,700	17,000	28,000	7,640	26,800	2,850	21,100	12,000	121
MANGANESE, TOTAL	µg/L	411	545	222	449	315	121	285	631	487	87.1	93.4	498	7.7
PHOSPHORUS, TOTAL	mg/L	0.36 J	0.76	1.4	0.093 J	1.3 J	ND	1.1	2.0	0.64	2.6	0.051 J	1.1	2.9
POTASSIUM, TOTAL	µg/L	5,570	4,180	7,830	2,100	5,570	2,880	5,940	4,280	8,390	4,690	6,360	7,340	1,460 J
SODIUM, TOTAL	µg/L	19,900	18,400	41,000	4,010	28,400	24,600	49,800	110,000	64,700	133,000	85,100	132,000	218,000

Notes:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Values displayed as ND.
4. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
5. NA - Not Applicable.

Table 1
Nature and Extent Groundwater Sampling Analytical Results - November 2018
Rush Island Nature and Extent Investigation
Rush Island Energy Center, Jefferson County, MO

Analyte	Units	P17S	P19D	P19I	P19S	P21D	P21I	P21S	P22D	P22I	P22S	P29D	P29S	P30S	P31S
Field Parameters															
DATE	NA	11/2/2018	11/5/2018	11/5/2018	11/5/2018	11/2/2018	11/2/2018	11/2/2018	11/2/2018	11/2/2018	11/1/2018	11/6/2018	11/6/2018	11/5/2018	11/6/2018
DISSOLVED OXYGEN	mg/L	0.15	0.23	0.07	0.12	0.05	0.56	0.71	0.90	0.07	0.17	0.12	0.31	5.00	0.16
pH	SU	8.55	7.61	11.00	6.96	7.53	8.01	6.76	7.54	7.41	6.95	7.26	7.07	8.58	7.24
REDOX POTENTIAL	mV	-52.4	-167.4	-244.2	-147.5	-172.3	-179.2	-104.0	-147.6	-133.6	1.4	-118.2	-127.3	-60.8	-74.3
SPECIFIC CONDUCTIVITY	mS/cm	1.34	0.84	12.93	0.87	1.07	0.49	1.07	0.92	0.74	1.37	0.84	0.68	1.15	0.35
TURBIDITY	NTU	5.21	6.79	6.55	4.73	3.98	1.49	0.50	2.21	1.89	2.11	0.88	4.78	4.98	2.19
Appendix III Parameters															
BORON, TOTAL	µg/L	3,530	12,600	6,580	3,840	8,110	1,910	1,380	9,940	572	432	80.1 J	64.6 J	468	315
CALCIUM, TOTAL	µg/L	66,400	37,500	7,430	85,600	34,700	15,200	113,000	26,400	60,300	118,000	92,600	113,000	161,000	61,700
CHLORIDE, TOTAL	mg/L	24.3	25.6	24.5	25.6	119	29.2	29.2	28.2	25.0	31.8	130	13.7	41.4	2.6
FLUORIDE, TOTAL	mg/L	1.5	1.3	1.4	0.41	1.7	1.3	0.41	2.2	0.82	0.51	0.28	0.26	0.26	0.39
SULFATE, TOTAL	mg/L	238	202	18.7	106	71.9	41.8	29.6	82.3	134	172	28.1	2.7	169	18.4
TOTAL DISSOLVED SOLIDS	mg/L	666	606	1030	550	633	222 J	557	565	382	336 J	557	454	766 J	204
Appendix IV Parameters															
ANTIMONY, TOTAL	µg/L	0.24 J	0.086 J	6.4	0.096 J	ND	ND	ND	0.10 J	ND	0.096 J	ND	0.093 J	0.12 J	ND
ARSENIC, TOTAL	µg/L	38.0	0.71 J	293	37.3	0.56 J	4.9	14.0	12.6	9.7	0.81 J	1.1	51.7	1.1	15.6
BARIUM, TOTAL	µg/L	57.3	121	15.9	260	44.1	33.4	279	69.4	116	119	152	335	110	141
BERYLLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	0.24 J	ND	ND	ND	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	0.064 J	0.34 J	0.59	ND	0.14 J	0.063 J	ND	0.15 J	0.036 J	0.070 J	ND	0.057 J	0.058 J	0.037 J
CHROMIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	1.1 J	ND	0.078 J	ND	ND	ND	ND
COBALT, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4 J	ND	1.4 J	ND	ND
FLUORIDE, TOTAL	mg/L	1.5	1.3	1.4	0.41	1.7	1.3	0.41	2.2	0.82	0.51	0.28	0.26	0.26	0.39
LEAD, TOTAL	µg/L	ND	ND	12.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LITHIUM, TOTAL	µg/L	21.4	24.5	16.1	42.1	49.8	18.4	20.6	20.5	23.20	36.6	47.9	11.1	47.7	8.3 J
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	125	1,040	368	26.0	422	61.2	5.5 J	343	33.8	13.5 J	1.6 J	1.1 J	1.3 J	7.8 J
RADIUM [226 + 228]	pCi/L	1.730	ND	ND	2.078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM, TOTAL	µg/L	0.52 J	0.30 J	3.4	0.15 J	0.23 J	0.61 J	0.21 J	0.77 J	0.087 J	0.20 J	0.091 J	0.17 J	0.32 J	0.14 J
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additional Parameters															
ALKALINITY	mg/L	231	194	306	347	278	130	476	305	166	321	318	431	432	208
ALUMINUM, TOTAL	µg/L	55.9 J	60.1 J	57.0 J	63.3 J	ND	ND	ND	109	ND	77.0 J	105	334	81.2	37.5 J
IRON, TOTAL	µg/L	985	2,100	113	10,800	1,130	521	9,780	1,130	1,750	140	4,940	14,200	49.8 J	4,170
MAGNESIUM, TOTAL	µg/L	15,600	6,220	18.6 J	29,400	9,740	2,190	32,000	3,600	11,000	24,500	29,400	30,300	31,800	11,400
MANGANESE, TOTAL	µg/L	332	301	4.0 J	372	227	75.0	1,680	69.6	371	283	172	535	20.7	890
PHOSPHORUS, TOTAL	mg/L	0.48	1.8	0.29	1.2	3.5	2.8	0.64	5.2	0.35	ND	0.11	0.86	ND	0.36
POTASSIUM, TOTAL	µg/L	3,410	3,900	12,300	6,550	5,180	3,980	5,270	4,770	5,860	5,920	5,080	4,890	6,120	4,310
SODIUM, TOTAL	µg/L	122,000	155,000	315,000	65,300	174,000	78,900	48,600	162,000	54,600	52,900	77,600	13,900	53,400	11,600

Notes:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Values displayed as ND.
4. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
5. NA - Not Applicable.

Table 2
Nature and Extent Groundwater Sampling Analytical Results - July-August 2019
Rush Island Nature and Extent Investigation
Rush Island Energy Center, Jefferson County, MO

Analyte	UNITS	P01S	P03D	P03S	P05I	P05S	P10S	P17D	P17I	P17S	P19D	P19S
Field Parameters												
Date	NA	8/15/2019	7/31/2019	7/31/2019	7/30/2019	7/31/2019	7/30/2019	7/30/2019	7/30/2019	7/30/2019	7/30/2019	7/30/2019
DISSOLVED OXYGEN	mg/L	0.19	0.09	0.04	0.05	0.10	0.29	1.35	0.27	0.12	0.12	0.43
pH	SU	6.81	6.98	7.02	7.05	7.04	7.22	7.45	10.14	7.26	7.51	6.72
REDOX POTENTIAL	mV	-45.5	-127.2	-156.5	-178.2	-154.4	-68.4	144.8	-131.2	-91.1	-55.5	-73.1
SPECIFIC CONDUCTIVITY	mS/cm	925	0.905	1.024	0.767	0.639	0.750	0.900	1.053	1.291	0.900	1.190
TURBIDITY	NTU	9.10	3.22	4.19	4.11	4.26	2.72	3.47	2.10	3.64	4.28	3.13
Appendix III Parameters												
BORON, TOTAL	µg/L	189	432	757	43.4 J	3,950	2,660	7,480	2,650	1,700	12,500	3,240
CALCIUM, TOTAL	µg/L	160,000	131,000	107,000	124,000	60,200	59,800	50,000	8,120	72,600	37,300	145,000
CHLORIDE, TOTAL	mg/L	26.2	12.4	16.6	2.6	23.5	20.2	28.0	23.1	38.3	27.3	27.1
FLUORIDE, TOTAL	mg/L	0.13 J	0.23	0.29	0.25	0.38	0.62	0.57	2.5	0.83	1.8	0.40
SULFATE, TOTAL	mg/L	96.2	10.8	0.24 J	ND	15.0	141	283	237	183	195	74.4
TOTAL DISSOLVED SOLIDS	mg/L	643	499	552	409	365	501	630	777	843	630	735
Appendix IV Parameters												
ANTIMONY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ARSENIC, TOTAL	µg/L	11.3	0.62 J	320	5.2	167	6.6	1.2	78.2	30.1	0.62 J	34.2
BARIUM, TOTAL	µg/L	256	478	274	458	158	108	112	17.0	55.6	116	349
BERYLLIUM, TOTAL	µg/L	ND	ND	0.27 J	ND	ND	ND	0.25 J	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	0.063 J	ND	ND	ND	ND	0.063 J	0.19 J	0.78	0.18 J	0.31 J	ND
CHROMIUM, TOTAL	µg/L	0.25 J	ND	0.16 J	0.20 J	0.23 J	ND	ND	0.74 J	0.15 J	0.20 J	0.21 J
COBALT, TOTAL	µg/L	1.9 J	2.0 J	ND	ND	ND	ND	ND	ND	1.6 J	ND	ND
LEAD, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	27.3	4.5 J	ND	ND
LITHIUM, TOTAL	µg/L	29.4	19.7	15.2	ND	13.6	15.2	38.3	ND	23.6	17.3	41.5
MERCURY, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	ND	ND	2.8 J	ND	3.0 J	130	648	130	49.8	1,030	8.6 J
RADIUM [226 + 228]	pCi/L	ND	2.330 J	ND	ND	ND	ND	ND	ND	ND	ND	1.563
SELENIUM, TOTAL	µg/L	1.0	0.099 J	0.28 J	ND	0.23 J	0.17 J	0.27 J	3.3	2.2	0.34 J	0.14 J
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additionally Sampled Parameters												
ALKALINITY	mg/L	459	472	537	375	280	217	122	205	426	208	524
IRON, TOTAL	µg/L	3,530	11,000	16,500	15,300	9,240	815	3,230	469	414	2,200	18,900
MAGNESIUM, TOTAL	µg/L	31,700	26,600	40,300	18,300	22,000	9,800	10,900	331 J	17,200	5,420	30,000
MANGANESE, TOTAL	µg/L	363	598	246	474	262	941	497	9.6	651	286	1,170
POTASSIUM, TOTAL	µg/L	5,660	3,680	8,130	1,630	5,560	4,600	7,090	1,900	2,610	3,700	7,240
SODIUM, TOTAL	µg/L	21,000	14,500	41,800	3,850	24,700	93,400	129,000	205,000	169,000	157,000	72,700

Notes:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Values displayed as ND.
4. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
5. NA - Not Applicable.

Table 2
Nature and Extent Groundwater Sampling Analytical Results - July-August 2019
Rush Island Nature and Extent Investigation
Rush Island Energy Center, Jefferson County, MO

Analyte	UNITS	P21D	P21I	P21S	P22D	P22I	P22S	P29D	P29S	P30S	P31S
Field Parameters											
Date	NA	7/31/2019	7/31/2019	7/31/2019	8/1/2019	7/31/2019	7/31/2019	7/30/2019	7/30/2019	7/31/2019	7/30/2019
DISSOLVED OXYGEN	mg/L	0.31	1.14	1.44	0.14	0.12	0.20	0.18	0.18	1.43	0.32
pH	SU	7.48	8.01	6.69	7.72	7.41	6.84	7.21	6.89	7.02	7.30
REDOX POTENTIAL	mV	22.6	118.8	18.5	-165.3	44.3	64.4	-105.4	-112.6	54.7	-123.3
SPECIFIC CONDUCTIVITY	mS/cm	1.28	0.389	1.58	0.85	0.72	1.11	0.92	0.99	1.03	0.428
TURBIDITY	NTU	2.34	3.32	3.13	4.76	3.22	4.00	4.98	19.0	4.89	2.52
Appendix III Parameters											
BORON, TOTAL	µg/L	7,400	1,820	590	9,400 J	570	407	78.6 J	84.5 J	513	318
CALCIUM, TOTAL	µg/L	48,000	9,520	232,000	21,100	68,300	159,000	94,500	147,000	141,000	62,100
CHLORIDE, TOTAL	mg/L	193	28.3	31.1	25.5	25.5	32.4	91.9	20.0	33.9	3.0
FLUORIDE, TOTAL	mg/L	1.5	1.3	0.42	2.1	0.79	0.40	0.28	0.23	0.28	0.41
SULFATE, TOTAL	mg/L	93.5	30.5	14.9	96.6	145	167	19.9	17.1	147	14.3
TOTAL DISSOLVED SOLIDS	mg/L	771	278	933	545	469	768	516	571	728	14.5
Appendix IV Parameters											
ANTIMONY, TOTAL	µg/L	ND	0.11 J	ND	0.10 J	ND	0.087 J	ND	ND	0.10 J	ND
ARSENIC, TOTAL	µg/L	0.57 J	5.7	30.9	13.8	13.0	0.95 J	1.0	43.8	2.0	19.1
BARIUM, TOTAL	µg/L	55.6	19.7	498	62.1	135	144	159	358	94.9	134
BERYLLIUM, TOTAL	µg/L	ND	ND	0.29 J	ND	ND	ND	ND	ND	ND	ND
CADMIUM, TOTAL	µg/L	0.18 J	0.15 J	ND	0.21 J	ND	0.089 J	ND	0.035 J	0.034 J	ND
CHROMIUM, TOTAL	µg/L	0.16 J	0.59 J	0.10 J	0.97 J	ND	0.083 J	0.093 J	0.45 J	ND	ND
COBALT, TOTAL	µg/L	ND	ND	2.1 J	ND	ND	ND	ND	2.2 J	ND	ND
LEAD, TOTAL	µg/L	ND	5.0 J	ND	ND	ND	ND	ND	ND	ND	ND
LITHIUM, TOTAL	µg/L	59.9	14.2	21.3	21.0	20.9	43.5	38.3	15.9	39.8	ND
MERCURY, TOTAL	µg/L	ND	ND	ND	0.54	0.32 J	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	µg/L	416	54.3	ND	376	35.3	8.6 J	ND	ND	ND	5.6 J
RADIUM [226 + 228]	pCi/L	ND	ND	2.400 J	ND	ND	ND	1.638 J	ND	ND	0.978 J
SELENIUM, TOTAL	µg/L	0.22 J	0.97 J	0.35 J	0.86 J	0.088 J	0.14 J	ND	0.18 J	0.47 J	ND
THALLIUM, TOTAL	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Additionally Sampled Parameters											
ALKALINITY	mg/L	287	110	901	277	195	458	315	492	386	208
IRON, TOTAL	µg/L	1,230	442	20,200	1,130	2,390	359 J	4,490	12,200	572	4,220
MAGNESIUM, TOTAL	µg/L	14,800	1,180	59,200	2,470	12,000	34,000	26,500	35,000	27,000	11,200
MANGANESE, TOTAL	µg/L	312	40.5	4,200	74.4	525	355	162	756	48.0	955
POTASSIUM, TOTAL	µg/L	5,590	3,170	5,680	4,350	5,970	6,600	4,320	5,540	5,890	4,120
SODIUM, TOTAL	µg/L	208,000	74,400	35,100	163,000 J	58,400	50,900	59,400	16,700	53,300	12,900

Notes:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units, pCi/L - picocuries per liter, mV - millivolts, mS/cm - millisiemens per centimeters, NTU - nephelometric turbidity unit.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect. Values displayed as ND.
4. Radium [226 + 228] is reported as the sum of Radium 226 and Radium 228 activity concentrations unless the sum of Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
5. NA - Not Applicable.

Table 3
Summary of Groundwater Elevation Monitoring Results
Rush Island Nature and Extent Investigation
Rush Island Energy Center, Jefferson County, MO

Well ID	Location		Top of Casing	Ground Surface Elevation	Ground Water Elevation Measurements 11/1/2018		Ground Water Elevation Measurements 12/05/2018		Groundwater Elevation Measurements 1/4/2019		Groundwater Elevation Measurements 7/29/2019		Groundwater Elevation Measurements 9/30/2019	
	Northing	Eastings	FT MSL ¹	FT MSL ¹	DTW ²	GWE ³	DTW ²	GWE ³	DTW ²	GWE ³	DTW ²	GWE ³	DTW ²	GWE ³
CCR RULE MONITORING WELLS														
MW-1	835384.2	889832.5	395.52	393.50	11.61	383.91	11.81	383.71	10.07	385.45	8.75	386.77	11.24	384.28
MW-2	834261.5	890364.1	393.87	391.70	10.31	383.56	10.19	383.68	8.49	385.38	7.41	386.46	9.67	384.20
MW-3	833178.4	890892.7	391.38	389.20	8.04	383.34	7.79	383.59	6.08	385.30	5.19	386.19	7.48	383.90
MW-4	831647.5	890830.5	392.78	390.80	9.29	383.49	9.71	383.07	7.51	385.27	6.47	386.31	9.03	383.75
MW-5	831994.9	889984.5	390.36	388.00	6.54	383.82	7.24	383.12	4.87	385.49	3.77	386.59	6.54	383.82
MW-6	833111.0	888977.0	402.71	401.10	18.29	384.42	19.46	383.25	17.11	385.60	16.03	386.68	18.91	383.80
MW-7	834476.8	888483.3	407.95	406.10	23.48	384.47	25.23	382.72	22.82	385.13	NA	NA	NA	NA
MW-7 (R)	834501.4	888496.4	408.22	406.03	NA	NA	NA	NA	NA	NA	NA	NA	24.09	384.13
MW-B1	837602.1	887903.9	411.61	409.60	27.21	384.40	28.69	382.92	26.24	385.37	24.62	386.99	27.29	384.32
MW-B2	837801.7	885337.2	397.85	395.90	12.36	385.49	15.07	382.78	12.23	385.62	10.58	387.27	14.26	383.59
ADDITIONAL NATURE AND EXTENT MONITORING WELLS														
P01S	831422.3	890858.9	387.62	385.69	3.74	383.88	4.68	382.94	2.24	385.38	NA	NA	3.44	384.18
P03D	831686.3	890369.8	391.65	389.34	7.75	383.90	8.36	383.29	6.04	385.61	3.04	388.61	7.66	383.99
P03S	831690.9	890352.1	391.68	389.48	7.65	384.03	8.54	383.14	6.10	385.58	6.72	384.96	8.21	383.47
P05I	832295.4	889756.1	390.07	387.87	5.95	384.12	6.67	383.40	4.31	385.76	3.22	386.85	5.97	384.10
P05S	832317.6	889749.7	392.50	390.05	8.34	384.16	9.12	383.38	6.69	385.81	4.91	387.59	8.42	384.08
P08D	833687.5	888715.1	404.61	401.77	20.04	384.57	21.61	383.00	19.01	385.60	NA	NA	NA	NA
P08S	833692.6	888711.1	404.79	402.03	18.33	386.46	21.95	382.84	19.57	385.22	NA	NA	NA	NA
P10S	834545.1	888099.0	407.23	404.83	22.16	385.07	24.39	382.84	21.37	385.86	19.46	387.77	22.86	384.37
P13D	834992.6	889105.8	410.40	408.52	26.21	384.19	27.24	383.16	25.04	385.36	NA	NA	NA	NA
P13I	834995.2	889110.6	410.52	408.57	26.11	384.41	27.33	383.19	25.08	385.44	NA	NA	NA	NA
P13S	835005.5	889108.3	411.62	409.25	27.26	384.36	28.46	383.16	26.28	385.34	NA	NA	NA	NA
P17D	834718.8	890158.3	395.56	392.62	11.77	383.79	11.61	383.95	9.96	385.60	7.91	387.65	11.17	384.39
P17I	834744.2	890148.9	394.86	392.53	11.03	383.83	11.00	383.86	9.29	385.57	8.10	386.76	10.49	384.37
P17S	834736.7	890152.8	394.65	392.49	6.96	387.69	10.96	383.69	10.48	384.17	6.76	387.89	12.76	381.89
P19D	833915.6	890552.2	392.08	390.31	8.89	383.19	9.70	382.38	7.01	385.07	5.95	386.13	8.31	383.77
P19I	833911.3	890550.6	392.75	390.24	8.51	384.24	8.37	384.38	6.66	386.09	5.56	387.19	7.95	384.80
P19S	833919.0	890546.4	393.31	390.58	9.10	384.21	9.94	383.37	8.15	385.16	6.49	386.82	9.40	383.91
P21D	832902.9	891031.2	393.39	391.04	9.93	383.46	9.63	383.76	7.89	385.50	7.02	386.37	9.36	384.03
P21I	832904.2	891027.0	393.53	391.19	9.95	383.58	9.68	383.85	7.94	385.59	7.04	386.49	9.39	384.14
P21S	832898.0	891024.7	393.87	391.45	9.91	383.96	10.59	383.28	8.73	385.14	7.27	386.60	10.21	383.66
P22D	832278.2	891018.7	393.76	391.63	10.26	383.50	10.25	383.51	8.33	385.43	7.43	386.33	9.84	383.92
P22I	832272.1	891018.0	393.52	391.59	10.03	383.49	10.11	383.41	8.15	385.37	7.15	386.37	9.66	383.86
P22S	832277.0	891007.6	394.30	392.15	10.60	383.70	11.12	383.18	9.01	385.29	7.85	386.45	10.53	383.77
P29D	837804.9	885389.1	398.27	396.23	12.54	385.73	15.23	383.04	12.39	385.88	10.75	387.52	14.31	383.96
P29S	837797.9	885383.8	399.11	397.02	13.36	385.75	16.08	383.03	13.65	385.46	11.65	387.46	16.29	382.82
P30S	836606.9	889007.8	407.75	407.98	25.20	382.55	24.53	383.22	22.60	385.15	20.66	387.09	23.53	384.22
P31S	835629.4	887488.1	408.68	406.08	22.31	386.37	25.38	383.30	22.48	386.20	19.82	388.86	23.00	385.68
Mississippi River ⁶	888823*	837705*	NA	NA	NA	384.79	NA	385.29	NA	386.72	NA	387.97	NA	385.83

Notes:

- 1.) FT MSL - Feet above mean sea level.
 - 2.) DTW - Depth to water measured in feet below top of casing.
 - 3.) GWE - Groundwater elevation measured in feet above mean sea level.
 - 4.) Horizontal Datum: State Plane Coordinates NAD83 (2000) Missouri East Zone feet.
 - 5.) Vertical Datum: NAVD88 feet.
 - 6.) Mississippi River gage elevation provided by Ameren.
 - 7.) NA - Not Applicable.
- * - Mississippi River gauge location is estimated.

Figures



LEGEND

- Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Monitoring Wells and Piezometer Locations

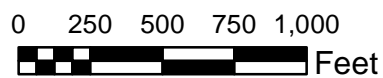
- Monitoring Well Used for Nature and Extent and Then Abandoned in 2019
- Nature and Extent Monitoring Wells
- RCPA CCR Well Location

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE. SOME PIEZOMETER LOCATIONS OFFSET FOR CLARITY PURPOSES.

REFERENCE

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) NRT 2014, NATURAL RESOURCE TECHNOLOGY, RUSH ISLAND IMPOUNDMENT POND CLOSURE GROUNDWATER MONITORING AND SAMPLING PLAN, MARCH 4, 2014.
- 3.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET.



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PROJECT
GROUNDWATER MONITORING PROGRAM

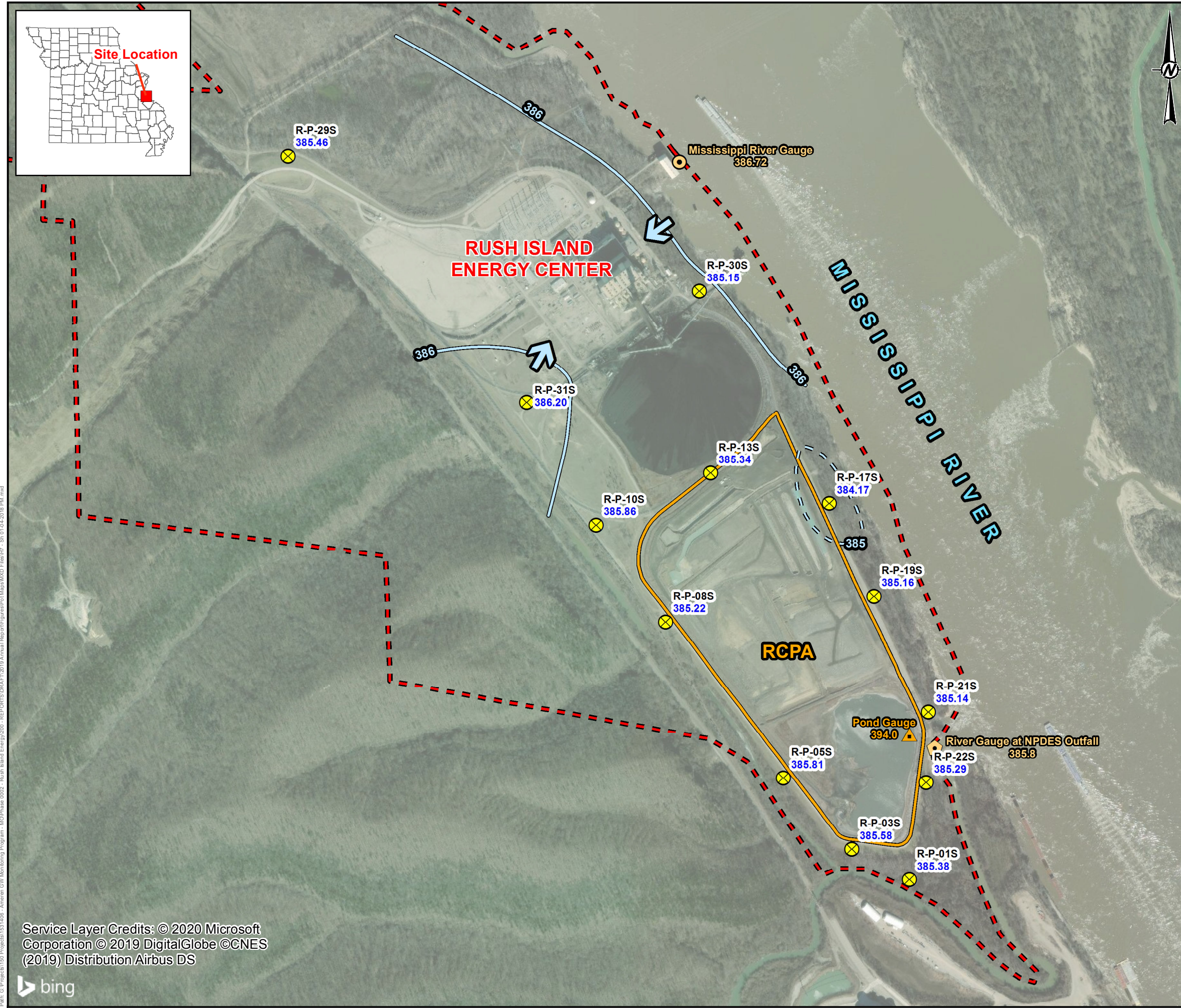


TITLE
SITE LOCATION AND MONITORING WELL AND PIEZOMETER LOCATION MAP

CONSULTANT	YYYY-MM-DD	2020-01-04
	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	CMR

APPENDIX H

**2019 Potentiometric Surface
Maps**



LEGEND

- Approximate Rush Island Energy Center Property
- Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- Mississippi River Gauge at NPDES Outfall
- RCPA Pond Gauge
- Monitoring Wells used for Nature and Extent
- ↗ Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.
 - 6.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

- REFERENCES**
- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - SHALLOW ALLUVIAL AQUIFER ZONE - JANUARY 4, 2019

CONSULTANT	YYYY-MM-DD	2019-01-25
	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	CMR

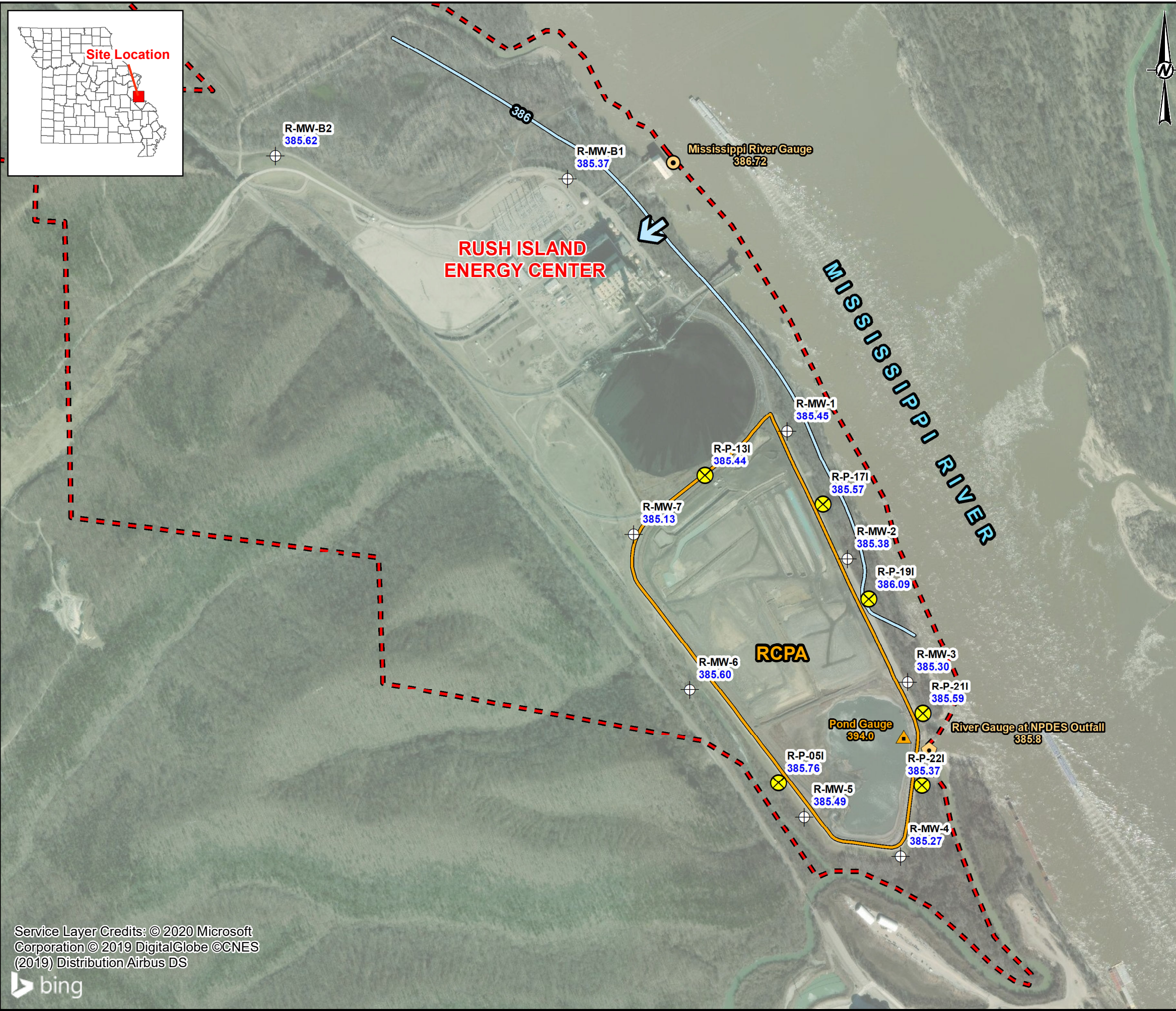
PROJECT No. 153-140601	PHASE 0002	Rev. 0.0	FIGURE P1
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Path: G:\Projects\153-1406 - Ameren GW Monitoring Program - MOCPhase 0002 - Rush Island Energy\2019 Annual Report\Figures\Pot\Map\MXD\Fig17 - SH 01-04-2019 PM.mxd

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



LEGEND

- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Elevation Contour (FT MSL)
- = = = Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ◡ Mississippi River Gauge at NPDES Outfall
- ▲ RCPA Pond Gauge
- ⊗ Monitoring Wells Used for Nature and Extent
- ⊕ CCR Rule Monitoring Wells
- ➔ Groundwater Flow Direction

NOTES

- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
- 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
- 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
- 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
- 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.
- 6.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER

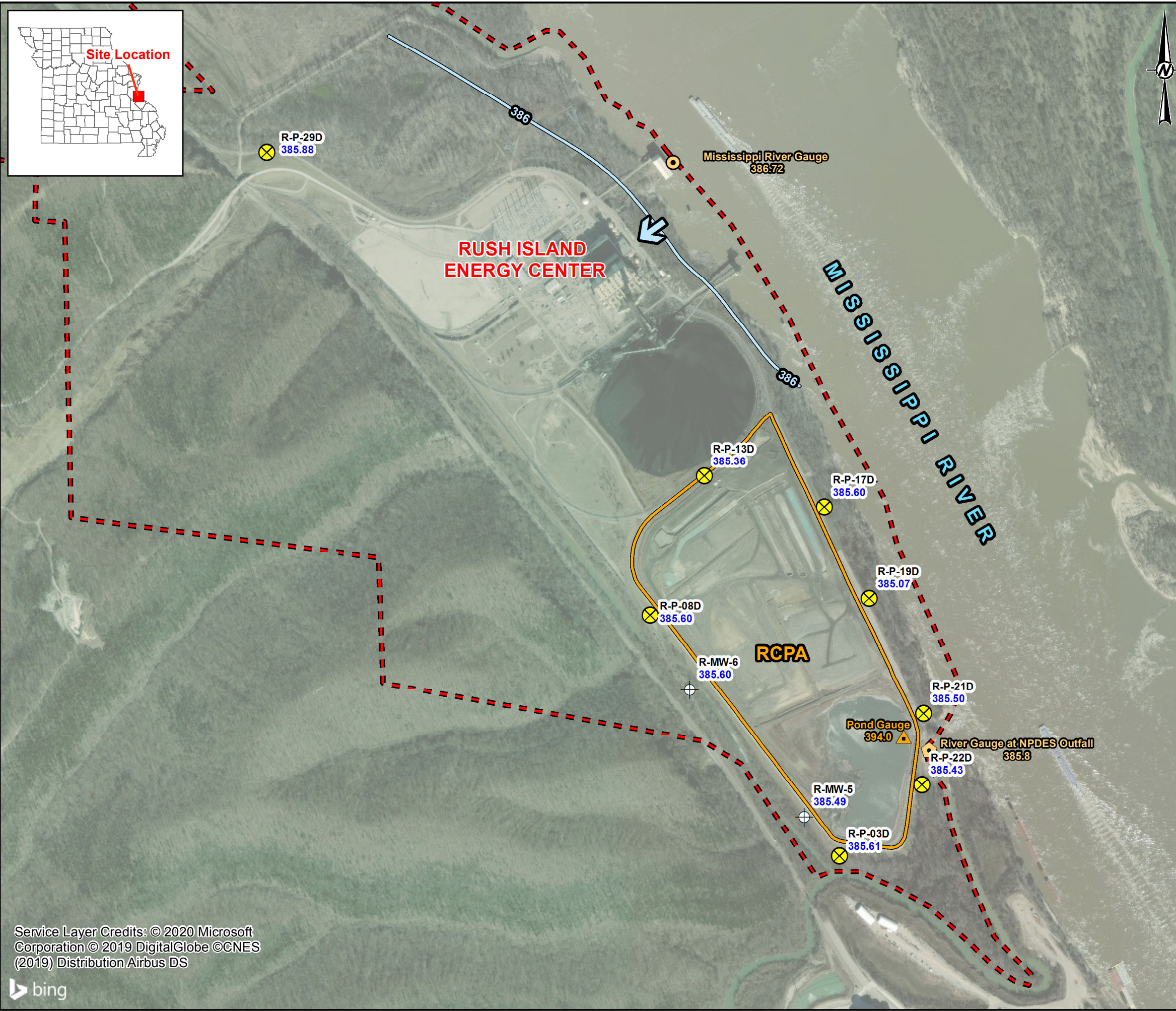
PROJECT
 CCR GROUNDWATER MONITORING PROGRAM



TITLE
RCPA POTENTIOMETRIC SURFACE MAP - INTERMEDIATE ALLUVIAL AQUIFER ZONE- JANUARY 4, 2019

YYYY-MM-DD	2019-01-25
PREPARED	JSI
DESIGN	JSI
REVIEW	EMS
APPROVED	CMR

PROJECT No. 153-140601 PHASE 0002 Rev. 0.0 FIGURE P2



LEGEND

- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Elevation Contour (FT MSL)
- - - Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ⬠ Mississippi River Gauge at NPDES Outfall
- ▲ RCPA Pond Gauge
- ⊗ Monitoring Wells Used for Nature and Extent
- ⊕ CCR Rule Monitoring Well
- ➔ Groundwater Flow Direction

NOTES

- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
- 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
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- 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
- 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.
- 6.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
AMEREN MISSOURI
RUSH ISLAND ENERGY CENTER



PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - DEEP ALLUVIAL AQUIFER ZONE - JANUARY 4, 2019

YYYY-MM-DD	2019-01-25
PREPARED	JSI
DESIGN	JSI
REVIEW	EMS
APPROVED	CMR

PROJECT No. 153-140601 PHASE 0002 Rev. 0.0 FIGURE **P3**

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LEGEND

- Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- Mississippi River Gauge at NPDES Outfall
- RCPA Pond Gauge
- Monitoring Wells used for Nature and Extent
- Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

0 500 1,000 2,000
Feet

CLIENT
AMEREN MISSOURI
RUSH ISLAND ENERGY CENTER



PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - SHALLOW ALLUVIAL AQUIFER ZONE - JULY 29, 2019

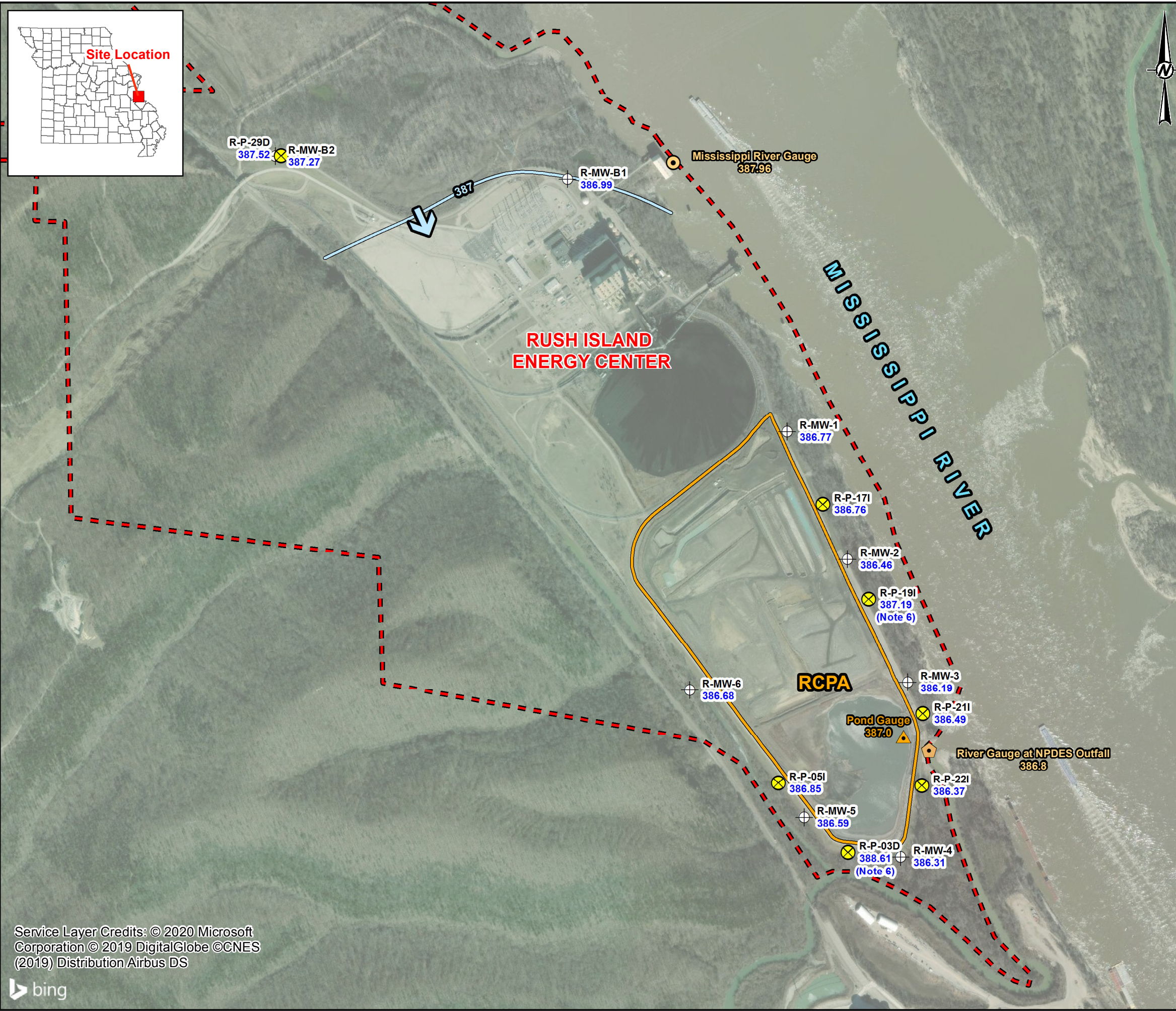
CONSULTANT	YYYY-MM-DD	2019-08-26
GOLDER	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	MNH

PROJECT No. 153-1406 PHASE 0002 Rev. 0.0 FIGURE P4

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LEGEND

- Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Elevation Contour (FT MSL)**
- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)
- Ground/Surface Water Measurement Locations**
- Mississippi River Gauge
- Mississippi River Gauge at NPDES Outfall
- RCPA Pond Gauge
- CCR Rule Monitoring Wells
- Monitoring Wells used for Nature and Extent
- Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.
 - 6.) R-P-19I AND R-P-03D NOT USED FOR CONTOUR MAPPING.
 - 7.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

- REFERENCES**
- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
- 0 500 1,000 2,000 Feet

CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - INTERMEDIATE ALLUVIAL AQUIFER ZONE - JULY 29, 2019

CONSULTANT	YYYY-MM-DD	2018-12-18
	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	MNH

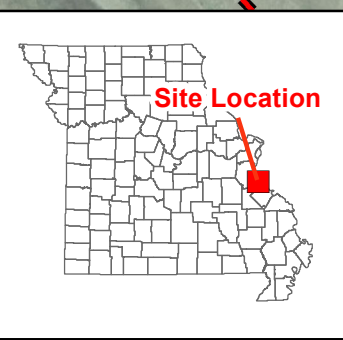
PROJECT No.	PHASE	Rev.	FIGURE
153-140601	0002	0.0	P5

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LEGEND

- Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- Mississippi River Gauge at NPDES Outfall
- RCPA Pond Gauge
- CCR Rule Monitoring Wells
- Monitoring Wells used for Nature and Extent
- Groundwater Flow Direction



NOTES

- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
- 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
- 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
- 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
- 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

0 500 1,000 2,000 Feet

CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - DEEP ALLUVIAL AQUIFER ZONE - JULY 29, 2019

CONSULTANT	YYYY-MM-DD	2019-8-18
	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	MNH

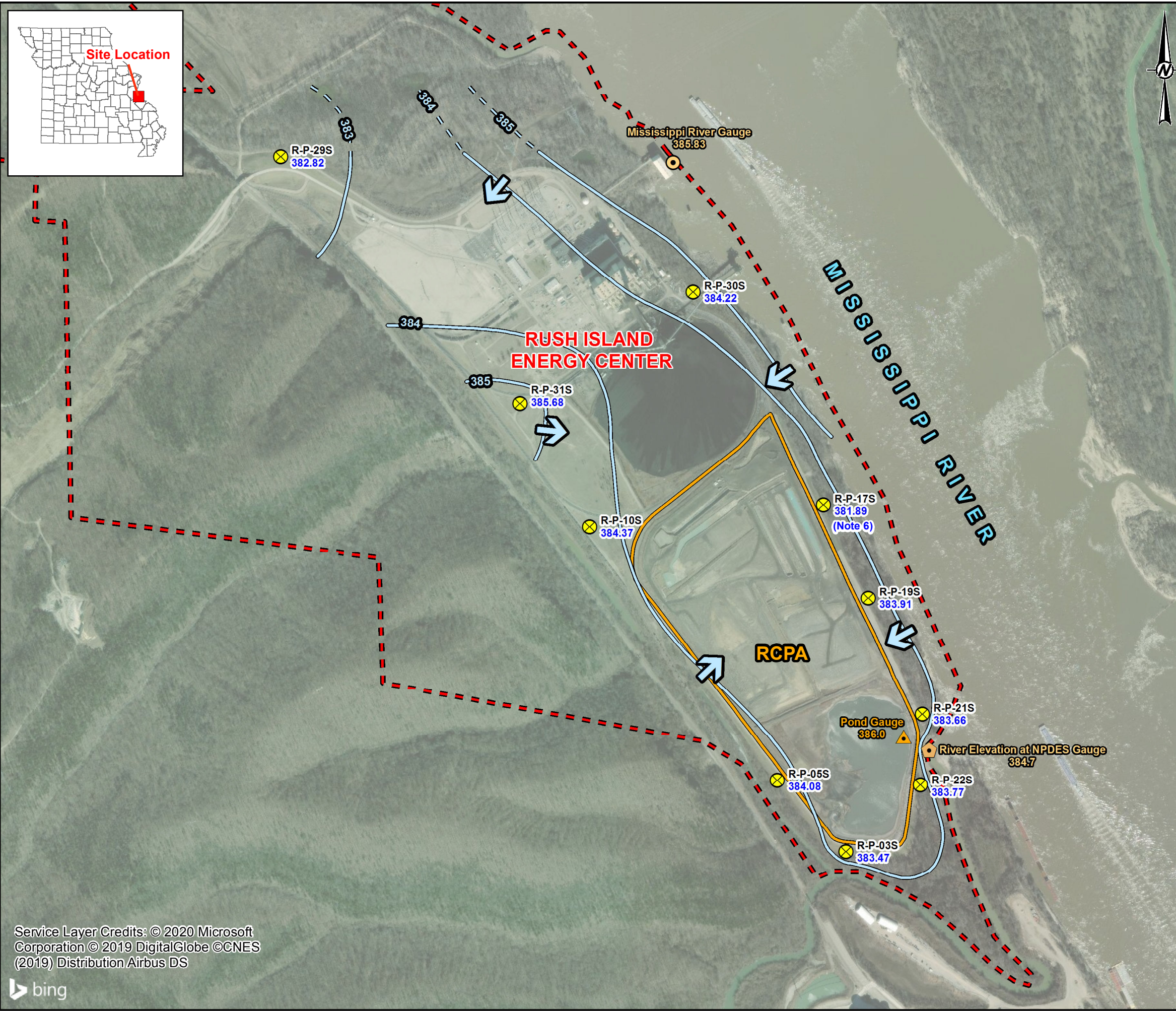
PROJECT No. 153-140601 PHASE 0002 Rev. 0.0 FIGURE P6

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LEGEND

- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

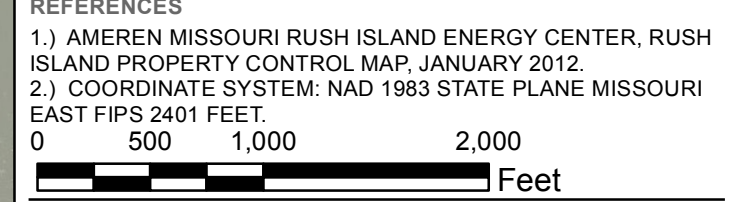
Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ⬠ Mississippi River Gauge at NPDES Outfall
- ▲ RCPA Pond Gauge
- ⊗ Monitoring Wells used for Nature and Extent
- ➔ Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.
 - 6.) R-P-17S WAS NOT USED FOR CONTOUR MAPPING.
 - 7.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.
- REFERENCES**
- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



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PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - SHALLOW ALLUVIAL AQUIFER ZONE - SEPTEMBER 30, 2019

CONSULTANT	YYYY-MM-DD	2019-10-21
	PREPARED	AMM
	DESIGN	JSI
	REVIEW	BCW
	APPROVED	MNH

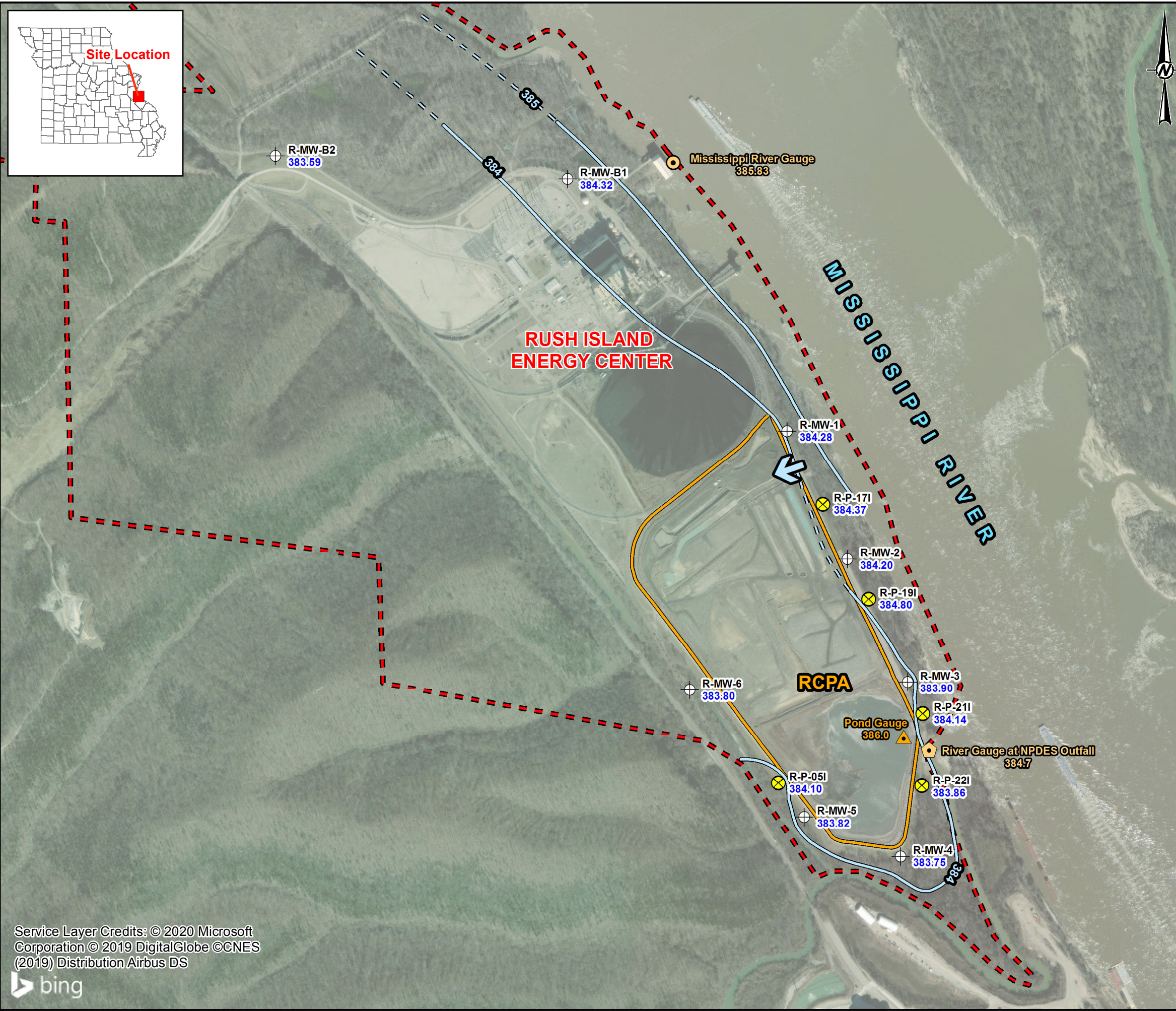
PROJECT No. 153-140601 PHASE 0002 Rev. 0.0 FIGURE P7

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LEGEND

- Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Elevation Contour (FT MSL)**
- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)
- Ground/Surface Water Measurement Locations**
- Mississippi River Gauge
- Mississippi River Gauge at NPDES Outfall
- RCPA Pond Gauge
- CCR Rule Monitoring Wells
- Monitoring Wells used for Nature and Extent
- Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) POND LEVEL OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

0 500 1,000 2,000
Feet

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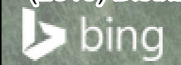
PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
**RCPA POTENTIOMETRIC SURFACE MAP - INTERMEDIATE
ALLUVIAL AQUIFER ZONE - SEPTEMBER 30, 2019**

CONSULTANT	YYYY-MM-DD	2019-10-18
GOLDER	PREPARED	AMM
	DESIGN	JSI
	REVIEW	BCW
	APPROVED	MNH

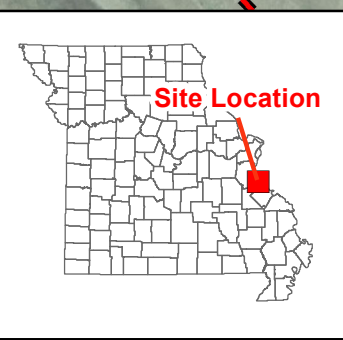
PROJECT No. 153-140601 PHASE 0002 Rev. 0.0 FIGURE P8

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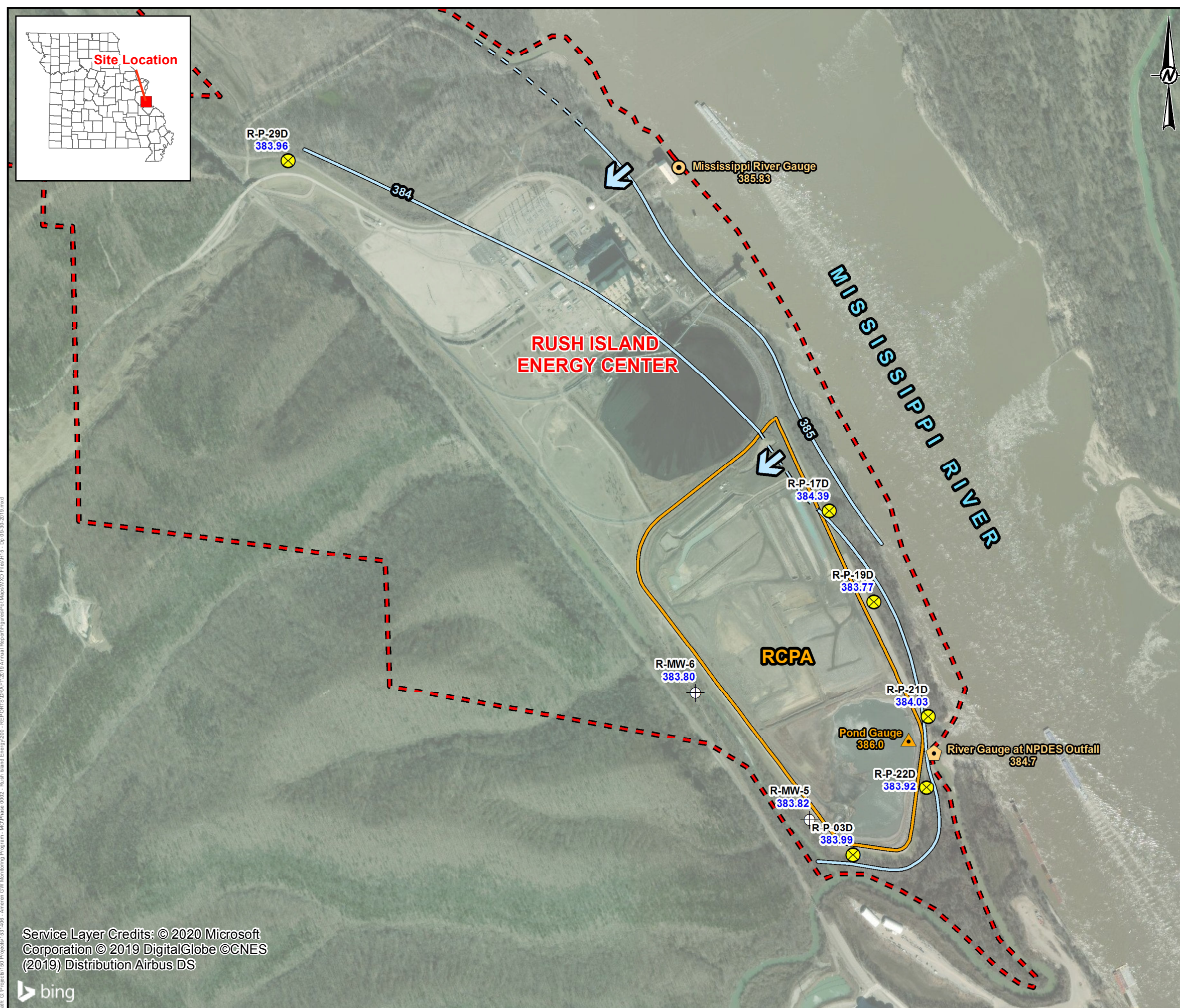
- Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ⬠ Mississippi River Gauge at NPDES Outfall
- ▲ RCPA Pond Gauge
- ⊕ CCR Rule Monitoring Wells
- ⊗ Monitoring Wells used for Nature and Extent
- ➔ Groundwater Flow Direction



- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) NPDES POND LEVEL OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

0 500 1,000 2,000
Feet

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RUSH ISLAND ENERGY CENTER



PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - DEEP ALLUVIAL AQUIFER ZONE - SEPTEMBER 30, 2019

CONSULTANT	YYYY-MM-DD	2019-10-21
GOLDER	PREPARED	AMM
	DESIGN	JSI
	REVIEW	BCW
	APPROVED	MNH

PROJECT No. 153-1406 PHASE 0002 Rev. 0.0 FIGURE P9

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LEGEND

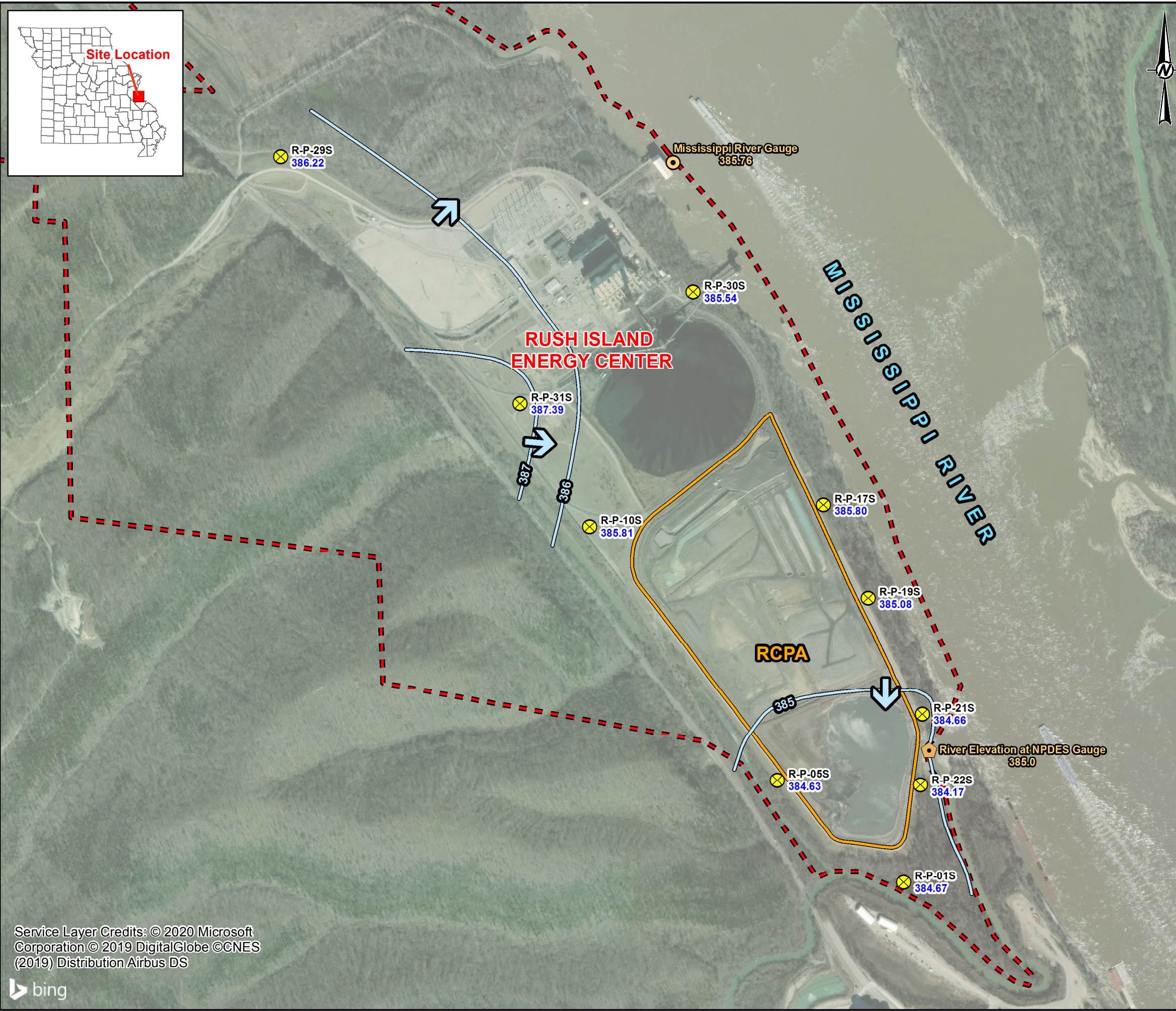
- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ◐ Mississippi River Gauge at NPDES Outfall
- ⊗ Monitoring Wells used for Nature and Extent
- ➔ Groundwater Flow Direction



NOTES

- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
- 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
- 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
- 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
- 5.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

REFERENCES

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.

0 500 1,000 2,000 Feet

CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - SHALLOW ALLUVIAL AQUIFER ZONE - NOVEMBER 8, 2019

CONSULTANT	YYYY-MM-DD	2019-11-22
	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	CMR

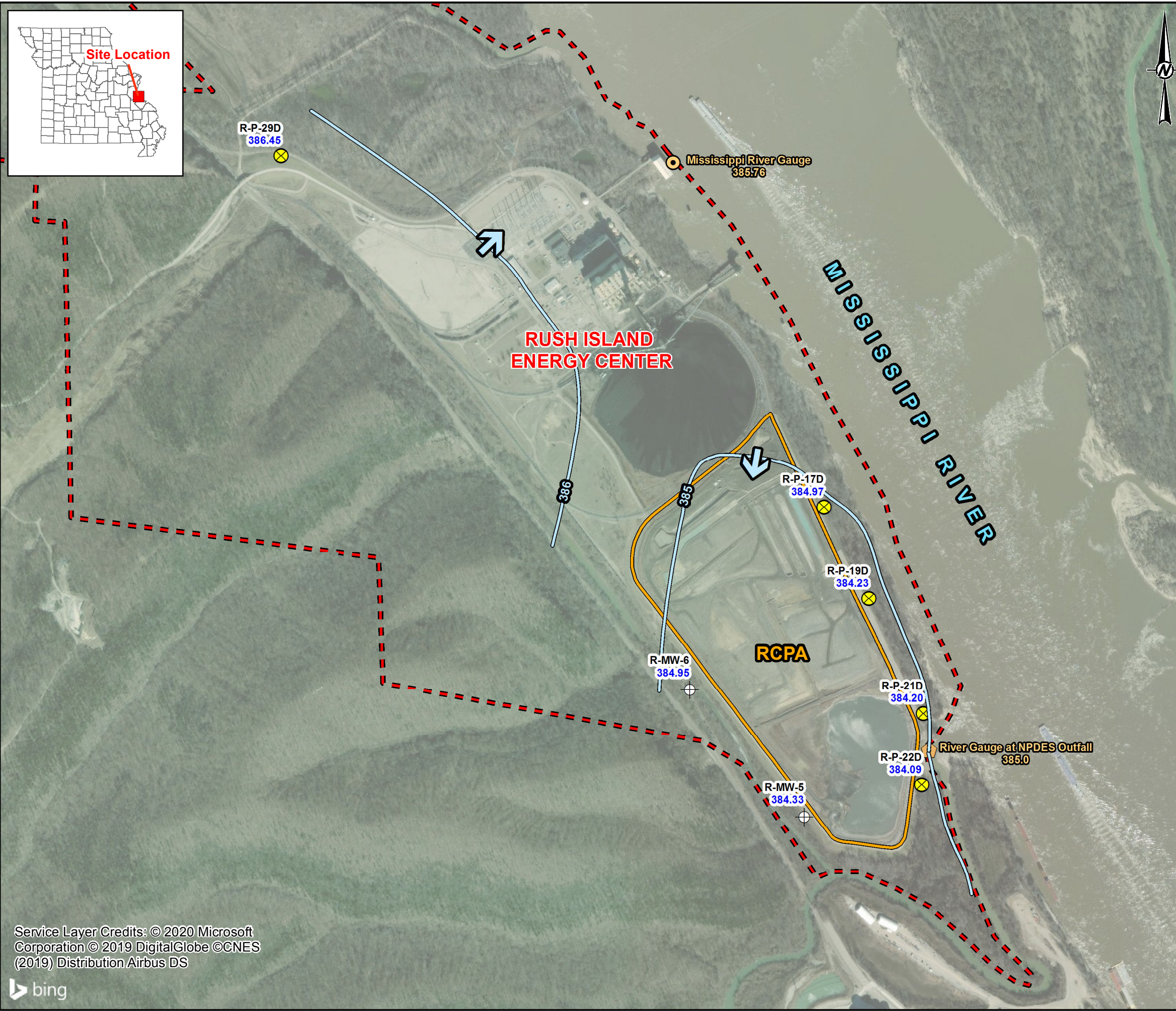
PROJECT No. 153-1406	PHASE 0002	Rev. 0.0	FIGURE P10
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LEGEND

- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment
- Groundwater Elevation Contour (FT MSL)
- = = = Inferred Groundwater Elevation Contour (FT MSL)
- ⊙ Mississippi River Gauge
- ⬠ Mississippi River Gauge at NPDES Outfall
- ⊕ CCR Rule Monitoring Wells
- ⊗ Monitoring Wells used for Nature and Extent
- ➔ Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

- REFERENCES**
- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - DEEP ALLUVIAL AQUIFER ZONE - NOVEMBER 8, 2019

CONSULTANT	YYYY-MM-DD	2019-11-22
GOLDER	PREPARED	JSI
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	CMR

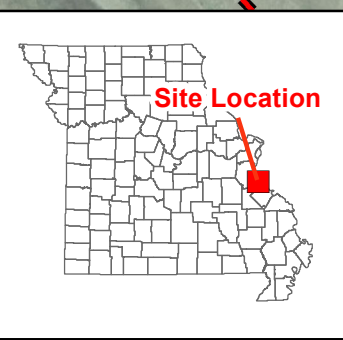
PROJECT No. 153-1406 PHASE 0002 Rev. 0.0 FIGURE P11

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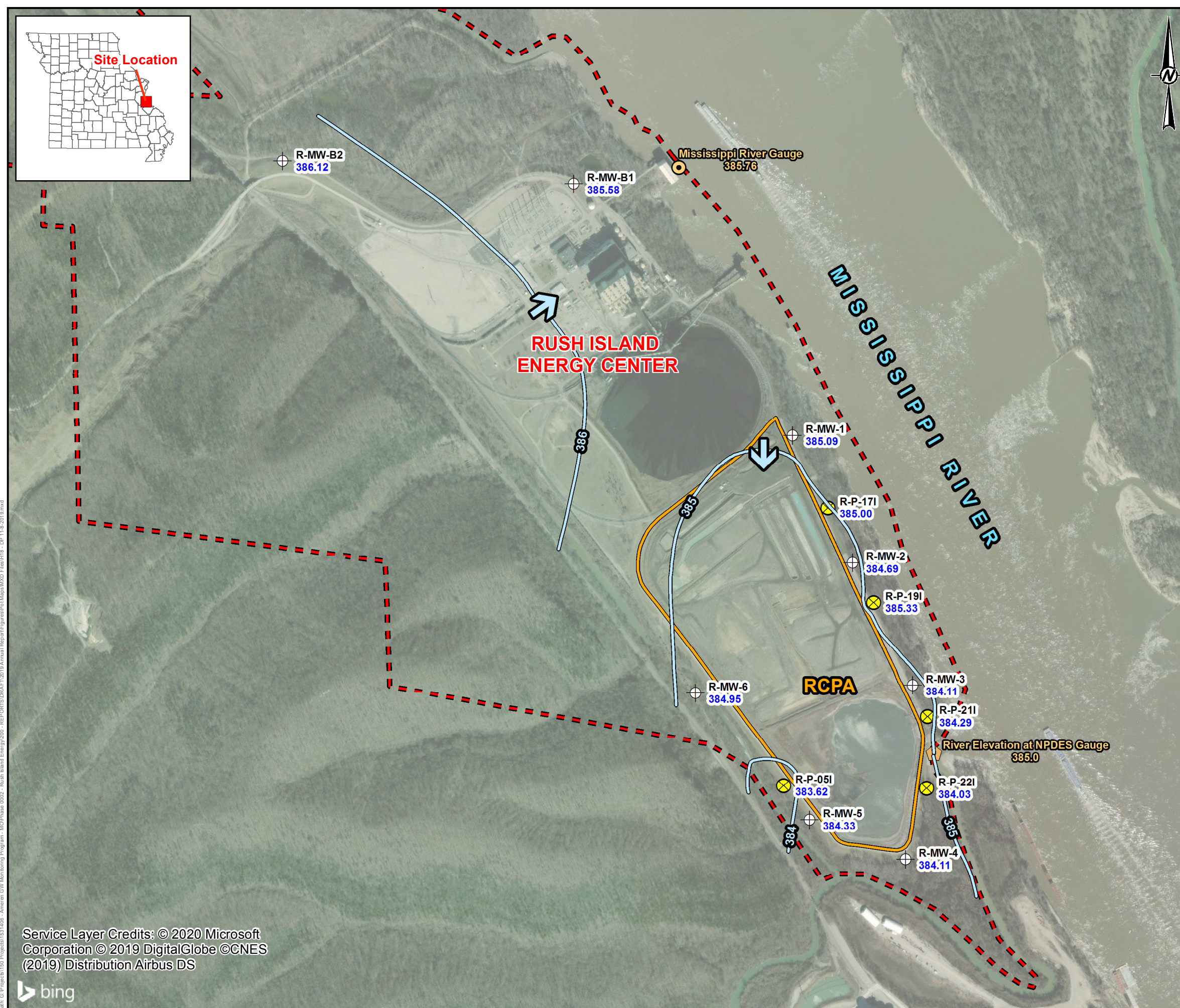


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LEGEND

- - - Approximate Rush Island Energy Center Property Boundary
- RCPA Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- Mississippi River Gauge
- ⬠ Mississippi River Gauge at NPDES Outfall
- ⊕ CCR Rule Monitoring Wells
- ⊗ Monitoring Wells used for Nature and Extent
- ➔ Groundwater Flow Direction

- NOTES**
- 1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
 - 2.) GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
 - 3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
 - 4.) MISSISSIPPI RIVER LEVEL PROVIDED BY AMEREN.
 - 5.) NPDES OUTFALL RIVER GAUGE OBTAINED ONSITE BY GOLDER.

- REFERENCES**
- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 - 2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.



CLIENT
 AMEREN MISSOURI
 RUSH ISLAND ENERGY CENTER



PROJECT
 CCR GROUNDWATER MONITORING PROGRAM

TITLE
RCPA POTENTIOMETRIC SURFACE MAP - INTERMEDIATE ALLUVIAL AQUIFER ZONE - NOVEMBER 8, 2019

CONSULTANT	YYYY-MM-DD	2019-11-22
	PREPARED	AMM
	DESIGN	JSI
	REVIEW	EMS
	APPROVED	CMR

PROJECT No. 153-1406 PHASE 0002 Rev. 0.0 FIGURE P12

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