



**REPORT**

# 2022 Annual Groundwater Monitoring and Corrective Action Report

*LCL1 - Utility Waste Landfill Cell 1, Labadie Energy Center, Franklin County, Missouri, USA*

Submitted to:

**Ameren Missouri**

1901 Chouteau Avenue, St. Louis, Missouri 63103

Submitted by:

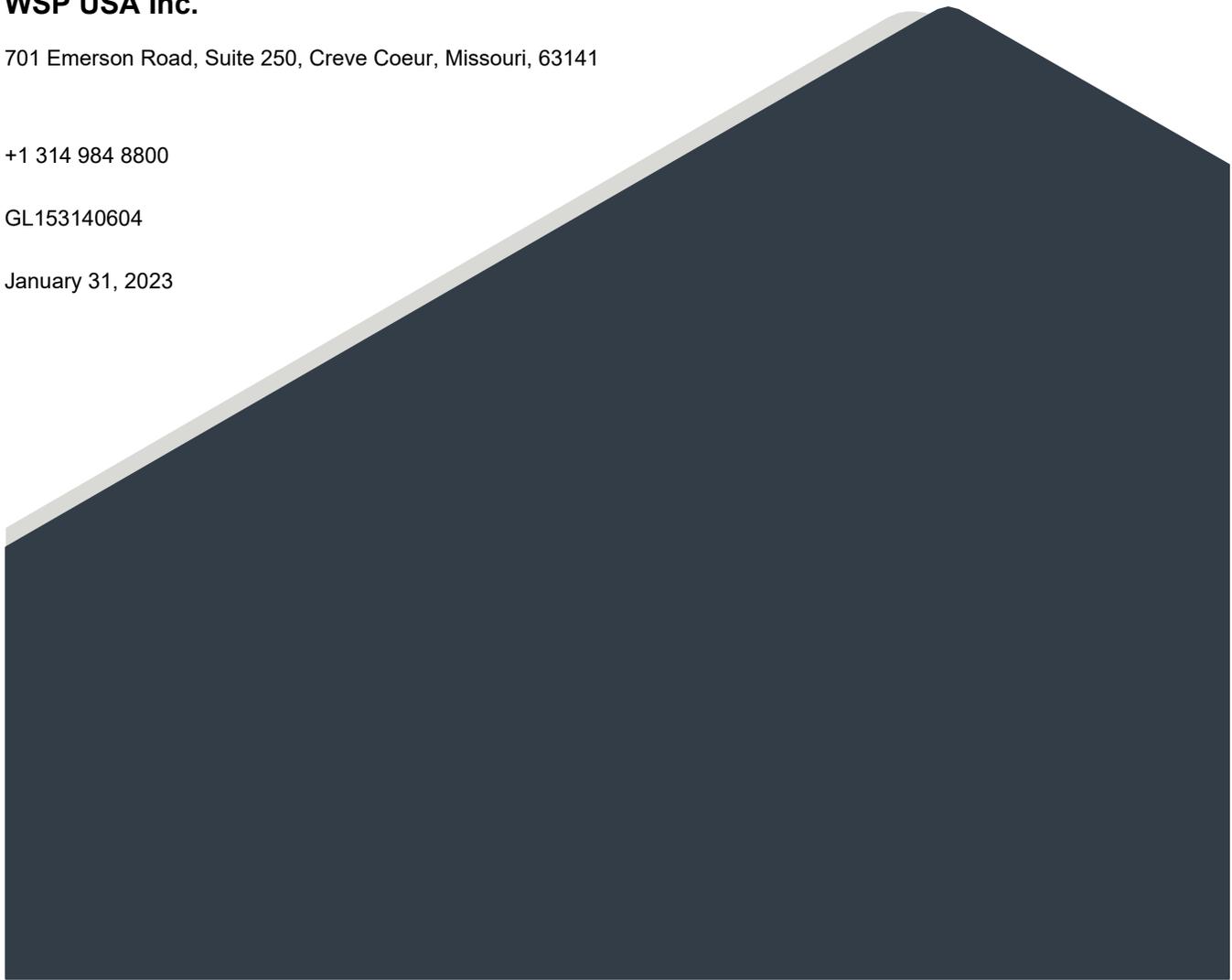
**WSP USA Inc.**

701 Emerson Road, Suite 250, Creve Coeur, Missouri, 63141

+1 314 984 8800

GL153140604

January 31, 2023



## EXECUTIVE SUMMARY AND STATUS OF THE LCL1 GROUNDWATER MONITORING PROGRAM

This annual report was developed to meet the requirements of United States Environmental Protection Agency (USEPA) 40 CFR Part 257 “Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule” (the CCR Rule). The CCR Rule requires owners or operators of existing CCR units to produce an Annual Groundwater Monitoring and Corrective Action Report (Annual Report) each year (§§ 257.90(e)). Ameren Missouri (Ameren) has determined that the Utility Waste Landfill (UWL) at the Labadie Energy Center (LEC) is subject to the requirements of the CCR Rule. The UWL currently only operates LCL1 (Cell 1), which is an on-site landfill cell and manages Coal Combustion Residuals (CCR) from the facility. This Annual Report for the LCL1 describes CCR Rule groundwater monitoring activities from January 1, 2022 through December 31, 2022 including verification results related to late 2021 sampling.

Throughout 2022, the LCL1 CCR unit has been operating under the Detection Monitoring Program (§257.94), which began October 17, 2017. As a part of Detection Monitoring, statistical evaluations are completed after each sampling event to determine if there are any values that represent a Statistically Significant Increase (SSI) over background concentrations. In 2022, SSIs have been determined during each sampling event and a summary of the SSIs for the past year is provided in **Table 1**.

**Table 1 – Summary of 2022 LCL1 Sampling Events, Previous Year Verification, and Statistical Evaluations**

Event Name	Type of Event and Sampling Dates	Laboratory Analytical Data Receipt Date	Parameters Collected	Verified SSI	SSI Determination Date	ASD Completion Date
November 2021 Sampling Event	Detection Monitoring, November 1-4, 2021	December 28, 2021	Appendix III, Major Cations and Anions	<b>Calcium:</b> TMW-2 <b>Chloride:</b> TMW-2 <b>Sulfate:</b> TMW-2 <b>TDS:</b> TMW-2	March 28, 2022	June 24, 2022
	Verification Sampling, February 10, 2022	February 28, 2022	Detected Appendix III Parameters <sup>(See Note 1)</sup>			
April 2022 Sampling Event	Detection Monitoring, April 6-11, 2022	June 5, 2022	Appendix III, Major Cations and Anions	<b>Calcium:</b> TMW-2 <b>Chloride:</b> TMW-2 <b>Sulfate:</b> TMW-2 <b>TDS:</b> TMW-2	September 2, 2022	November 18, 2022
	Verification Sampling, June 22, 2022	July 8, 2022	Detected Appendix III Parameters <sup>(See Note 1)</sup>			
October 2022 Sampling Event	Detection Monitoring, October 24-27, 2022	November, 22 2022	Appendix III, Major Cations and Anions	To be determined after statistical analyses and Verification Sampling are completed in 2023.		

Notes:

- 1) Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
- 2) SSI – Statistically Significant Increase.
- 3) ASD – Alternative Source Demonstration.
- 4) TDS – Total Dissolved Solids.

As outlined in section 257.94(e)(2) of the CCR Rule, the owner or operator may demonstrate that a source other than the CCR unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Alternative Source Demonstrations (ASDs) were prepared for each of these sampling events and are discussed further in this Annual Report.

There were no changes made to the monitoring system in 2022 with no new wells being installed or decommissioned.

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## 1.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

In accordance with the CCR Rule, a groundwater monitoring system has been installed to monitor the LCL1. The groundwater monitoring system consists of six (6) groundwater monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monitoring wells were installed or decommissioned in 2022 as a part of the CCR Rule monitoring program for the LCL1. For more information on the groundwater monitoring network, details are provided in the previous Annual Groundwater Monitoring Reports for the LCL1.

## 2.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections discuss the sampling events completed for the LCL1 CCR Unit in 2022. **Table 2** below provides a summary of the groundwater samples collected in 2022 including the number of samples, the date of sample collection, and the monitoring program.

**Table 2 – Summary of Groundwater Sampling Dates**

Sampling Event	Groundwater Monitoring Wells						Monitoring Program
	BMW-1S	BMW-2S	MW-26	TMW-1	TMW-2	TMW-3	
	Date of Sample Collection						
February 2022 Verification Sampling	-	-	2/10/2022	-	2/10/2022	-	Detection
April 2022 Sampling Event	4/6/2022	4/6/2022	4/7/2022	4/11/2022	4/11/2022	4/11/2022	Detection
June 2022 Verification Sampling	-	-	-	-	6/22/2022	-	Detection
October 2022 Sampling Event	10/27/2022	10/27/2022	10/24/2022	10/26/2022	10/25/2022	10/26/2022	Detection
Total Number of Samples Collected	2	2	3	2	4	2	NA

Notes:

- 1.) Detection Monitoring events tested for Appendix III parameters.
- 2.) Verification Sampling events tested for Appendix III parameters above the prediction limit for that analyte/well.
- 3.) "-" No sample collected.
- 4.) NA – Not applicable.

### 2.1 Detection Monitoring Program

A Detection Monitoring sampling event was completed November 1-4, 2021. Verification sampling and the statistical analysis to evaluate for SSIs for the November 2021 event were not completed until 2022 and are therefore included in this report. Detection of Appendix III analytes triggered a verification sampling event, which was completed on February 10, 2022 and verified SSIs. **Table 3** summarizes the results of the statistical analysis of the November 2021 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

As outlined in section 257.94(e)(2) of the CCR Rule, the owner or operator may demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or

resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. An Alternative Source Demonstration (ASD) was completed for these SSIs and is provided in **Appendix B**. This ASD demonstrates that SSIs at the monitoring wells around LCL1 are not caused by the LCL1 CCR unit and the LCL1 CCR unit remains in Detection Monitoring.

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. After the statistical analysis of the February-April 2021 sampling event, the statistical limits used to determine an SSI were updated according to the Statistical Analysis Plan. These updated limits were used for the November 2021 analysis and will be used in subsequent statistical analyses.

Detection monitoring samples were collected April 6-11, 2022 and testing was completed for all Appendix III analytes, as well as major cations and anions. Detection of Appendix III analytes triggered Verification sampling, which was completed June 22, 2022 and the testing results verified SSIs. **Table 4** summarizes the results of the statistical analysis of the April 2022 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**. As with the November 2021 sampling event, the SSIs reported for the monitoring data were not caused by the LCL1 CCR Unit and an ASD for the April 2022 sampling event is provided in **Appendix C**.

A Detection Monitoring sampling event was completed October 24-27, 2022 and testing was performed for all Appendix III analytes, as well as major cations and anions. Statistical analyses to evaluate for SSIs in the October 2022 data were not completed in 2022 and the results will be provided in the 2023 Annual Report. **Table 5** summarizes the results of the October 2022 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

## 2.2 Groundwater Elevation, Flow Rate and Direction

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

Groundwater elevations were used to generate potentiometric surface maps included in **Appendix D**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and influenced by seasonal changes in the water level in the adjacent Missouri River. Water flows into and out of the alluvial aquifer because 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 south/southwest (bluffs area) to the north/northeast (Missouri 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 alluvial aquifer wells at the Labadie Energy Center (LEC) using commercially available software to evaluate data since 2016. Results from this assessment indicate that while groundwater flow direction is variable, the overall net groundwater flow in the alluvial aquifer at the LEC is from the bluffs toward the river. Horizontal gradients calculated by the program range from 0.0001 to 0.0008 feet/foot with an estimated net annual groundwater movement of approximately 18 feet per year in the prevailing downgradient direction.

## **2.3 Sampling Issues**

No notable sampling issues were encountered at the LCL1 in 2022.

## **3.0 ACTIVITIES PLANNED FOR 2023**

Detection Monitoring is scheduled to continue on a semi-annual basis in the second and fourth quarters of 2023. Statistical analysis of the October 2022 Detection Monitoring data will be completed in 2023 and included in the 2023 Annual Report.

## Tables

**Table 3**  
**November 2021 Detection Monitoring Results**  
**LCL1 - Utility Waste Landfill Cell 1**  
**Labadie Energy Center, Franklin County, MO**

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1S	BMW-2S	Prediction Limit MW-26	MW-26	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
<b>November 2021 Detection Monitoring Event</b>											
DATE	NA	11/1/2021	11/1/2021	NA	11/4/2021	NA	11/2/2021	NA	11/2/2021	NA	11/2/2021
pH	SU	6.68	6.97	6.658-7.339	6.81	6.683-7.105	6.89	6.42-7.17	6.87	6.585-7.07	6.73
BORON, TOTAL	µg/L	77.0 J	40.7 J	102.8	68.7 J	121.6	113	134.3	119	136.9	116
CALCIUM, TOTAL	µg/L	260,000	140,000	155,150	146,000	183,389	161,000	205,487	240,000	202,001	161,000
CHLORIDE, TOTAL	mg/L	13.7	1.7 J	6.76	6.2 J	5.718	2.6 J	7.142	19.7	8.621	3.8 J
FLUORIDE, TOTAL	mg/L	ND	0.14 J	0.2118	0.24	0.2975	0.27	0.2972	0.25	0.2626	0.20
SULFATE, TOTAL	mg/L	146	46.2	38.24	29.3	128	61.4	115.5	259	104	40.3
TOTAL DISSOLVED SOLIDS	mg/L	953 J	475 J	543.7	490	733.7	617	815.4	960	815.4	595
<b>February 2022 Verification Sampling Event</b>											
DATE	NA				2/10/2022				2/10/2022		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L								278,000		
CHLORIDE, TOTAL	mg/L								43.1		
FLUORIDE, TOTAL	mg/L				ND						
SULFATE, TOTAL	mg/L								359		
TOTAL DISSOLVED SOLIDS	mg/L								1,360 J		

**NOTES:**

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
8. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: EMS  
Checked By: LMS  
Reviewed By: MNH

**Table 4**  
**April 2022 Detection Monitoring Results**  
**LCL1 - Utility Waste Landfill Cell 1**  
**Labadie Energy Center, Franklin County, MO**

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1S	BMW-2S	Prediction Limit MW-26	MW-26	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
<b>April 2022 Detection Monitoring Event</b>											
DATE	NA	4/6/2022	4/6/2022	NA	4/7/2022	NA	4/11/2022	NA	4/11/2022	NA	4/11/2022
pH	SU	7.10	7.06	6.658-7.339	6.94	6.683-7.105	6.95	6.42-7.17	6.93	6.585-7.07	6.82
BORON, TOTAL	µg/L	109	55.2 J	103	96.8 J	121.6	114	134.3	110	136.9	116
CALCIUM, TOTAL	µg/L	221,000	138,000	155,150	140,000	183,389	165,000	205,487	220,000	202,001	141,000
CHLORIDE, TOTAL	mg/L	2.5 J	2.5 J	6.76	5.9 J	5.718	2.9 J	7.142	11.9	8.621	2.5 J
FLUORIDE, TOTAL	mg/L	0.20 J	0.19 J	0.2118	ND	0.2975	0.21	0.2972	ND	0.2626	0.20 J
SULFATE, TOTAL	mg/L	38.6	45.7	38.24	29.0	128	91.9	115.5	197	104	27.8
TOTAL DISSOLVED SOLIDS	mg/L	828 J	513 J	543.7	498	733.7	653	815.4	975	815.4	684
<b>June 2022 Verification Sampling Event</b>											
DATE	NA								6/22/2022		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L								215,000		
CHLORIDE, TOTAL	mg/L								10.0		
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L								175		
TOTAL DISSOLVED SOLIDS	mg/L								940		

**NOTES:**

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.
5. Prediction Limits calculated using Sanitas Software.
6. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

Prepared By: BTT  
Checked By: GTM  
Reviewed By: MNH

**Table 5**  
**October 2022 Detection Monitoring Results**  
**LCL1 - Utility Waste Landfill Cell 1**  
**Labadie Energy Center, Franklin County, MO**

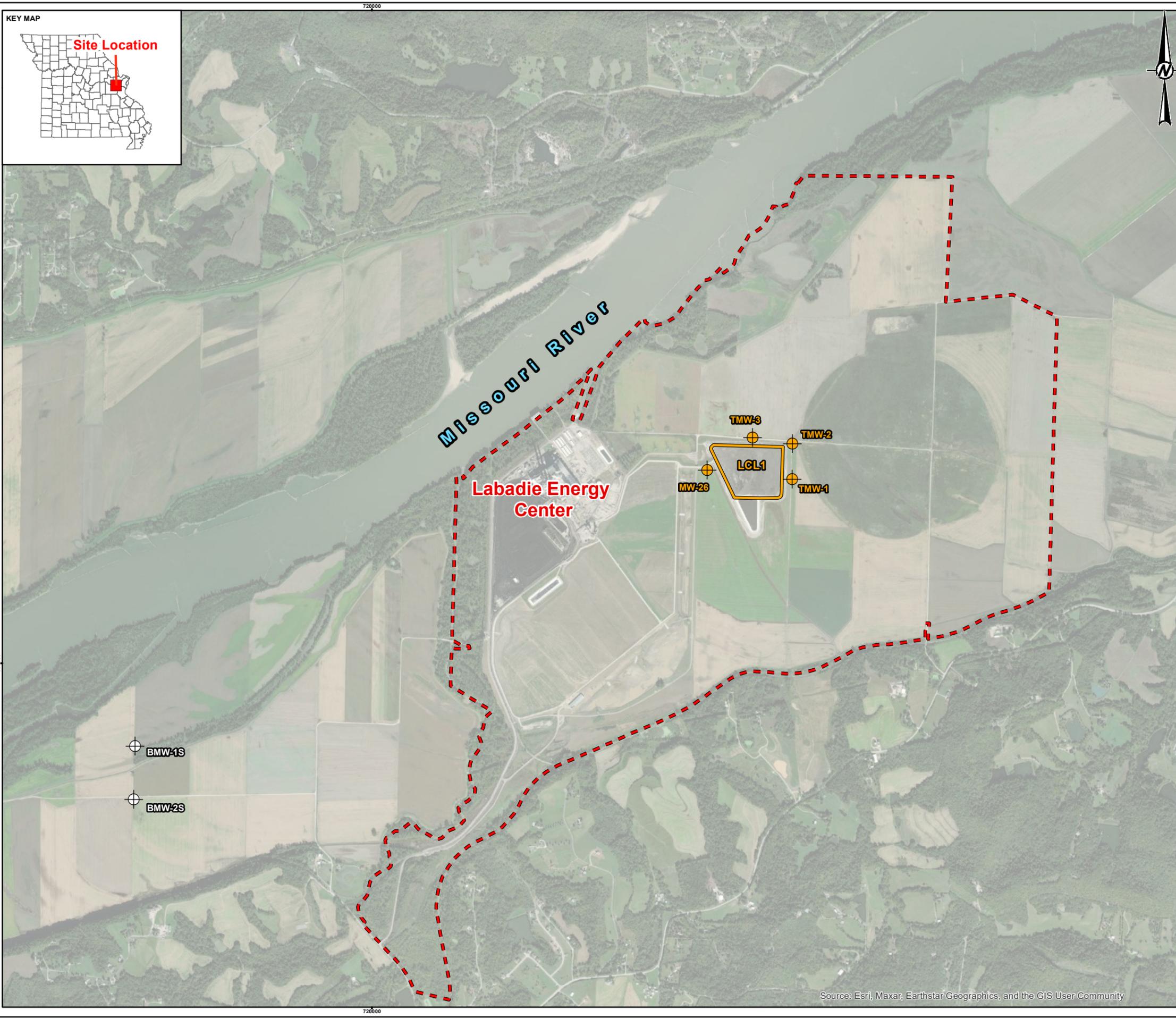
ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS			
		BMW-1S	BMW-2S	MW-26	TMW-1	TMW-2	TMW-3
<b>October 2022 Detection Monitoring Event</b>							
DATE	NA	10/27/2022	10/27/2022	10/24/2022	10/26/2022	10/25/2022	10/26/2022
pH	SU	6.68	6.95	6.80	6.80	6.67	6.79
BORON, TOTAL	µg/L	91.2 J	45.3 J	68.3 J	115	115	98.3 J
CALCIUM, TOTAL	µg/L	185,000	146,000	128,000	159,000	246,000 J	134,000
CHLORIDE, TOTAL	mg/L	5.9	1.4	10.3 J	3.2 J	18.2	3.1
FLUORIDE, TOTAL	mg/L	ND	ND	ND	ND	ND	ND
SULFATE, TOTAL	mg/L	66.5	34.4	31.3	70.8	247 J	39.5
TOTAL DISSOLVED SOLIDS	mg/L	710	496	493	664	1,070	496

**NOTES:**

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

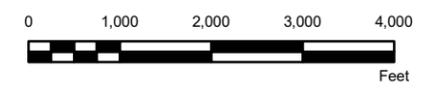
Prepared By: GTM  
Checked By: JAB  
Reviewed By: MNH

## Figures



**LEGEND**

- Approximate Property Boundary
- LCL1 - Utility Waste Landfill Cell 1
- Groundwater Monitoring Wells Used for LCL1 CCR Rule Monitoring**
- LCL1 - Utility Waste Landfill Cell 1 Monitoring Well
- Background Monitoring Well



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

**REFERENCE(S)**  
 1.) ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.  
 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.

CLIENT  
**AMEREN MISSOURI**  
**LABADIE ENERGY CENTER**

PROJECT  
**GROUNDWATER MONITORING PROGRAM**



TITLE  
**SITE LOCATION AERIAL MAP AND MONITORING WELL LOCATIONS**

CONSULTANT	WSP GOLDER	YYYY-MM-DD	2022-12-21
DESIGNED			JSI
PREPARED			GTM
REVIEWED			EMS
APPROVED			MNH

PROJECT NO. 153140604 CONTROL 1240 FIGURE 1

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PATH: C:\Users\Estimote\OneDrive\Documents\153140604\00 - Ameren CCR GW Monitoring Program 2020 - APE (US Technical Work)\001 - LCL1 & Figures\Drawings\PRODUCTION\Other Maps\Figures 1 - 2021 LCL1 Well Map - LCL1.mxd PRINTED ON: 2023-01-10 AT: 9:04:14 AM

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

**APPENDIX A**

**Laboratory Analytical Data**

February 28, 2022

Jeffrey Ingram  
Golder Associates  
701 Emerson Road, Suite 250  
Saint Louis, MO 63141

RE: Project: AMEREN VS LCL1  
Pace Project No.: 60392702

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on February 12, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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  
Brendan Talbert, Golder Associates



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

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### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 20-020-0

Arkansas Drinking Water

Illinois Certification #: 2000302021-3

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 #: KS000212019-9

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: AMEREN VS LCL1

Pace Project No.: 60392702

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60392702001	L-TMW-2	Water	02/10/22 09:55	02/12/22 04:50
60392702002	L-MW-26	Water	02/10/22 12:20	02/12/22 04:50
60392702003	L-LCL1-FB-1	Water	02/10/22 12:30	02/12/22 04:50
60392702004	L-LCL1-DUP-1	Water	02/10/22 00:00	02/12/22 04:50

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: AMEREN VS LCL1

Pace Project No.: 60392702

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60392702001	L-TMW-2	EPA 200.7	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CRN2, SK	3	PASI-K
60392702002	L-MW-26	EPA 200.7	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60392702003	L-LCL1-FB-1	EPA 200.7	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60392702004	L-LCL1-DUP-1	EPA 200.7	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	SK	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

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**Sample: L-TMW-2**      **Lab ID: 60392702001**      Collected: 02/10/22 09:55      Received: 02/12/22 04:50      Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>									
Analytical Method: EPA 200.7    Preparation Method: EPA 200.7									
Pace Analytical Services - Kansas City									
Calcium	<b>278000</b>	ug/L	600	226	3	02/15/22 14:27	02/28/22 13:44	7440-70-2	
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C									
Pace Analytical Services - Kansas City									
Total Dissolved Solids	<b>1360</b>	mg/L	13.3	13.3	1		02/16/22 15:27		
<b>300.0 IC Anions 28 Days</b>									
Analytical Method: EPA 300.0									
Pace Analytical Services - Kansas City									
Chloride	<b>43.1</b>	mg/L	10.0	5.3	10		02/18/22 14:58	16887-00-6	
Fluoride	<b>0.16J</b>	mg/L	0.20	0.12	1		02/18/22 14:17	16984-48-8	
Sulfate	<b>359</b>	mg/L	50.0	27.5	50		02/23/22 13:54	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

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**Sample: L-MW-26**      **Lab ID: 60392702002**      Collected: 02/10/22 12:20      Received: 02/12/22 04:50      Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>									
Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City									
Calcium	<b>140000</b>	ug/L	400	151	2	02/15/22 14:27	02/28/22 13:51	7440-70-2	
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Kansas City									
Total Dissolved Solids	<b>498</b>	mg/L	10.0	10.0	1		02/16/22 15:27		
<b>300.0 IC Anions 28 Days</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City									
Chloride	<b>5.7</b>	mg/L	1.0	0.53	1		02/18/22 15:40	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		02/18/22 15:40	16984-48-8	
Sulfate	<b>31.5</b>	mg/L	5.0	2.8	5		02/18/22 15:54	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

---

**Sample: L-LCL1-FB-1**      **Lab ID: 60392702003**      Collected: 02/10/22 12:30      Received: 02/12/22 04:50      Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>	Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Calcium	<b>91.1J</b>	ug/L	200	75.4	1	02/15/22 14:27	02/28/22 13:53	7440-70-2	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>&lt;5.0</b>	mg/L	5.0	5.0	1		02/16/22 15:27		
<b>300.0 IC Anions 28 Days</b>	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>&lt;0.53</b>	mg/L	1.0	0.53	1		02/18/22 16:08	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		02/18/22 16:08	16984-48-8	
Sulfate	<b>&lt;0.55</b>	mg/L	1.0	0.55	1		02/18/22 16:08	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

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**Sample: L-LCL1-DUP-1**      **Lab ID: 60392702004**      Collected: 02/10/22 00:00      Received: 02/12/22 04:50      Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>	Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Calcium	<b>292000</b>	ug/L	1000	377	5	02/15/22 14:27	02/28/22 13:55	7440-70-2	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>1060</b>	mg/L	13.3	13.3	1		02/17/22 09:33		
<b>300.0 IC Anions 28 Days</b>	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>41.3</b>	mg/L	10.0	5.3	10		02/25/22 16:55	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		02/25/22 15:49	16984-48-8	
Sulfate	<b>352</b>	mg/L	50.0	27.5	50		02/28/22 10:57	14808-79-8	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

QC Batch: 771128

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Total

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60392702001, 60392702002, 60392702003, 60392702004

METHOD BLANK: 3079100

Matrix: Water

Associated Lab Samples: 60392702001, 60392702002, 60392702003, 60392702004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<75.4	200	75.4	02/28/22 13:38	

LABORATORY CONTROL SAMPLE: 3079101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3079102 3079103

Parameter	Units	3079102		3079103		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Calcium	ug/L	278000	10000	297000	304000	186	251	70-130	2	20	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

QC Batch: 771427

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60392702001, 60392702002, 60392702003

METHOD BLANK: 3080232

Matrix: Water

Associated Lab Samples: 60392702001, 60392702002, 60392702003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/16/22 15:24	

LABORATORY CONTROL SAMPLE: 3080233

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 3080234

Parameter	Units	60392429003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	883	903	2	10	

SAMPLE DUPLICATE: 3080235

Parameter	Units	60392702001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1360	1300	5	10	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

QC Batch: 771592

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60392702004

METHOD BLANK: 3080734

Matrix: Water

Associated Lab Samples: 60392702004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	02/17/22 09:32	

LABORATORY CONTROL SAMPLE: 3080735

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

SAMPLE DUPLICATE: 3080736

Parameter	Units	60392705006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	564	551	2	10	

SAMPLE DUPLICATE: 3080737

Parameter	Units	60392712001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	674	671	0	10	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

QC Batch:	771702	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
		Laboratory:	Pace Analytical Services - Kansas City

Associated Lab Samples: 60392702001, 60392702002, 60392702003

METHOD BLANK: 3081280 Matrix: Water

Associated Lab Samples: 60392702001, 60392702002, 60392702003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	02/18/22 07:28	
Fluoride	mg/L	<0.12	0.20	0.12	02/18/22 07:28	
Sulfate	mg/L	<0.55	1.0	0.55	02/18/22 07:28	

METHOD BLANK: 3084126 Matrix: Water

Associated Lab Samples: 60392702001, 60392702002, 60392702003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	02/23/22 09:22	
Fluoride	mg/L	<0.12	0.20	0.12	02/23/22 09:22	
Sulfate	mg/L	<0.55	1.0	0.55	02/23/22 09:22	

LABORATORY CONTROL SAMPLE: 3081281

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	91	90-110	
Fluoride	mg/L	2.5	2.6	103	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

LABORATORY CONTROL SAMPLE: 3084127

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	99	90-110	
Fluoride	mg/L	2.5	2.5	102	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3081282 3081283

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60392271002	Result	Spike Conc.	Spike Conc.								
Chloride	mg/L	10.6	5	5	16.0	16.0	107	108	80-120	0	15		
Fluoride	mg/L	0.37	2.5	2.5	3.0	3.1	106	107	80-120	1	15		
Sulfate	mg/L	89.5	5	5	94.6	94.5	100	99	80-120	0	15 E		

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3081284 3081285												
Parameter	Units	60392702001		MS	MSD	MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Chloride	mg/L	43.1	50	50	92.3	93.0	99	100	80-120	1	15	
Fluoride	mg/L	0.16J	2.5	2.5	3.0	3.0	113	115	80-120	1	15	
Sulfate	mg/L	359	250	250	604	618	98	103	80-120	2	15	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

QC Batch: 772728

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60392702004

METHOD BLANK: 3085023

Matrix: Water

Associated Lab Samples: 60392702004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	02/25/22 15:22	
Fluoride	mg/L	<0.12	0.20	0.12	02/25/22 15:22	
Sulfate	mg/L	<0.55	1.0	0.55	02/25/22 15:22	

METHOD BLANK: 3086228

Matrix: Water

Associated Lab Samples: 60392702004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	02/28/22 10:29	
Fluoride	mg/L	<0.12	0.20	0.12	02/28/22 10:29	
Sulfate	mg/L	<0.55	1.0	0.55	02/28/22 10:29	

METHOD BLANK: 3086244

Matrix: Water

Associated Lab Samples: 60392702004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	02/28/22 12:27	
Fluoride	mg/L	<0.12	0.20	0.12	02/28/22 12:27	
Sulfate	mg/L	<0.55	1.0	0.55	02/28/22 12:27	

LABORATORY CONTROL SAMPLE: 3085024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	4.8	97	90-110	

LABORATORY CONTROL SAMPLE: 3086229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	90	90-110	
Sulfate	mg/L	5	4.6	92	90-110	

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### QUALITY CONTROL DATA

Project: AMEREN VS LCL1

Pace Project No.: 60392702

LABORATORY CONTROL SAMPLE: 3086245

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	90	90-110	
Fluoride	mg/L	2.5	2.5	98	90-110	
Sulfate	mg/L	5	4.7	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3085025 3085026

Parameter	Units	60392702004		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec						
Chloride	mg/L	41.3	50	50	94.9	95.1	107	108	80-120	0	15				
Fluoride	mg/L	<0.12	2.5	2.5	2.6	2.6	103	102	80-120	1	15				
Sulfate	mg/L	352	250	250	601	606	99	101	80-120	1	15				

MATRIX SPIKE SAMPLE: 3085027

Parameter	Units	60392967005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	118	100	244	126	80-120	M1
Fluoride	mg/L	ND	2.5	3.1	116	80-120	
Sulfate	mg/L	223	100	354	131	80-120	M1

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## QUALIFIERS

Project: AMEREN VS LCL1

Pace Project No.: 60392702

---

### 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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

### 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 VS LCL1

Pace Project No.: 60392702

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60392702001	L-TMW-2	EPA 200.7	771128	EPA 200.7	771338
60392702002	L-MW-26	EPA 200.7	771128	EPA 200.7	771338
60392702003	L-LCL1-FB-1	EPA 200.7	771128	EPA 200.7	771338
60392702004	L-LCL1-DUP-1	EPA 200.7	771128	EPA 200.7	771338
60392702001	L-TMW-2	SM 2540C	771427		
60392702002	L-MW-26	SM 2540C	771427		
60392702003	L-LCL1-FB-1	SM 2540C	771427		
60392702004	L-LCL1-DUP-1	SM 2540C	771592		
60392702001	L-TMW-2	EPA 300.0	771702		
60392702002	L-MW-26	EPA 300.0	771702		
60392702003	L-LCL1-FB-1	EPA 300.0	771702		
60392702004	L-LCL1-DUP-1	EPA 300.0	772728		

**REPORT OF LABORATORY ANALYSIS**

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DC#\_ Title: ENV-FRM-LENE-0009\_Sample

Revision: 2

Effective Date: 01/12/2022

WO#: 60392702



60392702

Client Name: Colder

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: T299 Type of Ice: Wet Blue  None

Cooler Temperature (°C): As-read 1.4 Corr. Factor 0.2 Corrected 1.2

Temperature should be above freezing to 6°C 0.7

Date and initials of person examining contents: 02-12-2022 42

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? (I INO <sub>3</sub> , I I <sub>2</sub> SO <sub>4</sub> , I ICI<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: \_\_\_\_\_ Date: \_\_\_\_\_



## MEMORANDUM

**DATE** March 2, 2022

**Project No.** 153140604.0001

**TO** Project File  
Golder Associates

**CC** Amanda Derhake, Jeff Ingram

**FROM** Annie Muehlfarth

**EMAIL** [AMuehlfarth@golder.com](mailto:AMuehlfarth@golder.com)

### **DATA VALIDATION SUMMARY, LABADIE ENERGY CENTER – LCL1 – VERIFICATION SAMPLING - DATA PACKAGE 60392702**

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 duplicate criterion was not met, the associated sample result was qualified as an estimate (J for detects, UJ for non-detects).

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates USA Inc / WSP  
 Project Name: Ameren- Labadie - LCL1  
 Reviewer: A. Muehlfarth

Project Manager: J. Ingram  
 Project Number: 153140604  
 Validation Date: 3/2/2022

Laboratory: Pace Analytical Services - Kansas City SDG #: 60392702  
 Analytical Method (type and no.): EPA 200.7 (Total Metals), SM 2540C (TDS), EPA 300.0 (Anions)  
 Matrix:  Air  Soil/Sed.  Water  Waste   
 Sample Names L-TMW-2, L-MW-26, L-LCL1-FB-1, L-LCL1-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>2/10/2022</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>BTT</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 (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"/>	<u>See Notes</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>				

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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>

## 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 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"/>	L-LCL1-DUP-1 @ L-TMW-2
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"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max RPD: 5% [<10%]

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"/>	
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"/>	
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:**

Calcium, chloride, and sulfate analyzed at a dilution in multiple samples, no qualification necessary.

**Blanks:**

L-LCL1-FB-1 @ L-MW-26: Calcium (91.1J), associated sample result >RL and >10x blank, no qualification necessary.

**Duplicates:**

L-LCL1-DUP-1 @ L-TMW-2: RPD for TDS (24.8%) exceeds limit (20%). Fluoride detected in sample, ND in duplicate.

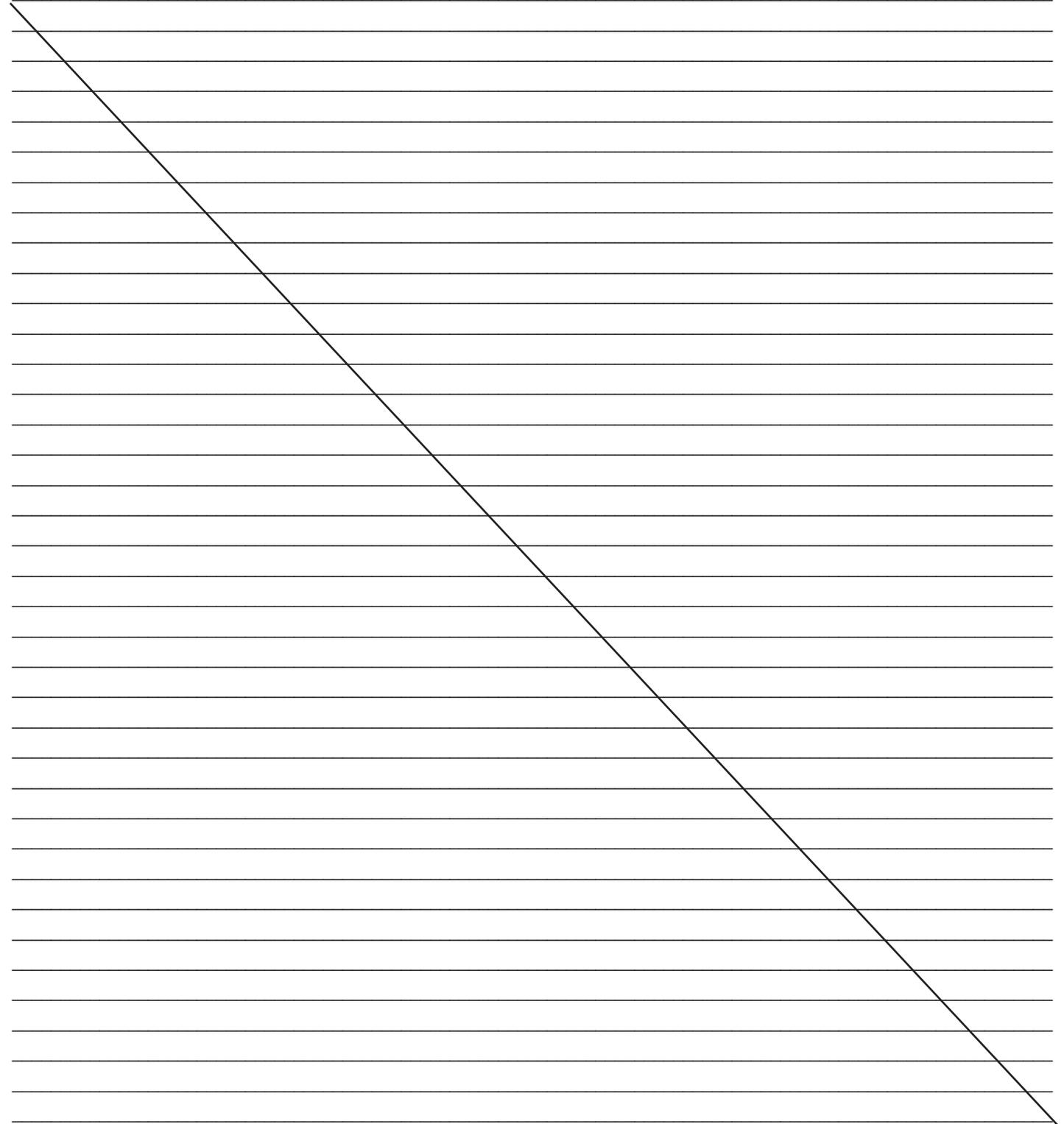
## QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

### Comments/Notes:

MS/MSD:

3079102/3079103: MS/MSD % recovery high for calcium. Associated with sample 60392702001, sample result >4x spike concentration, no qualification necessary.

3085027: MS % recovery high for chloride, sulfate. MS performed on unrelated sample, no qualification necessary.





June 05, 2022

Jeffrey Ingram  
Golder Associates  
701 Emerson Road, Suite 250  
Saint Louis, MO 63141

RE: Project: AMEREN LEC LCL1  
Pace Project No.: 60397403

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between April 08, 2022 and April 12, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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  
Brendan Talbert, Golder Associates



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

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### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 20-020-0

Arkansas Drinking Water

Illinois Certification #: 2000302021-3

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 #: T104704407-21-15

Utah Certification #: KS000212019-9

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60397403001	L-TMW-1	Water	04/11/22 12:56	04/12/22 04:53
60397403002	L-TMW-2	Water	04/11/22 11:07	04/12/22 04:53
60397403003	L-TMW-3	Water	04/11/22 14:38	04/12/22 04:53
60397403004	L-UWL-DUP-1	Water	04/11/22 08:00	04/12/22 04:53
60397403005	L-UWL-FB-1	Water	04/11/22 14:53	04/12/22 04:53
60397347006	L-MW-26	Water	04/07/22 13:41	04/08/22 05:28
60397347013	L-BMW-1S	Water	04/06/22 11:18	04/08/22 05:28
60397347014	L-BMW-2S	Water	04/06/22 13:27	04/08/22 05:28

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### SAMPLE ANALYTE COUNT

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60397403001	L-TMW-1	EPA 200.7	JLH	7	PASI-K
		SM 2320B	SB2	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397403002	L-TMW-2	EPA 200.7	JLH	7	PASI-K
		SM 2320B	SB2	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397403003	L-TMW-3	EPA 200.7	JLH	7	PASI-K
		SM 2320B	SB2	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397403004	L-UWL-DUP-1	EPA 200.7	JLH	7	PASI-K
		SM 2320B	SB2	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397403005	L-UWL-FB-1	EPA 200.7	JLH	7	PASI-K
		SM 2320B	SB2	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397347006	L-MW-26	EPA 200.7	JLH	7	PASI-K
		SM 2320B	KB	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	KB	3	PASI-K
60397347013	L-BMW-1S	EPA 200.7	JLH	7	PASI-K
		SM 2320B	KB	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60397347014	L-BMW-2S	EPA 200.7	JLH	7	PASI-K
		SM 2320B	KB	1	PASI-K
		SM 2540C	TNB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-TMW-1**      **Lab ID: 60397403001**      Collected: 04/11/22 12:56      Received: 04/12/22 04:53      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>114</b>	ug/L	100	7.1	1	04/21/22 15:13	04/22/22 17:54	7440-42-8	
Calcium	<b>165000</b>	ug/L	200	38.2	1	04/21/22 15:13	04/25/22 16:40	7440-70-2	
Iron	<b>38.5J</b>	ug/L	50.0	21.1	1	04/21/22 15:13	04/22/22 17:54	7439-89-6	
Magnesium	<b>40800</b>	ug/L	50.0	11.7	1	04/21/22 15:13	04/22/22 17:54	7439-95-4	
Manganese	<b>1510</b>	ug/L	5.0	1.1	1	04/21/22 15:13	04/22/22 17:54	7439-96-5	
Potassium	<b>5000</b>	ug/L	500	224	1	04/21/22 15:13	04/22/22 17:54	7440-09-7	
Sodium	<b>10100</b>	ug/L	500	166	1	04/21/22 15:13	04/22/22 17:54	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>524</b>	mg/L	20.0	4.6	1		04/20/22 11:22		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>653</b>	mg/L	10.0	10.0	1		04/15/22 16:10		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>2.9</b>	mg/L	1.0	0.53	1		04/27/22 22:10	16887-00-6	B
Fluoride	<b>0.21</b>	mg/L	0.20	0.12	1		04/27/22 22:10	16984-48-8	
Sulfate	<b>91.9</b>	mg/L	10.0	5.5	10		04/27/22 22:24	14808-79-8	

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-TMW-2**      **Lab ID: 60397403002**      Collected: 04/11/22 11:07      Received: 04/12/22 04:53      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>110</b>	ug/L	100	7.1	1	04/21/22 15:13	04/22/22 17:56	7440-42-8	
Calcium	<b>220000</b>	ug/L	200	38.2	1	04/21/22 15:13	04/25/22 16:43	7440-70-2	M1
Iron	<b>466</b>	ug/L	50.0	21.1	1	04/21/22 15:13	04/22/22 17:56	7439-89-6	
Magnesium	<b>56300</b>	ug/L	50.0	43.0	1	04/21/22 15:13	04/25/22 16:43	7439-95-4	
Manganese	<b>3200</b>	ug/L	5.0	1.1	1	04/21/22 15:13	04/22/22 17:56	7439-96-5	
Potassium	<b>7050</b>	ug/L	500	224	1	04/21/22 15:13	04/22/22 17:56	7440-09-7	
Sodium	<b>12500</b>	ug/L	500	166	1	04/21/22 15:13	04/22/22 17:56	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>620</b>	mg/L	20.0	4.6	1		04/20/22 11:30		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>975</b>	mg/L	13.3	13.3	1		04/15/22 16:10		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>11.9</b>	mg/L	1.0	0.53	1		04/27/22 22:37	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		04/27/22 22:37	16984-48-8	
Sulfate	<b>197</b>	mg/L	20.0	11.0	20		04/28/22 00:01	14808-79-8	

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-TMW-3**      **Lab ID: 60397403003**      Collected: 04/11/22 14:38      Received: 04/12/22 04:53      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>116</b>	ug/L	100	7.1	1	04/21/22 15:13	04/22/22 18:03	7440-42-8	
Calcium	<b>141000</b>	ug/L	200	38.2	1	04/21/22 15:13	04/25/22 17:00	7440-70-2	
Iron	<b>735</b>	ug/L	50.0	21.1	1	04/21/22 15:13	04/22/22 18:03	7439-89-6	
Magnesium	<b>27700</b>	ug/L	50.0	11.7	1	04/21/22 15:13	04/22/22 18:03	7439-95-4	
Manganese	<b>241</b>	ug/L	5.0	1.1	1	04/21/22 15:13	04/22/22 18:03	7439-96-5	
Potassium	<b>6160</b>	ug/L	500	224	1	04/21/22 15:13	04/22/22 18:03	7440-09-7	
Sodium	<b>9550</b>	ug/L	500	166	1	04/21/22 15:13	04/22/22 18:03	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>469</b>	mg/L	20.0	4.6	1		04/20/22 11:46		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>684</b>	mg/L	10.0	10.0	1		04/15/22 16:11		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>2.5</b>	mg/L	1.0	0.53	1		04/28/22 00:56	16887-00-6	B
Fluoride	<b>0.20J</b>	mg/L	0.20	0.12	1		04/28/22 00:56	16984-48-8	
Sulfate	<b>27.8</b>	mg/L	10.0	5.5	10		04/28/22 01:10	14808-79-8	

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-UWL-DUP-1**      **Lab ID: 60397403004**      Collected: 04/11/22 08:00      Received: 04/12/22 04:53      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>113</b>	ug/L	100	7.1	1	04/21/22 15:13	04/22/22 18:05	7440-42-8	
Calcium	<b>169000</b>	ug/L	200	38.2	1	04/21/22 15:13	04/25/22 17:03	7440-70-2	
Iron	<b>211</b>	ug/L	50.0	21.1	1	04/21/22 15:13	04/22/22 18:05	7439-89-6	
Magnesium	<b>40800</b>	ug/L	50.0	11.7	1	04/21/22 15:13	04/22/22 18:05	7439-95-4	
Manganese	<b>2290</b>	ug/L	5.0	1.1	1	04/21/22 15:13	04/22/22 18:05	7439-96-5	
Potassium	<b>4990</b>	ug/L	500	224	1	04/21/22 15:13	04/22/22 18:05	7440-09-7	
Sodium	<b>10200</b>	ug/L	500	166	1	04/21/22 15:13	04/22/22 18:05	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>527</b>	mg/L	20.0	4.6	1		04/20/22 11:53		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>603</b>	mg/L	10.0	10.0	1		04/15/22 16:11		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>2.9</b>	mg/L	1.0	0.53	1		04/28/22 01:24	16887-00-6	B
Fluoride	<b>0.23</b>	mg/L	0.20	0.12	1		04/28/22 01:24	16984-48-8	
Sulfate	<b>90.4</b>	mg/L	10.0	5.5	10		04/28/22 01:38	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-UWL-FB-1**      **Lab ID: 60397403005**      Collected: 04/11/22 14:53      Received: 04/12/22 04:53      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<7.1	ug/L	100	7.1	1	04/21/22 15:13	04/22/22 18:07	7440-42-8	
Calcium	<71.3	ug/L	200	71.3	1	04/21/22 15:13	04/22/22 18:07	7440-70-2	
Iron	<21.1	ug/L	50.0	21.1	1	04/21/22 15:13	04/22/22 18:07	7439-89-6	
Magnesium	<11.7	ug/L	50.0	11.7	1	04/21/22 15:13	04/22/22 18:07	7439-95-4	
Manganese	<1.1	ug/L	5.0	1.1	1	04/21/22 15:13	04/22/22 18:07	7439-96-5	
Potassium	<224	ug/L	500	224	1	04/21/22 15:13	04/22/22 18:07	7440-09-7	
Sodium	<166	ug/L	500	166	1	04/21/22 15:13	04/22/22 18:07	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<4.6	mg/L	20.0	4.6	1		04/20/22 12:12		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	5.0	mg/L	5.0	5.0	1		04/15/22 16:11		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	0.62J	mg/L	1.0	0.53	1		04/28/22 01:51	16887-00-6	B
Fluoride	<0.12	mg/L	0.20	0.12	1		04/28/22 01:51	16984-48-8	
Sulfate	<0.55	mg/L	1.0	0.55	1		04/28/22 01:51	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-MW-26**      **Lab ID: 60397347006**      Collected: 04/07/22 13:41      Received: 04/08/22 05:28      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>96.8J</b>	ug/L	100	13.5	1	04/19/22 13:10	04/21/22 19:06	7440-42-8	
Calcium	<b>140000</b>	ug/L	200	38.2	1	04/19/22 13:10	04/21/22 19:06	7440-70-2	
Iron	<b>&lt;23.9</b>	ug/L	50.0	23.9	1	04/19/22 13:10	04/21/22 19:06	7439-89-6	
Magnesium	<b>26300</b>	ug/L	50.0	43.0	1	04/19/22 13:10	04/21/22 19:06	7439-95-4	
Manganese	<b>115</b>	ug/L	5.0	3.8	1	04/19/22 13:10	04/21/22 19:06	7439-96-5	
Potassium	<b>4040</b>	ug/L	500	167	1	04/19/22 13:10	04/21/22 19:06	7440-09-7	
Sodium	<b>5960</b>	ug/L	500	64.8	1	04/19/22 13:10	04/21/22 19:06	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>414</b>	mg/L	20.0	4.6	1		04/16/22 08:41		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>498</b>	mg/L	10.0	10.0	1		04/14/22 16:03		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>5.9</b>	mg/L	1.0	0.53	1		04/20/22 19:02	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		04/20/22 19:02	16984-48-8	
Sulfate	<b>29.0</b>	mg/L	2.0	1.1	2		04/20/22 19:16	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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**ANALYTICAL RESULTS**

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-BMW-1S**      **Lab ID: 60397347013**      Collected: 04/06/22 11:18      Received: 04/08/22 05:28      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>109</b>	ug/L	100	13.5	1	04/19/22 13:10	04/21/22 19:39	7440-42-8	
Calcium	<b>221000</b>	ug/L	200	38.2	1	04/19/22 13:10	04/21/22 19:39	7440-70-2	
Iron	<b>24800</b>	ug/L	50.0	23.9	1	04/19/22 13:10	04/21/22 19:39	7439-89-6	
Magnesium	<b>53100</b>	ug/L	50.0	43.0	1	04/19/22 13:10	04/21/22 19:39	7439-95-4	
Manganese	<b>2740</b>	ug/L	5.0	3.8	1	04/19/22 13:10	04/21/22 19:39	7439-96-5	
Potassium	<b>5920</b>	ug/L	500	167	1	04/19/22 13:10	04/21/22 19:39	7440-09-7	
Sodium	<b>20700</b>	ug/L	500	64.8	1	04/19/22 13:10	04/21/22 19:39	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>&lt;4.6</b>	mg/L	20.0	4.6	1		04/16/22 07:31		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>828</b>	mg/L	10.0	10.0	1		04/14/22 16:02		H1
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>2.5</b>	mg/L	1.0	0.53	1		04/26/22 22:09	16887-00-6	B
Fluoride	<b>0.20J</b>	mg/L	0.20	0.12	1		04/26/22 22:09	16984-48-8	
Sulfate	<b>38.6</b>	mg/L	10.0	5.5	10		04/26/22 22:23	14808-79-8	

**REPORT OF LABORATORY ANALYSIS**

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

**Sample: L-BMW-2S**      **Lab ID: 60397347014**      Collected: 04/06/22 13:27      Received: 04/08/22 05:28      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>55.2J</b>	ug/L	100	13.5	1	04/19/22 13:10	04/21/22 19:41	7440-42-8	
Calcium	<b>138000</b>	ug/L	200	38.2	1	04/19/22 13:10	04/21/22 19:41	7440-70-2	
Iron	<b>&lt;23.9</b>	ug/L	50.0	23.9	1	04/19/22 13:10	04/21/22 19:41	7439-89-6	
Magnesium	<b>20900</b>	ug/L	50.0	43.0	1	04/19/22 13:10	04/21/22 19:41	7439-95-4	
Manganese	<b>6.4</b>	ug/L	5.0	3.8	1	04/19/22 13:10	04/21/22 19:41	7439-96-5	
Potassium	<b>5790</b>	ug/L	500	167	1	04/19/22 13:10	04/21/22 19:41	7440-09-7	
Sodium	<b>4340</b>	ug/L	500	64.8	1	04/19/22 13:10	04/21/22 19:41	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>403</b>	mg/L	20.0	4.6	1		04/16/22 07:35		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>513</b>	mg/L	10.0	10.0	1		04/14/22 16:02		H1
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>2.5</b>	mg/L	1.0	0.53	1		04/26/22 22:37	16887-00-6	B
Fluoride	<b>0.19J</b>	mg/L	0.20	0.12	1		04/26/22 22:37	16984-48-8	
Sulfate	<b>45.7</b>	mg/L	5.0	2.8	5		04/27/22 10:05	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1  
Pace Project No.: 60397403

QC Batch: 782070 Analysis Method: EPA 200.7  
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
Laboratory: Pace Analytical Services - Kansas City  
Associated Lab Samples: 60397347006, 60397347013, 60397347014

METHOD BLANK: 3119106 Matrix: Water  
Associated Lab Samples: 60397347006, 60397347013, 60397347014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<13.5	100	13.5	04/21/22 18:32	
Calcium	ug/L	<38.2	200	38.2	04/21/22 18:32	
Iron	ug/L	<23.9	50.0	23.9	04/21/22 18:32	
Magnesium	ug/L	<43.0	50.0	43.0	04/21/22 18:32	
Manganese	ug/L	<3.8	5.0	3.8	04/21/22 18:32	
Potassium	ug/L	<167	500	167	04/21/22 18:32	
Sodium	ug/L	<64.8	500	64.8	04/22/22 11:39	

LABORATORY CONTROL SAMPLE: 3119107

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1020	102	85-115	
Calcium	ug/L	10000	10400	104	85-115	
Iron	ug/L	10000	9940	99	85-115	
Magnesium	ug/L	10000	10400	104	85-115	
Manganese	ug/L	1000	1060	106	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	9980	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3119108 3119109

Parameter	Units	60397347001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	% Rec					
Boron	ug/L	3330	1000	1000	4050	4310	71	97	70-130	6	20		
Calcium	ug/L	69700	10000	10000	74400	78800	47	91	70-130	6	20 M1		
Iron	ug/L	<23.9	10000	10000	9200	9670	92	97	70-130	5	20		
Magnesium	ug/L	89.9	10000	10000	9540	10000	94	100	70-130	5	20		
Manganese	ug/L	<3.8	1000	1000	970	1020	97	102	70-130	5	20		
Potassium	ug/L	9260	10000	10000	17900	18900	86	96	70-130	5	20		
Sodium	ug/L	64000	10000	10000	68200	72400	42	84	70-130	6	20 M1		

MATRIX SPIKE SAMPLE: 3119110

Parameter	Units	60397347011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	<13.5	1000	1030	102	70-130	
Calcium	ug/L	<38.2	10000	10300	103	70-130	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

MATRIX SPIKE SAMPLE:		3119110					
Parameter	Units	60397347011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	<23.9	10000	9670	97	70-130	
Magnesium	ug/L	<43.0	10000	10300	103	70-130	
Manganese	ug/L	<3.8	1000	1050	105	70-130	
Potassium	ug/L	<167	10000	9960	100	70-130	
Sodium	ug/L	<64.8	10000	9780	97	70-130	

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 782602 Analysis Method: EPA 200.7  
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
 Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

METHOD BLANK: 3120948 Matrix: Water

Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<7.1	100	7.1	04/22/22 17:27	
Calcium	ug/L	<38.2	200	38.2	04/22/22 17:27	
Iron	ug/L	<21.1	50.0	21.1	04/22/22 17:27	
Magnesium	ug/L	<11.7	50.0	11.7	04/22/22 17:27	
Manganese	ug/L	<1.1	5.0	1.1	04/22/22 17:27	
Potassium	ug/L	<224	500	224	04/22/22 17:27	
Sodium	ug/L	<166	500	166	04/22/22 17:27	

LABORATORY CONTROL SAMPLE: 3120949

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	2000	1830	92	85-115	
Calcium	ug/L	20000	18900	94	85-115	
Iron	ug/L	20000	18900	95	85-115	
Magnesium	ug/L	20000	19000	95	85-115	
Manganese	ug/L	2000	1910	96	85-115	
Potassium	ug/L	20000	19100	95	85-115	
Sodium	ug/L	20000	19100	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3120950 3120951

Parameter	Units	60397479003		3120951		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Boron	ug/L	2350	1000	1000	3370	3360	102	101	70-130	0	20
Calcium	ug/L	105000	10000	10000	116000	116000	106	110	70-130	0	20
Iron	ug/L	11200	10000	10000	21300	20900	101	97	70-130	2	20
Magnesium	ug/L	20200	10000	10000	29400	29000	92	88	70-130	1	20
Manganese	ug/L	1310	1000	1000	2340	2300	103	100	70-130	1	20
Potassium	ug/L	5200	10000	10000	15500	15400	103	102	70-130	1	20
Sodium	ug/L	17100	10000	10000	27700	27500	106	104	70-130	1	20

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3120952 3120953

Parameter	Units	60397403002		3120953		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Boron	ug/L	110	1000	1000	1080	1080	97	97	70-130	0	20

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

Parameter	Units	3120952		3120953		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60397403002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Calcium	ug/L	220000	10000	10000	228000	226000	77	59	70-130	1	20	M1	
Iron	ug/L	466	10000	10000	10000	10100	96	96	70-130	0	20		
Magnesium	ug/L	56300	10000	10000	65000	65000	87	87	70-130	0	20		
Manganese	ug/L	3200	1000	1000	4100	4150	90	95	70-130	1	20		
Potassium	ug/L	7050	10000	10000	17500	17400	105	104	70-130	0	20		
Sodium	ug/L	12500	10000	10000	22800	22900	103	104	70-130	0	20		

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 781580	Analysis Method: SM 2320B
QC Batch Method: SM 2320B	Analysis Description: 2320B Alkalinity
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397347006, 60397347013, 60397347014

METHOD BLANK: 3117114 Matrix: Water

Associated Lab Samples: 60397347006, 60397347013, 60397347014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.6	20.0	4.6	04/15/22 16:07	

LABORATORY CONTROL SAMPLE: 3117115

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	496	99	90-110	

SAMPLE DUPLICATE: 3117116

Parameter	Units	60397346006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	408	406	0	10	

SAMPLE DUPLICATE: 3117118

Parameter	Units	60397347001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	34.3	35.0	2	10	

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch:	782260	Analysis Method:	SM 2320B
QC Batch Method:	SM 2320B	Analysis Description:	2320B Alkalinity
		Laboratory:	Pace Analytical Services - Kansas City

Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

METHOD BLANK: 3119662 Matrix: Water  
Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.6	20.0	4.6	04/20/22 10:52	

LABORATORY CONTROL SAMPLE: 3119663

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	475	95	90-110	

SAMPLE DUPLICATE: 3119664

Parameter	Units	60397403002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	620	622	0	10	

SAMPLE DUPLICATE: 3119665

Parameter	Units	60397347017 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	139	137	1	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 781487	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397347006, 60397347013, 60397347014

METHOD BLANK: 3116838 Matrix: Water  
Associated Lab Samples: 60397347006, 60397347013, 60397347014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/14/22 16:01	

LABORATORY CONTROL SAMPLE: 3116839

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	891	89	80-120	

SAMPLE DUPLICATE: 3116840

Parameter	Units	60397347029 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	14.0	11.0	24	10	D6

SAMPLE DUPLICATE: 3116841

Parameter	Units	60397347030 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	795	784	1	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 781721	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

METHOD BLANK: 3117705 Matrix: Water

Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/15/22 16:10	

LABORATORY CONTROL SAMPLE: 3117706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	873	87	80-120	

SAMPLE DUPLICATE: 3117707

Parameter	Units	60397403002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	975	939	4	10	

SAMPLE DUPLICATE: 3117708

Parameter	Units	60397683001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	374	363	3	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 782267

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397347006

METHOD BLANK: 3119718

Matrix: Water

Associated Lab Samples: 60397347006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	04/20/22 08:07	
Fluoride	mg/L	<0.12	0.20	0.12	04/20/22 08:07	
Sulfate	mg/L	<0.55	1.0	0.55	04/20/22 08:07	

METHOD BLANK: 3121096

Matrix: Water

Associated Lab Samples: 60397347006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	04/21/22 09:52	
Fluoride	mg/L	<0.12	0.20	0.12	04/21/22 09:52	
Sulfate	mg/L	<0.55	1.0	0.55	04/21/22 09:52	

LABORATORY CONTROL SAMPLE: 3119719

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	2.6	103	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

LABORATORY CONTROL SAMPLE: 3121097

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	91	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	4.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3119720

3119721

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60394153001 Result	Spike Conc.	Spike Conc.	Conc.								
Chloride	mg/L	ND	250	250	246	245	85	85	80-120	1	15	H1	
Fluoride	mg/L	ND	125	125	128	129	103	103	80-120	0	15	H1	
Sulfate	mg/L	198	250	250	439	439	96	96	80-120	0	15	H1	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 782513

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60397347013, 60397347014

METHOD BLANK: 3120630

Matrix: Water

Associated Lab Samples: 60397347013, 60397347014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.63J	1.0	0.53	04/26/22 12:57	
Fluoride	mg/L	<0.12	0.20	0.12	04/26/22 12:57	
Sulfate	mg/L	<0.55	1.0	0.55	04/26/22 12:57	

METHOD BLANK: 3124994

Matrix: Water

Associated Lab Samples: 60397347013, 60397347014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.61J	1.0	0.53	04/27/22 09:06	
Fluoride	mg/L	<0.12	0.20	0.12	04/27/22 09:06	
Sulfate	mg/L	<0.55	1.0	0.55	04/27/22 09:06	

LABORATORY CONTROL SAMPLE: 3120631

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	4.8	97	90-110	

LABORATORY CONTROL SAMPLE: 3124995

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	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3120632

3120633

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60397347001 Result	Spike Conc.	Spike Conc.	Conc.								
Chloride	mg/L	17.4	5	5	25.3	22.7	157	105	80-120	11	15	E,M1	
Fluoride	mg/L	0.16J	2.5	2.5	4.0	2.6	153	98	80-120	42	15	M1,R1	
Sulfate	mg/L	263	250	250	505	506	97	97	80-120	0	15		

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

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

SAMPLE DUPLICATE: 3120634

Parameter	Units	60397347001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	17.4	17.5	0	15	
Fluoride	mg/L	0.16J	<0.12		15	
Sulfate	mg/L	263	266	1	15	

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

QC Batch: 783373 Analysis Method: EPA 300.0  
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
 Laboratory: Pace Analytical Services - Kansas City  
 Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

METHOD BLANK: 3123953 Matrix: Water  
 Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.61J	1.0	0.53	04/27/22 14:36	
Fluoride	mg/L	<0.12	0.20	0.12	04/27/22 14:36	
Sulfate	mg/L	<0.55	1.0	0.55	04/27/22 14:36	

METHOD BLANK: 3127055 Matrix: Water  
 Associated Lab Samples: 60397403001, 60397403002, 60397403003, 60397403004, 60397403005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.60J	1.0	0.53	04/28/22 09:00	
Fluoride	mg/L	<0.12	0.20	0.12	04/28/22 09:00	
Sulfate	mg/L	<0.55	1.0	0.55	04/28/22 09:00	

LABORATORY CONTROL SAMPLE: 3123954

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	101	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

LABORATORY CONTROL SAMPLE: 3127056

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	100	90-110	
Sulfate	mg/L	5	4.8	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3123955 3123956

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60397403002	Result	Spike Conc.	Spike Conc.								
Chloride	mg/L	11.9	5	5	17.0	16.8	103	98	80-120	1	15		
Fluoride	mg/L	<0.12	2.5	2.5	2.4	2.3	95	90	80-120	6	15		
Sulfate	mg/L	197	100	100	294	293	97	96	80-120	0	15		

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

SAMPLE DUPLICATE: 3123957

Parameter	Units	60397403002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	11.9	11.9	0	15	
Fluoride	mg/L	<0.12	0.28		15	
Sulfate	mg/L	197	193	2	15	

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## QUALIFIERS

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

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### 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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

### 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.

H1 Analysis conducted outside the EPA method holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN LEC LCL1

Pace Project No.: 60397403

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60397347006	L-MW-26	EPA 200.7	782070	EPA 200.7	782144
60397347013	L-BMW-1S	EPA 200.7	782070	EPA 200.7	782144
60397347014	L-BMW-2S	EPA 200.7	782070	EPA 200.7	782144
60397403001	L-TMW-1	EPA 200.7	782602	EPA 200.7	782675
60397403002	L-TMW-2	EPA 200.7	782602	EPA 200.7	782675
60397403003	L-TMW-3	EPA 200.7	782602	EPA 200.7	782675
60397403004	L-UWL-DUP-1	EPA 200.7	782602	EPA 200.7	782675
60397403005	L-UWL-FB-1	EPA 200.7	782602	EPA 200.7	782675
60397347006	L-MW-26	SM 2320B	781580		
60397347013	L-BMW-1S	SM 2320B	781580		
60397347014	L-BMW-2S	SM 2320B	781580		
60397403001	L-TMW-1	SM 2320B	782260		
60397403002	L-TMW-2	SM 2320B	782260		
60397403003	L-TMW-3	SM 2320B	782260		
60397403004	L-UWL-DUP-1	SM 2320B	782260		
60397403005	L-UWL-FB-1	SM 2320B	782260		
60397347006	L-MW-26	SM 2540C	781487		
60397347013	L-BMW-1S	SM 2540C	781487		
60397347014	L-BMW-2S	SM 2540C	781487		
60397403001	L-TMW-1	SM 2540C	781721		
60397403002	L-TMW-2	SM 2540C	781721		
60397403003	L-TMW-3	SM 2540C	781721		
60397403004	L-UWL-DUP-1	SM 2540C	781721		
60397403005	L-UWL-FB-1	SM 2540C	781721		
60397347006	L-MW-26	EPA 300.0	782267		
60397347013	L-BMW-1S	EPA 300.0	782513		
60397347014	L-BMW-2S	EPA 300.0	782513		
60397403001	L-TMW-1	EPA 300.0	783373		
60397403002	L-TMW-2	EPA 300.0	783373		
60397403003	L-TMW-3	EPA 300.0	783373		
60397403004	L-UWL-DUP-1	EPA 300.0	783373		
60397403005	L-UWL-FB-1	EPA 300.0	783373		

### REPORT OF LABORATORY ANALYSIS

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DC#\_Title: ENV-FRM-LENE-0009\_Sample Co

Revision: 2

Effective Date: 01/12/2022

Issued By: Lenexa

Client Name: Golden

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

Tracking #: \_\_\_\_\_ Pace Shipping Label Used? Yes  No

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

Packing Material: Bubble Wrap  Bubble Bags  Foam  None  Other

Thermometer Used: T-301 Type of Ice: Wet Blue  None

Cooler Temperature (°C): As-read 3.4/2.7 Corr. Factor -0.2 Corrected 2.4/1.7  
 Temperature should be above freezing to 6°C -1.0

Date and initials of person examining contents:  
PV 4/12/22

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	
Rush Turn Around Time requested:	<input checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT#: <u>55192</u>	<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: \_\_\_\_\_ Date: \_\_\_\_\_





## MEMORANDUM

**DATE** June 7, 2022

**Project No.** 153140604.0001

**TO** Project File  
Golder Associates

**CC** Amanda Derhake, Jeff Ingram

**FROM** Annie Muehlfarth

**EMAIL** [ann.muehlfarth@wsp.com](mailto:ann.muehlfarth@wsp.com)

### **DATA VALIDATION SUMMARY, LABADIE ENERGY CENTER – LCL1 – DETECTION MONITORING - DATA PACKAGE 60397403**

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 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 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 duplicate criterion was not met, the associated sample result was qualified as an estimate (J for detects, UJ for non-detects).
- When a compound was analyzed outside of hold time, associated sample results were qualified as estimates (J for detects, UJ for non-detects).

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates USA Inc  
 Project Name: Ameren - LEC - LCL1  
 Reviewer: A. Muehlfarth

Project Manager: J. Ingram  
 Project Number: GL153140604.0001  
 Validation Date: 6/7/2022

Laboratory: Pace Analytical SDG #: 60397403  
 Analytical Method (type and no.): EPA 200.7 (Total Metals); SM2320B (Alkalinity); SM2540C (TDS); EPA 300.0 (Anions)  
 Matrix:  Air  Soil/Sed.  Water  Waste   
 Sample Names L-TMW-1, L-TMW-2, L-TMW-3, L-UWL-DUP-1, L-UWL-FB-1, L-MW-26, L-BMW-1S, L-BMW-2S

**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>4/6/2022 - 4/11/2022</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>EMS/GTM/BTT</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 (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"/>	<u>See Notes</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>				

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

<b>Blanks</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Laboratory Control Sample (LCS)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Duplicates</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L-UWL-DUP-1 @ L-TMW-1
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"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Notes

<b>Blind Standards</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Matrix Spike/Matrix Spike Duplicate (MS/MSD)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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:**

TDS analyzed outside of hold time in samples -013 and -014. Results qualified as estimates.

Sulfate analyzed at a dilution in multiple samples, no qualification necessary.

**Blanks:**

MB 3120630: Chloride (0.63J), associated with samples -013 and -014. Sample results >RL but <10x blank, qualified as estimates.

MB 3124994: Chloride (0.61J), associated with samples -013 and -014. Sample results >RL but <10x blank, qualified as estimates.

## QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

### Comments/Notes:

MB 3123953: Chloride (0.61J), associated with samples -001 through -005. Results >RL but <10x blank were qualified as estimates. Results >10x blank and RL not qualified. Results >RL were reported at RL and qualified as estimates.

MB 3127055: Chloride (0.60J), associated with samples -001 through -005. See notes above.

L-UWL-FB-1 @ L-TMW-3: TDS (5.0), chloride (0.62J). TDS result >10x blank and RL, no qualification necessary. Chloride result >RL but <10x blank, qualified as an estimate.

### Duplicates:

L-UWL-DUP-1 @ L-TMW-1: RPD exceeds limit (20%) for iron (138.3%) and manganese (41.1%).

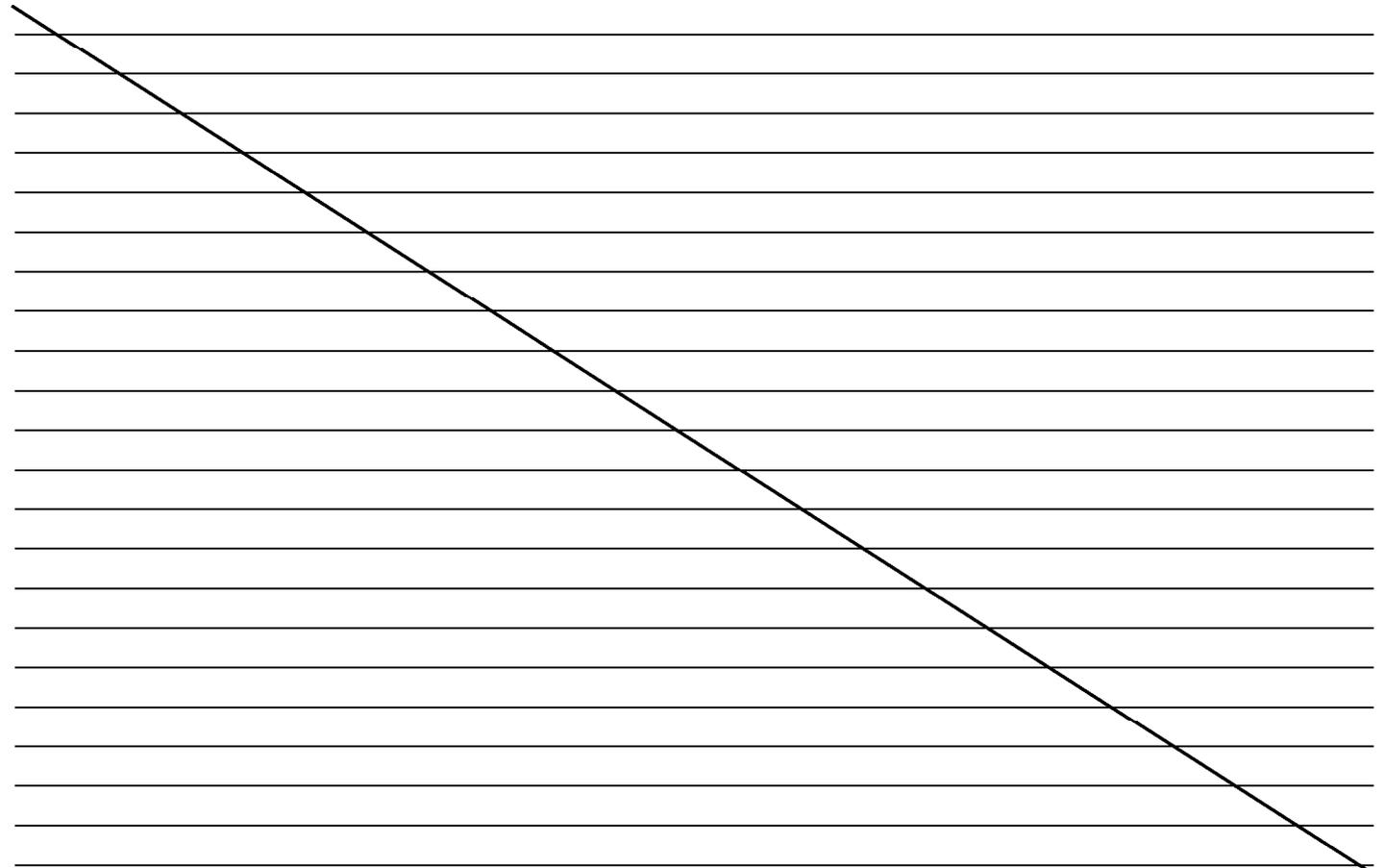
Sample Duplicate 3116840: RPD exceeds limit (10%) fro TDS (24%). Performed on unrelated sample, no qualification necessary.

### MS/MSD:

3119108/3119109: MS % recovery low for calcium and sodium, MS/MSD performed on unrelated sample, no qualification necessary.

3120952/3120953: MSD % recovery low for calcium, associated with sample -002. Only 1 QC indicator outside of control limits, no qualification necessary.

3120632/3120633: MS % recovery high for chloride. MS % recovery and RPD high for fluoride. MS/MSD performed on unrelated sample, no qualification necessary.





July 08, 2022

Jeffrey Ingram  
Golder Associates  
701 Emerson Road, Suite 250  
Saint Louis, MO 63141

RE: Project: AMEREN VERIFICATION LCL1  
Pace Project No.: 60403844

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on June 23, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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  
Brendan Talbert, Golder Associates



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

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### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 22-031-0

Arkansas Drinking Water

Illinois Certification #: 2000302021-3

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 #: T104704407-21-15

Utah Certification #: KS000212019-9

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60403844001	HOLD	Water	06/22/22 00:00	06/23/22 03:57
60403836010	L-TMW-2	Water	06/22/22 09:21	06/23/22 03:57
60403836011	L-LCL1-DUP-1	Water	06/22/22 08:00	06/23/22 03:57
60403836012	L-LCL1-FB-1	Water	06/22/22 09:36	06/23/22 03:57

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60403836010	L-TMW-2	EPA 200.7	MA1	1	PASI-K
		SM 2540C	SK	1	PASI-K
		EPA 300.0	KB	2	PASI-K
60403836011	L-LCL1-DUP-1	EPA 200.7	MA1	1	PASI-K
		SM 2540C	SK	1	PASI-K
		EPA 300.0	KB	2	PASI-K
60403836012	L-LCL1-FB-1	EPA 200.7	MA1	1	PASI-K
		SM 2540C	SK	1	PASI-K
		EPA 300.0	KB	2	PASI-K

PASI-K = Pace Analytical Services - Kansas City

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

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**Sample: L-TMW-2**      **Lab ID: 60403836010**    Collected: 06/22/22 09:21    Received: 06/23/22 03:57    Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>	Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Calcium	<b>215000</b>	ug/L	200	33.7	1	06/28/22 02:41	07/07/22 16:31	7440-70-2	M1
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>940</b>	mg/L	13.3	13.3	1		06/29/22 11:26		
<b>300.0 IC Anions 28 Days</b>	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>10</b>	mg/L	1.0	0.53	1		07/01/22 15:24	16887-00-6	
Sulfate	<b>175</b>	mg/L	10.0	5.5	10		07/01/22 16:19	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

**Sample: L-LCL1-DUP-1**      **Lab ID: 60403836011**      Collected: 06/22/22 08:00      Received: 06/23/22 03:57      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Calcium	<b>224000</b>	ug/L	200	33.7	1	06/28/22 02:41	07/07/22 16:37	7440-70-2	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>920</b>	mg/L	13.3	13.3	1		06/29/22 11:27		
<b>300.0 IC Anions 28 Days</b>	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>9.0</b>	mg/L	1.0	0.53	1		07/06/22 10:23	16887-00-6	
Sulfate	<b>166</b>	mg/L	50.0	27.5	50		07/01/22 17:57	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

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**Sample: L-LCL1-FB-1**      **Lab ID: 60403836012**      Collected: 06/22/22 09:36      Received: 06/23/22 03:57      Matrix: Water

---

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>	Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Calcium	<b>&lt;33.7</b>	ug/L	200	33.7	1	06/28/22 02:41	07/07/22 16:39	7440-70-2	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>10.0</b>	mg/L	5.0	5.0	1		06/29/22 11:27		
<b>300.0 IC Anions 28 Days</b>	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>0.63J</b>	mg/L	1.0	0.53	1		07/01/22 18:10	16887-00-6	B
Sulfate	<b>&lt;0.55</b>	mg/L	1.0	0.55	1		07/01/22 18:10	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

QC Batch:	794742	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
		Laboratory:	Pace Analytical Services - Kansas City

Associated Lab Samples: 60403836010, 60403836011, 60403836012

METHOD BLANK: 3166167 Matrix: Water

Associated Lab Samples: 60403836010, 60403836011, 60403836012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<33.7	200	33.7	07/07/22 16:27	

LABORATORY CONTROL SAMPLE: 3166168

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9810	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3166169 3166170

Parameter	Units	3166169		3166170		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Calcium	ug/L	215000	10000	226000	229000	113	136	70-130	1	20	M1

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

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

QC Batch: 794977	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60403836010, 60403836011, 60403836012

METHOD BLANK: 3167039 Matrix: Water

Associated Lab Samples: 60403836010, 60403836011, 60403836012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	06/29/22 11:26	

LABORATORY CONTROL SAMPLE: 3167040

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1040	104	80-120	

SAMPLE DUPLICATE: 3167041

Parameter	Units	60403836007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	485	464	4	10	

SAMPLE DUPLICATE: 3167042

Parameter	Units	60403836010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	940	900	4	10	

SAMPLE DUPLICATE: 3167043

Parameter	Units	60403987001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	173	170	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 VERIFICATION LCL1

Pace Project No.: 60403844

QC Batch: 795227 Analysis Method: EPA 300.0  
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
 Laboratory: Pace Analytical Services - Kansas City  
 Associated Lab Samples: 60403836010, 60403836011, 60403836012

METHOD BLANK: 3167864 Matrix: Water  
 Associated Lab Samples: 60403836010, 60403836011, 60403836012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.62J	1.0	0.53	07/01/22 12:22	
Sulfate	mg/L	<0.55	1.0	0.55	07/01/22 12:22	

METHOD BLANK: 3172952 Matrix: Water  
 Associated Lab Samples: 60403836010, 60403836011, 60403836012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	07/06/22 09:29	
Sulfate	mg/L	<0.55	1.0	0.55	07/06/22 09:29	

LABORATORY CONTROL SAMPLE: 3167865

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

LABORATORY CONTROL SAMPLE: 3172953

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	91	90-110	
Sulfate	mg/L	5	4.8	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3167868 3167869

Parameter	Units	60403836010		3167869		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Chloride	mg/L	10	5	5	14.9	15.0	100	101	80-120	1	15
Sulfate	mg/L	175	50	50	228	227	106	104	80-120	0	15 E

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

**REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

SAMPLE DUPLICATE: 3167870

Parameter	Units	60403836010 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	10	10.2	2	15	
Sulfate	mg/L	175	177	1	15	

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### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: AMEREN VERIFICATION LCL1

Pace Project No.: 60403844

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### 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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

### 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 VERIFICATION LCL1

Pace Project No.: 60403844

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60403836010	L-TMW-2	EPA 200.7	794742	EPA 200.7	794756
60403836011	L-LCL1-DUP-1	EPA 200.7	794742	EPA 200.7	794756
60403836012	L-LCL1-FB-1	EPA 200.7	794742	EPA 200.7	794756
60403836010	L-TMW-2	SM 2540C	794977		
60403836011	L-LCL1-DUP-1	SM 2540C	794977		
60403836012	L-LCL1-FB-1	SM 2540C	794977		
60403836010	L-TMW-2	EPA 300.0	795227		
60403836011	L-LCL1-DUP-1	EPA 300.0	795227		
60403836012	L-LCL1-FB-1	EPA 300.0	795227		

### REPORT OF LABORATORY ANALYSIS

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WO#: 60403836



DC#\_ Title: ENV-FRM-LENE-0009\_Sam



Revision: 2

Effective Date: 01/12/2

Client Name: Holder

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

Tracking #: \_\_\_\_\_ Pace Shipping Label Used? Yes  No

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

Packing Material: Bubble Wrap  Bubble Bags  Foam  None  Other  epk

Thermometer Used: T-299 Type of Ice: Wet Blue  None

Cooler Temperature (°C): As-read 3.4, 3.0 Corr. Factor -1.0 Corrected 2.4, 2.0

Date and initials of person examining contents: 6/25/22 [Signature]

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 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 <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , 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: \_\_\_\_\_ Date: \_\_\_\_\_



Client: \_\_\_\_\_ Profile #: \_\_\_\_\_

Site: \_\_\_\_\_ Notes: \_\_\_\_\_

COC Line Item	Matrix	VG9H	DG9H	DG9Q	VG9U	DG9U	DG9M	DG9B	BG1U	AG1H	AG1U	AG2U	AG3S	AG4U	AG5U	JGFU	WGKU	WGDU	BP1U	BP2U	BP3U	BP1N	BP3N	BP3F	BP3S	BP3C	BP3Z	WPDU	ZPLC	Other	
1																															
2																															
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

Container Codes

	Glass		Plastic	Misc.
DG9B	40mL bisulfate clear vial	WGKU	1L NaOH plastic	I
DG9H	40mL HCl amber vial	WGKU	1L HNO3 plastic	SP5T
DG9M	40mL MeOH clear vial	WG2U	1L H2SO4 plastic	ZPLC
DG9Q	40mL TSP amber vial	JGFU	1L unreserved plastic	AF
DG9S	40mL H2SO4 amber vial	AG0U	1L unreserved plastic	C
DG9T	40mL Na Thio amber vial	AG1H	1L NaOH, Zn Acetate	R
DG9U	40mL amber unreserved	AG1S	500mL NaOH plastic	U
VG9H	40mL HCl clear vial	AG1T	500mL HNO3 plastic	
VG9U	40mL Na Thio. clear vial	AG1U	500mL H2SO4 plastic	
VG9U	40mL unreserved clear vial	AG2N	500mL unreserved plastic	
BG1S	1liter H2SO4 clear glass	AG2S	500mL NaOH, Zn Acetate	
BG1U	1liter unres glass	AG3S	250mL NaOH plastic	
BG3H	250mL HCL Clear glass	AG2U	250mL HNO3 plastic - field filtered	WT
BG3U	250mL Unpres Clear glass	AG3U	250mL unreserved plastic	SL
WGDU	16oz clear soil jar	AG4U	250mL HNO3 plastic	NAL
		AG5U	250mL unreserved plastic	OL
			250mL H2SO4 plastic	WP
			250mL NaOH, Zn Acetate	DW
			125mL unreserved plastic	
			125mL HNO3 plastic	
			125mL H2SO4 plastic	
			16oz unreserved plastic	

Work Order Number:

**MEMORANDUM****DATE** June 25, 2022**Project No.** 153140604.0001**TO** Project File  
Golder Associates**CC** Amanda Derhake, Jeff Ingram**FROM** Annie Muehlfarth**EMAIL** [ann.muehlfarth@wsp.com](mailto:ann.muehlfarth@wsp.com)**DATA VALIDATION SUMMARY, LABADIE ENERGY CENTER – LCL1 – VERIFICATION SAMPLING - DATA PACKAGE 60403844**

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 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 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 USA Inc/WSP  
 Project Name: Ameren - LEC - LCL1  
 Reviewer: A. Muehlfarth

Project Manager: J. Ingram  
 Project Number: GL153140604.0001  
 Validation Date: 7/25/2022

Laboratory: Pace Analytical SDG #: 60403844  
 Analytical Method (type and no.): EPA 200.7 (Total Metals); SM2540C (TDS); EPA 300.0 (Anions)  
 Matrix:  Air  Soil/Sed.  Water  Waste  \_\_\_\_\_  
 Sample Names L-TMW-2, L-LCL1-DUP-1, L-LCL1-FB-1

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

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>6/22/2022</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>BTT/GTM</u>
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"/>	<u>See Notes</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"/>	_____
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

<b>Blanks</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	L-LCL1-FB-1 @ L-TMW-2
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"/>	

<b>Laboratory Control Sample (LCS)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Duplicates</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L-LCL1-DUP-1 @ L-TMW-2
b) Were field dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max RPD: 10.5% [<20%]
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"/>	Max RPD: 4% [<10%]

<b>Blind Standards</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Matrix Spike/Matrix Spike Duplicate (MS/MSD)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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:**

Sulfate analyzed at a dilution in several samples, no qualification necessary.

Blanks:

3167864: Chloride (0.62J). Associated with samples -6010, -6011, -6012. Results >RL and 10x blank were not qualified.

Sample -6012 was <RL, analyte reported as ND.

L-LCL1-FB-1 @ L-TMW-2: Chloride (0.63J). Associated result >RL and 10x blank, no qualification necessary.

# QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

## Comments/Notes:

MS/MSD:

3166169/3166170: MSD % recovery high for calcium. Associated with sample -6010. Only 1 QC indicator outside of control limits, no qualification necessary.

*(This area contains horizontal lines for additional notes, crossed out by a diagonal line.)*



November 22, 2022

Jeffrey Ingram  
WSP Golder  
701 Emerson Road  
Suite 250  
Saint Louis, MO 63141

RE: Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between October 26, 2022 and October 28, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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: Mark Haddock, Golder Associates  
Lisa Meyer, Ameren  
Grant Morey, WSP Golder  
Ann Muehlfarth, WSP Golder  
Eric Schneider, WSP Golder



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

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### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 22-031-0

Illinois Certification #: 2000302021-3

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212023-1

Oklahoma Certification #: 2022-057

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-21-15

Utah Certification #: KS000212022-12

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

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## SAMPLE SUMMARY

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60413961001	L-TMW-2	Water	10/25/22 10:38	10/26/22 03:51
60413961002	L-TMW-1	Water	10/26/22 16:17	10/28/22 03:43
60413961003	L-TMW-3	Water	10/26/22 13:38	10/28/22 03:43
60413961004	L-LCL1-DUP-1	Water	10/26/22 08:00	10/28/22 03:43
60413961005	L-LCL1-FB-1	Water	10/26/22 16:27	10/28/22 03:43
60413956008	L-MW-26	Water	10/24/22 09:28	10/26/22 03:51
60413956024	L-BMW-1S	Water	10/27/22 10:36	10/28/22 03:43
60413956025	L-BMW-2S	Water	10/27/22 11:35	10/28/22 03:43

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### SAMPLE ANALYTE COUNT

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60413961001	L-TMW-2	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413961002	L-TMW-1	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	KJD	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413961003	L-TMW-3	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	KJD	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413961004	L-LCL1-DUP-1	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	KJD	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413961005	L-LCL1-FB-1	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	KJD	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413956008	L-MW-26	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	TML	1	PASI-K
		EPA 300.0	CRN2, RKA	3	PASI-K
60413956024	L-BMW-1S	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60413956025	L-BMW-2S	EPA 200.7	JDS	7	PASI-K
		SM 2320B	SZ	1	PASI-K
		SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-TMW-2**      **Lab ID: 60413961001**      Collected: 10/25/22 10:38      Received: 10/26/22 03:51      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>115</b>	ug/L	100	4.2	1	11/15/22 14:22	11/18/22 19:22	7440-42-8	
Calcium	<b>246000</b>	ug/L	200	33.7	1	11/15/22 14:22	11/18/22 19:22	7440-70-2	M1
Iron	<b>164</b>	ug/L	50.0	5.6	1	11/15/22 14:22	11/18/22 19:22	7439-89-6	
Magnesium	<b>67300</b>	ug/L	50.0	27.1	1	11/15/22 14:22	11/18/22 19:22	7439-95-4	
Manganese	<b>2700</b>	ug/L	5.0	0.24	1	11/15/22 14:22	11/18/22 19:22	7439-96-5	
Potassium	<b>7700</b>	ug/L	500	87.6	1	11/15/22 14:22	11/18/22 19:22	7440-09-7	
Sodium	<b>18000</b>	ug/L	500	73.2	1	11/15/22 14:22	11/18/22 19:22	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>651</b>	mg/L	20.0	4.6	1		11/02/22 14:42		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>1070</b>	mg/L	13.3	13.3	1		11/01/22 14:18		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>18.2</b>	mg/L	1.0	0.53	1		11/11/22 09:42	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		11/11/22 09:42	16984-48-8	M1
Sulfate	<b>247</b>	mg/L	100	55.0	100		11/15/22 02:14	14808-79-8	M1

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-TMW-1**      **Lab ID: 60413961002**      Collected: 10/26/22 16:17      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>									
Analytical Method: EPA 200.7    Preparation Method: EPA 200.7									
Pace Analytical Services - Kansas City									
Boron	115	ug/L	100	4.2	1	11/15/22 14:22	11/18/22 19:35	7440-42-8	
Calcium	159000	ug/L	200	33.7	1	11/15/22 14:22	11/18/22 19:35	7440-70-2	
Iron	161	ug/L	50.0	5.6	1	11/15/22 14:22	11/18/22 19:35	7439-89-6	
Magnesium	44700	ug/L	50.0	27.1	1	11/15/22 14:22	11/18/22 19:35	7439-95-4	
Manganese	451	ug/L	5.0	0.24	1	11/15/22 14:22	11/18/22 19:35	7439-96-5	
Potassium	5830	ug/L	500	87.6	1	11/15/22 14:22	11/18/22 19:35	7440-09-7	
Sodium	11300	ug/L	500	73.2	1	11/15/22 14:22	11/18/22 19:35	7440-23-5	
<b>2320B Alkalinity</b>									
Analytical Method: SM 2320B									
Pace Analytical Services - Kansas City									
Alkalinity, Total as CaCO3	539	mg/L	20.0	4.6	1		11/03/22 19:46		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C									
Pace Analytical Services - Kansas City									
Total Dissolved Solids	664	mg/L	10.0	10.0	1		11/02/22 11:37		
<b>300.0 IC Anions 28 Days</b>									
Analytical Method: EPA 300.0									
Pace Analytical Services - Kansas City									
Chloride	3.2	mg/L	1.0	0.53	1		11/14/22 22:20	16887-00-6	
Fluoride	<0.12	mg/L	0.20	0.12	1		11/14/22 22:20	16984-48-8	
Sulfate	70.8	mg/L	10.0	5.5	10		11/14/22 23:04	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-TMW-3**      **Lab ID: 60413961003**      Collected: 10/26/22 13:38      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>98.3J</b>	ug/L	100	4.2	1	11/15/22 14:22	11/18/22 19:37	7440-42-8	
Calcium	<b>134000</b>	ug/L	200	33.7	1	11/15/22 14:22	11/18/22 19:37	7440-70-2	
Iron	<b>1230</b>	ug/L	50.0	5.6	1	11/15/22 14:22	11/18/22 19:37	7439-89-6	
Magnesium	<b>29700</b>	ug/L	50.0	27.1	1	11/15/22 14:22	11/18/22 19:37	7439-95-4	
Manganese	<b>795</b>	ug/L	5.0	0.24	1	11/15/22 14:22	11/18/22 19:37	7439-96-5	
Potassium	<b>5730</b>	ug/L	500	87.6	1	11/15/22 14:22	11/18/22 19:37	7440-09-7	
Sodium	<b>6700</b>	ug/L	500	73.2	1	11/15/22 14:22	11/18/22 19:37	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>433</b>	mg/L	20.0	4.6	1		11/03/22 19:53		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>496</b>	mg/L	10.0	10.0	1		11/02/22 11:37		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>3.1</b>	mg/L	1.0	0.53	1		11/14/22 23:19	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		11/14/22 23:19	16984-48-8	
Sulfate	<b>39.5</b>	mg/L	10.0	5.5	10		11/14/22 23:33	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-LCL1-DUP-1**      **Lab ID: 60413961004**      Collected: 10/26/22 08:00      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>98.7J</b>	ug/L	100	4.2	1	11/15/22 14:22	11/18/22 19:39	7440-42-8	
Calcium	<b>133000</b>	ug/L	200	33.7	1	11/15/22 14:22	11/18/22 19:39	7440-70-2	
Iron	<b>1280</b>	ug/L	50.0	5.6	1	11/15/22 14:22	11/18/22 19:39	7439-89-6	
Magnesium	<b>29300</b>	ug/L	50.0	27.1	1	11/15/22 14:22	11/18/22 19:39	7439-95-4	
Manganese	<b>793</b>	ug/L	5.0	0.24	1	11/15/22 14:22	11/18/22 19:39	7439-96-5	
Potassium	<b>5760</b>	ug/L	500	87.6	1	11/15/22 14:22	11/18/22 19:39	7440-09-7	
Sodium	<b>6490</b>	ug/L	500	73.2	1	11/15/22 14:22	11/18/22 19:39	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>427</b>	mg/L	20.0	4.6	1		11/03/22 20:00		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>509</b>	mg/L	10.0	10.0	1		11/02/22 11:37		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>3.2</b>	mg/L	1.0	0.53	1		11/14/22 15:51	16887-00-6	B
Fluoride	<b>0.13J</b>	mg/L	0.20	0.12	1		11/14/22 15:51	16984-48-8	
Sulfate	<b>38.8</b>	mg/L	5.0	2.8	5		11/14/22 16:06	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample:** L-LCL1-FB-1      **Lab ID:** 60413961005      Collected: 10/26/22 16:27      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<4.2	ug/L	100	4.2	1	11/15/22 14:22	11/18/22 19:41	7440-42-8	
Calcium	52.1J	ug/L	200	33.7	1	11/15/22 14:22	11/18/22 19:41	7440-70-2	
Iron	<5.6	ug/L	50.0	5.6	1	11/15/22 14:22	11/18/22 19:41	7439-89-6	
Magnesium	<27.1	ug/L	50.0	27.1	1	11/15/22 14:22	11/18/22 19:41	7439-95-4	
Manganese	0.35J	ug/L	5.0	0.24	1	11/15/22 14:22	11/18/22 19:41	7439-96-5	B
Potassium	139J	ug/L	500	87.6	1	11/15/22 14:22	11/18/22 19:41	7440-09-7	B
Sodium	<73.2	ug/L	500	73.2	1	11/15/22 14:22	11/18/22 19:41	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	4.7J	mg/L	20.0	4.6	1		11/03/22 20:07		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	7.0	mg/L	5.0	5.0	1		11/02/22 11:38		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	0.62J	mg/L	1.0	0.53	1		11/14/22 16:46	16887-00-6	B
Fluoride	<0.12	mg/L	0.20	0.12	1		11/14/22 16:46	16984-48-8	
Sulfate	<0.55	mg/L	1.0	0.55	1		11/14/22 16:46	14808-79-8	

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-MW-26**      **Lab ID: 60413956008**      Collected: 10/24/22 09:28      Received: 10/26/22 03:51      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>68.3J</b>	ug/L	100	7.6	1	11/15/22 14:08	11/18/22 12:41	7440-42-8	
Calcium	<b>128000</b>	ug/L	200	26.5	1	11/15/22 14:08	11/18/22 12:41	7440-70-2	M1
Iron	<b>7.5J</b>	ug/L	50.0	7.4	1	11/15/22 14:08	11/18/22 12:41	7439-89-6	
Magnesium	<b>23200</b>	ug/L	50.0	24.1	1	11/15/22 14:08	11/18/22 12:41	7439-95-4	
Manganese	<b>68.9</b>	ug/L	5.0	0.38	1	11/15/22 14:08	11/18/22 12:41	7439-96-5	
Potassium	<b>4180</b>	ug/L	500	90.1	1	11/15/22 14:08	11/18/22 12:41	7440-09-7	
Sodium	<b>5270</b>	ug/L	500	38.8	1	11/15/22 14:08	11/18/22 12:41	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>410</b>	mg/L	20.0	4.6	1		11/01/22 18:26		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>493</b>	mg/L	10.0	10.0	1		10/31/22 14:22		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>10.3</b>	mg/L	1.0	0.53	1		11/11/22 20:50	16887-00-6	M1
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		11/11/22 20:50	16984-48-8	M1
Sulfate	<b>31.3</b>	mg/L	10.0	5.5	10		11/15/22 21:10	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-BMW-1S**      **Lab ID: 60413956024**      Collected: 10/27/22 10:36      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>91.2J</b>	ug/L	100	7.6	1	11/15/22 14:08	11/18/22 13:27	7440-42-8	
Calcium	<b>185000</b>	ug/L	200	26.5	1	11/15/22 14:08	11/18/22 13:27	7440-70-2	
Iron	<b>30500</b>	ug/L	50.0	7.4	1	11/15/22 14:08	11/21/22 11:17	7439-89-6	
Magnesium	<b>37200</b>	ug/L	50.0	24.1	1	11/15/22 14:08	11/18/22 13:27	7439-95-4	
Manganese	<b>2320</b>	ug/L	5.0	0.38	1	11/15/22 14:08	11/18/22 13:27	7439-96-5	
Potassium	<b>4940</b>	ug/L	500	90.1	1	11/15/22 14:08	11/18/22 13:27	7440-09-7	
Sodium	<b>15500</b>	ug/L	500	38.8	1	11/15/22 14:08	11/18/22 13:27	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>625</b>	mg/L	20.0	4.6	1		11/03/22 16:57		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>710</b>	mg/L	10.0	10.0	1		11/03/22 15:40		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>5.9</b>	mg/L	1.0	0.53	1		11/14/22 13:44	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		11/14/22 13:44	16984-48-8	
Sulfate	<b>66.5</b>	mg/L	5.0	2.8	5		11/14/22 13:59	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

**Sample: L-BMW-2S**      **Lab ID: 60413956025**      Collected: 10/27/22 11:35      Received: 10/28/22 03:43      Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7    Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron	<b>45.3J</b>	ug/L	100	7.6	1	11/15/22 14:08	11/18/22 13:47	7440-42-8	
Calcium	<b>146000</b>	ug/L	200	26.5	1	11/15/22 14:08	11/18/22 13:47	7440-70-2	
Iron	<b>16.0J</b>	ug/L	50.0	7.4	1	11/15/22 14:08	11/21/22 11:35	7439-89-6	
Magnesium	<b>21300</b>	ug/L	50.0	24.1	1	11/15/22 14:08	11/18/22 13:47	7439-95-4	
Manganese	<b>4.9J</b>	ug/L	5.0	0.38	1	11/15/22 14:08	11/18/22 13:47	7439-96-5	
Potassium	<b>5400</b>	ug/L	500	90.1	1	11/15/22 14:08	11/18/22 13:47	7440-09-7	
Sodium	<b>4130</b>	ug/L	500	38.8	1	11/15/22 14:08	11/18/22 13:47	7440-23-5	
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B Pace Analytical Services - Kansas City							
Alkalinity, Total as CaCO3	<b>404</b>	mg/L	20.0	4.6	1		11/03/22 17:04		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	<b>496</b>	mg/L	10.0	10.0	1		11/03/22 15:40		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	<b>1.4</b>	mg/L	1.0	0.53	1		11/14/22 14:47	16887-00-6	
Fluoride	<b>&lt;0.12</b>	mg/L	0.20	0.12	1		11/14/22 14:47	16984-48-8	
Sulfate	<b>34.4</b>	mg/L	5.0	2.8	5		11/14/22 15:01	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

QC Batch: 818348 Analysis Method: EPA 200.7  
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956008, 60413956024

METHOD BLANK: 3254663 Matrix: Water  
Associated Lab Samples: 60413956008, 60413956024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<7.6	100	7.6	11/18/22 12:19	
Calcium	ug/L	57.2J	200	26.5	11/18/22 12:19	
Iron	ug/L	<7.4	50.0	7.4	11/18/22 12:19	
Magnesium	ug/L	<24.1	50.0	24.1	11/18/22 12:19	
Manganese	ug/L	0.71J	5.0	0.38	11/18/22 12:19	
Potassium	ug/L	<90.1	500	90.1	11/18/22 12:19	
Sodium	ug/L	<38.8	500	38.8	11/21/22 11:09	

LABORATORY CONTROL SAMPLE: 3254664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	960	96	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10000	100	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9940	99	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3254665 3254666

Parameter	Units	60413956008		60413956016		3254665		3254666		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.	MS % Rec	MSD % Rec	MS % Rec	MSD % Rec				
Boron	ug/L	68.3J	1000	1010	1000	94	92	94	92	70-130	2	20	
Calcium	ug/L	128000	10000	141000	10000	132	115	132	115	70-130	1	20	M1
Iron	ug/L	7.5J	10000	9930	10000	99	97	99	97	70-130	3	20	
Magnesium	ug/L	23200	10000	33300	10000	101	98	101	98	70-130	1	20	
Manganese	ug/L	68.9	1000	1040	1000	97	95	97	95	70-130	2	20	
Potassium	ug/L	4180	10000	14300	10000	101	97	101	97	70-130	3	20	
Sodium	ug/L	5270	10000	15500	10000	102	99	102	99	70-130	2	20	

MATRIX SPIKE SAMPLE: 3254667

Parameter	Units	60413956016 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	316	1000	1240	92	70-130	
Calcium	ug/L	166000	10000	178000	120	70-130	

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

MATRIX SPIKE SAMPLE:		3254667					
Parameter	Units	60413956016 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	14200	10000	24400	102	70-130	
Magnesium	ug/L	33700	10000	43500	98	70-130	
Manganese	ug/L	2780	1000	3680	90	70-130	
Potassium	ug/L	6180	10000	16000	98	70-130	
Sodium	ug/L	50300	10000	60800	105	70-130	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 818353	Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7	Analysis Description: 200.7 Metals, Total
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956025

METHOD BLANK: 3254702 Matrix: Water

Associated Lab Samples: 60413956025

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<7.6	100	7.6	11/18/22 13:30	
Calcium	ug/L	<26.5	200	26.5	11/18/22 13:30	
Iron	ug/L	19.1J	50.0	7.4	11/21/22 11:19	
Magnesium	ug/L	<24.1	50.0	24.1	11/18/22 13:30	
Manganese	ug/L	0.76J	5.0	0.38	11/18/22 13:30	
Potassium	ug/L	<90.1	500	90.1	11/18/22 13:30	
Sodium	ug/L	<38.8	500	38.8	11/18/22 13:30	

LABORATORY CONTROL SAMPLE: 3254703

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	896	90	85-115	
Calcium	ug/L	10000	9510	95	85-115	
Iron	ug/L	10000	9980	100	85-115	
Magnesium	ug/L	10000	9300	93	85-115	
Manganese	ug/L	1000	940	94	85-115	
Potassium	ug/L	10000	9370	94	85-115	
Sodium	ug/L	10000	9530	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3254704 3254705

Parameter	Units	60413956017		60413956017		3254705		% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec						
Boron	ug/L	8070	1000	1000	9180	9250	111	117	70-130	1	20		
Calcium	ug/L	97400	10000	10000	109000	110000	117	123	70-130	1	20		
Iron	ug/L	4830	10000	10000	14900	14800	101	99	70-130	1	20		
Magnesium	ug/L	11900	10000	10000	21200	21300	93	94	70-130	0	20		
Manganese	ug/L	248	1000	1000	1170	1200	92	95	70-130	3	20		
Potassium	ug/L	8950	10000	10000	18900	19200	100	103	70-130	2	20		
Sodium	ug/L	104000	10000	10000	115000	115000	109	113	70-130	0	20		

MATRIX SPIKE SAMPLE: 3254706

Parameter	Units	60413956026 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	9220	1000	7710	-151	70-130	M1
Calcium	ug/L	108000	10000	84800	-232	70-130	M1

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

MATRIX SPIKE SAMPLE:		3254706					
Parameter	Units	60413956026 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	5240	10000	10400	51	70-130	M1
Magnesium	ug/L	22000	10000	9740	-122	70-130	M1
Manganese	ug/L	275	1000	995	72	70-130	
Potassium	ug/L	7390	10000	22600	152	70-130	M1
Sodium	ug/L	99400	10000	89100	-103	70-130	M1

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 818362 Analysis Method: EPA 200.7  
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
 Laboratory: Pace Analytical Services - Kansas City  
 Associated Lab Samples: 60413961001, 60413961002, 60413961003, 60413961004, 60413961005

METHOD BLANK: 3254745 Matrix: Water  
 Associated Lab Samples: 60413961001, 60413961002, 60413961003, 60413961004, 60413961005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<4.2	100	4.2	11/18/22 19:18	
Calcium	ug/L	<33.7	200	33.7	11/18/22 19:18	
Iron	ug/L	<5.6	50.0	5.6	11/18/22 19:18	
Magnesium	ug/L	<27.1	50.0	27.1	11/18/22 19:18	
Manganese	ug/L	0.48J	5.0	0.24	11/18/22 19:18	
Potassium	ug/L	171J	500	87.6	11/18/22 19:18	
Sodium	ug/L	<73.2	500	73.2	11/18/22 19:18	

LABORATORY CONTROL SAMPLE: 3254746

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	875	88	85-115	
Calcium	ug/L	10000	9730	97	85-115	
Iron	ug/L	10000	9430	94	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Manganese	ug/L	1000	931	93	85-115	
Potassium	ug/L	10000	9360	94	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3254747 3254748

Parameter	Units	60413961001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Boron	ug/L	115	1000	1000	1020	1000	90	89	70-130	1	20		
Calcium	ug/L	246000	10000	10000	250000	250000	39	38	70-130	0	20	M1	
Iron	ug/L	164	10000	10000	9710	9480	95	93	70-130	2	20		
Magnesium	ug/L	67300	10000	10000	75900	75900	86	86	70-130	0	20		
Manganese	ug/L	2700	1000	1000	3600	3570	90	87	70-130	1	20		
Potassium	ug/L	7700	10000	10000	17400	17300	97	96	70-130	0	20		
Sodium	ug/L	18000	10000	10000	27300	27100	93	91	70-130	1	20		

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 815835

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956008

METHOD BLANK: 3244507

Matrix: Water

Associated Lab Samples: 60413956008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	4.8J	20.0	4.6	11/01/22 16:22	

LABORATORY CONTROL SAMPLE: 3244508

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	485	97	90-110	

SAMPLE DUPLICATE: 3244509

Parameter	Units	60414091002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	639	641	0	10	

SAMPLE DUPLICATE: 3244510

Parameter	Units	60413956004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	273	274	0	10	

SAMPLE DUPLICATE: 3244511

Parameter	Units	60413956008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	410	412	0	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 816118

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961001

METHOD BLANK: 3245823

Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	<4.6	20.0	4.6	11/02/22 14:01	

LABORATORY CONTROL SAMPLE: 3245824

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	500	482	96	90-110	

SAMPLE DUPLICATE: 3245825

Parameter	Units	60413959002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	66.6	63.3	5	10	

SAMPLE DUPLICATE: 3245826

Parameter	Units	60413960001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	326	327	0	10	

SAMPLE DUPLICATE: 3245827

Parameter	Units	60413961001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	651	659	1	10	

SAMPLE DUPLICATE: 3245828

Parameter	Units	60414104002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	508	505	1	10	

SAMPLE DUPLICATE: 3245829

Parameter	Units	60414104004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	392	383	3	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 816349

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961002, 60413961003, 60413961004, 60413961005

METHOD BLANK: 3246752

Matrix: Water

Associated Lab Samples: 60413961002, 60413961003, 60413961004, 60413961005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.6	20.0	4.6	11/03/22 17:58	

LABORATORY CONTROL SAMPLE: 3246753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	482	96	90-110	

SAMPLE DUPLICATE: 3246754

Parameter	Units	60413956013 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	6.6J	<4.6		10	

SAMPLE DUPLICATE: 3246755

Parameter	Units	60413956017 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	147	143	3	10	

SAMPLE DUPLICATE: 3246756

Parameter	Units	60413959012 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.6	<4.6		10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 816350

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956024, 60413956025

METHOD BLANK: 3246761

Matrix: Water

Associated Lab Samples: 60413956024, 60413956025

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<4.6	20.0	4.6	11/03/22 15:09	

LABORATORY CONTROL SAMPLE: 3246762

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	482	96	90-110	

SAMPLE DUPLICATE: 3246763

Parameter	Units	60414155002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	81.3	77.4	5	10	

SAMPLE DUPLICATE: 3246764

Parameter	Units	60414190001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	297	299	1	10	

SAMPLE DUPLICATE: 3246765

Parameter	Units	60413959007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	158	152	4	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 815561

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956008

METHOD BLANK: 3243642

Matrix: Water

Associated Lab Samples: 60413956008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	10/31/22 14:20	

LABORATORY CONTROL SAMPLE: 3243643

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 3243645

Parameter	Units	60413956008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	493	489	1	10	

SAMPLE DUPLICATE: 3244133

Parameter	Units	60413768001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	720	735	2	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

QC Batch: 815775	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961001

METHOD BLANK: 3244259 Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/01/22 14:13	

LABORATORY CONTROL SAMPLE: 3244260

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 3244261

Parameter	Units	60413960001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	700	707	1	10	

SAMPLE DUPLICATE: 3244262

Parameter	Units	60413961001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1070	1080	1	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 815993

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961002, 60413961003, 60413961004, 60413961005

METHOD BLANK: 3245280

Matrix: Water

Associated Lab Samples: 60413961002, 60413961003, 60413961004, 60413961005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/02/22 11:26	

LABORATORY CONTROL SAMPLE: 3245281

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 3245282

Parameter	Units	60413956020 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	5.0	<5.0		10	

SAMPLE DUPLICATE: 3245283

Parameter	Units	60413960003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	511	561	9	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 816279

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956024, 60413956025

METHOD BLANK: 3246425

Matrix: Water

Associated Lab Samples: 60413956024, 60413956025

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/03/22 15:39	

LABORATORY CONTROL SAMPLE: 3246426

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

SAMPLE DUPLICATE: 3246427

Parameter	Units	60414192001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3930	4030	3	10	

SAMPLE DUPLICATE: 3246428

Parameter	Units	60413959007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	762	794	4	10	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

QC Batch: 817771 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956008

METHOD BLANK: 3252261 Matrix: Water  
Associated Lab Samples: 60413956008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.59J	1.0	0.53	11/11/22 17:54	
Fluoride	mg/L	<0.12	0.20	0.12	11/11/22 17:54	
Sulfate	mg/L	<0.55	1.0	0.55	11/11/22 17:54	

METHOD BLANK: 3255749 Matrix: Water  
Associated Lab Samples: 60413956008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	11/15/22 09:48	
Fluoride	mg/L	<0.12	0.20	0.12	11/15/22 09:48	
Sulfate	mg/L	<0.55	1.0	0.55	11/15/22 09:48	

LABORATORY CONTROL SAMPLE: 3252262

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

LABORATORY CONTROL SAMPLE: 3255750

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	2.6	106	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3252263 3252264

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60413956008	Result	Spike Conc.	Spike Conc.								
Chloride	mg/L	10.3	5	5	16.5	16.3	124	121	80-120	1	15	M1	
Fluoride	mg/L	<0.12	2.5	2.5	3.2	3.1	125	122	80-120	2	15	M1	
Sulfate	mg/L	31.3	50	50	88.8	86.5	115	110	80-120	3	15		

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3252266												3252267	
Parameter	Units	60413960001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	% Rec Limits	Max RPD	Qual	
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Chloride	mg/L	20.8	25	25	46.5	46.1	103	101	80-120	1	15		
Fluoride	mg/L	0.33	2.5	2.5	3.4	3.4	124	125	80-120	0	15	M1	
Sulfate	mg/L	198	100	100	307	305	109	107	80-120	1	15		

SAMPLE DUPLICATE: 3252265

Parameter	Units	60413956008 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	10.3	10.4	1	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	31.3	30.3	3	15	

SAMPLE DUPLICATE: 3252268

Parameter	Units	60413960001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	20.8	21.4	3	15	
Fluoride	mg/L	0.33	0.33	0	15	
Sulfate	mg/L	198	188	5	15	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch: 817772	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961001

METHOD BLANK: 3252269 Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	11/11/22 08:55	
Fluoride	mg/L	<0.12	0.20	0.12	11/11/22 08:55	
Sulfate	mg/L	<0.55	1.0	0.55	11/11/22 08:55	

METHOD BLANK: 3254909 Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	11/14/22 08:48	
Fluoride	mg/L	<0.12	0.20	0.12	11/14/22 08:48	
Sulfate	mg/L	<0.55	1.0	0.55	11/14/22 08:48	

METHOD BLANK: 3255739 Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.57J	1.0	0.53	11/15/22 08:24	
Fluoride	mg/L	<0.12	0.20	0.12	11/15/22 08:24	
Sulfate	mg/L	<0.55	1.0	0.55	11/15/22 08:24	

METHOD BLANK: 3256514 Matrix: Water

Associated Lab Samples: 60413961001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.60J	1.0	0.53	11/16/22 08:40	
Fluoride	mg/L	<0.12	0.20	0.12	11/16/22 08:40	
Sulfate	mg/L	<0.55	1.0	0.55	11/16/22 08:40	

LABORATORY CONTROL SAMPLE: 3252270

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	2.6	104	90-110	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

LABORATORY CONTROL SAMPLE: 3252270

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

LABORATORY CONTROL SAMPLE: 3254910

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	100	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

LABORATORY CONTROL SAMPLE: 3255740

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Fluoride	mg/L	2.5	2.6	103	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

LABORATORY CONTROL SAMPLE: 3256515

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	104	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3252272 3252273

Parameter	Units	60413961001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	MSD % Rec					
Chloride	mg/L	18.2	5	5	23.5	23.8	107	113	80-120	1	15	E	
Fluoride	mg/L	<0.12	2.5	2.5	1.9	2.0	76	80	80-120	6	15	M1	
Sulfate	mg/L	247	500	500	1240	1240	199	199	80-120	0	15	M1	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3252274 3252275

Parameter	Units	60415008021		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	MSD % Rec					
Chloride	mg/L	686	500	500	1210	1220	105	106	80-120	0	15		
Fluoride	mg/L	ND	25	25	24.4	23.9	98	96	80-120	2	15		
Sulfate	mg/L	109	50	50	179	171	138	124	80-120	4	15	M1	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

SAMPLE DUPLICATE: 3252271

Parameter	Units	60413961001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	18.2	18.2	0	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	247	244	1	15	

SAMPLE DUPLICATE: 3252276

Parameter	Units	60415008021 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	686	689	1	15	
Fluoride	mg/L	ND	<1.2		15	
Sulfate	mg/L	109	115	5	15	

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

QC Batch: 817968 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60413956024, 60413956025, 60413961002, 60413961003

METHOD BLANK: 3253027 Matrix: Water  
Associated Lab Samples: 60413956024, 60413956025, 60413961002, 60413961003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	11/14/22 08:48	
Fluoride	mg/L	<0.12	0.20	0.12	11/14/22 08:48	
Sulfate	mg/L	<0.55	1.0	0.55	11/14/22 08:48	

LABORATORY CONTROL SAMPLE: 3253028

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	100	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3253029 3253030

Parameter	Units	60413959007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	17.9	5	5	24.0	23.8	121	118	80-120	1	15	E,M1
Fluoride	mg/L	<0.12	2.5	2.5	2.6	2.5	102	98	80-120	4	15	
Sulfate	mg/L	413	250	250	685	685	108	108	80-120	0	15	

SAMPLE DUPLICATE: 3253031

Parameter	Units	60413959007 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	17.9	18.0	0	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	413	409	1	15	

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**QUALITY CONTROL DATA**

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

QC Batch:	817974	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
		Laboratory:	Pace Analytical Services - Kansas City

Associated Lab Samples: 60413961004, 60413961005

METHOD BLANK: 3253037 Matrix: Water

Associated Lab Samples: 60413961004, 60413961005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	11/14/22 15:22	
Fluoride	mg/L	<0.12	0.20	0.12	11/14/22 15:22	
Sulfate	mg/L	<0.55	1.0	0.55	11/14/22 15:22	

METHOD BLANK: 3255763 Matrix: Water

Associated Lab Samples: 60413961004, 60413961005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.60J	1.0	0.53	11/15/22 08:48	
Fluoride	mg/L	<0.12	0.20	0.12	11/15/22 08:48	
Sulfate	mg/L	<0.55	1.0	0.55	11/15/22 08:48	

LABORATORY CONTROL SAMPLE: 3253038

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	4.7	94	90-110	

LABORATORY CONTROL SAMPLE: 3255764

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.6	106	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3253039 3253040

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60415066004 Result	Spike Conc.	Spike Conc.	Result						
Chloride	mg/L	261	5	5	269	269	157	146	80-120	0	15 E,M1
Fluoride	mg/L	<0.12	2.5	2.5	2.6	2.6	100	104	80-120	4	15
Sulfate	mg/L	15.7	5	5	21.8	21.7	123	122	80-120	0	15 E,M1

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### QUALITY CONTROL DATA

Project: AMEREN LEC LCL1  
Pace Project No.: 60413961

SAMPLE DUPLICATE: 3253041

Parameter	Units	60415066004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	261	264	1	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	15.7	15.6	0	15	

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## QUALIFIERS

Project: AMEREN LEC LCL1

Pace Project No.: 60413961

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### 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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

### 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 LEC LCL1

Pace Project No.: 60413961

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60413956008	L-MW-26	EPA 200.7	818348	EPA 200.7	818468
60413961001	L-TMW-2	EPA 200.7	818362	EPA 200.7	818499
60413956024	L-BMW-1S	EPA 200.7	818348	EPA 200.7	818468
60413956025	L-BMW-2S	EPA 200.7	818353	EPA 200.7	818470
60413961002	L-TMW-1	EPA 200.7	818362	EPA 200.7	818499
60413961003	L-TMW-3	EPA 200.7	818362	EPA 200.7	818499
60413961004	L-LCL1-DUP-1	EPA 200.7	818362	EPA 200.7	818499
60413961005	L-LCL1-FB-1	EPA 200.7	818362	EPA 200.7	818499
60413956008	L-MW-26	SM 2320B	815835		
60413961001	L-TMW-2	SM 2320B	816118		
60413956024	L-BMW-1S	SM 2320B	816350		
60413956025	L-BMW-2S	SM 2320B	816350		
60413961002	L-TMW-1	SM 2320B	816349		
60413961003	L-TMW-3	SM 2320B	816349		
60413961004	L-LCL1-DUP-1	SM 2320B	816349		
60413961005	L-LCL1-FB-1	SM 2320B	816349		
60413956008	L-MW-26	SM 2540C	815561		
60413961001	L-TMW-2	SM 2540C	815775		
60413956024	L-BMW-1S	SM 2540C	816279		
60413956025	L-BMW-2S	SM 2540C	816279		
60413961002	L-TMW-1	SM 2540C	815993		
60413961003	L-TMW-3	SM 2540C	815993		
60413961004	L-LCL1-DUP-1	SM 2540C	815993		
60413961005	L-LCL1-FB-1	SM 2540C	815993		
60413956008	L-MW-26	EPA 300.0	817771		
60413961001	L-TMW-2	EPA 300.0	817772		
60413956024	L-BMW-1S	EPA 300.0	817968		
60413956025	L-BMW-2S	EPA 300.0	817968		
60413961002	L-TMW-1	EPA 300.0	817968		
60413961003	L-TMW-3	EPA 300.0	817968		
60413961004	L-LCL1-DUP-1	EPA 300.0	817974		
60413961005	L-LCL1-FB-1	EPA 300.0	817974		

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



	DC#_ Title: ENV-FRM-LENE-0009_Sample Con	
	Revision: 2	Effective Date: 01/12/2022

Client Name: WSP Golden

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: T299 Type of Ice: Ice Blue  None

Cooler Temperature (°C): As-read 11.4/11.4 Corr. Factor 0.0 Corrected 11.4/11.4/1.1

Date and initials of person examining contents: 10/26/22

Temperature should be above freezing to 6°C 1.1

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 <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT#: <u>55192</u>	<input 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: \_\_\_\_\_ Date: \_\_\_\_\_



WO#: 60413961



60413961



DC#\_ Title: ENV-FRM-LENE-0009\_Sample C

Revision: 2

Effective Date: 01/12/2022

Issued By: Lenexa

Client Name: WSP Golden

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: T299 Type of Ice: Wet Blue  None

Cooler Temperature (°C): As-read 2.1/1.4 Corr. Factor 0.0 Corrected 2.1/1.4

Date and initials of person examining contents:

pu/0128/22

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 <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , 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	

LOT#: 55192

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

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: \_\_\_\_\_ Date: \_\_\_\_\_





## MEMORANDUM

**DATE** January 10, 2023

**Project No.** 153140604.0001

**TO** Project File  
WSP USA Inc.

**CC** Amanda Derhake, Jeff Ingram

**FROM** Rahel Pommerenke

**EMAIL** rahel.pommerenke@wsp.com

### **DATA VALIDATION SUMMARY, LABADIE ENERGY CENTER – LCL1 – DETECTION MONITORING – DATA PACKAGE 60413961**

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 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 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 duplicate criterion was not met, the associated sample result was qualified as an estimate (J for detects, UJ for non-detects).
- When matrix spike/matrix spike duplicate (MS/MSD) criterion was not met, the associated sample result was qualified as an estimate (J, J+ for estimates biased high, and J- for estimates biased low).

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: WSP USA Inc.  
 Project Name: Ameren LEC - LCL1  
 Reviewer: R.Pommerenke

Project Manager: J. Ingram  
 Project Number: 153140604  
 Validation Date: 1/10/2023

Laboratory: Pace Analytical Services SDG #: 60413961  
 Analytical Method (type and no.): EPA 200.7/200.8 (Total Metals); SM2320B (Alkalinity); SM2540C (TDS); EPA 300.0 (Anions)  
 Matrix:  Air  Soil/Sed.  Water  Waste   
 Sample Names L-TMW-2, L-TMW-1, L-TMW-3, L-LCL1-DUP-1, L-LCL1-FB-1, L-MW-26, L-BMW-1S, L-BMW-2S

**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>10/25/2022 - 10/27/2022</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>GTM/PCS/SMA</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 (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"/>	<u>See notes.</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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>See notes.</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>				

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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See notes.</u>

## QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

<b>Blanks</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Laboratory Control Sample (LCS)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Duplicates</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L-LCL1-DUP-1 @ L-TMW-3
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"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See notes.

<b>Blind Standards</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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"/>	

<b>Matrix Spike/Matrix Spike Duplicate (MS/MSD)</b>	<b>YES</b>	<b>NO</b>	<b>NA</b>	<b>COMMENTS</b>
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 type="checkbox"/>	<input type="checkbox"/>	RPD Max (6%) < 15%

**Comments/Notes:**

Dilutions:

Sulfate analyzed at a dilution. No qualification necessary.

Blanks:

MB3254663: Calcium (57.2J), Manganese (0.71J). Associated with samples -008 and -024. Results > 10x blank result and > RL: no qualification necessary.

MB3254702: Iron (19.1J), Manganese (0.76J). Associated with sample -025. Results < RL, reported as ND at RL.

## QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

### Comments/Notes:

---

MB3254745: Manganese (0.48J), Potassium (171J). Associated with samples -001 through -005.

---

Results > 10 x blank result and > RL: no qualification necessary. Results < RL, reported as ND at RL.

---

---

MB3244507: Alkalinity (4.8J). Associated with sample -008. Results > 10 x blank result and > RL: no qualification necessary.

---

---

MB3252261: Chloride (0.59J). Associated with samples -008. Results > 10 x blank result and > RL: no qualification necessary.

---

---

MB3255739: Chloride (0.57J). Associated with sample -001. Results > 10 x blank result and > RL: no qualification necessary.

---

---

MB3256514: Chloride (0.60J). Associated with sample -001. Results > 10 x blank result and > RL: no qualification necessary.

---

---

MB3255763: Chloride (0.60J). Associated with samples -004 and -005. Results < 10x blank result and > RL, qualified as estimate. Results < RL, reported as ND at RL.

---

---

L-LCL1-FB-1 @ L-TMW-1: Calcium (52.1J), Manganese (0.35J), Potassium (139J), Alkalinity (4.7J), Total Dissolved Solids (7.0), Chloride (0.62J). Results < 10x blank but > RL: qualified as estimate.

---

### Duplicates:

---

L-LCL1-DUP-1 @ L-TMW-3: Fluoride detected in DUP sample but not in parent sample.

---

---

Sample Duplicate 3246754: Alkalinity detected in parent sample but not in duplicate. Performed on unrelated sample: no qualification necessary.

---

---

Sample Duplicate 3245282: Total Dissolved Solids detected in parent sample but not in duplicate. Performed on unrelated sample: no qualification necessary.

---

### MS/MSD:

---

3254665/3254666: MS % recovery high for Calcium. Associated with L-MW-26. Only one QC indicator out of control limits: no qualification necessary.

---

---

3254706: MS % recovery low (<10%) for Boron, Calcium, Magnesium, and Sodium. MS % recovery low for Iron.

---

MS % recovery high for Potassium. Performed on unrelated sample: no qualification necessary.

---

---

3254747/3254748: MS/MSD % recovery low for Calcium. Associated with sample L-TMW-2.

---

---

3252263/3252264: MS/MSD % recovery high for Chloride and Fluoride. Associated with sample L-MW-26.

---

---

3252266/3252267: MS/MSD % recovery high for Fluoride. Performed on unrelated sample: no qualification necessary.

---

---

3252272/3252273: MS % recovery low for Fluoride. Only one QC indicator out of control limits for Fluoride:

---

no qualification necessary. MS/MSD % recovery high for Sulfate. Associated with sample L-TMW-2.

---

---

3252274/3252275: MS/MSD % recovery high for Sulfate. Performed on unrelated sample: no qualification necessary.

---

---

3253029/3253030: MS % recovery high for Chloride. Performed on unrelated sample: no qualification necessary.

---

---

3253039/3253040: MS/MSD % recovery high for Chloride and Sulfate. Performed on unrelated sample: no qualification necessary.

---



**APPENDIX B**

**Alternative Source Demonstration -  
November 2021 Sampling Event**



**REPORT**

**LCL1 - Alternative Source Demonstration**

*Labadie Energy Center, Franklin County, Missouri, USA*

Submitted to:

**Ameren Missouri**

1901 Chouteau Avenue, St. Louis, MO 63103

Submitted by:

**Golder Associates USA, Inc.**

701 Emerson Road, Suite 250, Creve Coeur, Missouri, USA, 63141

+1 314 984-8800

153140604

June 24, 2022



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**Figure 1 – Labadie Energy Center Groundwater Monitoring Programs and Monitoring Well Location Map**

**Figure 2 – Timeseries Plot of Boron Concentrations at TMW-2 and Background Monitoring Wells**

**Figure 3 – Timeseries Plot of Calcium Concentrations at TMW-2 and Background Monitoring Wells**

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**Figure 6 – Timeseries Plot of TDS Concentrations at TMW-2 and Background Monitoring Wells**

**Figure 7 – Timeseries Plot of Calcium Concentrations and Water Level at TMW-2**

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**Figure 12 – Timeseries Plot of Sulfate Concentrations and Water Level at TMW-2**

**Figure 13 – Timeseries Plot of Total Dissolved Solids Concentrations and Water Level at TMW-2**

## CERTIFICATION STATEMENT

This *LCL1 – Alternative Source Demonstration, Labadie Energy Center, Franklin County, Missouri, USA* has been prepared to comply with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this *LCL1 – Alternative Source Demonstration, Labadie Energy Center, Franklin County, Missouri, USA* located at 226 Labadie Power Plant Road, Labadie Missouri 63055 has been prepared to meet the requirements of 40 CFR §257.94(e)(2).

**GOLDER ASSOCIATES USA INC.**



---

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

## 1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this *LCL1 – Alternative Source Demonstration* has been prepared to document an Alternative Source Demonstration (ASD) for a Statistically Significant Increase (SSI) calculated at Ameren Missouri's (Ameren) Labadie Energy Center (LEC), Utility Waste Landfill (UWL) LCL1 or Cell 1. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

## 2.0 SITE DESCRIPTION AND BACKGROUND

The LEC is located approximately 35 miles west of downtown St. Louis in Franklin County, Missouri, just south of the Missouri River. **Figure 1** depicts the site location and layout, including the location of LCL1. The LEC encompasses approximately 2,400 acres and is located within the Missouri River Valley. The facility is bounded to the north by the Missouri River, to the west by Labadie Creek, to the northeast and east by agricultural land, and to the south by a railroad line and bedrock bluffs.

### 2.1 Geological and Hydrogeological Setting

The site lies between the Missouri River (to the north) and bedrock bluffs (to the south). Flow and deposition from the Missouri River have resulted in thick alluvial deposits which lie on top of bedrock. These alluvial deposits, which can range from approximately 90 to 120 feet thick, comprise the uppermost aquifer. Overall, this alluvial aquifer is described as a fining-upwards sequence of stratified sands and gravels with varying amounts of silts and clays. Based on drilling records, the alluvial aquifer is divided into sub-units, including floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of these alluvial deposits are variable.

Beneath the alluvial aquifer lies the bedrock aquifer. Bedrock in this region consists of Ordovician-aged rock. Formations include primarily limestone, dolomite, sandstone, and shale and are comprised of the Plattin Group, Joachim Dolomite, St. Peter Sandstone, Powell Dolomite, and the Cotter/Jefferson City Dolomites.

### 2.2 Utility Waste Landfill Cell 1 – LCL1

UWL Cell 1 is referred to by Ameren as the LCL1, or Cell 1. The LCL1 is approximately 31 acres in size and is located east of the generating plant (**Figure 1**). The CCR unit manages CCR from the LEC and is permitted to accept fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels. Currently, the LCL1 is used for the dry disposal of fly ash and bottom ash from the LEC.

The LCL1 was constructed with a composite liner system consisting of two feet of compacted clay soil with a hydraulic conductivity of less than  $1 \times 10^{-7}$  centimeters per second (cm/sec) overlain by a 60-mil High Density Polyethylene (HDPE) geomembrane liner. Information on the design of the UWL is available in the 2013 Proposed Construction Permit application (Gredell and Reitz & Jens, 2013).

A groundwater monitoring well network was installed in 2013 and 2014 to permit the UWL construction. This monitoring well network was approved by the Missouri Department of Natural Resources (MDNR) and consists of 36 monitoring wells surrounding the current and future extents of the UWL (**Figure 1**). Most of these monitoring wells are installed in the uppermost portions of the alluvial aquifer, just below the seasonally low elevation for

groundwater. Three (3) monitoring wells (MW-33(D), MW-34(D), and MW-35(D)) are installed in the intermediate/deeper zones of the alluvial aquifer. Groundwater samples have been collected in most of these monitoring wells since April 2013 and tested for the MDNR UWL parameters. In April 2017, four (4) monitoring wells were installed and added to this network along Labadie Bottoms Road (S-1, S-2, S-3, and S-4).

The permit for the LCL1 was issued October 27, 2016 (permit #0907101). Eleven (11) sampling events were performed prior to October 27, 2016 at most of the state required UWL monitoring wells, and four (4) rounds of baseline CCR Rule sampling were completed at CCR Rule monitoring wells (discussed below). These results represent groundwater quality prior to CCR placement in the UWL. The results from these pre-disposal monitoring events are used in conjunction with other site information in the ASD presented below.

### 2.3 CCR Rule Groundwater Monitoring

As required by the CCR Rule, the following was completed prior to the October 17, 2017 deadline; (1) a groundwater monitoring well system was installed and certified by a Professional Engineer, (2) a Statistical Method Certification was prepared and certified by a Professional Engineer, (3) a Groundwater Monitoring Plan (GMP) was prepared recording the design, installation, development, sampling procedures, as well as statistical methods, and placed in the owner's operating record, and eight (8) baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of the CCR Rule.

The groundwater monitoring system for the LCL1 consists of six (6) monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. Two (2) existing monitoring wells (MW-26 and TMW-1) were installed by Reitz & Jens, Inc. in 2013 as a part of the state UWL monitoring program. The remaining monitoring wells (TMW-2, TMW-3, BMW-1S, and BMW-2S) were installed by Golder in 2015 and 2016 for CCR Rule groundwater monitoring purposes. More information regarding the design and installation of the monitoring wells is provided in the LCL1 GMP (Golder, 2017) and the LCL1 2017 Annual Report (Golder, 2018).

Between May 2016 and June 2017, eight (8) baseline sampling events were completed for the LCL1. After baseline sampling, Detection Monitoring events have been completed twice a year generally once in Q2 and once in Q4. November 2021 was the last Detection Monitoring sampling event. Laboratory testing was performed for the following Appendix III constituents during each Detection Monitoring event:

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

Background results from the eight (8) baseline sampling events were used to calculate statistical upper prediction limits (UPL). These UPLs were then compared to the Detection Monitoring results. If the result from the current Detection Monitoring event was higher than the calculated UPL, the result was considered an initial exceedance, and verification sampling was performed in accordance with the LCL1 statistical analysis plan. Per the statistical

analysis plan, after the May 2019 sampling event, the UPLs were updated to incorporate results from four (4) of the Detection Monitoring events. The UPLs were updated again after the February-April 2021 sampling event.

In November 2017, no exceedances were reported. In May 2018, four (4) initial exceedances were identified including boron, fluoride, and total dissolved solids (TDS) at TMW-1, as well as fluoride at TMW-2. Verification sampling results confirmed all four (4) SSIs. An ASD was prepared for the May 2018 results and is available in the 2018 LCL1 Annual Report; that ASD concluded that the SSIs observed for the May 2018 sampling event were not caused by the LCL1, but rather primarily the result of relatively low calculated UPLs that were not representative of the full, natural geochemical variability within the alluvial aquifer.

In November 2018, four (4) initial exceedances were identified for boron, chloride and fluoride at TMW-1 and fluoride at TMW-2, three (3) of which were the same as those reported during May 2018. Verification sampling results confirmed only the fluoride at TMW-1 result. An ASD was prepared for the November 2018 results and is available in the 2019 LCL1 Annual Report; the ASD also concluded that the confirmed SSI observed for November 2018 was not caused by the LCL1, but rather primarily the result of relatively low calculated UPLs that were not representative of the full, natural geochemical variability within the alluvial aquifer.

In May 2019, seven (7) initial exceedances were identified for pH, calcium, chloride, and fluoride at various wells. Verification sampling results confirmed only chloride at TMW-1. An ASD was prepared for the May 2019 results and is available in the 2019 LCL1 Annual Report. This ASD also concluded that the confirmed SSI observed for May 2019 was not caused by the LCL1, but rather primarily the result of relatively low calculated UPLs that were not representative of the full, natural geochemical variability within the alluvial aquifer.

In November 2019, four (4) initial exceedances were identified for boron, chloride, and TDS at MW-26 and chloride at TMW-1. Verification sampling results only confirmed the three (3) SSIs at MW-26. An ASD was prepared for the November 2019 results and is available in the 2020 LCL1 Annual Report, which concluded that the SSIs observed in the November 2019 sampling event were not caused by the LCL1. The SSI observed for TDS at MW-26 was primarily caused by relatively low calculated UPLs that did not reflect the full, natural geochemical variability within the alluvial aquifer. The SSIs identified for boron and chloride in MW-26 were primarily caused by the LCL1 being downgradient from the LCPA, which is currently in corrective action. The LCPA, and not the LCL1, was identified as the source for the November 2019 SSIs.

In November 2020, six (6) initial exceedances were identified for calcium, chloride, fluoride, sulfate, and TDS at several wells. Verification sampling results only confirmed the four (4) SSIs at TMW-2. The SSIs at TMW-2 for calcium, chloride, sulfate, and TDS were caused by natural geochemical variability, and a relatively small set of baseline data that do not reflect the temporal and spatial geochemical variability within the alluvial aquifer, and not by the LCL1.

In February-April 2021, six (6) initial exceedances were identified for boron, calcium, chloride, fluoride, and TDS at several wells. Verification sampling results only confirmed the one (1) SSI for chloride at MW-26. The SSI at MW-26 for chloride was caused by natural geochemical variability, and a relatively small set of baseline data that do not reflect the temporal and spatial geochemical variability within the alluvial aquifer, and not by the LCL1.

In November 2021, five (5) initial exceedances were identified for calcium, chloride, fluoride, sulfate, and TDS at MW-26 and TMW-2. Verification sampling results confirmed four (4) SSIs for calcium, chloride, sulfate, and TDS at TMW-2. Results from this sampling event are provided in **Table 1**.

### 3.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

The SSIs for calcium, chloride, sulfate, and TDS occurred at monitoring well TMW-2 and the values are presented on **Table 1**. TMW-2 is screened in the upper portion of the alluvial aquifer, just below the average seasonal low for groundwater. As shown on **Figure 1**, TMW-2 is located to the northeast of the LCL1, which is east of the generating plant as well as surface impoundments LCPA and LCPB. Closure of the LCPA was substantially completed before the April 2021 sampling event, with the completion of the liner cover system on December 30, 2020.

Based on Golder's review of the pre-disposal data discussed in **Section 2.2** above, as well as our comparison of the pre-disposal data with the results from the eight (8) CCR-Rule baseline events, the groundwater at the LCL1 contains low-level, pre-existing CCR impacts from units/activities that pre-dated disposal activities in the LCL1. As a result of these pre-existing impacts, the LCL1 statistical analysis plan uses intrawell upper prediction limits (UPLs) to determine SSIs. Intrawell UPLs are calculated from historical data within a particular well, and not by pooling data from background wells, such that individual limits are calculated for each constituent in each well in the monitoring program.

### 4.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSIs at TMW-2 are not the result of a release from the LCL1, but are rather from an alternative source. The following bullets summarize the different lines of evidence that support this ASD:

- Pre-existing, low level concentrations of CCR indicators in groundwater that pre-date the installation and operation of LCL1.
- Construction of the LCL1 with a 60-mil geomembrane liner and a 2-foot thick clay barrier.
- Location near gravel roads, and the potential geochemical influence from the road construction materials.

#### 4.1 CCR Indicators

Several types of CCR byproducts are generated by coal-fired power plants. The different types of CCR typically display distinct geochemical signatures and indicator parameters. **Table 2** below describes the different types of CCRs and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017).

**Table 2: Types of CCR and Typical Indicator Parameters**

Type of CCR	Description of CCR (USEPA 2018)	Key Indicators (EPRI 2011, 2012, 2017)
<b>Fly Ash</b>	Fine grained, powdery material composed mostly of silica made from the burning of finely ground coal in the boiler.	<ul style="list-style-type: none"> <li>• Boron</li> <li>• Molybdenum</li> <li>• Lithium</li> <li>• Sulfate</li> </ul>
<b>Boiler Slag / Bottom Ash</b>	Molten bottom ash from the slag tap and cyclone type furnaces that turns into pellets that have a smooth glassy appearance after quenching with water.	<ul style="list-style-type: none"> <li>• Bromide</li> <li>• Potassium</li> <li>• Sodium</li> <li>• Fluoride</li> </ul>

Type of CCR	Description of CCR (USEPA 2018)	Key Indicators (EPRI 2011, 2012, 2017)
<b>Flue Gas Desulfurization Material (FGD)</b>	A material leftover from the process of reducing sulfur dioxide emissions from a coal-fired boiler that can be a wet sludge consisting of calcium sulfite or calcium sulfate or a dry powdered material that is a mixture of sulfites and sulfates.	<ul style="list-style-type: none"> <li>• Sulfate</li> <li>• Fluoride</li> <li>• Calcium</li> <li>• Boron</li> <li>• Bromide</li> <li>• Chloride</li> </ul>

## Notes:

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

As described above, the LCL1 has historically received fly ash. No FGD type wastes are managed at the LEC.

## 4.2 Analysis of Key CCR Constituents at TMW-2

### 4.2.1 Boron Concentrations

As indicated in **Table 2**, boron is a key indicator for fly ash and boiler slag/bottom ash impacts because it is typically present at relatively high concentrations in the leachate from these types of waste, is not a common anthropogenic contaminant, and is non-reactive and mobile in most hydrogeological environments (EPRI 2012). This non-reactive and mobile nature makes boron an early and key indicator of impacts from a CCR unit. Boron is also present in the monitoring wells around the LCPA and has been shown to be a key indicator for CCR impacts at this site. Therefore, if groundwater was impacted by the LCL1, current boron concentrations should be statistically elevated with respect to pre-CCR placement downgradient of the LCL1.

**Figure 2** displays boron concentrations at TMW-2 as well as the two shallow background wells for the LEC for the entire historical monitoring period. At TMW-2, boron concentrations have varied over time with values ranging from 86.8 J to 132 micrograms per liter ( $\mu\text{g/L}$ ). The intrawell UPL for boron at TMW-2 is 134.3  $\mu\text{g/L}$ . Through this same timeframe, boron results in the background wells BMW-1S and BMW-2S, located approximately 2.5 miles to the west of the LCL1, and 1.5 miles west of the LCPA have had values ranging between non-detect ( $< 50 \mu\text{g/L}$ ) to 151  $\mu\text{g/L}$ . The interwell UPL for boron (based on LEC background wells) is 147  $\mu\text{g/L}$ .

As displayed in **Figure 2**, current boron concentrations at TMW-2 (119  $\mu\text{g/L}$ ) are below the UPL for both TMW-2 and the background monitoring wells and are consistent with previous results. The absence of boron exceedances at TMW-2 demonstrates that elevated concentrations for other constituents are related to an alternative source, rather than the LCL1.

## 4.3 Evaluation of SSIs at TMW-2

As discussed in **Section 3.0**, there are four (4) verified SSIs from the November 2021 sampling event, all at monitoring well TMW-2 including calcium, chloride, sulfate, and TDS (referred to henceforth as the Constituents of Interest or COIs). To determine the source for the recent exceedances for the COIs, values were compared to background and different source water datasets. **Figures 3-6** are timeseries plots displaying the concentrations of the COIs compared to shallow background concentrations from background wells located 2.5 miles upgradient of the LCL1. As displayed on these figures, there is an increase in each of the COIs in the November and

subsequent February sampling events, followed by a decrease in the April 2022 sampling event. However, as discussed in **Section 4.2**, the absence of boron with the calcium exceedances indicates that it is unlikely that these SSIs are caused by CCR impacts.

**Table 3**, below, displays concentration data for the COIs, alkalinity, and magnesium from the November 2021 and February 2022 sampling events as compared with the CCR pore-water concentrations from the LCPA (contains bottom ash and fly ash) and the LCPB (fly ash).

**Table 3: Comparison of TMW-2 SSIs and Pore-water Concentrations**

Constituent (Units)	November 2021 Result at TMW-2	February 2022 Result at TMW-2	LCPA Porewater Range	LCPB Porewater Range
Calcium (µg/L)	240,000	278,000	76,500 – 106,000	11,400 – 22,600
Chloride (mg/L)	19.7	43.1	15.2 – 25.5	15.6 – 18.4
Sulfate (mg/L)	259	359	254 – 306	728 – 1,060
Total Dissolved Solids (mg/L)	960	1,360 J	528 – 642	1,860 – 2,850
Magnesium (µg/L)	65,700	Not Sampled	184 – 45,500	84.4 – 386
Alkalinity (mg/L)	593	Not Sampled	77.6 – 208	861 – 1,340

Notes:

µg/L – Micrograms per liter.

mg/L – Milligrams per liter.

J – Result is an estimated value based on data validation.

As displayed in **Table 3**, samples collected from the LCPA and LCPB CCR units indicate that CCR is not a potential source for increases in calcium, chloride (February 2022), or magnesium at TMW-2, as the concentrations in pore-water are lower than those found in groundwater at TMW-2. This, combined with a lack of the key CCR indicator, boron, indicates that an alternative source is responsible for exceedances present at TMW-2.

#### 4.4 Nearby Carbonate Gravel Roadways as Potential Source

In addition to the lines of evidence presented above, the recent placement of a fresh limestone ( $\text{CaCO}_3$ )/dolomite ( $\text{CaMg}(\text{CO}_3)_2$ ) gravel near well TMW-2 is a potential source of the elevated COI concentrations reported in the shallow well TMW-2. TMW-2 is located 30 feet south and east of gravel roads. Additionally, the LCL1, is constructed with gravel roads at the top of the unit, gravel beneath the fabric-formed articulated concrete mat (FCM) side slopes of the unit, and a gravel road at the base of the LCL1. The gravel used for the roadways nearby consists mostly of limestone and dolomite, with lesser amounts of calcite sourced from nearby quarries. Precipitation and recharge of surface water through fresh gravel and associated water-soluble salts leaches soluble components into the shallow groundwater and can cause an increase in the COIs.

The potential impact of carbonate rocks and their associated water-soluble salts has been studied since the 1950s, and Lamar and Shorde (1953) determined that soluble salts in dolomite and limestone commonly contain increased amounts of magnesium, bicarbonate (alkalinity), chloride, calcium, and sulfate. Numerous studies and geochemistry textbook citations since that time have confirmed these findings. The LCL1 was constructed in

2015 and 2016 and completed by October 27, 2016. Labadie Bottoms Road was impacted by the construction of the LCL1, and based on aerial imagery from Google Earth, the road was re-graveled between October 2018 and September 2019. As described above, the materials used in the construction of the LCL1 as well as the application of carbonate-based gravel and re-grading of Labadie Bottom Road would contribute to increases in concentrations of COIs.

As displayed on **Figure 7**, calcium concentrations increased simultaneous with the placement of fresh gravel on Labadie Bottom Road in late 2018 to early 2019. Additionally, the increase in calcium since the construction of the adjacent Labadie Bottom Road shows a correlation with the depth to water below ground surface. The correlation between calcium and groundwater levels indicates that some leaching from Labadie Bottom Road gravel is occurring, and when the water table is higher (i.e., more water is present due to higher amounts of precipitation and/or higher river levels), the concentrations become diluted, and concentrations decrease.

In addition to calcium impacts, magnesium, alkalinity, chloride, sulfate, sodium, and TDS display very similar trends to calcium (see **Figures 7-13**), with increasing concentrations since the gravel placement on Labadie Bottom Road and covariation with the water table fluctuation. As indicated above, covariation in the concentrations of these additional COIs is expected due to potential influence of limestone/dolomite gravel on shallow groundwater concentrations.

Increases in these constituents, especially those that are not a result of CCR influence (i.e., calcium, magnesium, chloride, as shown in **Table 3**) coupled with a lack of increasing boron indicates that these impacts are not from CCR influence on the groundwater, but are believed to be related to leaching of fresh carbonate gravel and its associated soluble salt sources.

## **5.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY LCL1 IMPACT**

Based on the information presented in **Section 4.0** above, the SSIs reported for TMW-2 during the November 2021 monitoring event are not a result of impacts from the LCL1. The SSIs appear to be a result of the new limestone/dolomite gravel placed on Labadie Bottom Road, and/or aggregate materials used in the construction of the LCL1, in the general vicinity of TMW-2. Soluble salts associated with the new gravel roads (calcium, chloride, sulfate, magnesium, alkalinity, and TDS) display an increase in concentration immediately after placement of fresh gravel on Labadie Bottom Road and show covariation with groundwater levels. These trends, coupled with the lack of boron increases, indicate that the changes in concentration are not caused by the LCL1, but rather the adjacent gravel roads.

Finally, the construction of the LCL1, with a base liner constructed of 2-feet of compacted clay overlain by a 60-mil HDPE liner, also limits the potential that the November 2021 SSIs reported for TMW-2 are a result of influence from the LCL1. These lines of evidence indicate that the SSIs observed in TMW-2 are not the result of impacts from the LCL1, but are from recent road gravel placement and leaching from carbonate gravel.

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## Tables

**Table 1**  
**November 2021 Detection Monitoring Results**  
**LCL1 - Utility Waste Landfill Cell 1**  
**Labadie Energy Center, Franklin County, MO**

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1S	BMW-2S	Prediction Limit MW-26	MW-26	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
<b>November 2021 Detection Monitoring Event</b>											
DATE	NA	11/1/2021	11/1/2021	NA	11/4/2021	NA	11/2/2021	NA	11/2/2021	NA	11/2/2021
pH	SU	6.68	6.97	6.658-7.339	6.81	6.638-7.105	6.89	6.42-7.17	6.87	6.585-7.07	6.73
BORON, TOTAL	µg/L	77.0 J	40.7 J	102.8	68.7 J	121.6	113	134.3	119	136.9	116
CALCIUM, TOTAL	µg/L	260,000	140,000	155,150	146,000	183,389	161,000	205,487	240,000	202,001	161,000
CHLORIDE, TOTAL	mg/L	13.7	1.7 J	6.76	6.2 J	5.718	2.6 J	7.142	19.7	8.621	3.8 J
FLUORIDE, TOTAL	mg/L	ND	0.14 J	0.2118	0.24	0.2975	0.27	0.2972	0.25	0.2626	0.20
SULFATE, TOTAL	mg/L	146	46.2	38.24	29.3	128	61.4	115.5	259	104	40.3
TOTAL DISSOLVED SOLIDS	mg/L	953 J	475 J	543.7	490	733.7	617	815.4	960	815.4	595
<b>February 2022 Verification Sampling Event</b>											
DATE	NA				2/10/2022				2/10/2022		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L								278,000		
CHLORIDE, TOTAL	mg/L								43.1		
FLUORIDE, TOTAL	mg/L				ND						
SULFATE, TOTAL	mg/L								359		
TOTAL DISSOLVED SOLIDS	mg/L								1,360 J		

**NOTES:**

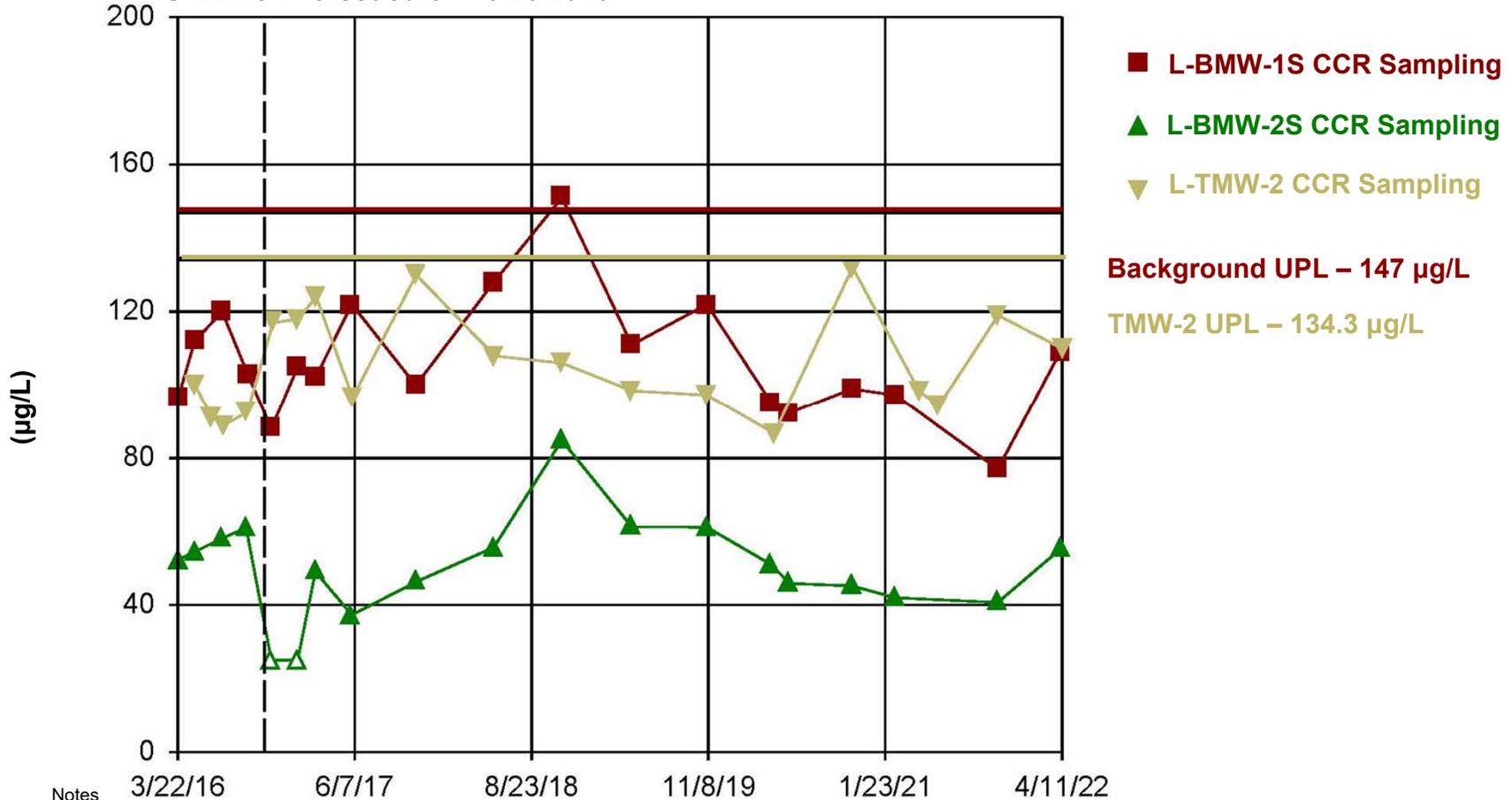
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
8. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: EMS  
Checked By: LMS  
Reviewed By: MNH

## Figures



**UWL Permit Issued on 10/26/2016**



- Notes
- 1) µg/L – Micrograms per liter.
  - 2) UPL – Upper Prediction Limit.
  - 3) UWL – Utility Waste Landfill.
  - 4) CCR – Coal Combustion Residuals.

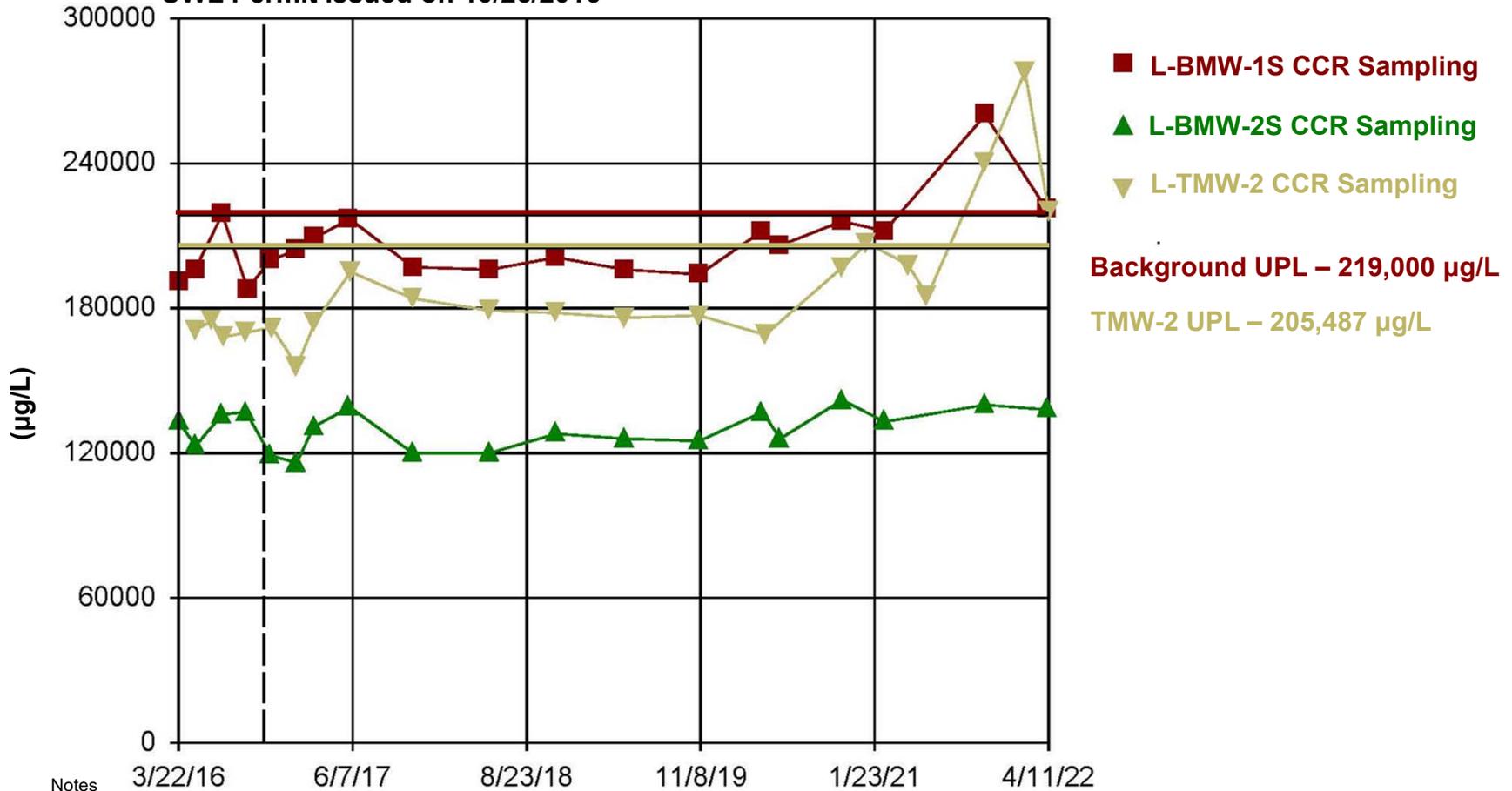
CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE **Timeseries Plot of Boron Concentrations  
 at TMW-2 and Background Monitoring  
 Wells**

DRAWN EMS	CHECKED GTM	REVIEWED MNH	DATE 2022-05-31	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>2</b>
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**UWL Permit Issued on 10/26/2016**



- Notes
- 1) µg/L – Micrograms per liter.
  - 2) UPL – Upper Prediction Limit.
  - 3) UWL – Utility Waste Landfill.
  - 4) CCR – Coal Combustion Residuals.

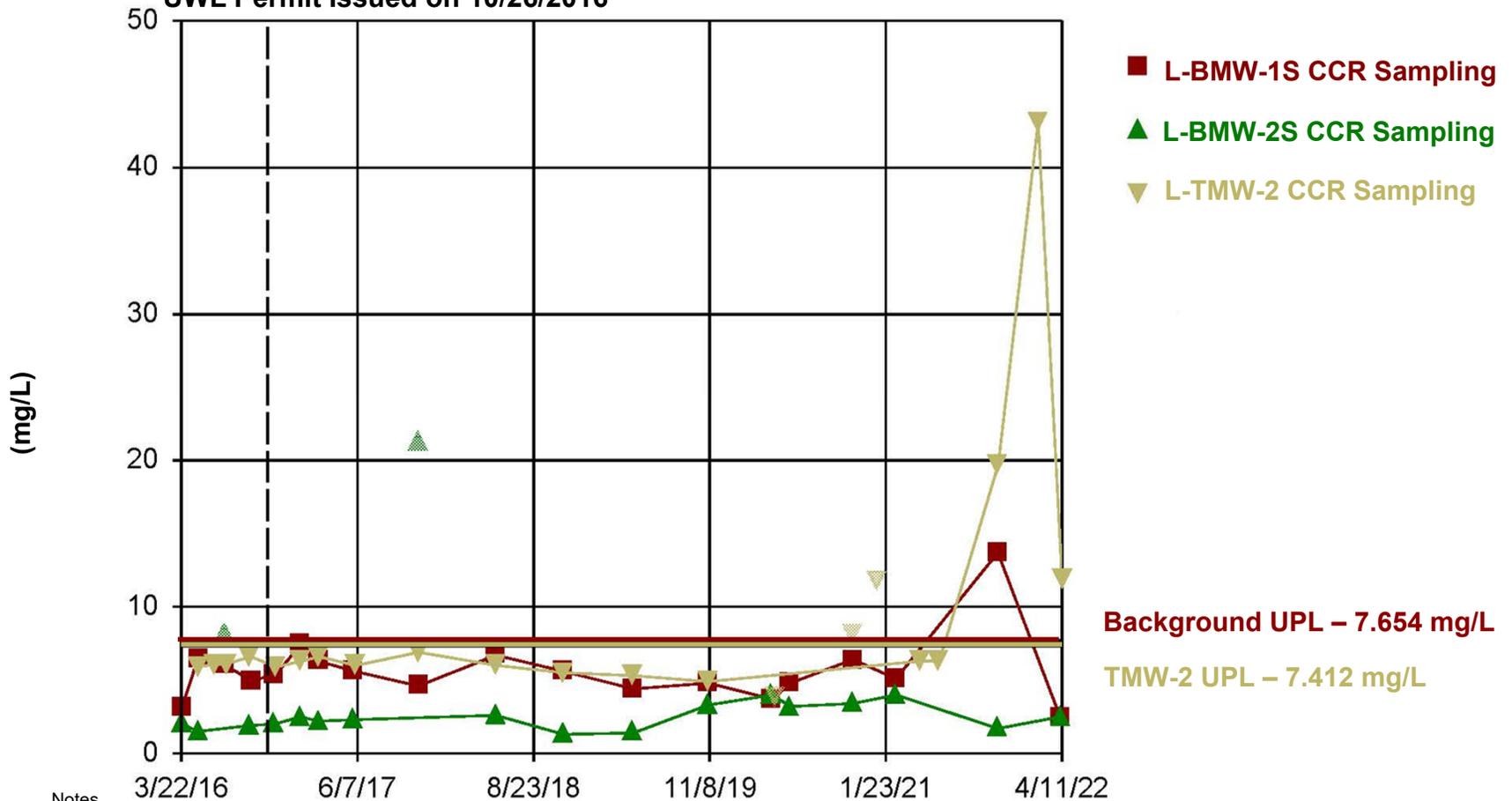
CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE **Timeseries Plot of Calcium Concentrations  
 at TMW-2 and Background Monitoring  
 Wells**

DRAWN EMS	CHECKED GTM	REVIEWED MNH	DATE 2022-05-31	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>3</b>
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**UWL Permit Issued on 10/26/2016**



- Notes
- 1) mg/L – Milligrams per liter.
  - 2) UPL – Upper Prediction Limit.
  - 3) UWL – Utility Waste Landfill.
  - 4) CCR – Coal Combustion Residuals.
  - 5) Data points not connected to lines are considered outliers.

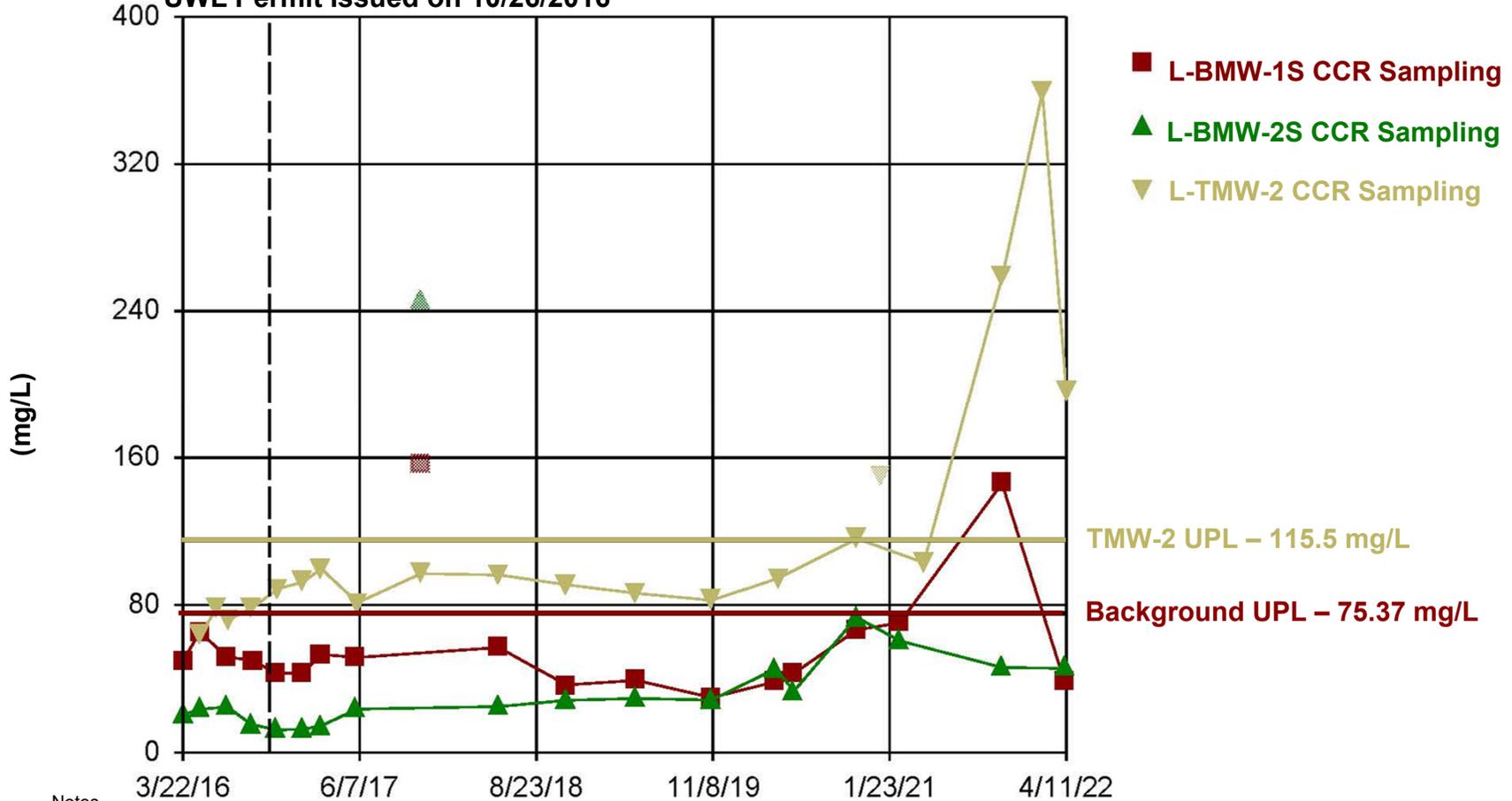
CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE **Timeseries Plot of Chloride Concentrations  
 at TMW-2 and Background Monitoring  
 Wells**

DRAWN EMS	CHECKED GTM	REVIEWED MNH	DATE 2022-05-31	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>4</b>
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UWL Permit Issued on 10/26/2016



Notes

- 1) mg/L – Milligrams per liter.
- 2) UPL – Upper Prediction Limit.
- 3) UWL – Utility Waste Landfill.
- 4) CCR – Coal Combustion Residuals.
- 5) Data points not connected to lines are considered outliers.

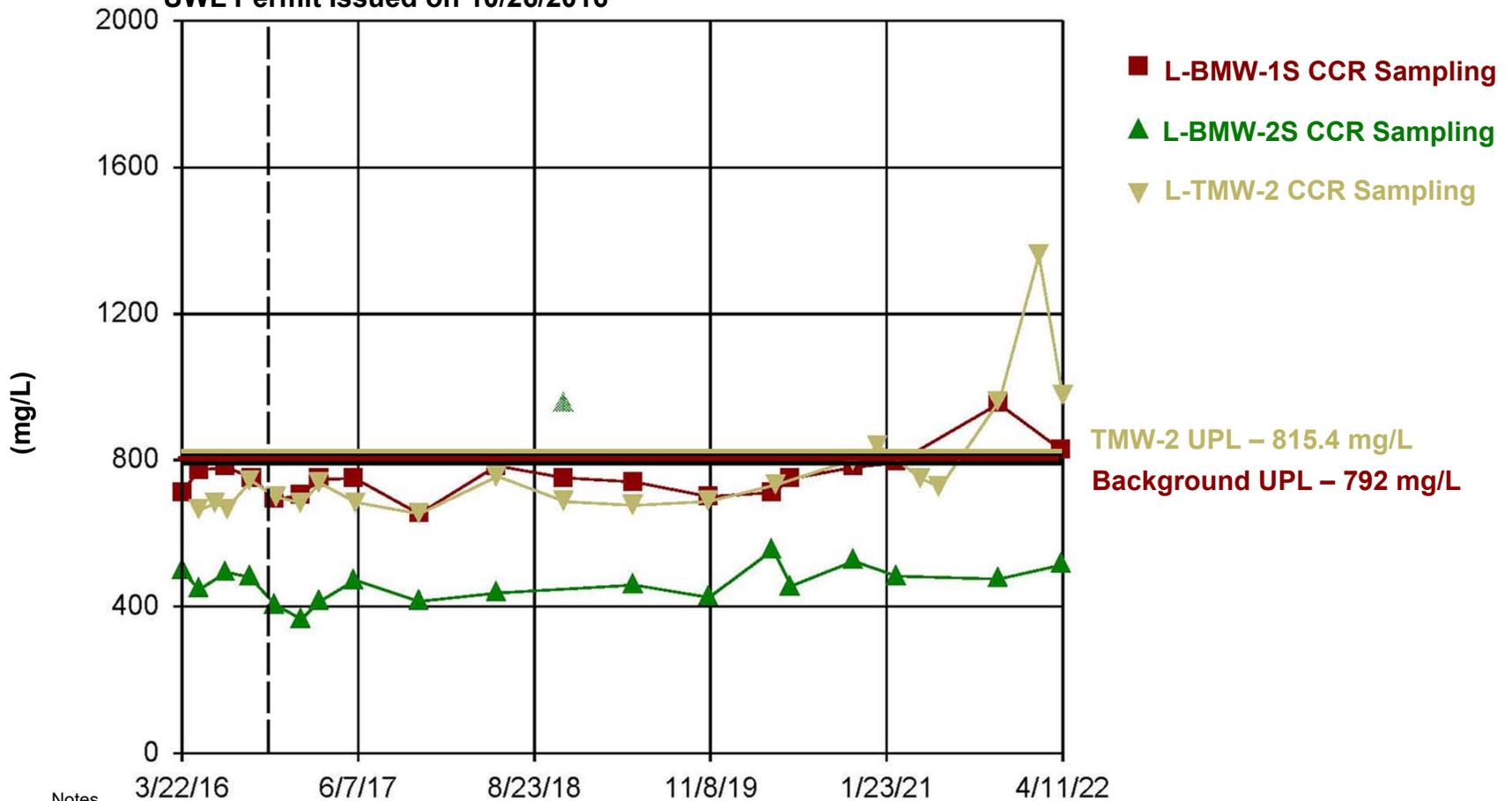
CLIENT/PROJECT  
AMEREN MISSOURI  
LABADIE ENERGY CENTER



TITLE **Timeseries Plot of Sulfate Concentrations  
at TMW-2 and Background Monitoring  
Wells**

DRAWN EMS	CHECKED GTM	REVIEWED MNH	DATE 2022-05-31	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>5</b>
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**UWL Permit Issued on 10/26/2016**



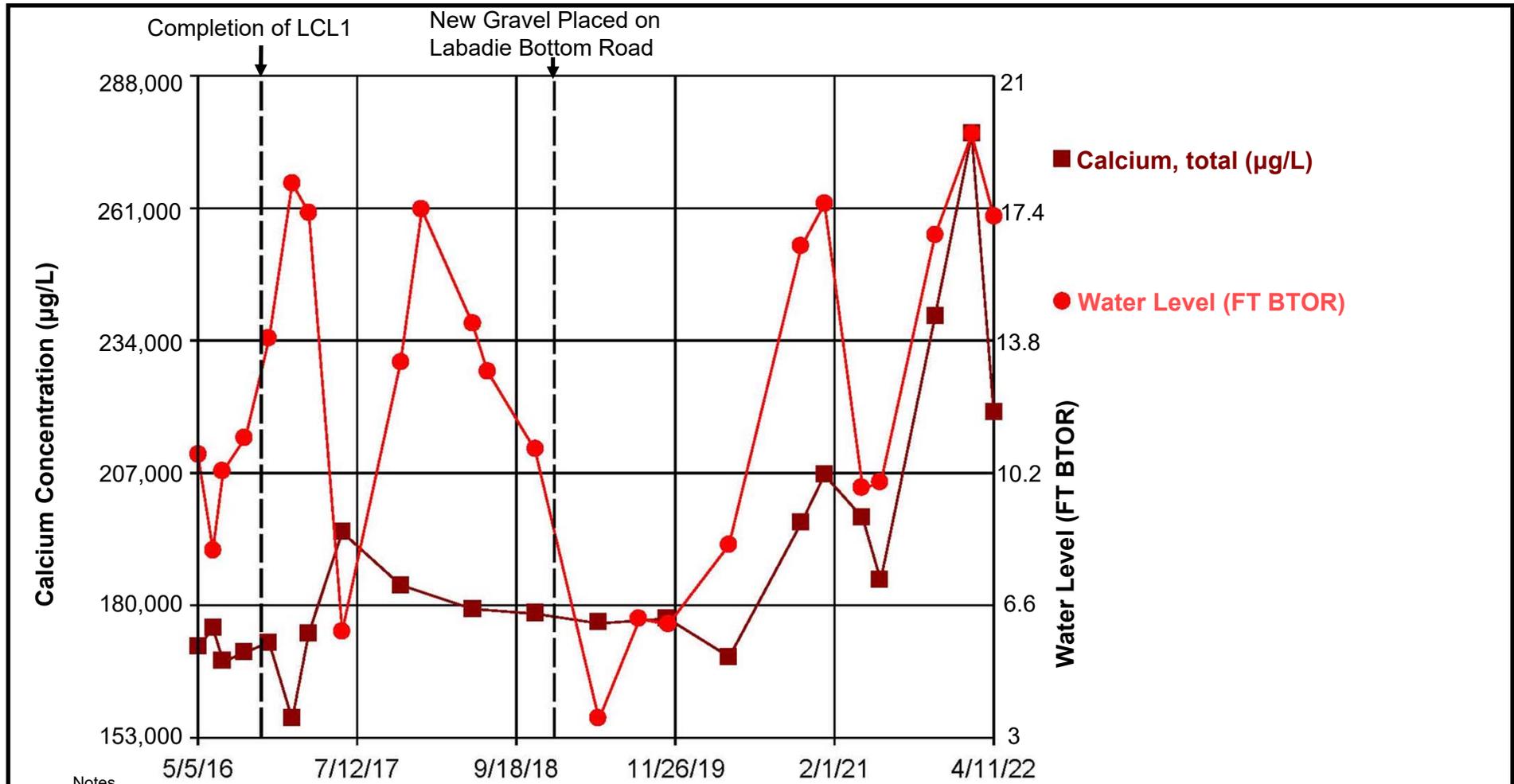
- Notes
- 1) mg/L – Milligrams per liter.
  - 2) UPL – Upper Prediction Limit.
  - 3) UWL – Utility Waste Landfill.
  - 4) CCR – Coal Combustion Residuals.
  - 5) Data points not connected to lines are considered outliers.

CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



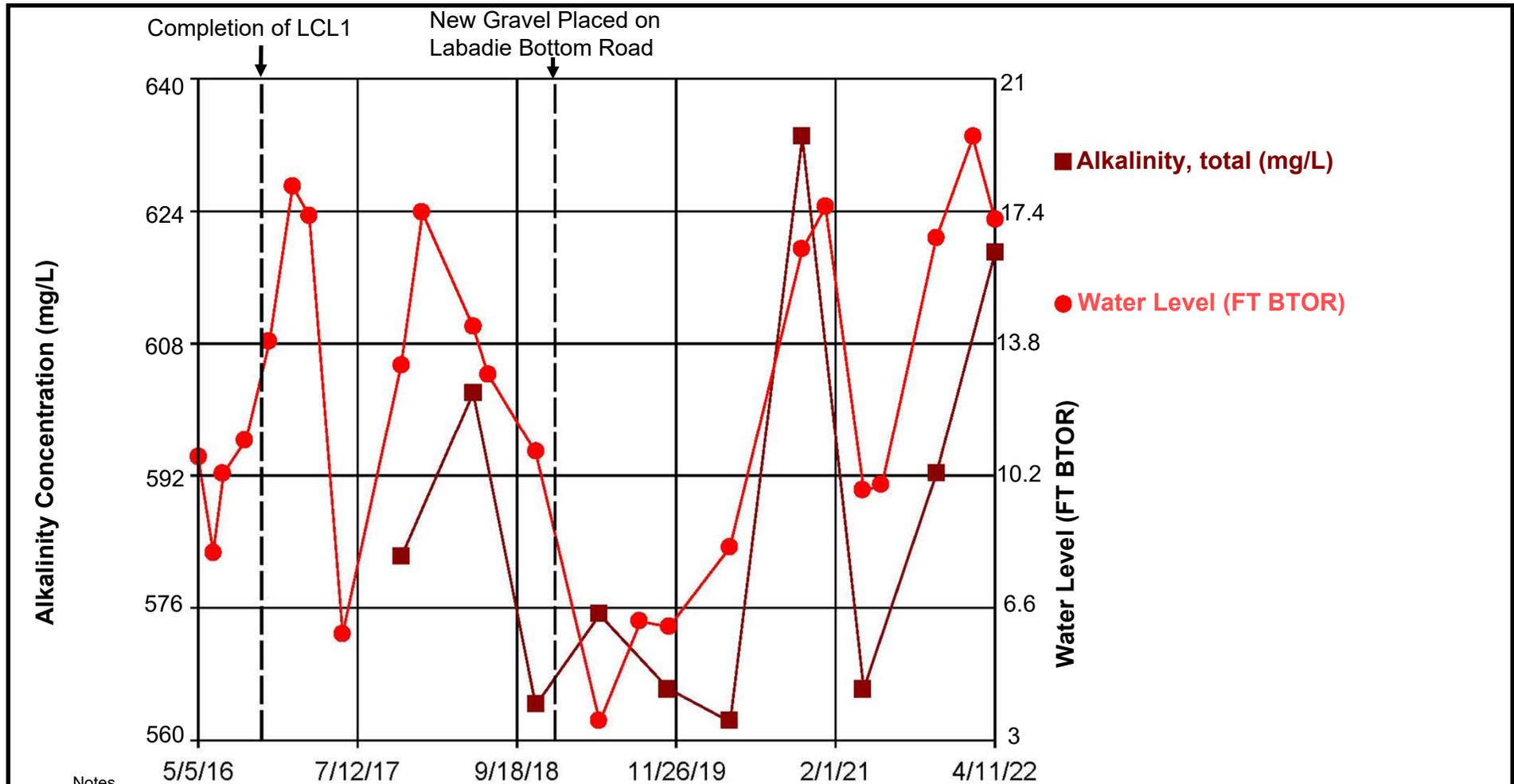
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 Concentrations at TMW-2 and Background  
 Monitoring Wells**

DRAWN EMS	CHECKED GTM	REVIEWED MNH	DATE 2022-05-31	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>6</b>
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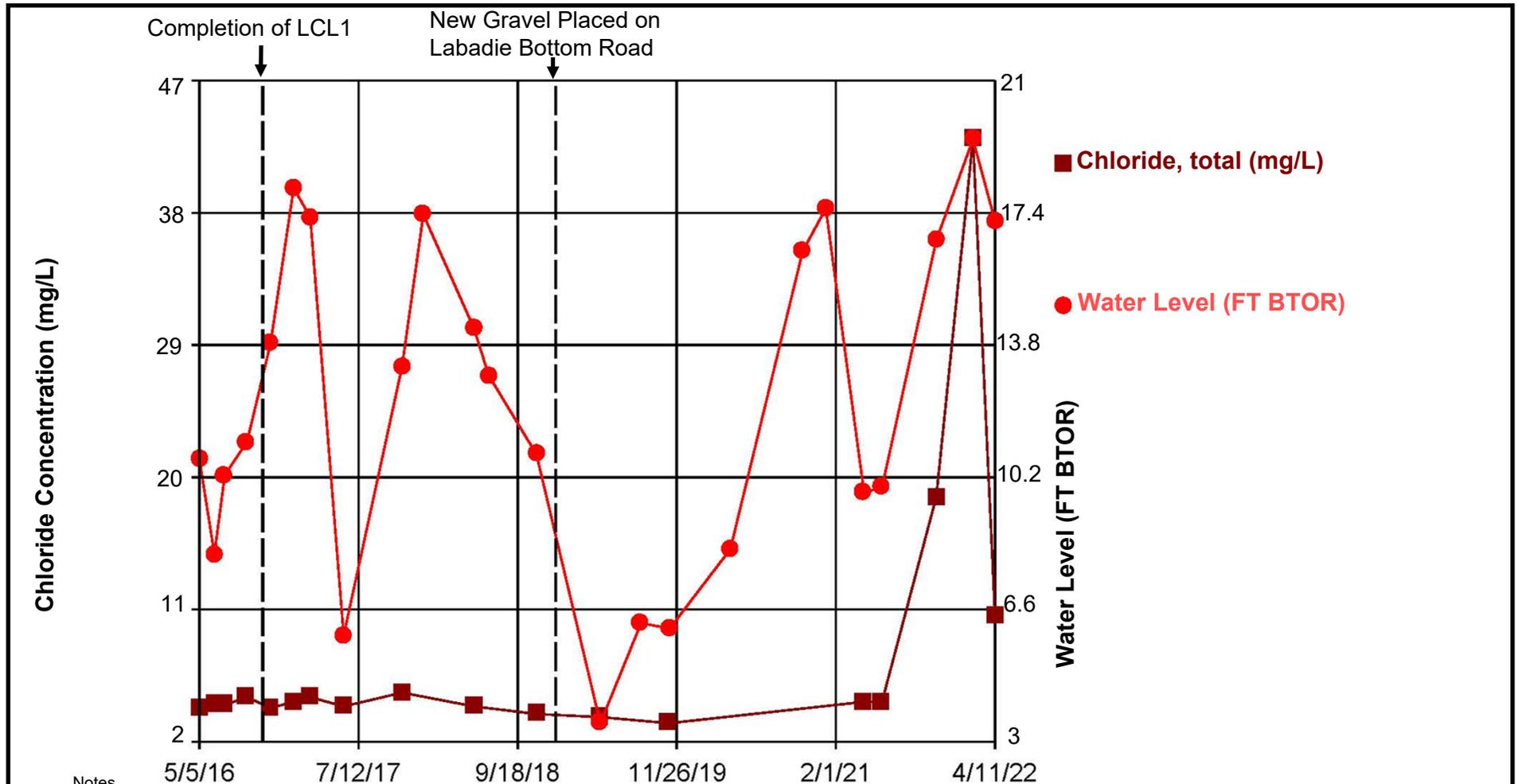
Notes  
 1) µg/L – Micrograms per liter.  
 2) FT BTOR – Feet below top of riser.

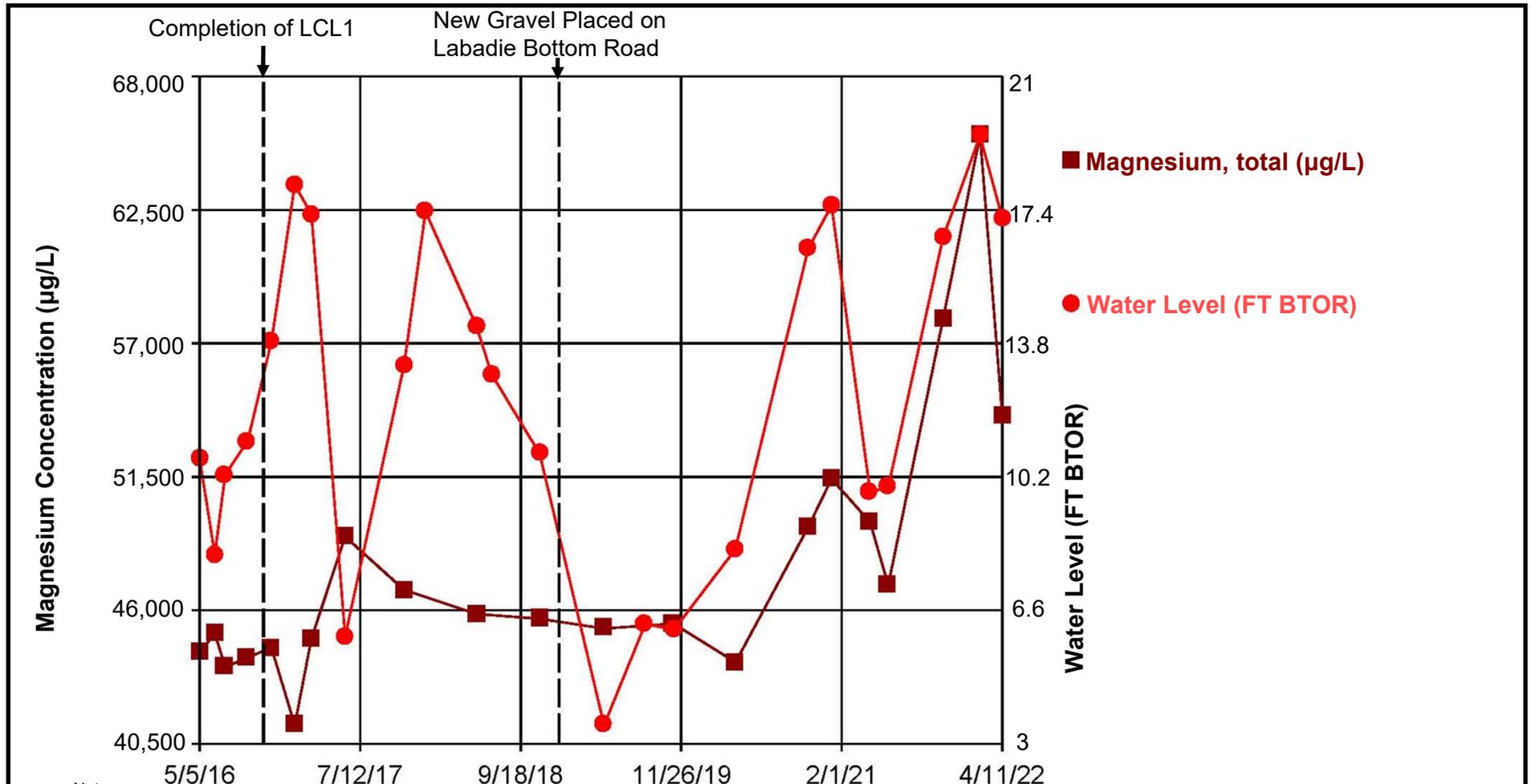
CLIENT/PROJECT <b>AMEREN MISSOURI          LABADIE ENERGY CENTER</b>										TITLE <b>Timeseries Plot of Calcium Concentrations          and Water Level at TMW-2</b>			
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-06-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>7</b>			



Notes  
 1) mg/L – Milligrams per liter.  
 2) FT BTOR – Feet below top of riser.

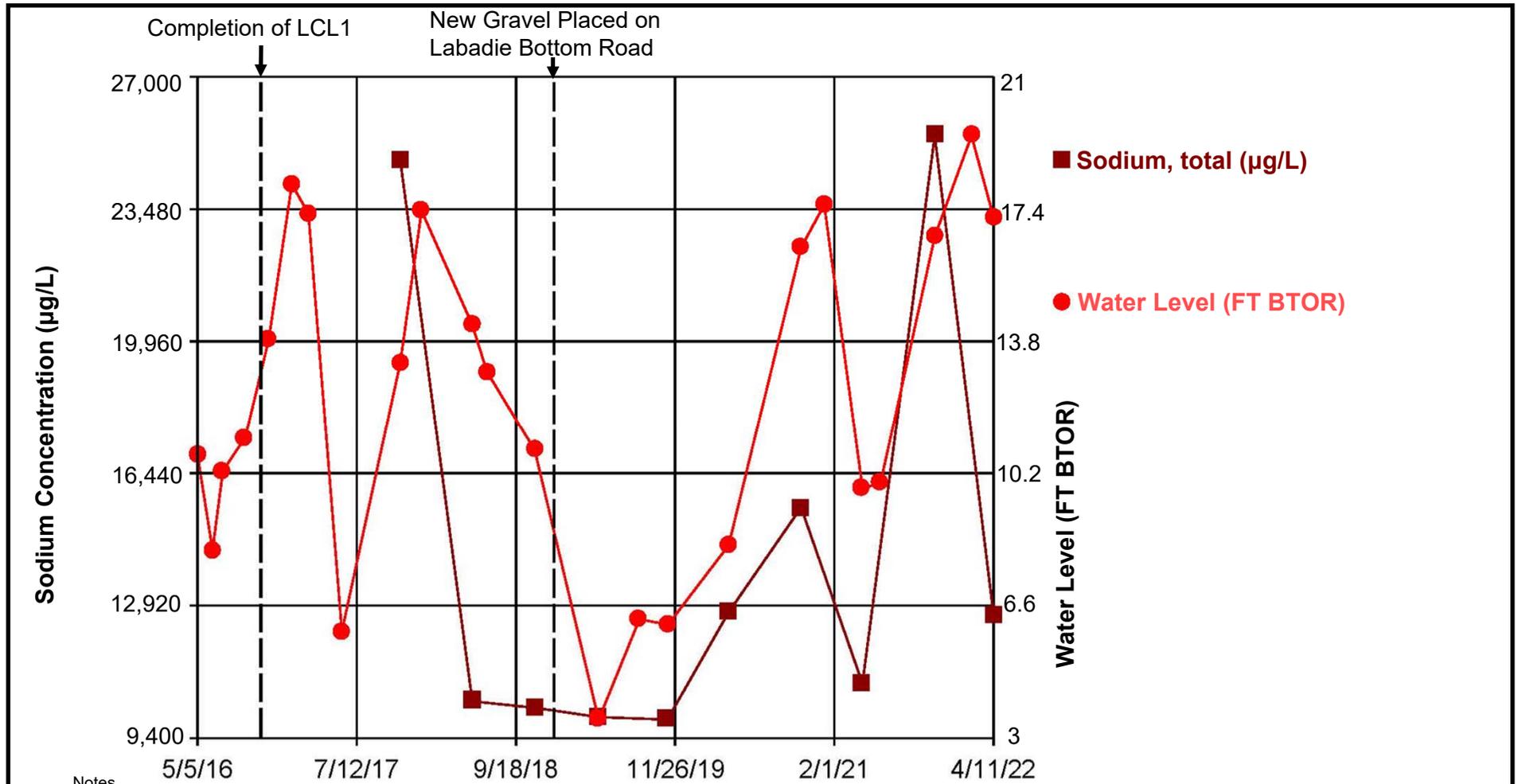
CLIENT/PROJECT <b>AMEREN MISSOURI          LABADIE ENERGY CENTER</b>										TITLE <b>Timeseries Plot of Alkalinity          Concentrations and Water Level at TMW-2</b>		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-06-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>8</b>		





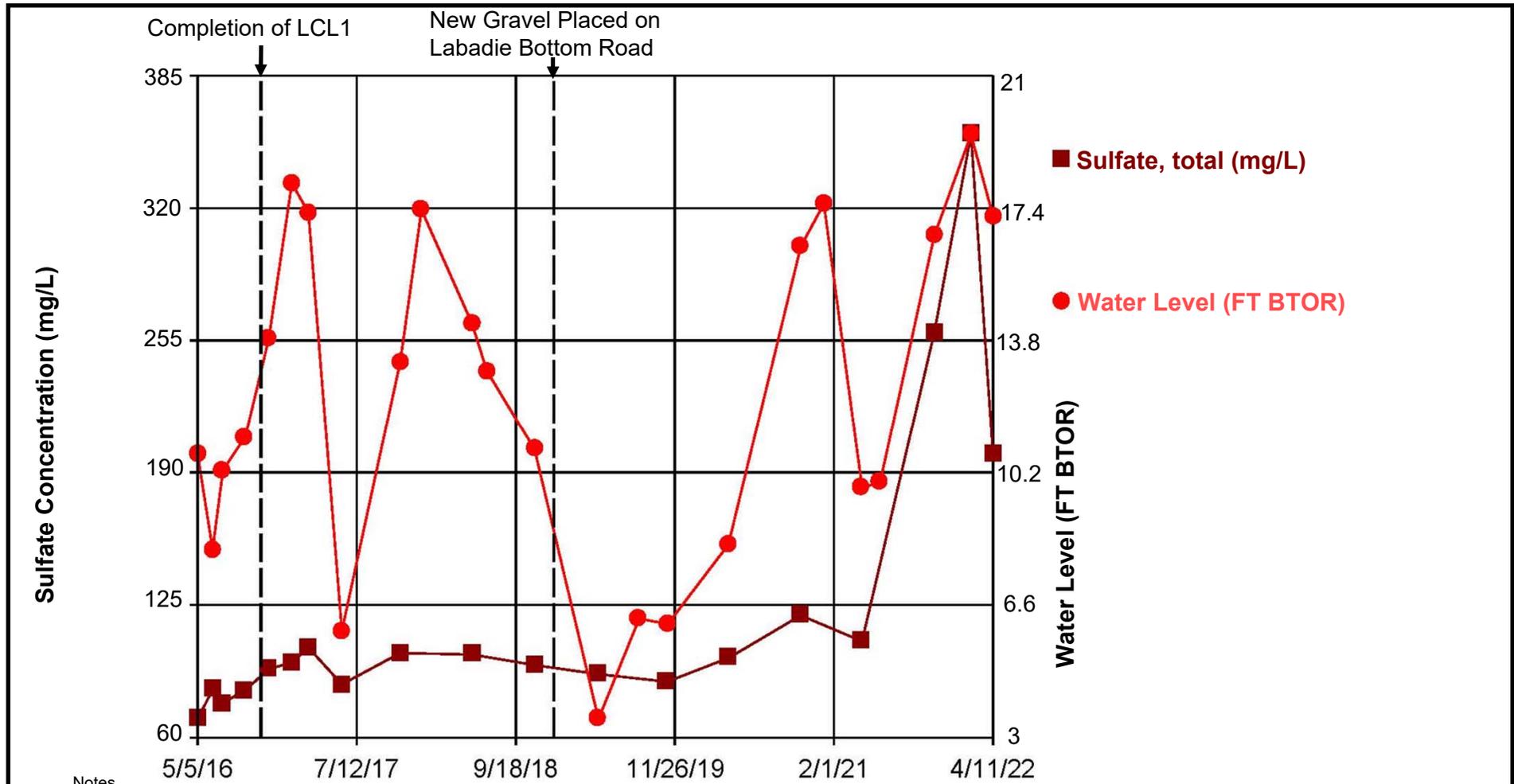
Notes  
 1) µg/L – Micrograms per liter.  
 2) FT BTOR – Feet below top of riser.

CLIENT/PROJECT AMEREN MISSOURI LABADIE ENERGY CENTER										TITLE Timeseries Plot of Magnesium Concentrations and Water Level at TMW-2		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-06-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>10</b>		



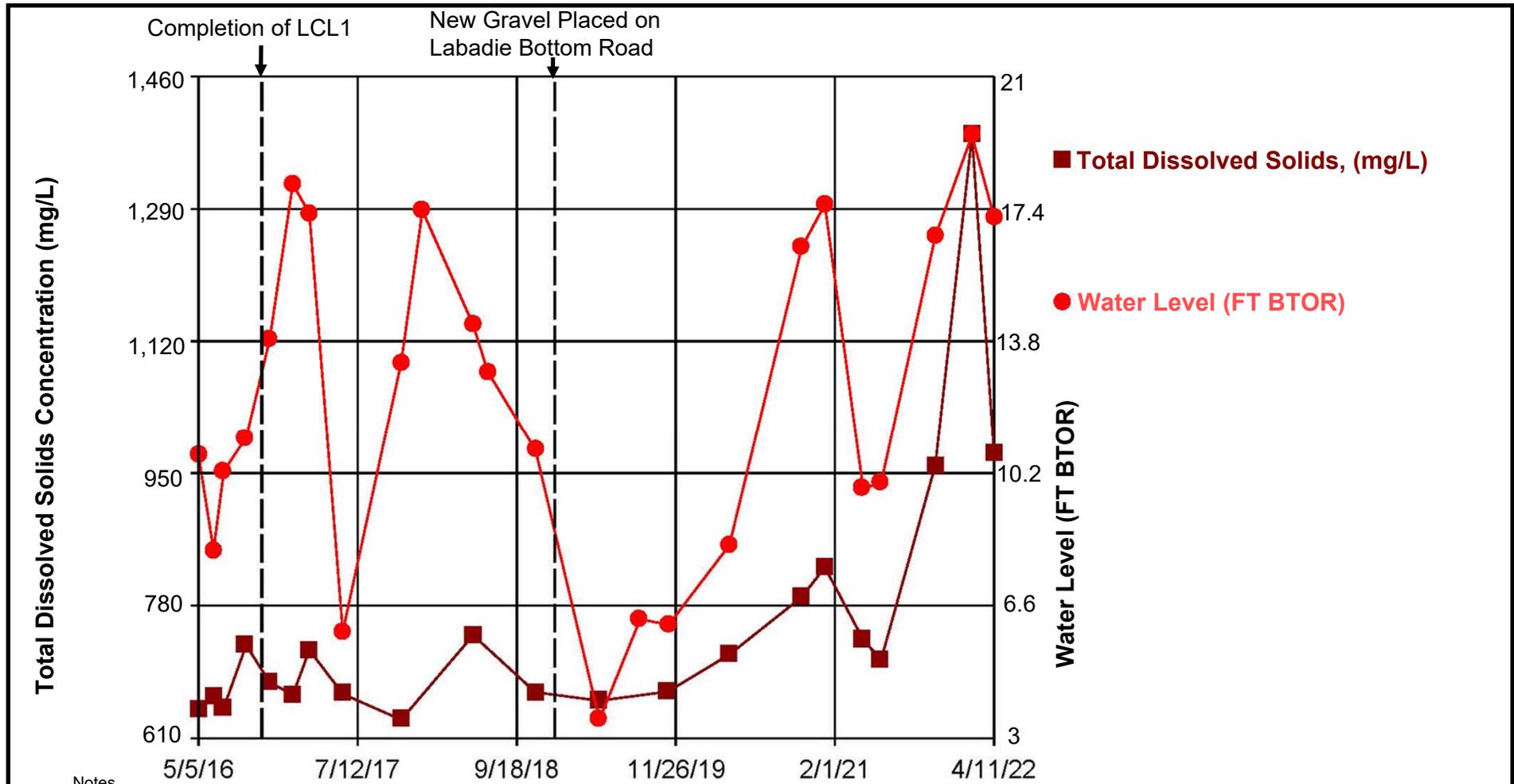
Notes  
 1) µg/L – Micrograms per liter.  
 2) FT BTOR – Feet below top of riser.

CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Sodium Concentrations and Water Level at TMW-2</b>		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-06-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>11</b>	



Notes  
 1) mg/L – Milligrams per liter.  
 2) FT BTOR – Feet below top of riser.

CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Sulfate Concentrations and Water Level at TMW-2</b>		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-06-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>12</b>	



**APPENDIX C**

**Alternative Source Demonstration -  
April 2022 Sampling Event**



**REPORT**

**LCL1 - Alternative Source Demonstration**

*Labadie Energy Center, Franklin County, Missouri, USA*

Submitted to:

**Ameren Missouri**

1901 Chouteau Avenue, St. Louis, MO 63103

Submitted by:

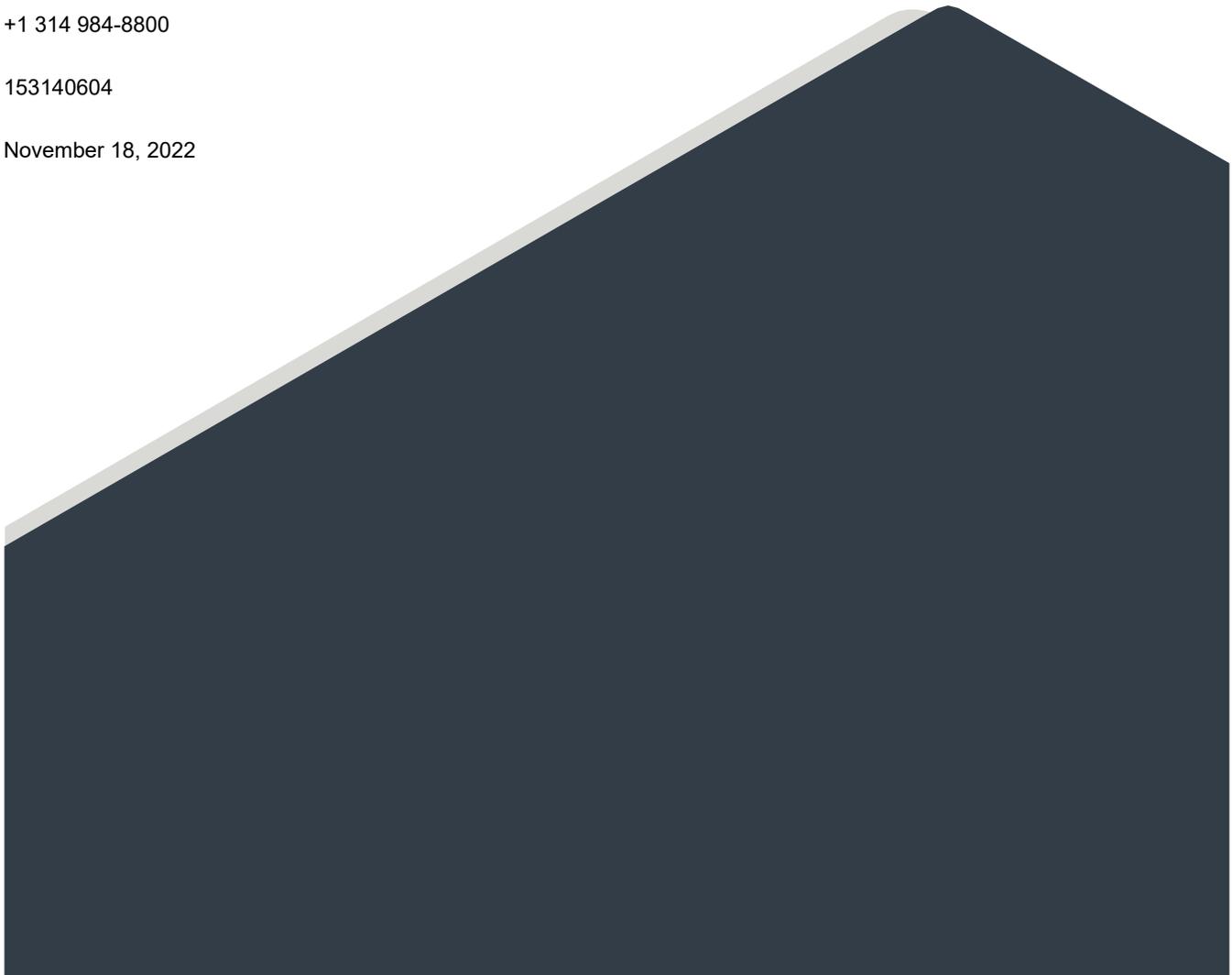
**Golder Associates USA, Inc.**

701 Emerson Road, Suite 250, Creve Coeur, Missouri, USA, 63141

+1 314 984-8800

153140604

November 18, 2022



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## CERTIFICATION STATEMENT

This *LCL1 – Alternative Source Demonstration, Labadie Energy Center, Franklin County, Missouri, USA* has been prepared to comply with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this *LCL1 – Alternative Source Demonstration, Labadie Energy Center, Franklin County, Missouri, USA* located at 226 Labadie Power Plant Road, Labadie Missouri 63055 has been prepared to meet the requirements of 40 CFR §257.94(e)(2).

### GOLDER ASSOCIATES USA INC.



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

## 1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this *LCL1 – Alternative Source Demonstration* has been prepared to document an Alternative Source Demonstration (ASD) for a Statistically Significant Increase (SSI) calculated at Ameren Missouri's (Ameren) Labadie Energy Center (LEC), Utility Waste Landfill (UWL) LCL1 or Cell 1. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

## 2.0 SITE DESCRIPTION AND BACKGROUND

The LEC is located approximately 35 miles west of downtown St. Louis in Franklin County, Missouri, just south of the Missouri River. **Figure 1** depicts the site location and layout, including the location of LCL1. The LEC encompasses approximately 2,400 acres and is located within the Missouri River Valley. The facility is bounded to the north by the Missouri River, to the west by Labadie Creek, to the northeast and east by agricultural land, and to the south by a railroad line and bedrock bluffs.

### 2.1 Geological and Hydrogeological Setting

The site lies between the Missouri River (to the north) and bedrock bluffs (to the south). Flow and deposition from the Missouri River have resulted in thick alluvial deposits which lie on top of bedrock. These alluvial deposits, which can range from approximately 90 to 120 feet thick, comprise the uppermost aquifer. Overall, this alluvial aquifer is described as a fining-upwards sequence of stratified sands and gravels with varying amounts of silts and clays. Based on drilling records, the alluvial aquifer is divided into sub-units, including floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of these alluvial deposits are variable.

Beneath the alluvial aquifer lies the bedrock aquifer. Bedrock in this region consists of Ordovician-aged rock. Formations include primarily limestone, dolomite, sandstone, and shale and are comprised of the Plattin Group, Joachim Dolomite, St. Peter Sandstone, Powell Dolomite, and the Cotter/Jefferson City Dolomites.

### 2.2 Utility Waste Landfill Cell 1 – LCL1

UWL Cell 1 is referred to by Ameren as the LCL1, or Cell 1. The LCL1 is approximately 31 acres in size and is located east of the generating plant (**Figure 1**). The CCR unit manages CCR from the LEC and is permitted to accept fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels. Currently, the LCL1 is used for the dry disposal of fly ash and bottom ash from the LEC.

The LCL1 was constructed with a composite liner system consisting of two feet of compacted clay soil with a hydraulic conductivity of less than  $1 \times 10^{-7}$  centimeters per second (cm/sec) overlain by a 60-mil High Density Polyethylene (HDPE) geomembrane liner. Information on the design of the UWL is available in the 2013 Proposed Construction Permit application (Gredell and Reitz & Jens, 2013).

A groundwater monitoring well network was installed in 2013 and 2014 to permit the UWL construction. This monitoring well network was approved by the Missouri Department of Natural Resources (MDNR) and consists of 36 monitoring wells surrounding the current and future extents of the UWL (**Figure 1**). Most of these monitoring wells are installed in the uppermost portions of the alluvial aquifer, just below the seasonally low elevation for

groundwater. Three (3) monitoring wells (MW-33(D), MW-34(D), and MW-35(D)) are installed in the intermediate/deeper zones of the alluvial aquifer. Groundwater samples have been collected in most of these monitoring wells since April 2013 and tested for the MDNR UWL parameters. In April 2017, four (4) monitoring wells were installed and added to this network along Labadie Bottoms Road (S-1, S-2, S-3, and S-4).

The permit for the LCL1 was issued October 27, 2016 (permit #0907101). Eleven (11) sampling events were performed prior to October 27, 2016, at most of the state required UWL monitoring wells, and four (4) rounds of baseline CCR Rule sampling were completed at CCR Rule monitoring wells (discussed below). These results represent groundwater quality prior to CCR placement in the UWL. The results from these pre-disposal monitoring events are used in conjunction with other site information in the ASD presented below.

### 2.3 CCR Rule Groundwater Monitoring

As required by the CCR Rule, the following was completed prior to the October 17, 2017 deadline; (1) a groundwater monitoring well system was installed and certified by a Professional Engineer, (2) a Statistical Method Certification was prepared and certified by a Professional Engineer, (3) a Groundwater Monitoring Plan (GMP) was prepared recording the design, installation, development, sampling procedures, as well as statistical methods, and placed in the owner's operating record, and eight (8) baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of CCR Rule.

The groundwater monitoring system for the LCL1 consists of six (6) monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. Two (2) existing monitoring wells (MW-26 and TMW-1) were installed by Reitz & Jens, Inc. in 2013 as a part of the state UWL monitoring program. The remaining monitoring wells (TMW-2, TMW-3, BMW-1S, and BMW-2S) were installed by Golder in 2015 and 2016 for CCR Rule groundwater monitoring purposes. More information regarding the design and installation of the monitoring wells is provided in the LCL1 GMP (Golder, 2017) and the LCL1 2017 Annual Report (Golder, 2018).

Between May 2016 and June 2017, eight (8) baseline sampling events were completed for the LCL1. After baseline sampling, Detection Monitoring events have been completed twice a year generally once in Q2 and once in Q4. April 2022 was the last Detection Monitoring sampling event. Laboratory testing was performed for the following Appendix III constituents during each Detection Monitoring event:

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

Background results from the eight (8) baseline sampling events were used to calculate statistical upper prediction limits (UPL). These UPLs were then compared to the Detection Monitoring results. If the result from the current Detection Monitoring event was higher than the calculated UPL, the result was considered an initial exceedance, and verification sampling was performed in accordance with the LCL1 statistical analysis plan. Per the statistical

analysis plan, after the May 2019 sampling event, the UPLs were updated to incorporate results from four (4) of the Detection Monitoring events. The UPLs were updated again following the February-April 2021 sampling event after an additional four (4) Detection Monitoring events were completed.

Since November 2017, several ASDs have been prepared for MW-26, TMW-1 and TMW-2. These previous ASDs are available in the 2018, 2019, 2020, and 2021 Annual Reports for the LCL1 and are available on Ameren's publicly available CCR Compliance website (<https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion/ccr-compliance-reports>). These ASDs have demonstrated that previous SSIs at the site were not caused by the LCL1, but rather primarily the result of relatively low calculated UPLs that were not representative of the full, natural geochemical variability within the alluvial aquifer or primarily caused by the LCL1 being downgradient from the LCPA, which is currently in corrective action. Additionally, the potential geochemical influence of construction materials on the shallow alluvial aquifer, such as fresh gravel, during the construction of the LCL1.

In April 2022, four (4) initial exceedances were identified for calcium, chloride, sulfate, and TDS at TMW-2. Verification sampling results confirmed each to be an SSI at TMW-2. Results from this sampling event are provided in **Table 1**.

### 3.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

The SSIs for calcium, chloride, sulfate, and TDS occurred at monitoring well TMW-2 and the values are presented on **Table 1**. TMW-2 is screened in the upper portion of the alluvial aquifer, just below the average seasonal low for groundwater. As shown on **Figure 1**, TMW-2 is located to the northeast of the LCL1, which is east of the generating plant as well as surface impoundments LCPA and LCPB. Closure of the LCPA was substantially completed before the April 2021 sampling event, with the completion of the liner cover system on December 30, 2020.

Based on Golder's review of the pre-disposal data discussed in **Section 2.2** above, as well as our comparison of the pre-disposal data with the results from the eight (8) CCR-Rule baseline events, the groundwater at the LCL1 contains low-level, pre-existing CCR impacts from units/activities that pre-dated disposal activities in the LCL1. As a result of these pre-existing impacts, the LCL1 Statistical Analysis Plan (SAP) uses intrawell UPLs to determine SSIs. Intrawell UPLs are calculated from historical data within a particular well, and not by pooling data from background wells, such that individual limits are calculated for each constituent in each well in the monitoring program.

### 4.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSIs at TMW-2 are not the result of a release from the LCL1 but are rather from an alternative source. The following bullets summarize the different lines of evidence that

- Pre-existing, low level concentrations of CCR impacts in groundwater that pre-date the installation and operation of the LCL1.
- Construction of the LCL1 with a 60-mil geomembrane liner and a 2-foot thick clay barrier.
- Location near fresh limestone and dolomitic gravels, and the potential geochemical influence from the LCL1 gravel construction materials on shallow groundwater.

## 4.1 CCR Indicators

Several types of CCR byproducts are generated by coal-fired power plants. The different types of CCR typically display distinct geochemical signatures and indicator parameters. **Table 2** below describes the different types of CCRs and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017).

**Table 2: Types of CCR and Typical Indicator Parameters**

Type of CCR	Description of CCR (USEPA 2018)	Key Indicators (EPRI 2011, 2012, 2017)
<b>Fly Ash</b>	Fine grained, powdery material composed mostly of silica made from the burning of finely ground coal in the boiler.	<ul style="list-style-type: none"> <li>• Boron</li> <li>• Molybdenum</li> <li>• Lithium</li> <li>• Sulfate</li> </ul>
<b>Boiler Slag / Bottom Ash</b>	Molten bottom ash from the slag tap and cyclone type furnaces that turns into pellets that have a smooth glassy appearance after quenching with water.	<ul style="list-style-type: none"> <li>• Bromide</li> <li>• Potassium</li> <li>• Sodium</li> <li>• Fluoride</li> </ul>
<b>Flue Gas Desulfurization Material (FGD)</b>	A material leftover from the process of reducing sulfur dioxide emissions from a coal-fired boiler that can be a wet sludge consisting of calcium sulfite or calcium sulfate or a dry powdered material that is a mixture of sulfites and sulfates.	<ul style="list-style-type: none"> <li>• Sulfate</li> <li>• Fluoride</li> <li>• Calcium</li> <li>• Boron</li> <li>• Bromide</li> <li>• Chloride</li> </ul>

Notes:

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

As described above, the LCL1 has historically received fly ash. No FGD type wastes are managed at the LEC.

## 4.2 Analysis of Key CCR Constituents at TMW-2

### 4.2.1 Boron Concentrations

As indicated in **Table 2**, boron is a key indicator for fly ash and boiler slag/bottom ash impacts because it is typically present at relatively high concentrations in the leachate from these types of waste, is not a common anthropogenic contaminant, and is non-reactive and mobile in most hydrogeological environments (EPRI 2012). This non-reactive and mobile nature makes boron an early and key indicator of impacts from a CCR unit. Boron is also present in the monitoring wells around the LCPA and has been shown to be a key indicator for CCR impacts at this site. Therefore, if groundwater was impacted by the LCL1, current boron concentrations should be statistically elevated with respect to pre-CCR placement downgradient of the LCL1.

**Figure 2** displays boron concentrations at TMW-2 as well as the two shallow background wells for the LEC for the entire historical monitoring period. At TMW-2, boron concentrations have varied over time with values ranging from 86.8 J to 132 micrograms per liter ( $\mu\text{g/L}$ ). The intrawell UPL for boron at TMW-2 is 134.3  $\mu\text{g/L}$ . Throughout this same timeframe, boron concentrations in the background wells BMW-1S and BMW-2S, which have no pre-existing CCR impact and are located approximately 2.5 miles to the west of the LCL1, have had values ranging

between non-detect (< 50 µg/L) to 151 µg/L. The interwell UPL for boron (based on LEC background wells) is 147 µg/L.

As displayed in Figure 2, the most recent boron concentration at TMW-2 (110 µg/L) is below the UPL for both TMW-2 and the background monitoring wells and is consistent with previous results. The absence of boron exceedances at TMW-2 demonstrates that elevated concentrations for other constituents are related to an alternative source, rather than the LCL1.

### 4.3 Evaluation of SSIs at TMW-2

As discussed in **Section 3.0**, there are four (4) verified SSIs from the April 2022 sampling event, all at monitoring well TMW-2, including calcium, chloride, sulfate, and TDS (referred to hereafter as the Constituents of Interest or COIs). To determine the source for the recent exceedances for the COIs, values were compared to background and different source water datasets. **Figures 3-9** are timeseries plots displaying the concentrations of the COIs and other selected constituents compared to shallow background concentrations from background wells located 2.5 miles upgradient of the LCL1. As displayed on these figures, there is an increase in each of the COIs in the November and subsequent February sampling events, followed by decreases in the April 2022 and June 2022 sampling events. However, as discussed in **Section 4.2**, the absence of boron with the other exceedances indicates that it is unlikely that these low-level SSIs are caused by CCR impacts.

**Table 3** below displays concentration data for the COIs, alkalinity, and magnesium from the April 2022 and June 2022 sampling events as compared with the CCR porewater concentrations from the LCPA (contains bottom ash and fly ash) and the LCPB (contains fly ash).

**Table 3: Comparison of TMW-2 SSI and Porewater Concentrations**

Constituent (Units)	April 2022 Result at TMW-2	June 2022 Result at TMW-2	LCPA Porewater Range	LCPB Porewater Range
Calcium (µg/L)	220,000	215,000	76,500 – 106,000	11,400 – 22,600
Chloride (mg/L)	11.9	10.0	15.2 – 25.5	15.6 – 18.4
Sulfate (mg/L)	197	175	254 – 306	728 – 1,060
Total Dissolved Solids (mg/L)	975	940	528 – 642	1,860 – 2,850
Magnesium (µg/L)	56,300	Not Sampled	184 – 45,500	84.4 – 386
Alkalinity (mg/L)	620	Not Sampled	77.6 – 208	861 – 1,340
Sodium (µg/L)	12,500	Not Sampled	50,500 – 84,000	750,000 – 969,000

Notes:

µg/L – Micrograms per liter.

mg/L – Milligrams per liter.

As displayed in **Table 3**, porewater samples collected from the LCPA and LCPB CCR units indicate that CCR is not a potential source for increases in calcium or magnesium at TMW-2, as the concentrations in pore-water are lower than those found in groundwater at TMW-2. This, combined with a lack of the key CCR indicator, boron, indicates that an alternative source is responsible for exceedances present at TMW-2.

#### 4.4 Nearby Carbonate Gravel Roadways and Concrete Construction as Potential Source

In addition to the lines of evidence presented above, the recent placement of fresh, crushed limestone ( $\text{CaCO}_3$ )/dolomite ( $\text{CaMg}(\text{CO}_3)_2$ ) gravel and concrete near well TMW-2 is a potential source of the elevated COI concentrations reported in the shallow well TMW-2. As displayed in **Figure 10**, the area around TMW-2 has had a significant amount of construction activity during the past approximately seven (7) years associated with LCL1 construction, and fresh limestone and dolomite gravels, as well as concrete, have been placed near TMW-2 in the following locations:

- 1) After construction of the LCL1, Labadie Bottoms Road was re-graded and fresh, crushed gravel was placed on the road in late 2018 to early 2019. TMW-2 is located approximately 30 feet south and east of the new gravel roads as displayed in **Figure 10**.
- 2) The LCL1 Cell was constructed between 2015 and October 2016 and is constructed with gravel roads at the top of the unit, gravel beneath the fabric-formed articulated concrete mat (FCM) side slopes of the unit, and a gravel road at the base of the LCL1 as displayed in **Figure 7**. TMW-2<sup>1</sup> is approximately 145 feet from the toe of the berm. Based on aerial imagery and photographs, completion of the FCM and gravel road began in April 2016 and were completed by October 2016.
- 3) During the construction of the LCL1, fresh limestone/dolomite gravel was placed just to the east of the LCL1 and ~50 feet west of TMW-2. This gravel area was used as a parking area for construction and as a staging and laydown area for equipment. Based on onsite photos and aerial imagery, the gravel area was built in April 2016, and was removed after completion of the LCL1, in late 2016. The parking area is approximately 50–125 feet to the west/southwest of TMW-2. An image displaying the north end of the parking area is provided in **Figure 11**.



The gravel used for the roadways, under the FCM, and parking lots nearby consists mostly of limestone and dolomite and contains some calcite sourced from nearby quarries. Precipitation and infiltration of surface water through fresh gravel and concrete that contain water-soluble salts leaches soluble components into the shallow groundwater and can cause an increase in the COIs observed in TMW-2.

The potential impact of carbonate rocks and their associated water-soluble salts has been studied since the 1950s, and Lamar and Shorde (1953) determined that soluble salts in dolomite and limestone commonly contain

<sup>1</sup> The location of TMW-2 is as close as was feasible to the LCL1 in 2016 in order to comply with the timeframes of the CCR Rule. Construction activities associated with the LCL1 and a nearby gas pipeline made it so the closest practicable location for TMW-2 was ~145 feet from the toe of the berm at the LCL1.

increased amounts of magnesium, bicarbonate (alkalinity), chloride, calcium, and sulfate. Numerous studies and geochemistry textbook citations since that time have confirmed these findings. Concrete is also known to contain water-soluble salts (Cheng et al., 2013) similar to those discussed for carbonate gravels with increased levels of calcium, chloride, and sulfate. The leaching of these salts from concrete is called efflorescence, and it can be common in the concrete construction industry. Efflorescence, the migration of salts to the surface, is typically described as a whitish colored powder that coats the surface of the concrete. As with the carbonate gravels, precipitation and runoff of surface water from the concrete FCM and associated water-soluble salts leaches soluble components into the shallow groundwater and can cause an increase in the COIs observed in TMW-2.

#### 4.4.1 Hydraulic Connection Between Potential Fresh Carbonate Gravel and Concrete Sources and TMW-2

As discussed in the 2021 LCL1 Annual Report (Golder, 2022), net groundwater flow at the site is estimated to be approximately 18 feet per year toward the northeast. Based on the net groundwater flow, both the former gravel parking and laydown area associated with the construction of the LCL1, and the gravel roads/ and exposed FCM concrete/ berm associated with the finished LCL1 cell are likely sources for COI impacts at TMW-2.

The FCM and the gravel road at the top of the berm around the LCL1 were placed on top of compacted earth fill and were sloped to drain surface water toward the gravel road at the toe of the berm, surrounding the LCL1 (Gredell and Reitz & Jens, 2013). Historical aerial images (See **Figure 12**, in text) display that the surface water runoff from the FCM is occurring as designed with some pooling of surface water below the berm and is causing increased infiltration over the former gravel area. As discussed above, the water that is infiltrating into the groundwater will have leached available water-soluble salts from the FCM concrete and the underlying carbonate gravel/rock base.

**Figure 12 – Historic Aerial Images near TMW-2**



Notes:

- 1) Aerial images from Google Earth ©

As discussed previously, the FCM, gravel roads associated with the UWL, and the gravel area located just west of TMW-2 were built between April and October 2016. These potential upgradient leaching sources are located approximately 50 to 145 feet upgradient of TMW-2. Based on the net groundwater flow rate (~18 feet per year

average), leaching impacts from these carbonates and associated salt sources would be expected to reach well TMW-2 in groundwater between 2019 and 2024.

As displayed in **Figure 3**, calcium concentrations at TMW-2 begin to increase slightly between the April 2020 and November 2020 sampling events, with larger increases occurring during the November 2021 and February 2022 sampling events. This corresponds with the date range that would be expected for impacts caused by the leaching of the water-soluble salts associated with the fresh carbonate gravel/rock placement during the LCL1 construction and adjacent parking area construction. Additionally, as discussed above, CCR placed in the LCL1 is not a potential source for increases in calcium at TMW-2, as the concentrations in CCR pore-water at LEC are lower than those found in groundwater at TMW-2 and in the background wells. Therefore, leaching of the gravel and concrete water-soluble salts provides the most likely explanation for the increase in calcium concentrations at TMW-2, as fresh carbonates have been demonstrated to cause increases to calcium concentrations to groundwater (Lamar and Shorde, 1953) and the potential carbonate source is upgradient and hydrologically connected to TMW-2.

In addition to calcium impacts, magnesium, alkalinity, chloride, sulfate, sodium, and TDS display very similar trends to calcium (see **Figures 4-9**), with increasing concentrations in the same timeframe. Increases in these constituents, especially those that are not a result of CCR influence (i.e., calcium, magnesium, alkalinity, as shown in **Table 3**), coupled with a lack of increasing boron, indicates that these impacts are not from CCR influence on the groundwater, but are most likely related to leaching of fresh carbonate gravel and concrete and their associated soluble salt sources.

Lastly, the documented construction of the LCL1, with a robust, engineered base liner system constructed of two feet of low-permeability compacted clay overlain by a 60-mil HDPE liner, also limits the potential that the April 2022 SSIs reported for TMW-2 are a result of influence from the LCL1. These lines of evidence collectively indicate that the SSIs observed in TMW-2 are not the result of impacts from the LCL1.

## 5.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY LCL1 IMPACT

Based on the information presented in **Section 4.0** above, the SSIs reported for TMW-2 during the April 2022 monitoring event are not a result of impacts from the LCL1. The SSIs appear to be a result of the limestone/dolomite gravel and concrete placed upgradient of TMW-2 that has migrated downgradient into shallow groundwater to TMW-2. Soluble salts associated with the gravel and concrete (calcium, chloride, sulfate, magnesium, alkalinity, and TDS) display an increase in concentration that correlates with the time of placement and LCL1 construction activities and the net groundwater movement at the site. These trends, coupled with the lack of boron increases and robust engineered construction of the LCL1, indicate that the changes in concentration are not caused by the LCL1, but rather the upgradient gravel and exposed concrete materials used in LCL1 construction.

## 6.0 REFERENCES

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- Golder Associates Inc., 2019d, Updated Statistical Limits with Additional Background Data – LCPB.
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## Tables

**Table 1**  
**April 2022 Detection Monitoring Results**  
**LCL1 - Utility Waste Landfill Cell 1**  
**Labadie Energy Center, Franklin County, MO**

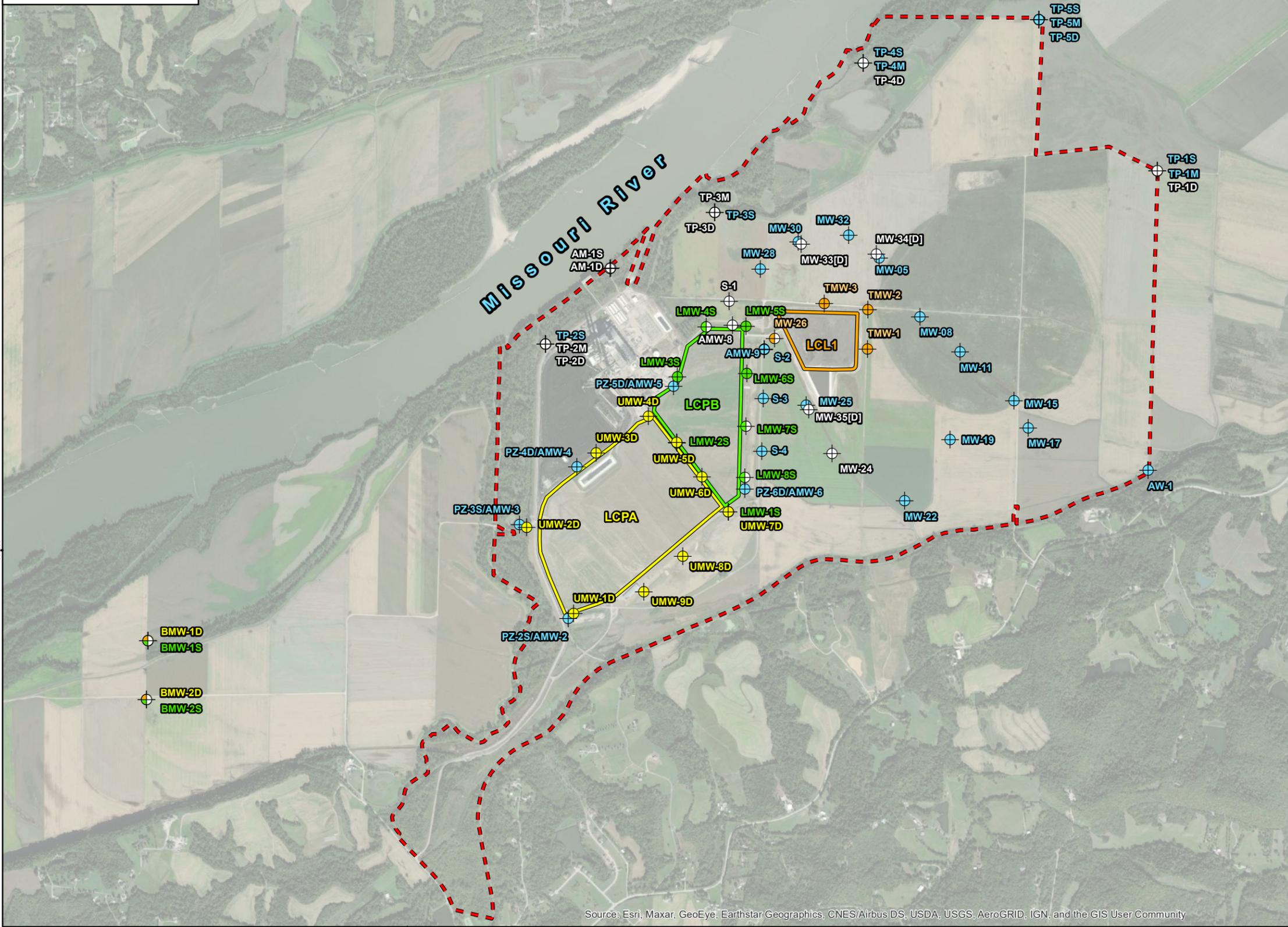
ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		BMW-1S	BMW-2S	Prediction Limit MW-26	MW-26	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
<b>April 2022 Detection Monitoring Event</b>											
DATE	NA	4/6/2022	4/6/2022	NA	4/7/2022	NA	4/11/2022	NA	4/11/2022	NA	4/11/2022
pH	SU	7.10	7.06	6.658-7.339	6.94	6.683-7.105	6.95	6.42-7.17	6.93	6.585-7.07	6.82
BORON, TOTAL	µg/L	109	55.2 J	103	96.8 J	121.6	114	134.3	110	136.9	116
CALCIUM, TOTAL	µg/L	221,000	138,000	155,150	140,000	183,389	165,000	205,487	220,000	202,001	141,000
CHLORIDE, TOTAL	mg/L	2.5 J	2.5 J	6.76	5.9 J	5.718	2.9 J	7.142	11.9	8.621	2.5 J
FLUORIDE, TOTAL	mg/L	0.20 J	0.19 J	0.2118	ND	0.2975	0.21	0.2972	ND	0.2626	0.20 J
SULFATE, TOTAL	mg/L	38.6	45.7	38.24	29.0	128	91.9	115.5	197	104	27.8
TOTAL DISSOLVED SOLIDS	mg/L	828 J	513 J	543.7	498	733.7	653	815.4	975	815.4	684
<b>June 2022 Verification Sampling Event</b>											
DATE	NA								6/22/2022		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L								215,000		
CHLORIDE, TOTAL	mg/L								10.0		
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L								175		
TOTAL DISSOLVED SOLIDS	mg/L								940		

**NOTES:**

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.
4. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.
5. Prediction Limits calculated using Sanitas Software.
6. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

Prepared By: BTT  
Checked By: GTM  
Reviewed By: MNH

## Figures



**LEGEND**

- Approximate Property Boundary
- Labadie Energy Center CCR Units**
  - LCPA - Closed Bottom Ash Surface Impoundment
  - LCPB - Closed Fly Ash Surface Impoundment
  - LCL1 - Utility Waste Landfill Cell 1
- Monitoring Well Network**
  - Corrective Action Monitoring Well
  - LCPA Monitoring Well
  - LCPB Monitoring Well
  - LCPB and Corrective Action Monitoring Well
  - LCL1 Monitoring Well
  - LCL1 and Corrective Action Monitoring Well
  - Background Well Used for LCPA Corrective Action, LCPB, and LCL1 Monitoring
  - Monitoring Well Used for Water Level Elevation Measurements Only

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

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

**REFERENCE(S)**  
1.) ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.  
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.

CLIENT  
**AMEREN MISSOURI**  
**LABADIE ENERGY CENTER**

PROJECT  
**GROUNDWATER MONITORING PROGRAM**



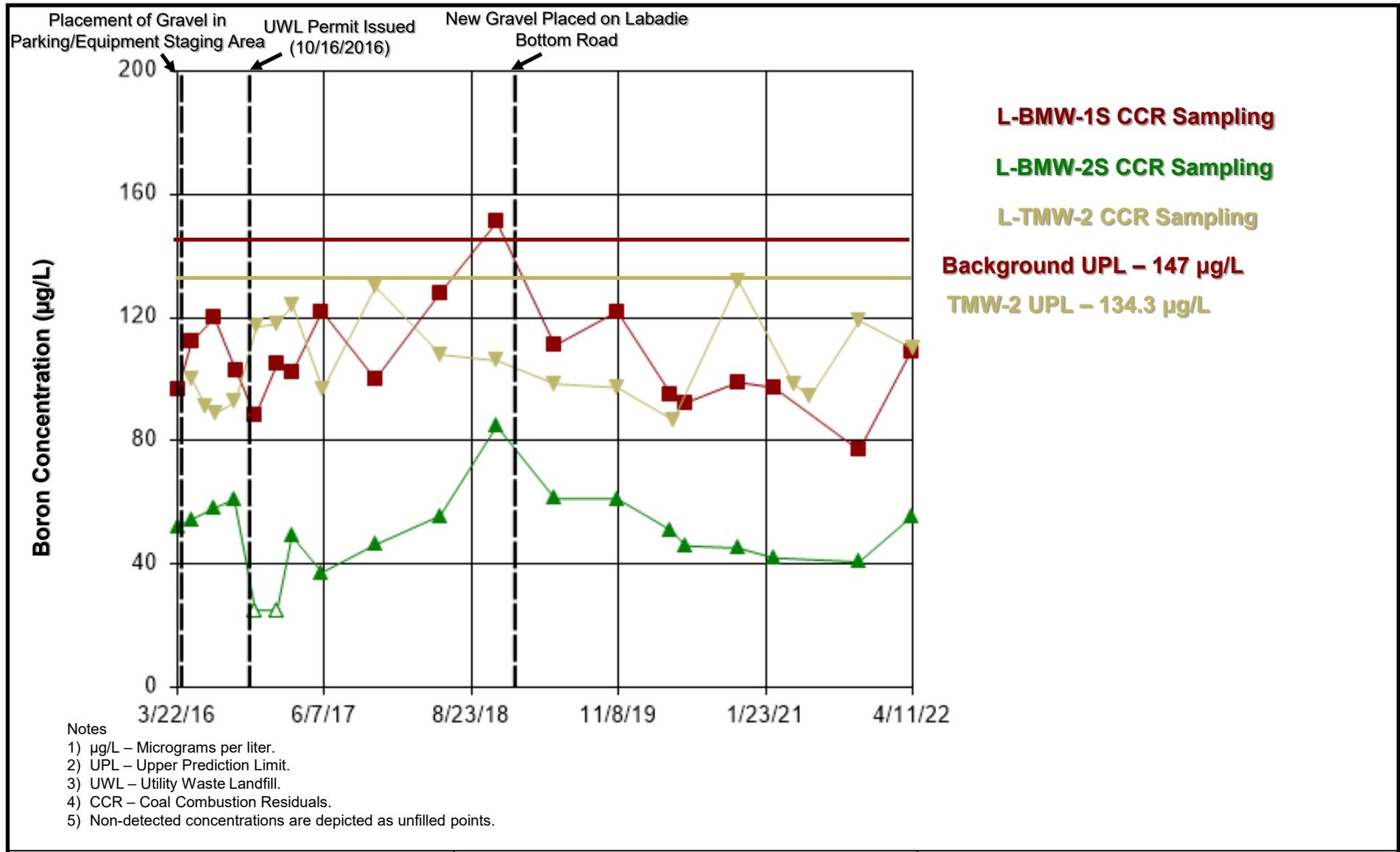
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DESIGNED	JSI	
PREPARED	ETF	
REVIEWED	BTT	
APPROVED	MNH	

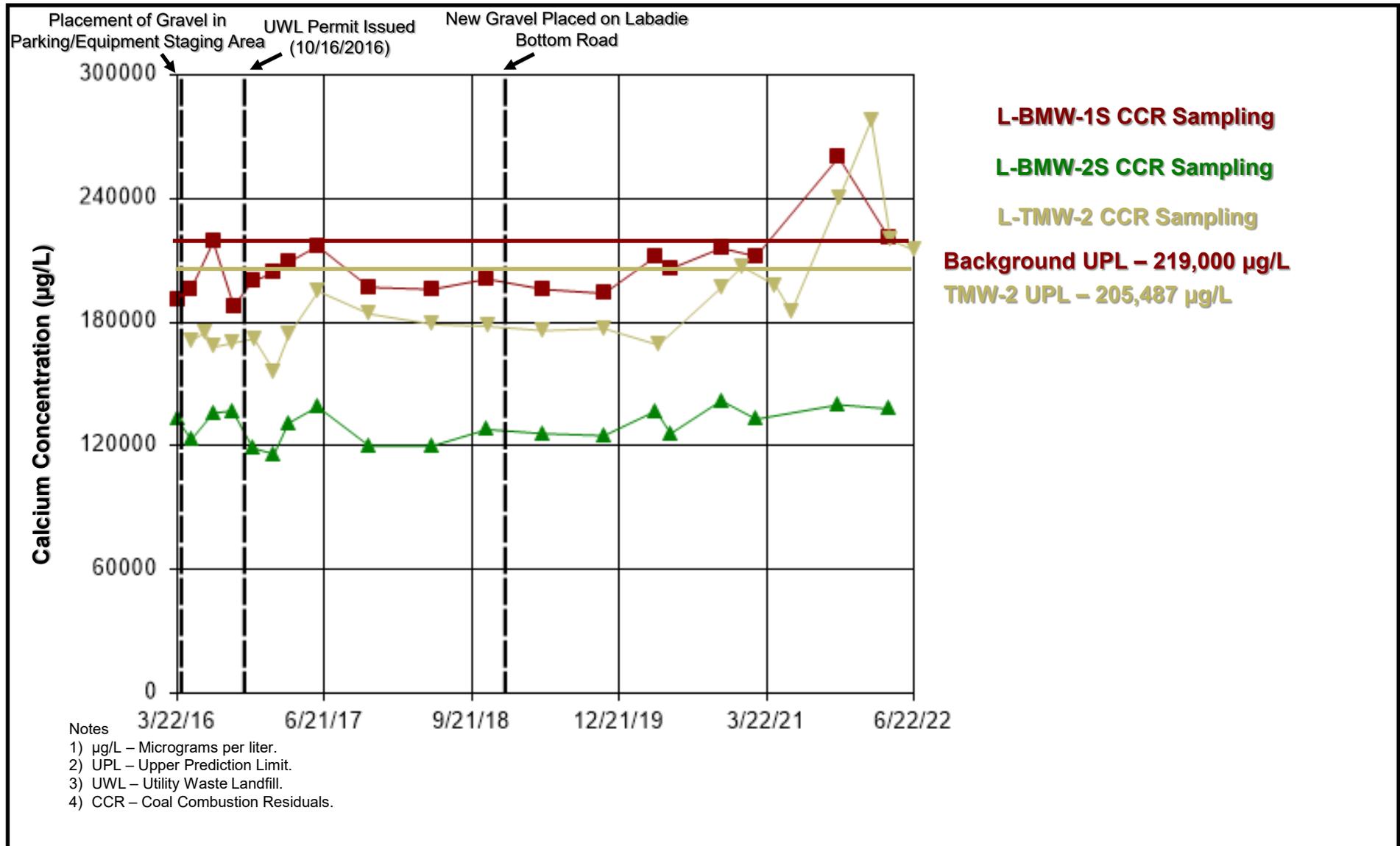
PROJECT NO. 153140604 CONTROL 1240 FIGURE 1

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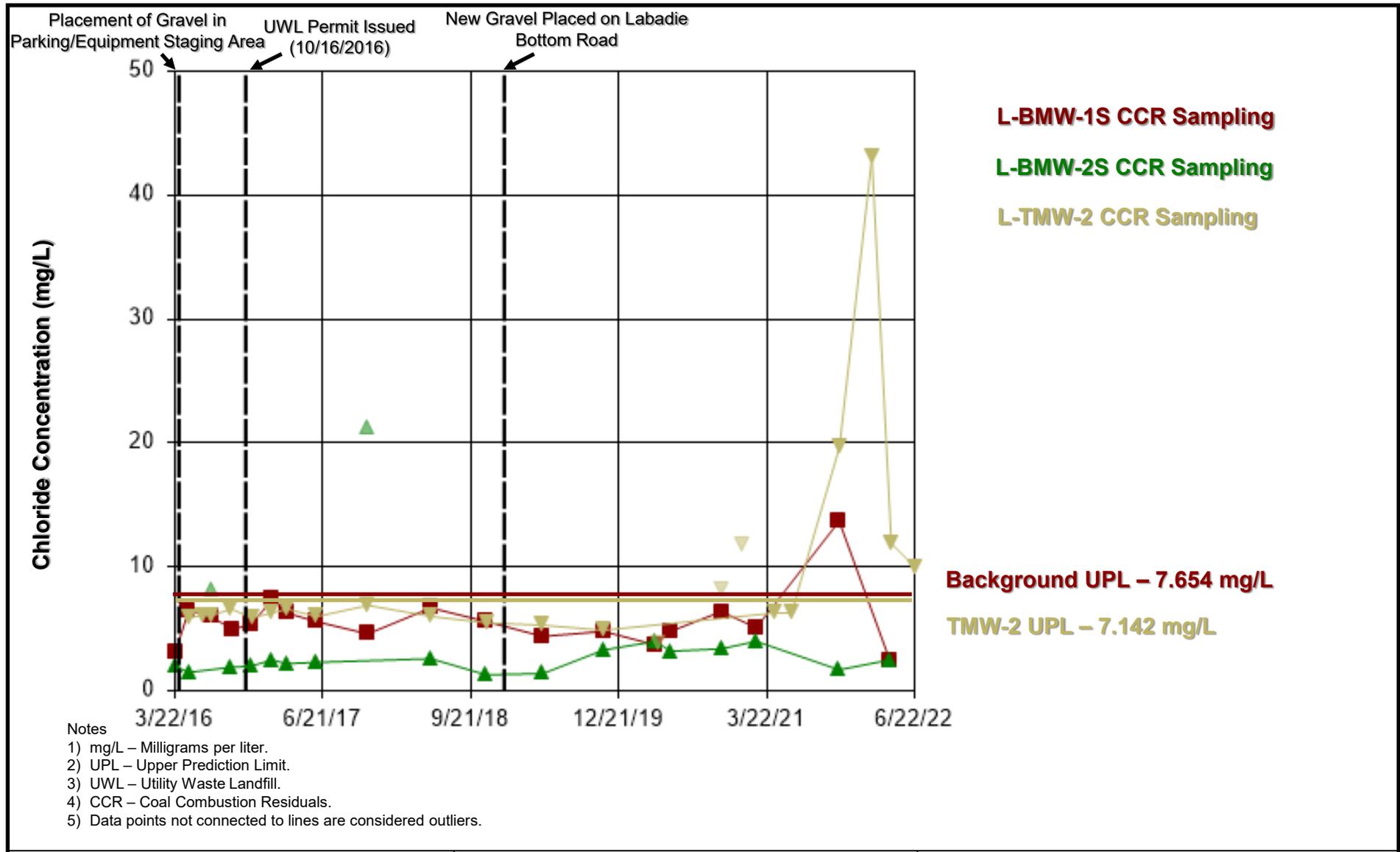
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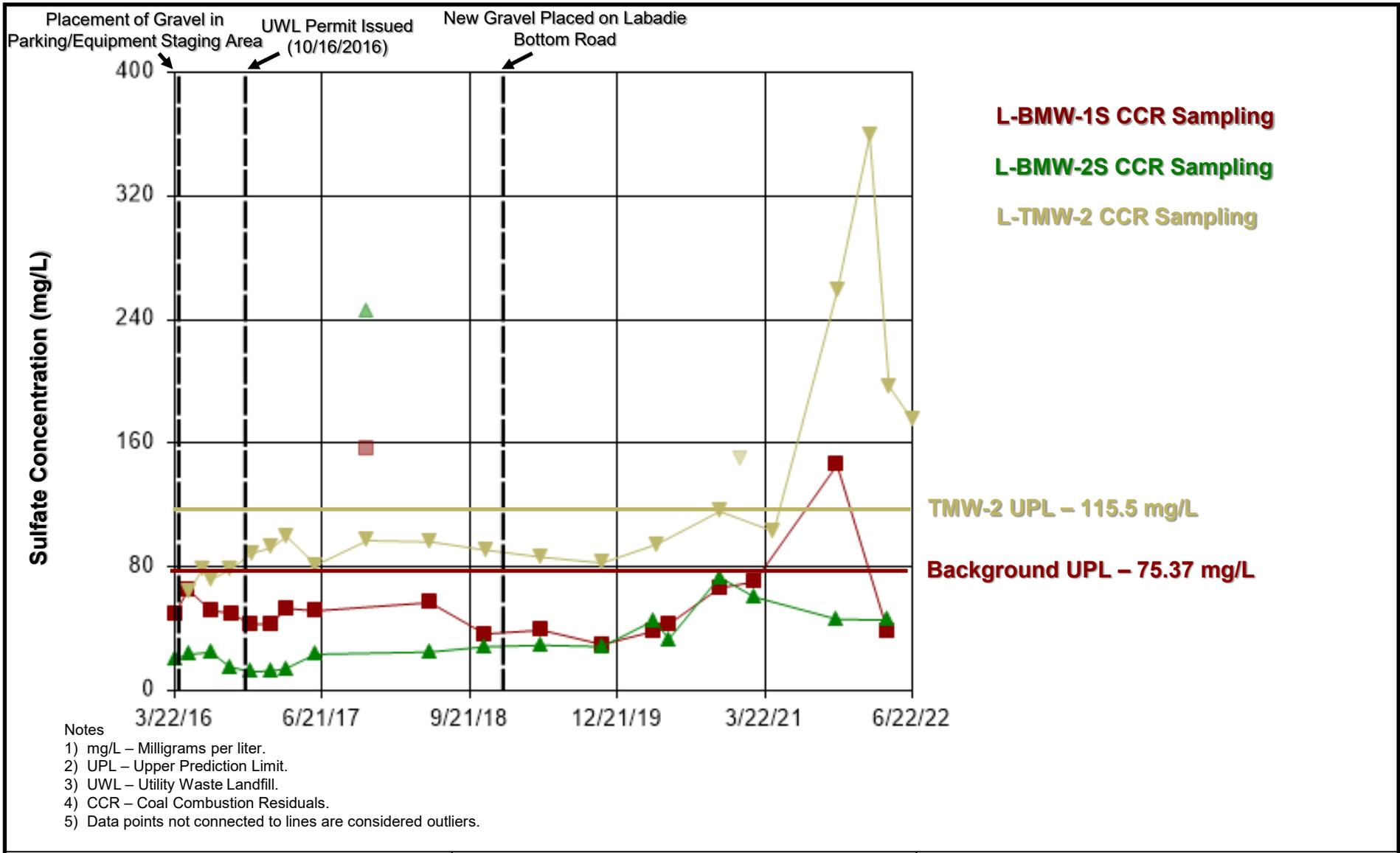
CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Boron Concentrations at TMW-2 and Background Monitoring Wells</b>			
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>2</b>		



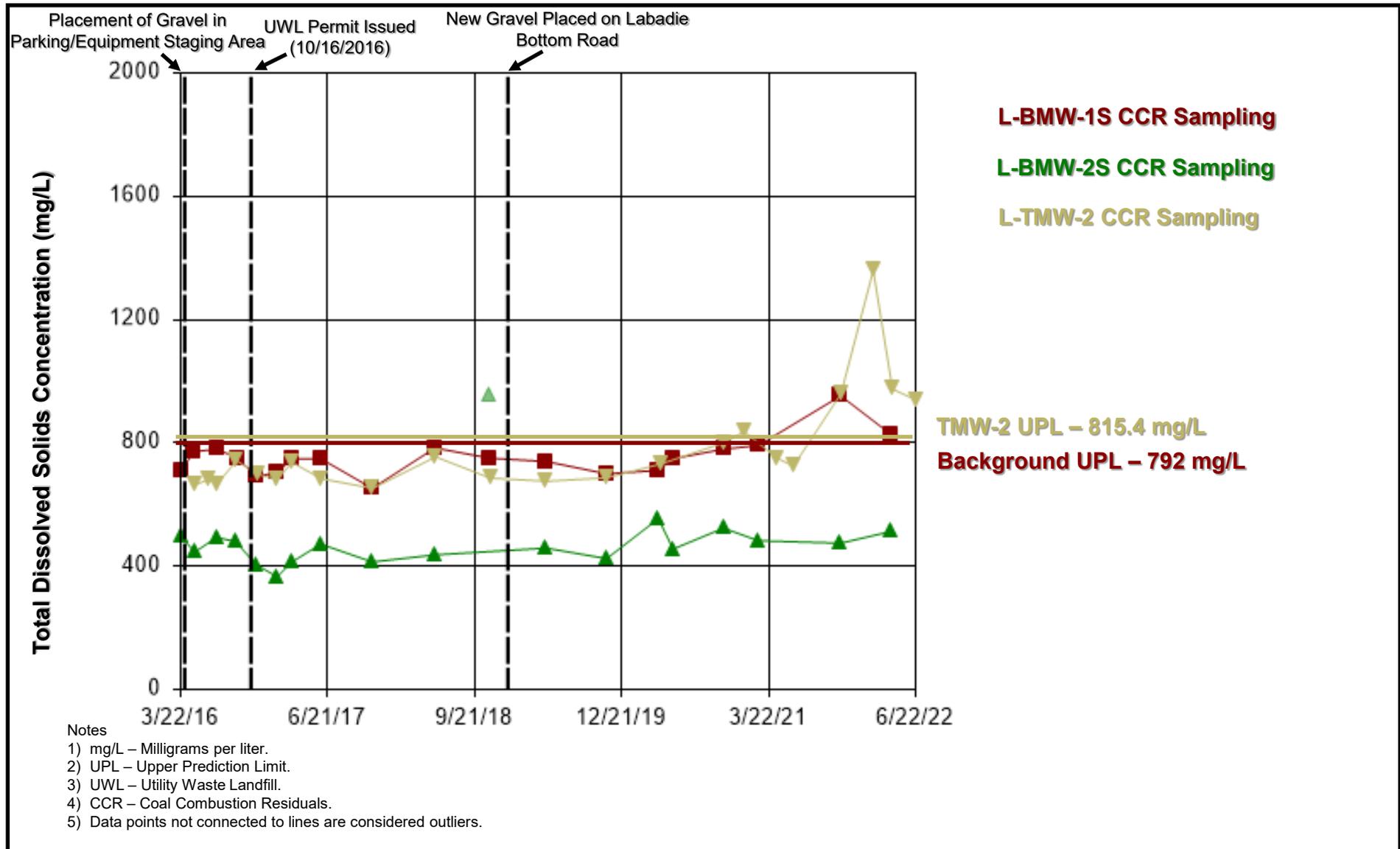
CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Calcium Concentrations at TMW-2 and Background Monitoring Wells</b>			
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>3</b>		



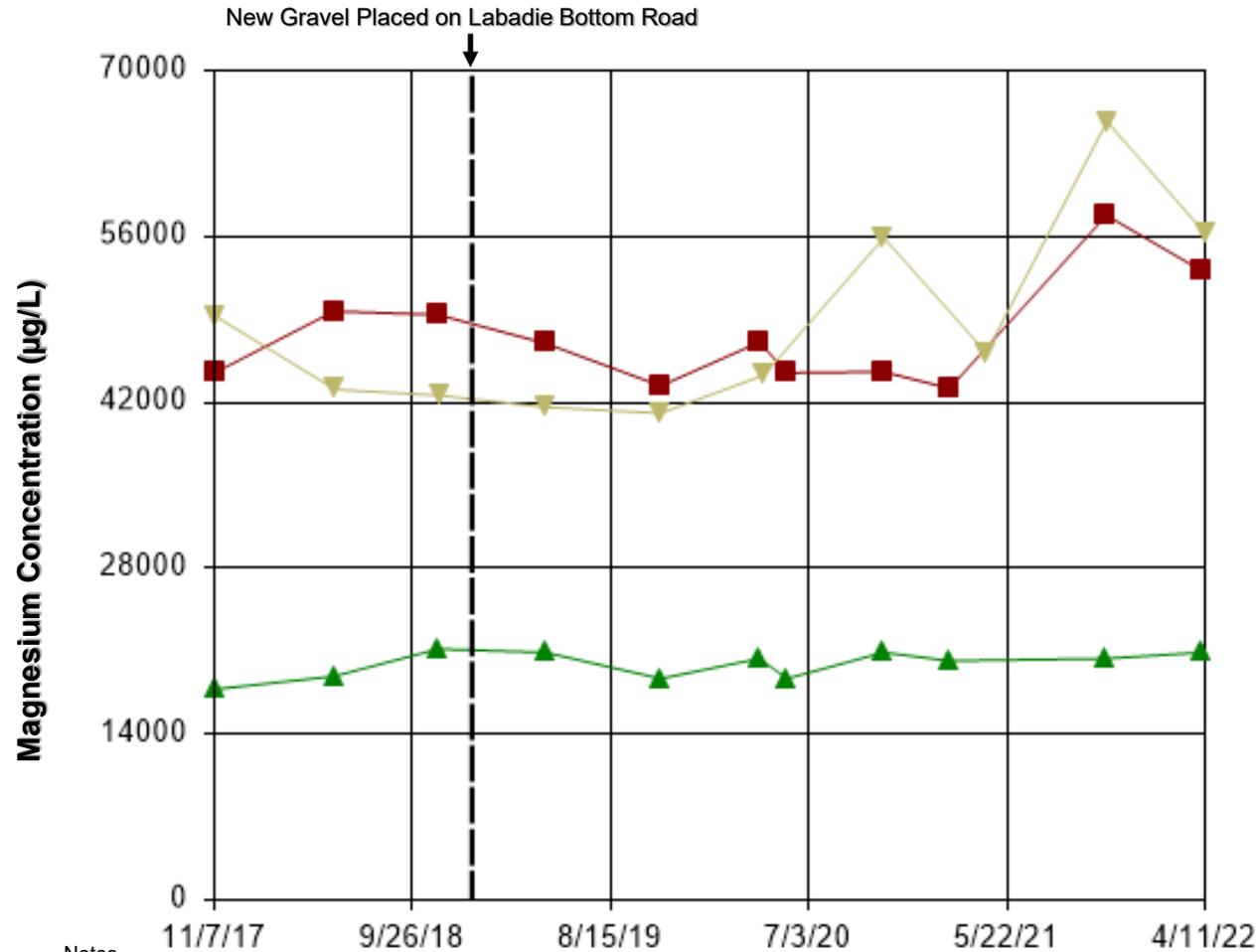
CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Chloride Concentrations at TMW-2 and Background Monitoring Wells</b>		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>4</b>	



CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Sulfate Concentrations at TMW-2 and Background Monitoring Wells</b>		
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CLIENT/PROJECT <b>AMEREN MISSOURI LABADIE ENERGY CENTER</b>									TITLE <b>Timeseries Plot of Total Dissolved Solids Concentrations at TMW-2 and Background Monitoring Wells</b>		
DRAWN GTM	CHECKED EMS	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>6</b>	



**L-BMW-1S CCR Sampling**  
**L-BMW-2S CCR Sampling**  
**L-TMW-2 CCR Sampling**

Notes

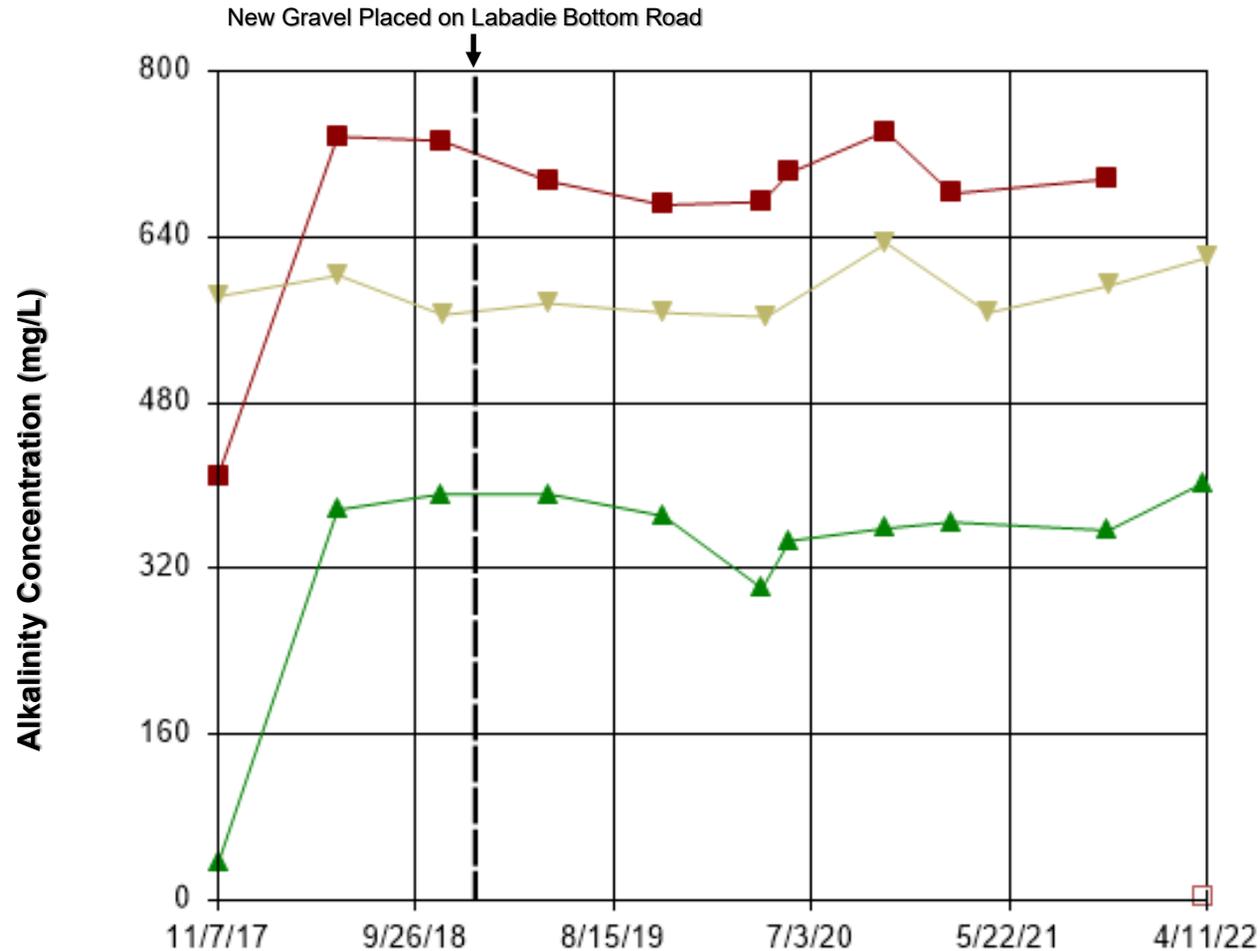
- 1) µg/L – Micrograms per liter.
- 2) UWL – Utility Waste Landfill.
- 3) CCR – Coal Combustion Residuals.

CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE  
**Timeseries Plot of Magnesium  
 Concentrations at TMW-2 and Background  
 Monitoring Wells**

DRAWN GTM	CHECKED JSI	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>7</b>
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**L-BMW-1S CCR Sampling**  
**L-BMW-2S CCR Sampling**  
**L-TMW-2 CCR Sampling**

Notes

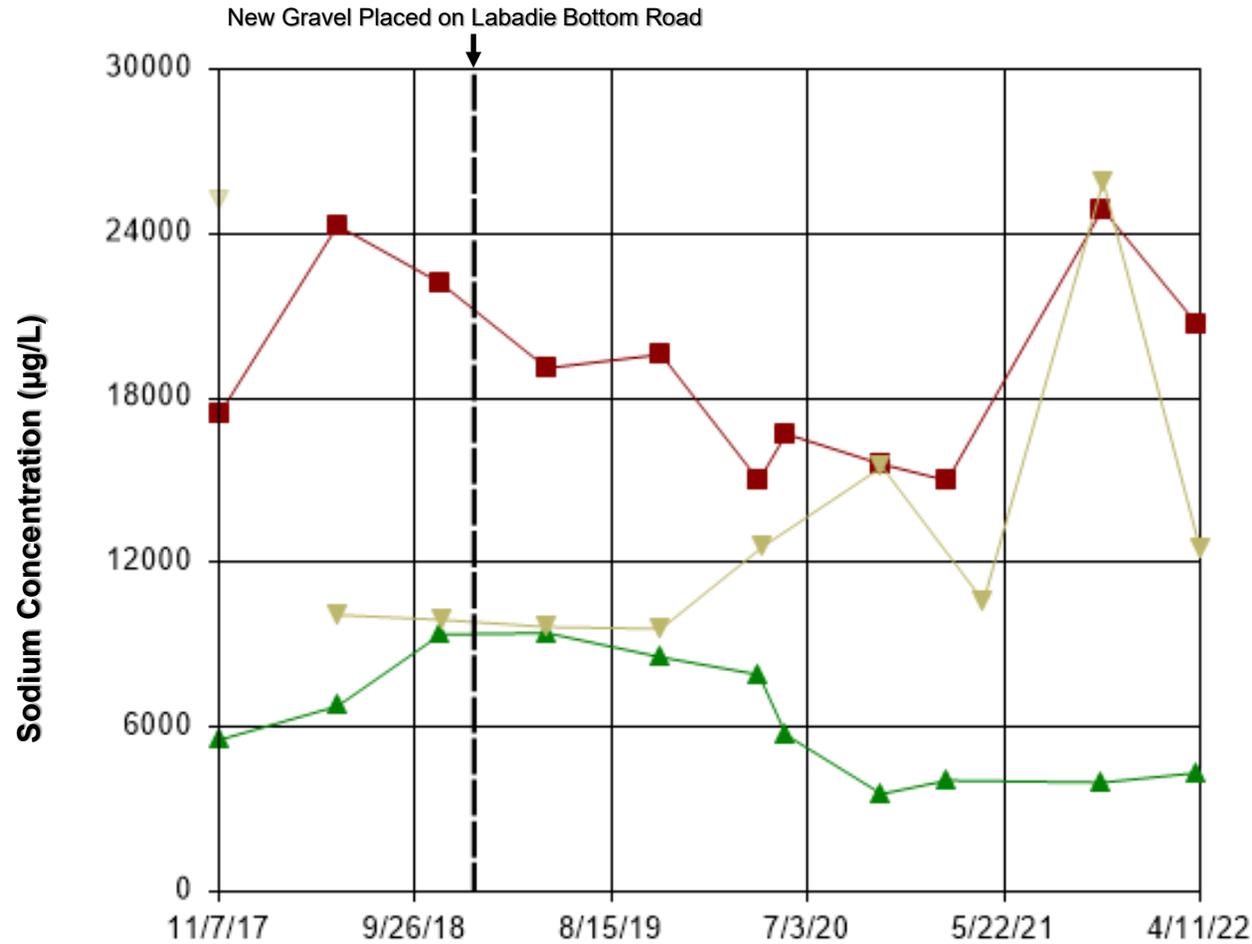
- 1) mg/L – Milligrams per liter.
- 2) UWL – Utility Waste Landfill.
- 3) CCR – Coal Combustion Residuals.
- 4) Data points not connected to lines are considered outliers.
- 5) Non-detected concentrations are depicted as unfilled points.

CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE  
**Timeseries Plot of Alkalinity  
 Concentrations at TMW-2 and Background  
 Monitoring Wells**

DRAWN GTM	CHECKED JSI	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>8</b>
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**L-BMW-1S CCR Sampling**  
**L-BMW-2S CCR Sampling**  
**L-TMW-2 CCR Sampling**

Notes

- 1) mg/L – Milligrams per liter.
- 2) UWL – Utility Waste Landfill.
- 3) CCR – Coal Combustion Residuals.
- 4) Data points not connected to lines are considered outliers.

CLIENT/PROJECT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



TITLE **Timeseries Plot of Sodium Concentrations  
 at TMW-2 and Background Monitoring  
 Wells**

DRAWN GTM	CHECKED JSI	REVIEWED MNH	DATE 2022-11-17	SCALE N/A	FILE NO. N/A	JOB NO. 153140604.0001	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE <b>9</b>
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45000

45000



**LEGEND**

-  Monitoring Well TMW-2
-  Labadie Bottom Road, Fresh Gravel Placed Late 2018- Early 2019
-  Gravel Parking Area, April 2016 - Late 2016
-  LCL1 FCM and Gravel Roads, Built 2015 - October 2016



**NOTE(S)**  
 1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.  
 2. FCM - FABRIC-FORMED ARTICULATED CONCRETE MAT.

**REFERENCE(S)**  
 1. LCL1 ALTERNATIVE SOURCE DEMONSTRATION (GOLDER, 2022).

CLIENT  
**AMEREN MISSOURI  
 LABADIE ENERGY CENTER**



PROJECT  
**CCR GROUNDWATER MONITORING PROGRAM**



CONSULTANT	YYYY-MM-DD	2022-11-17
	DESIGNED	GTM
	PREPARED	GTM
	REVIEWED	JSI
	APPROVED	MNH

TITLE  
**AERIAL MAP OF FRESH GRAVEL PLACEMENT NEAR  
 MONITORING WELL TMW-2**

PROJECT NO.	PHASE	REV.	FIGURE
153140604	0001	0	10

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**APPENDIX D**

**2022 Potentiometric Surface Maps**



**LEGEND**

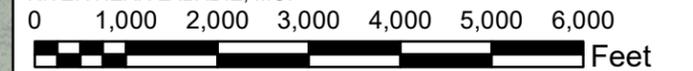
- Labadie Energy Center Property Boundary
- Utility Waste Landfill (UWL)**
- Proposed Final UWL Fence Perimeter
- LCL1 - Utility Waste Landfill Cell 1
- Surface Impoundments**
- LCPA - Bottom Ash Surface Impoundment
- LCPB - Fly Ash Surface Impoundment
- Monitoring Well or Piezometer**
- Monitoring Well or Piezometer
- Surface Water Elevation Measurement Location**
- Missouri River Gauge
- Groundwater Elevation Contours**
- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Flow Direction

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4. MISSOURI RIVER LEVEL OBTAINED FROM USGS LABADIE GAUGE 06935550.
5. THE UWL BOUNDARIES AND DESIGNATIONS ARE BASED ON AMEREN LABADIE CONSTRUCTION PERMIT APPLICATION DRAWINGS.
6. AW-1 WAS NOT USED IN POTENTIOMETRIC SURFACE CONTOURING DUE TO LOCALIZED CONDITIONS CAUSING AN ARTIFICIALLY HIGH POTENTIOMETRIC ELEVATION.

**REFERENCES**

1. ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.
3. USGS (UNITED STATES GEOLOGICAL SURVEY), NATIONAL WATER INFORMATION SYSTEM, USGS GAUGE 06935550 MISSOURI RIVER NEAR LABADIE, MO.



CLIENT  
**AMEREN MISSOURI**  
**LABADIE ENERGY CENTER**

PROJECT  
**CCR GROUNDWATER MONITORING PROGRAM**

TITLE  
**FEBRUARY 9, 2022 POTENTIOMETRIC SURFACE MAP**

CONSULTANT	YYYY-MM-DD	2022-12-05
	PREPARED	GTM
	DESIGN	JSI
	REVIEW	SSS/EMS
	APPROVED	MNH

PROJECT No. 153140604      PHASE 0001      FIGURE **D1**

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics,

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**LEGEND**

- Labadie Energy Center Property Boundary
- Utility Waste Landfill (UWL)**
- Proposed Final UWL Fence Perimeter
- LCL1 - Utility Waste Landfill Cell 1
- Surface Impoundments**
- LCPA - Bottom Ash Surface Impoundment
- LCPB - Fly Ash Surface Impoundment
- Monitoring Well or Piezometer**
- Monitoring Well or Piezometer
- Surface Water Elevation Measurement Location**
- Missouri River Gauge
- Groundwater Elevation Contours**
- Groundwater Elevation Contour (FT MSL)
- Groundwater Flow Direction

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4. MISSOURI RIVER LEVEL OBTAINED FROM USGS LABADIE GAUGE 06935550.
5. THE UWL BOUNDARIES AND DESIGNATIONS ARE BASED ON AMEREN LABADIE CONSTRUCTION PERMIT APPLICATION DRAWINGS.
6. AW-1 WAS NOT USED IN POTENTIOMETRIC SURFACE CONTOURING DUE TO LOCALIZED CONDITIONS CAUSING AN ARTIFICIALLY HIGH POTENTIOMETRIC ELEVATION.

**REFERENCES**

1. ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.
3. USGS (UNITED STATES GEOLOGICAL SURVEY), NATIONAL WATER INFORMATION SYSTEM, USGS GAUGE 06935550 MISSOURI RIVER NEAR LABADIE, MO.



**CLIENT**

AMEREN MISSOURI  
LABADIE ENERGY CENTER



**PROJECT**

CCR GROUNDWATER MONITORING PROGRAM

**TITLE**

APRIL 5, 2022 POTENTIOMETRIC SURFACE MAP

**CONSULTANT**

YYYY-MM-DD	2023-01-05
PREPARED	JSI
DESIGN	JSI
REVIEW	BTT
APPROVED	MNH

PROJECT No.  
153140604

PHASE  
0001

FIGURE  
D2



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics,

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



**LEGEND**

- Labadie Energy Center Property Boundary
- Utility Waste Landfill (UWL)**
- Proposed Final UWL Fence Perimeter
- LCL1 - Utility Waste Landfill Cell 1
- Surface Impoundments**
- LCPA - Bottom Ash Surface Impoundment
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- Missouri River Gauge
- Groundwater Elevation Contours**
- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Flow Direction

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4. MISSOURI RIVER LEVEL OBTAINED FROM USGS LABADIE GAUGE 06935550.
5. THE UWL BOUNDARIES AND DESIGNATIONS ARE BASED ON AMEREN LABADIE CONSTRUCTION PERMIT APPLICATION DRAWINGS.
6. GROUNDWATER ELEVATION COULD NOT BE COLLECTED WITHIN 24 HOURS OF OTHER ELEVATIONS DUE TO AN OBSTRUCTION AT AM-1D.

**REFERENCES**

1. ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.
3. USGS (UNITED STATES GEOLOGICAL SURVEY), NATIONAL WATER INFORMATION SYSTEM, USGS GAUGE 06935550 MISSOURI RIVER NEAR LABADIE, MO.



CLIENT  
**AMEREN MISSOURI**  
**LABADIE ENERGY CENTER**

PROJECT  
**CCR GROUNDWATER MONITORING PROGRAM**

TITLE  
**JUNE 21, 2022 POTENTIOMETRIC SURFACE MAP**

CONSULTANT	YYYY-MM-DD	2023-01-05
	PREPARED	ETF
	DESIGN	ETF
	REVIEW	GTM
	APPROVED	MNH

PROJECT No. 153140604      PHASE 0001      FIGURE **D3**

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics,

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



**LEGEND**

- Labadie Energy Center Property Boundary
- Utility Waste Landfill (UWL)**
- Proposed Final UWL Fence Perimeter
- LCL1 - Utility Waste Landfill Cell 1
- Surface Impoundments**
- LCPA - Bottom Ash Surface Impoundment
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- Groundwater Elevation Contours**
- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Flow Direction

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FT MSL (FEET ABOVE MEAN SEA LEVEL).
4. MISSOURI RIVER LEVEL OBTAINED FROM USGS LABADIE GAUGE 06935550.
5. THE UWL BOUNDARIES AND DESIGNATIONS ARE BASED ON AMEREN LABADIE CONSTRUCTION PERMIT APPLICATION DRAWINGS.

**REFERENCES**

1. ZAHNER AND ASSOCIATES, INC. 2016. LOT CONSOLIDATION PLAT OF "LABADIE ENERGY CENTER" - PREPARED FOR AMEREN MISSOURI. REVISED JUNE 15, 2016.
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2,401 FEET.
3. USGS (UNITED STATES GEOLOGICAL SURVEY), NATIONAL WATER INFORMATION SYSTEM, USGS GAUGE 06935550 MISSOURI RIVER NEAR LABADIE, MO.



**CLIENT**

AMEREN MISSOURI  
LABADIE ENERGY CENTER



**PROJECT**

CCR GROUNDWATER MONITORING PROGRAM

**TITLE**

OCTOBER 24, 2022 POTENTIOMETRIC SURFACE MAP

**CONSULTANT**

YYYY-MM-DD	2023-01-05
PREPARED	ETF
DESIGN	JSI
REVIEW	GTM
APPROVED	MNH

PROJECT No.  
153140604

PHASE  
0001

FIGURE  
D4



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics,

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



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