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2022 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT POND 003 NEW MADRID POWER PLANT MARSTON, MISSOURI

by
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Cleveland, Ohio

for
Associated Electric Cooperative, Inc.
Springfield, Missouri

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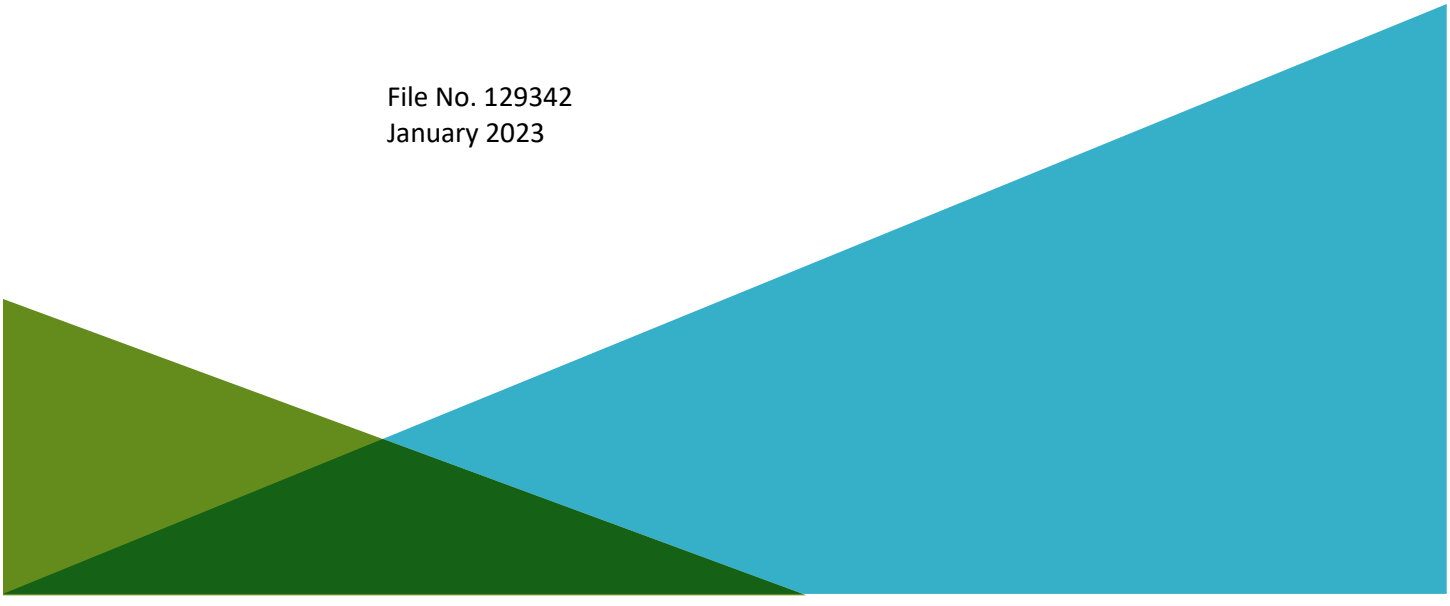

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1. Introduction

This 2022 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses Pond 003 at the New Madrid Power Plant (NMPP), operated by the Associated Electric Cooperative, Inc. (AECI). This Annual Report was developed in accordance with the U.S. Environmental Protection Agency Coal Combustion Residual (CCR) Rule effective 19 October 2015 (Rule) including subsequent revisions, specifically Title 40 Code of Federal Regulations (40 CFR), subsection 257.90(e). The Annual Report documents the groundwater monitoring system for Pond 003 consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2022) and documents compliance with the Rule. The specific requirements listed in § 257.90(e)(1) through (6) of the Rule are provided in Sections 1 and 2 of this Annual Report and are in bold italic font, followed by a short narrative describing how each Rule requirement has been met.

1.1 40 CFR § 257.90(e)(6) SUMMARY

A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:

1.1.1 40 CFR § 257.90(e)(6)(i) – Initial Monitoring Program

At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

At the start of the current annual reporting period (1 January 2022), Pond 003 was operating under an assessment monitoring program in compliance with 40 CFR § 257.95 for all constituents except molybdenum. Since July 2019, Pond 003 is in a corrective measures program in accordance with 40 CFR § 257.96 for molybdenum.

1.1.2 40 CFR § 257.90(e)(6)(ii) – Final Monitoring Program

At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;

At the end of the current annual reporting period (31 December 2022), Pond 003 was operating under an assessment monitoring program in compliance with 40 CFR § 257.95 for all constituents except molybdenum. Pond 003 is implementing a corrective measures program in accordance with 40 CFR § 257.96 for molybdenum.

1.1.3 40 CFR § 257.90(e)(6)(iii) – Statistically Significant Increases

If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to § 257.94(e):

1.1.3.1 40 CFR § 257.90(e)(6)(iii)(a)

Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and

Pond 003 at NMPP is operating under an assessment monitoring program; therefore, no statistical evaluations were conducted for appendix III constituents in 2022.

1.1.3.2 40 CFR § 257.90(e)(6)(iii)(b)

Provide the date when the assessment monitoring program was initiated for the CCR unit.

An assessment monitoring program for Pond 003 was established on 15 August 2018 to meet the requirements of 40 CFR § 257.95. Pond 003 remained in assessment monitoring in 2022 for all constituents except molybdenum. A corrective measures program implemented for molybdenum in accordance with 40 CFR § 257.96 was in place during 2022.

1.1.4 40 CFR § 257.90(e)(6)(iv) – Statistically Significant Levels

If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:

1.1.4.1 40 CFR § 257.90(e)(6)(iv)(a) – Statistically Significant Level Constituents

Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;

Statistically significant levels (SSL) above the groundwater protection standards (GWPS) identified in 2022 following completion of statistical analyses in accordance with 40 CFR § 257.93 at Pond 003 for the August 2021 and February 2022 semi-annual assessment monitoring sampling events are listed in Table I.

1.1.4.2 40 CFR § 257.90(e)(6)(iv)(b) – Initiation of the Assessment of Corrective Measures

Provide the date when the assessment of corrective measures was initiated for the CCR unit;

No assessment of corrective measures was required to be initiated in 2022 for this unit. The assessment of corrective measures for Pond 003 was initiated on 3 July 2019.

1.1.4.3 40 CFR § 257.90(e)(6)(iv)(c) – Assessment of Corrective Measures Public Meeting

Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and

The public meeting following the assessment of corrective measures was held on 14 November 2019. No new assessment of corrective measures was required to be initiated for Pond 003 in 2022; therefore, a public meeting related to a new assessment of corrective measures was not held in 2022.

1.1.4.4 40 CFR § 257.90(e)(6)(iv)(d) – Completion of the Assessment of Corrective Measures

Provide the date when the assessment of corrective measures was completed for the CCR unit.

An assessment of corrective measures was completed on 13 September 2019 in accordance with 40 CFR § 257.96. AECI continues to evaluate the associated selection of remedy in accordance with 40 CFR § 257.97. No new assessment of corrective measures was required to be completed in 2022 for this unit.

1.1.5 40 CFR § 257.90(e)(6)(v) – Selection of Remedy

Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and

The selection of remedy required under 40 CFR § 257.97 remained ongoing in 2022 for molybdenum at select monitoring wells at Pond 003. A remedy was not selected in the current 2022 annual reporting period.

1.1.6 40 CFR § 257.90(e)(6)(vi) – Remedial Activities

Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.

No remedial activities have been initiated in 2022; therefore, no demonstration or certification is applicable for this unit.

2. 40 CFR § 257.90 Applicability

2.1 40 CFR § 257.90(a)

All CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under §§ 257.90 through 257.99, except as provided in paragraph (g) [Suspension of groundwater monitoring requirements] of this section.

AECI has installed and certified a groundwater monitoring system at the NMPP Pond 003. Pond 003 is subject to the groundwater monitoring and corrective action requirements described under 40 CFR §§ 257.90 through 257.98. This document addresses the requirement for the Owner/Operator to prepare an Annual Report per § 257.90(e) (Rule).

2.2 40 CFR § 257.90(e) – SUMMARY

Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1).

This Annual Report describes the monitoring completed and actions taken at the NMPP Pond 003 as required by the Rule. Groundwater sampling and analysis was conducted in accordance with requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 and § 257.95 is also provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 2022.

2.2.1 Status of the Groundwater Monitoring Program

Results of the detection monitoring statistical analyses completed in January 2018 identified a statistically significant increased (SSI) concentration of appendix III constituents in downgradient monitoring wells relative to concentrations observed in upgradient monitoring wells. No alternative source was identified for the SSI constituents. Accordingly, the groundwater monitoring program transitioned to assessment monitoring in May 2018. Appendix IV SSLs were detected above the GWPS for molybdenum during the October 2018 and March 2019 assessment monitoring sampling events. Therefore, a corrective measures assessment was initiated and completed in 2019. The selection of remedy required under § 257.97 was ongoing in 2022. AECI is currently implementing an assessment monitoring program for all other constituents.

2.2.2 Key Actions Completed

The 2021 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2022. Statistical analysis of analytical data from the August 2021 semi-annual assessment monitoring sampling event was completed in January 2022. A summary including the sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program of the NMPP Pond 003 is presented in Table II of this report. The statistical analyses completed in January 2022 indicated appendix IV SSLs above the GWPS for molybdenum at monitoring wells MW-7, MW-8, MW-9, P-2, P-3, and P-5 from the August 2021 sampling event

A semi-annual assessment monitoring event was completed in February 2022 for appendix IV constituents detected during the June 2021 annual assessment monitoring sampling event. Statistical analysis was completed within 90 days of receipt of verified laboratory data for the February 2022 sampling event. Appendix IV SSLs were identified consistent with previous monitoring events for molybdenum. A summary of appendix IV SSLs identified in the August 2021 and February 2022 assessment monitoring events are provided in Table I. Notifications documenting the identified SSLs have been entered into the facility's operating record in accordance with § 257.95(g).

The determination of the nature and extent of the appendix IV SSLs was initiated in 2019 pursuant to § 257.95(g) with the installation of 15 additional groundwater monitoring wells. Analytical results from the groundwater monitoring events completed at the nature and extent monitoring wells from February and August 2022 are provided in Table III. Two Semi-Annual Remedy Selection Progress reports were completed in March and September 2022 pursuant to 40 CFR § 257.96(a).

An annual assessment monitoring sampling event was completed in May 2022 to identify detected appendix IV constituents for subsequent semi-annual sampling events in August 2022 and planned for February 2023. GWPSs for detected appendix IV constituents were established. GWPSs utilized for the statistical analyses completed in 2022 are presented in Table IV. Semi-annual assessment monitoring was completed in August 2022 for appendix IV constituents detected during the May 2022 annual monitoring event. Statistical analysis of the results from the August 2022 semi-annual assessment monitoring sampling event are due to be completed in January 2023 and will be reported in the next annual report.

2.2.3 Problems Encountered

Problems encountered during groundwater monitoring activities in 2022 consisted of laboratory errors that resulted in appendix III constituents being analyzed outside of hold times for the upgradient wells (MW-16, B-123, and B-126) during the August 2022 semi-annual sampling event. These wells were resampled on 13 October 2022 with analytical results received on 28 October 2022. An additional laboratory error required the reanalysis of fluoride and total dissolved solids during the October 2022 resampling event for monitoring wells MW-16, B-123, and B-126. The analytical results were revised accordingly.

2.2.4 Actions to Resolve Problems

The resolution to sampling and laboratory problems encountered in 2022 included additional laboratory analyses and/or resampling at select monitoring wells, as described above. The analytical results were updated accordingly. No other problems were encountered at Pond 003 in 2022; therefore, no actions to resolve problems were required.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2023 include completion of the 2022 Annual Groundwater Monitoring and Corrective Action Report, statistical analysis of assessment monitoring analytical data collected in August 2022, and conducting semi-annual assessment monitoring and subsequent statistical analysis. AECI is also completing additional steps of the corrective measures program including working towards a selection of remedy.

2.3 40 CFR § 257.90(e) – INFORMATION

At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

2.3.1 40 CFR § 257.90(e)(1)

A map, aerial image, or diagram showing the CCR unit and all background (or up gradient) and down gradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

As required by § 257.90(e)(1), a map showing the locations of the CCR unit and associated upgradient and downgradient monitoring wells for Pond 003 is included in this report as Figure 1. In addition, this information is presented in the CCR Groundwater Monitoring Network Description Report prepared for AECI, which was placed in the facility's operating record by 17 October 2017 as required by § 257.105(h)(2) and updated in April 2019. Monitoring wells installed to assist with the nature and extent investigation at Pond 003 are presented in Figure 2.

2.3.2 40 CFR § 257.90(e)(2) – Monitoring System Changes

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

No monitoring wells were installed or decommissioned during 2022.

2.3.3 40 CFR § 257.90(e)(3) – Summary of Sampling Events

In addition to all the monitoring data obtained under §257.90 through §257.98, a summary including the number of groundwater samples that were collected for analysis for each background and down gradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

In accordance with § 257.94(b), three independent assessment monitoring samples were collected from each background and downgradient monitoring well that are a part of the certified groundwater monitoring network in 2022. A summary including the sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program of the NMPP Pond 003 is presented in Table II of this report.

Two independent samples were collected from each nature and extent monitoring well in 2022 during the semi-annual sampling events pursuant to § 257.95(g)(1)(iv). Analytical results associated with the nature and extent investigation conducted in 2022 are reported in Table III.

2.3.4 40 CFR § 257.90(e)(4) – Monitoring Transition Narrative

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

An assessment monitoring program was established on 15 August 2018 to meet the requirements of 40 CFR § 257.95. Statistical analyses of analytical data from October 2018 and March 2019 indicated appendix IV SSLs above the GWPS for molybdenum at monitoring wells MW-7, MW-8, MW-9, P-2, P-3, and P-5. AECI pursued an Alternate Source Demonstration (ASD) in April 2019 to determine if a source other than the CCR unit caused the SSL, which was unsuccessful. Therefore, a corrective measures assessment was initiated, which was completed in September 2019. The selection of remedy required under § 257.97 was ongoing in 2022. AECI is currently implementing an assessment monitoring program for all other appendix IV constituents.

2.3.5 40 CFR § 257.90(e)(5) – Other Requirements

Other information required to be included in the annual report as specified in § 257.90 through § 257.98.

This Annual Report documents activities conducted to comply with §§ 257.90 through 257.95 of the Rule. It is understood that there are supplemental references in §§ 257.90 through 257.98 that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for activities completed in calendar year 2022.

2.3.5.1 40 CFR § 257.94(d)(3) – Demonstration for Alternative Detection Monitoring Frequency

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An alternative groundwater detection monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

2.3.5.2 40 CFR § 257.94(e)(2) – Detection Monitoring Alternate Source Demonstration

The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

This unit is in assessment monitoring; therefore, no detection monitoring ASD or certification is applicable.

2.3.5.3 40 CFR § 257.95(c)(3) – Demonstration for Alternative Assessment Monitoring Frequency

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An alternative groundwater assessment monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

2.3.5.4 40 CFR § 257.95(d)(3) – Assessment Monitoring Concentrations and Groundwater Protection Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An assessment monitoring program is currently being implemented at the CCR unit. Three rounds of assessment monitoring sampling were completed in 2022. Analytical results for both downgradient and upgradient wells are provided in Table II. The background concentrations (upper tolerance limits) and GWPSs established for the NMPP Pond 003 that were utilized for statistical analyses completed in 2022 are included in Table IV.

2.3.5.5 40 CFR § 257.95(g)(3)(ii) – Assessment Monitoring Alternate Source Demonstration

Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section and may return to detection monitoring if the constituents in appendices III and IV to this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

An alternate source was not identified for SSLs identified in 2022 at Pond 003; therefore, no ASD or certification is applicable. Pond 003 remained in assessment monitoring during 2022 for all constituents other than molybdenum.

2.3.5.6 40 CFR § 257.96(a) – Demonstration for Additional Time for Assessment of Corrective Measures

Within 90 days of finding that any constituent listed in appendix IV to this part has been detected at a statistically significant level exceeding the groundwater protection standard defined under § 257.95(h), or immediately upon detection of a release from a CCR unit, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected area to original conditions. The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

A new assessment of corrective measures was not required to be initiated in 2022; therefore, no demonstration or certification is applicable for this unit.

2.4 40 CFR § 257.90(f)

The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the internet requirements specified in § 257.107(h).

In order to comply with the Rule recordkeeping requirements, the following actions must be completed:

- Pursuant to § 257.105(h)(1), this Annual Report must be placed in the facility's operating record.
- Pursuant to § 257.106(h)(1), notification must be sent to the relevant State Director and/or Tribal authority within 30 days of this Annual Report being placed on the facility's operating record [§ 257.106(d)].
- Pursuant to § 257.107(h)(1), this Annual Report must be posted to the AECI CCR website within 30 days of this Annual Report being placed on the facility's operating record [§ 257.107(d)].

TABLES

TABLE I
SSL SUMMARY TABLE
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Constituent	Sampling Event	Well ID	Groundwater Protection Standard (mg/L)
Molybdenum	August 2021	MW-7	0.100*
		MW-8	
		MW-9	
		P-2	
		P-3	
		P-5	
	February 2022	MW-7	
		MW-8	
		MW-9	
		P-2	
		P-3	
		P-5	

Notes:

** Value obtained from U.S. Environmental Protection Agency Federal CCR Rule Title 40 Code of Federal Regulations § 257.95(h)(2)*

mg/L = milligrams per liter

SSL = statistically significant level

TABLE II
SUMMARY OF ANALYTICAL RESULTS - 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Upgradient											
	B-123				B-126				MW-16			
Measure Point (TOC)	292.7				293.63				292.85			
Sample Name	B-123	B-123	B-123	B-123	B-126	B-126	B-126	B-126	MW-16	MW-16	MW-16	MW-16
Sample Date	1/31/2022	05/10/2022	8/8/2022	10/13/2022	1/31/2022	05/09/2022	8/8/2022	10/13/2022	2/1/2022	05/13/2022	8/8/2022	10/13/2022
Final Lab Report Date	3/18/2022	6/2/2022	N/A	10/28/2022	3/18/2022	6/2/2022	N/A	10/28/2022	3/18/2022	6/2/2022	N/A	10/28/2022
Final Lab Report Revision Date	N/A	N/A	N/A	11/9/2022	N/A	N/A	N/A	11/9/2022	N/A	N/A	N/A	11/9/2022
Final Radiation Lab Report Date	3/18/2022	8/1/2022	9/28/2022	N/A	3/18/2022	8/1/2022	9/28/2022	N/A	3/18/2022	7/12/2022	9/28/2022	N/A
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	6/15/2022	9/27/2022	12/20/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022	12/20/2022
Depth to Water (ft btoc)	19.37	17.60	19.86	21.20	21.75	18.50	20.06	21.45	23.40	17.20	24.46	30.06
Temperature (Deg C)	16.36	16.18	17.00	15.90	16.83	18.10	19.05	17.41	17.14	16.90	18.43	16.65
Conductivity, Field (µS/cm)	667	686	694	636	1470	646	927	1350	988	951	1020	785
Turbidity, Field (NTU)	14.4	19.0	9.90	3.10	38.8	50.2	34.40	10.00	9.4	1.7	3.80	4.50
pH (field) (su)	8.67	7.39	8.11	7.69	8.87	7.13	7.74	7.51	8.44	7.89	7.51	7.40
Boron, Total (mg/L)	**0.072**	-	-	**0.023**	**0.082**	-	-	**0.047**	**0.12**	-	-	**0.05**
Calcium, Total (mg/L)	**78**	-	-	**75**	**180**	-	-	**190**	**140**	-	-	**110**
Chloride (mg/L)	**2.4**	-	-	**1.4**	**14**	-	-	**13**	< 5.0	-	-	**2.6**
Fluoride (mg/L)	**0.503**	**0.542**	-	**0.475**	< 0.250	**0.397**	-	0.283	**1.32**	**1.42**	-	**1.05**
Sulfate (mg/L)	**27**	-	-	**26**	**170**	-	-	**170**	**65**	-	-	**59**
pH (lab) (su)	**7.28**	-	-	**7.26**	**6.99**	-	-	**7.02**	**6.95**	-	-	**7.03**
TDS (mg/L)	**420**	-	-	**380**	**890**	-	-	**880**	**590**	-	-	**570**
Antimony, Total (mg/L)	-	< 0.0030	-	-	-	< 0.0030	-	-	-	< 0.0030	-	-
Arsenic, Total (mg/L)	**0.0018**	**0.0030**	-	**0.0020**	**0.0032**	**0.0041**	-	**0.0030**	**0.0022**	**0.0025**	-	**0.0023**
Barium, Total (mg/L)	**0.17**	**0.20**	-	**0.18**	**0.40**	**0.25**	-	**0.44**	**0.63**	**0.63**	-	**0.57**
Beryllium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-
Cadmium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-
Chromium, Total (mg/L)	-	< 0.0040	-	-	-	**0.0054**	-	-	-	< 0.0040	-	-
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	-	< 0.0020	<0.0020	< 0.0020	-	< 0.0020	< 0.0020	< 0.0020	-	< 0.0020
Lead, Total (mg/L)	-	< 0.00050	-	-	-	**0.0029**	-	-	-	< 0.00050	-	-
Lithium, Total (mg/L)	**0.027**	**0.031**	-	**0.024**	**0.027**	**0.015**	-	**0.025**	**0.024**	**0.024**	-	**0.018**
Mercury, Total (mg/L)	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	**0.00050**	-	< 0.00020
Molybdenum, Total (mg/L)	**0.0038**	**0.0037**	-	**0.0042**	< 0.0010	< 0.0010	-	**0.001**	<0.0010	< 0.0010	-	< 0.0010
Selenium, Total (mg/L)	<0.0010	< 0.0010	-	< 0.0010	< 0.0010	< 0.0010	-	< 0.0010	<0.0010	< 0.0010	-	< 0.0010
Thallium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-
Radium 226 & 228 Combined (pCi/L)	0.476 +/- 1.10 (2.16)	0.523 ± 0.647 (1.28)	0.121 ± 0.239 (0.410)	-	0.870 +/- 1.15 (2.27)	0.675 ± 0.600 (1.11)	**1.02 ± 0.332 (0.463)**	-	**1.49 +/- 0.853 (0.875)**	1.63 ± 1.01 (1.65)	**1.66 ± 0.349 (0.456)**	-

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*

Radiological results are presented as activity plus or minus uncertainty with MDC.

[1] Turbidity meter error in field

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

N/A = Not Applicable

NTU = Nephelometric Turbidity Unit

pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

TABLE II
SUMMARY OF ANALYTICAL RESULTS - 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient									
	MW-6				MW-7			MW-8		
Measure Point (TOC)	300.27				301.5			310.63		
Sample Name	MW-6	MW-6	MW-6	DUP-P3-08-2022	MW-7	MW-7	MW-7	MW-8	MW-8	MW-8
Sample Date	2/15/2022	05/16/2022	8/12/2022	8/12/2022	2/15/2022	05/16/2022	8/12/2022	2/1/2022	05/16/2022	8/15/2022
Final Lab Report Date	3/21/2022	6/2/2022	8/31/2022	8/31/2022	3/21/2022	6/2/2022	8/31/2022	2/23/2022	6/2/2022	8/31/2022
Final Lab Report Revision Date	4/12/2022	N/A	N/A	N/A	4/12/2022	N/A	N/A	3/14/2022	N/A	N/A
Final Radiation Lab Report Date	3/21/2022	7/29/2022	9/28/2022	9/28/2022	3/21/2022	7/29/2022	9/28/2022	3/14/2022	7/29/2022	9/28/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	6/15/2022	9/27/2022	12/20/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022
Depth to Water (ft btoc)	29.00	21.59	33.42	33.42	30.84	24.02	33.19	40.32	33.15	41.85
Temperature (Deg C)	16.26	17.08	17.73	-	16.47	17.29	18.24	16.87	16.73	18.79
Conductivity, Field (µS/cm)	737	771	855	-	849	1150	1030	1284	1250	1360
Turbidity, Field (NTU)	3.28	0.20	0.00	-	9.19	0.93	0.00	0.7	0.45	0.00
pH (field) (su)	7.25	7.42	6.56	-	7.07	7.22	6.57	7.77	7.54	6.65
Boron, Total (mg/L)	**0.19**	**-**	**0.23**	**0.26**	**9.3**	**-**	**9.5**	**16**	**-**	**18**
Calcium, Total (mg/L)	**100**	**-**	**110**	**110**	**100**	**-**	**120**	**190**	**-**	**190**
Chloride (mg/L)	**10**	**-**	**6.9**	**6.7**	**6.9**	**-**	**8.5**	**8.1**	**-**	**8.5**
Fluoride (mg/L)	**0.558**	**0.336**	**0.477**	**0.480**	**0.405**	**0.325**	**0.379**	< 0.250	< 0.250	**0.269**
Sulfate (mg/L)	**54**	-	**45**	**47**	**170**	-	**190**	**230**	-	**240**
pH (lab) (su)	**7.26**	**-**	**7.20**	**7.22**	**6.97**	-	**6.97**	**7.07**	**-**	**7.11**
TDS (mg/L)	**500**	-	**480**	**540**	**610**	-	**1100**	**900**	-	**940**
Antimony, Total (mg/L)	-	< 0.0030	-	-	-	< 0.0030	-	-	< 0.0030	-
Arsenic, Total (mg/L)	<0.0010	< 0.0010	< 0.0010	< 0.0010	**0.0040**	**0.0038**	**0.0028**	**0.0051**	**0.0048**	**0.0037**
Barium, Total (mg/L)	**0.11**	**0.12**	**0.12**	**0.11**	**0.077**	**0.11**	**0.087**	**0.078**	**0.081**	**0.078**
Beryllium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	< 0.0010	-
Cadmium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	< 0.0010	-
Chromium, Total (mg/L)	-	< 0.0040	-	-	-	< 0.0040	-	-	< 0.0040	-
Cobalt, Total (mg/L)	**0.0042**	**0.0027**	**0.0026**	**0.0025**	**0.0030**	**0.0035**	**0.0041**	< 0.0020	< 0.0020	< 0.0020
Lead, Total (mg/L)	-	< 0.00050	-	-	-	< 0.00050	-	-	< 0.00050	-
Lithium, Total (mg/L)	**0.014**	**0.016**	**0.013**	**0.013**	**0.017**	**0.021**	**0.015**	**0.027**	**0.018**	**0.016**
Mercury, Total (mg/L)	-	< 0.00020	< 0.00020	< 0.00020	-	< 0.00020	< 0.00020	-	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.023**	**0.029**	**0.0087**	**0.01**	**2.4**	**2.1**	**1.9**	**0.76**	**1.0**	**0.93**
Selenium, Total (mg/L)	<0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Thallium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	0.574 +/- 0.900 (1.58)	1.22 ± 0.812 (1.42)	**0.849 ± 0.268 (0.455)**	**1.05 ± 0.313 (0.443)**	0.785 +/- 1.02 (1.94)	1.16 ± 0.777 (1.31)	**1.40 ± 0.368 (0.526)**	0.454 +/- 0.739 (1.40)	1.32 ± 0.947 (1.61)	0.575 ± 0.35 (0.575)

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*

Radiological results are presented as activity plus or minus uncertainty with MDC.

[1] *Turbidity meter error in field*

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

N/A = Not Applicable

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pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

TABLE II
SUMMARY OF ANALYTICAL RESULTS - 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient									
	MW-9			P-1			P-2			
Measure Point (TOC)	310.24			313.35			309.84			
Sample Name	MW-9	MW-9	MW-9	P-1	P-1	P-1	P-2	P3-DUP-02-2022	P-2	P-2
Sample Date	2/1/2022	05/16/2022	8/15/2022	2/14/2022	05/13/2022	8/15/2022	2/14/2022	2/14/2022	05/13/2022	8/15/2022
Final Lab Report Date	2/23/2022	6/2/2022	8/31/2022	3/21/2022	6/1/2022	8/31/2022	3/21/2022	3/21/2022	6/1/2022	8/31/2022
Final Lab Report Revision Date	3/14/2022	N/A	N/A	4/12/2022	6/2/2022	N/A	4/12/2022	4/12/2022	6/2/2022	N/A
Final Radiation Lab Report Date	3/14/2022	7/29/2022	9/28/2022	3/21/2022	N/A	9/28/2022	3/21/2022	3/21/2022	N/A	9/28/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	6/15/2022	9/27/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022	6/15/2022	6/15/2022	9/27/2022	12/20/2022
Depth to Water (ft btoc)	40.25	31.94	42.52	39.95	33.50	47.23	36.44	-	30.60	43.43
Temperature (Deg C)	17.28	16.88	18.25	17.04	18.95	22.46	17.43	-	18.29	19.75
Conductivity, Field (µS/cm)	875	740	865	9240	1040	572	1010	-	1050	981
Turbidity, Field (NTU)	0.8	1.06	0.00	6.73	0.80	1.40	2.52	-	0.80	0.00
pH (field) (su)	7.63	7.59	6.68	6.92	8.13	6.97	7.42	-	8.22	6.78
Boron, Total (mg/L)	**2.8**	-	**2.5**	**1.9**	-	**1.8**	**2.4**	**2.4**	-	**2.3**
Calcium, Total (mg/L)	**120**	-	**110**	**140**	-	**120**	**140**	**140**	-	**120**
Chloride (mg/L)	**15**	-	**17**	**21**	-	**17**	**18**	**19**	-	**16**
Fluoride (mg/L)	**0.442**	**0.278**	**0.416**	**0.387**	**0.252**	**0.464**	**0.527**	**0.465**	**0.446**	**0.428**
Sulfate (mg/L)	**120**	-	**130**	**160**	-	**70**	**240**	**240**	-	**120**
pH (lab) (su)	**7.11**	-	**7.07**	**7.19**	-	**7.23**	**7.27**	**7.22**	-	**7.20**
TDS (mg/L)	**620**	-	**540**	**690**	-	**560**	**710**	**690**	-	**700**
Antimony, Total (mg/L)	-	< 0.0030	-	-	< 0.0030	-	-	-	< 0.0030	-
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	<0.0010	<0.0010	< 0.0010	< 0.0010
Barium, Total (mg/L)	**0.074**	**0.064**	**0.072**	**0.061**	**0.067**	**0.055**	**0.072**	**0.072**	**0.071**	**0.066**
Beryllium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-
Cadmium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-
Chromium, Total (mg/L)	-	< 0.0040	-	-	< 0.0040	-	-	-	< 0.0040	-
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	<0.0020	< 0.0020	< 0.0020	<0.0020	<0.0020	< 0.0020	< 0.0020
Lead, Total (mg/L)	-	< 0.00050	-	-	< 0.00050	-	-	-	< 0.00050	-
Lithium, Total (mg/L)	**0.025**	**0.024**	**0.024**	**0.019**	**0.025**	**0.016**	**0.016**	**0.018**	**0.017**	**0.015**
Mercury, Total (mg/L)	-	< 0.00020	< 0.00020	-	< 0.00020	< 0.00020	-	-	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.25**	**0.34**	**0.25**	**0.040**	**0.021**	**0.041**	**0.33**	**0.33**	**0.28**	**0.24**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	**0.0012**	**0.0015**	**0.0018**	<0.0010	<0.0010	< 0.0010	< 0.0010
Thallium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	0.417 +/- 0.735 (1.45)	**3.46 ± 1.60 (1.95)**	0.497 ± 0.302 (0.548)	0.306 +/- 1.06 (2.24)	0.000 +/- 0.643 (1.52)	0.116 ± 1.12 (2.06)	0.167 +/- 0.819 (1.77)	0.0815 +/- 0.992 (2.08)	0.260 +/- 0.802 (1.66)	**0.887 ± 0.313 (0.519)**

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[1] *Turbidity meter error in field*

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Deg C = degrees Celsius

ft btoc = feet below top of casing

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su = standard unit

TDS = total dissolved solids

TOC = top of casing

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ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient									
	P-3				P-4			P-5		
Measure Point (TOC)	310.72				311.067			301.97		
Sample Name	P-3	P-3	DUP-POND3-MAY22	P-3	P-4	P-4	P-4	P-5	P-5	P-5
Sample Date	2/9/2022	05/13/2022	5/13/2022	8/15/2022	2/9/2022	5/16/2022	8/15/2022	2/11/2022	5/16/2022	8/12/2022
Final Lab Report Date	3/25/2022	6/1/2022	6/1/2022	8/31/2022	3/25/2022	6/2/2022	8/31/2022	3/21/2022	6/2/2022	8/31/2022
Final Lab Report Revision Date	N/A	6/2/2022	6/2/2022	N/A	N/A	N/A	N/A	4/12/2022	N/A	N/A
Final Radiation Lab Report Date	3/25/2022	N/A	N/A	9/28/2022	3/25/2022	7/29/2022	9/28/2022	3/21/2022	7/29/2022	9/28/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	6/15/2022	9/27/2022	9/27/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022	6/15/2022	9/27/2022	12/20/2022
Depth to Water (ft btoc)	40.30	31.32	-	44.07	41.20	31.24	44.48	31.50	24.92	33.01
Temperature (Deg C)	15.75	16.40	-	18.73	15.95	16.72	21.19	14.57	16.02	16.90
Conductivity, Field (µS/cm)	1030	1120	-	1290	701	730	872	941	1080	1010
Turbidity, Field (NTU)	0.0	0.50	-	0.00	0.4	8.41	0.00	263[1]	1.02	0.00
pH (field) (su)	7.41	8.22	-	6.70	7.44	7.48	6.81	6.92	7.11	6.34
Boron, Total (mg/L)	**8.6**	**-**	-	**7.9**	**0.53**	**-**	**0.48**	**6.6**	**-**	**7.2**
Calcium, Total (mg/L)	**210**	**-**	-	**200**	**85**	**-**	**110**	**130**	**-**	**120**
Chloride (mg/L)	**14**	**-**	-	**15**	**20**	**-**	**19**	**6.3**	**-**	**7.5**
Fluoride (mg/L)	<1.25	**0.506**	**0.468**	**0.511**	**0.436**	**0.263**	**0.296**	<0.250	< 0.250	< 0.250
Sulfate (mg/L)	**100**	**-**	**-**	**63**	**71**	**-**	**62**	**130**	-	**65**
pH (lab) (su)	**7.11**	-	-	**7.15**	**7.28**	**-**	**7.36**	**6.77**	**-**	**6.76**
TDS (mg/L)	**550**	-	-	**810**	**290**	-	**540**	**640**	-	**640**
Antimony, Total (mg/L)	-	< 0.0030	< 0.0030	-	-	< 0.0030	**-**	-	< 0.0030	-
Arsenic, Total (mg/L)	**0.0011**	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	**0.0056**	**0.0071**	**0.0054**
Barium, Total (mg/L)	**0.080**	**0.083**	**0.083**	**0.095**	**0.098**	**0.10**	**0.13**	**0.12**	**0.14**	**0.11**
Beryllium, Total (mg/L)	-	< 0.0010	< 0.0010	-	-	< 0.0010	**-**	-	< 0.0010	-
Cadmium, Total (mg/L)	-	< 0.0010	< 0.0010	**-**	-	< 0.0010	**-**	-	< 0.0010	**-**
Chromium, Total (mg/L)	-	< 0.0040	< 0.0040	**-**	-	< 0.0040	**-**	-	< 0.0040	-
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	<0.0020	< 0.0020	< 0.0020	<0.0020	< 0.0020	< 0.0020
Lead, Total (mg/L)	-	< 0.00050	< 0.00050	**-**	-	< 0.00050	**-**	-	< 0.00050	**-**
Lithium, Total (mg/L)	**0.026**	**0.023**	**0.024**	**0.024**	**0.022**	**0.025**	**0.028**	**0.019**	**0.019**	**0.013**
Mercury, Total (mg/L)	-	< 0.00020	< 0.00020	< 0.00020	-	< 0.00020	< 0.00020	-	**0.00035**	< 0.00020
Molybdenum, Total (mg/L)	**1.5**	**1.1**	**1.1**	**1.2**	**0.032**	**0.029**	**0.025**	**0.22**	**0.28**	**0.23**
Selenium, Total (mg/L)	**0.0023**	**0.0028**	**0.0028**	**0.0023**	**0.0020**	**0.0016**	**0.0029**	<0.0010	< 0.0010	< 0.0010
Thallium, Total (mg/L)	-	< 0.0010	< 0.0010	-	-	< 0.0010	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	0.753 +/- 0.950 (1.75)	0.758 +/- 0.757 (1.45)	0.387 +/- 0.771 (1.67)	**2.28 ± 0.474 (0.781)**	0.506 +/- 0.811 (1.48)	1.16 ± 0.935 (1.76)	0.304 ± 0.281 (0.505)	0.604 +/- 0.731 (1.29)	**2.07 ± 1.02 (1.53)**	**1.52 ± 0.340 (0.484)**

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*

Radiological results are presented as activity plus or minus uncertainty with MDC.

[1] *Turbidity meter error in field*

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

N/A = Not Applicable

NTU = Nephelometric Turbidity Unit

pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

TABLE III
SUMMARY OF 2022 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	MW-7D			MW-19S		MW-20S		MW-20D		MW-21S		
Measure Point (TOC)	302.07			293.87		293.56		293.45		289.90		
Sample Name	MW-7D	MW-7D	NE-DUP1-08-2022	MW-19S	MW-19S	MW-20S	MW-20S	MW-20D	MW-20D	MW-21S	NE-DUP	MW-21S
Sample Date	2/11/2022	8/12/2022	8/12/2022	2/18/2022	8/17/2022	2/18/2022	8/17/2022	2/18/2022	8/17/2022	2/18/2022	2/18/2022	8/17/2022
Lab Data Reviewed and Accepted	7/6/2022	12/20/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	7/6/2022	12/20/2022
Depth to Water (ft btoc)	30.78	33.45	-	21.68	27.61	21.32	29.52	21.30	26.90	19.70	-	23.52
Temperature (Deg C)	15.62	22.88	-	16.24	18.17	16.18	18.60	15.70	19.03	13.53	-	16.27
Conductivity, Field (µS/cm)	1130	1330	-	1000	1070	1090	1080	1010	933	974	-	885
Dissolved Oxygen (mg/L)	0.54	0.00	-	2.77	0.00	3.61	0.00	3.05	0.00	1.39	-	0.00
ORP (mV)	-94	-177	-	50	-41	-92	-180	-109	-195	57	-	80
Turbidity, Field (NTU)	18.2	0.50	-	8.43	0.00	1.97	0.00	4.31	1.50	7.75	-	0.00
pH, Field (SU)	7.33	6.83	-	7.47	6.99	7.50	7.02	7.66	7.17	7.18	-	7.02
Boron, Total (mg/L)	**17**	**17**	**17**	**0.99**	**1.4**	**3.6**	**3.2**	**2.8**	**2.7**	**6.8**	**6.8**	**4.4**
Calcium, Total (mg/L)	**160**	**150**	**150**	**150**	**140**	**160**	**150**	**140**	**120**	**150**	**160**	**140**
Chloride (mg/L)	**6.0**	**7.7**	**7.5**	**24**	**14**	**18**	**14**	**21**	**15**	**15**	**17**	**12**
Fluoride (mg/L)	**0.665**	**0.479**	**0.476**	**0.284**	**0.503**	**0.432**	**0.632**	**0.500**	**0.685**	**0.478**	**0.489**	**0.678**
Sulfate (mg/L)	**300**	**260**	**260**	**230**	**230**	**230**	**290**	**260**	**150**	**110**	**100**	**93**
pH (lab) (su)	**7.11**	**7.16**	**7.05**	**7.08**	**7.34**	**7.05**	**7.23**	**7.22**	**7.52**	**7.24**	**7.09**	**7.29**
TDS (mg/L)	**930**	**1000**	**930**	**670**	**660**	**700**	**780**	**670**	**600**	**530**	**600**	**540**
Arsenic, Total (mg/L)	**0.0053**	**0.0053**	**0.0052**	**0.0015**	< 0.0010	**0.0038**	**0.0032**	**0.0018**	**0.0018**	**0.0010**	**0.0011**	< 0.0010
Barium, Total (mg/L)	**0.13**	**0.12**	**0.12**	**0.084**	**0.092**	**0.14**	**0.14**	**0.11**	**0.087**	**0.1**	**0.1**	**0.095**
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Lithium, Total (mg/L)	**0.033**	**0.024**	**0.024**	**0.020**	**0.021**	**0.016**	**0.017**	**0.014**	**0.014**	**0.016**	**0.017**	**0.017**
Mercury, Total (mg/L)	-	< 0.00020	< 0.00020	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	-	< 0.00020
Molybdenum, Total (mg/L)	**0.69**	**0.68**	**0.67**	**0.049**	**0.041**	**0.35**	**0.39**	**0.21**	**0.19**	**1.0**	**1.0**	**0.81**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	**0.0013**	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Molybdenum, Dissolved (mg/L)	**0.77**	**0.69**	**0.68**	**0.047**	**0.041**	**0.34**	**0.39**	**0.20**	**0.18**	**1.0**	**1.0**	**0.79**
Radium-226 & 228, Combined (pCi/L)	1.02 ± 0.801 (1.35)	**3.69 ± 0.943 (1.58)**	1.52 ± 1.57 (2.80)	0.524 ± 0.635 (1.27)	**1.72 ± 0.291 (0.462)**	0.242 ± 1.16 (2.45)	**0.737 ± 0.288 (0.584)**	0.137 ± 1.1 (2.43)	**1.57 ± 0.287 (0.510)**	1.00 ± 0.917 (1.48)	0.552 ± 0.83 (1.44)	**0.848 ± 0.275 (0.551)**

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*
Radiological results are presented as activity plus or minus uncertainty with MDC.
Data presented in this table were verified against the laboratory and validation reports.
µS/cm = micro Siemens per centimeter
Deg C = degrees Celsius
ft btoc = feet below top of casing
mg/L = milligrams per liter
N/A = Not Applicable
NTU = Nephelometric Turbidity Unit
pCi/L = picoCuries per liter
su = standard unit
TDS = total dissolved solids
TOC = top of casing

TABLE III
SUMMARY OF 2022 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient												
	MW-21D		MW-22S		MW-22D		MW-23S		MW-24S		MW-24D		
Measure Point (TOC)	289.95		293.66		293.54		292.32		300.66		300.67		
Sample Name	MW-21D	MW-21D	MW-22S	MW-22S	MW-22D	MW-22D	MW-23S	MW-23S	MW-24S	MW-24S	MW-24D	MW-24D	NE-DUP2-08-2022
Sample Date	2/18/2022	8/17/2022	2/18/2022	8/17/2022	2/18/2022	8/17/2022	2/18/2022	8/17/2022	2/28/2022	8/11/2022	2/28/2022	8/11/2022	8/11/2022
Lab Data Reviewed and Accepted	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	12/20/2022
Depth to Water (ft btoc)	19.85	23.47	21.40	27.75	21.32	27.25	21.80	26.00	28.24	30.71	28.24	30.68	-
Temperature (Deg C)	13.73	17.36	14.63	16.65	14.87	17.12	15.91	19.53	15.02	17.07	14.67	18.10	-
Conductivity, Field (µS/cm)	830	869	1050	1180	814	852	855	978	788	706	631	747	-
Dissolved Oxygen (mg/L)	4.68	0.00	1.51	0.00	3.67	0.00	2.16	2.21	2.96	0.00	5.40	0.63	-
ORP (mV)	-146	-217	56	-135	-115	-212	87	206	-72	-148	-94	-183	-
Turbidity, Field (NTU)	0.18	0.00	2.74	0.00	2.08	9.80	0.0	0.00	4.81	0.00	5.83	0.00	-
pH, Field (SU)	7.67	7.33	7.12	6.68	7.88	7.36	7.26	6.76	6.81	6.94	7.41	6.93	-
Boron, Total (mg/L)	**3.7**	**4.0**	**5.6**	**3.2**	**3.8**	**4.2**	**0.73**	**0.56**	**0.072**	**0.065**	**0.059**	**0.039**	**0.11**
Calcium, Total (mg/L)	**130**	**130**	**160**	**180**	**110**	**110**	**120**	**140**	**110**	**88**	**79**	**86**	**87**
Chloride (mg/L)	**19**	**18**	**30**	**23**	**17**	**15**	**17**	**19**	**14**	**8.1**	**13**	**12**	**10**
Fluoride (mg/L)	**0.482**	**0.407**	< 0.250	< 0.250	**0.706**	**0.676**	**0.268**	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250
Sulfate (mg/L)	**110**	**97**	**130**	**100**	**140**	**120**	**98**	**90**	**51**	**43**	**50**	**53**	**52**
pH (lab) (su)	**7.42**	**7.56**	**9.88**	**7.12**	**7.13**	**7.63**	**7.15**	**7.21**	**7.44**	**7.11**	**7.33**	**7.08**	**7.11**
TDS (mg/L)	**490**	**520**	**620**	**730**	**510**	**560**	**480**	**600**	**460**	**470**	**320**	**500**	**440**
Arsenic, Total (mg/L)	**0.0021**	**0.0019**	**0.0013**	**0.0038**	**0.0047**	**0.0049**	< 0.0010	< 0.0010	**0.0038**	**0.0042**	**0.0036**	**0.0034**	**0.0034**
Barium, Total (mg/L)	**0.12**	**0.13**	**0.17**	**0.19**	**0.084**	**0.089**	**0.11**	**0.13**	**0.23**	**0.19**	**0.15**	**0.16**	**0.16**
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Lithium, Total (mg/L)	**0.023**	**0.023**	**0.020**	**0.019**	**0.018**	**0.020**	**0.025**	**0.024**	**0.024**	**0.013**	**0.023**	< 0.010	< 0.010
Mercury, Total (mg/L)	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.34**	**0.32**	**0.16**	**0.072**	**0.63**	**0.67**	**0.021**	**0.018**	**0.0018**	< 0.0010	**0.0090**	**0.0046**	**0.0049**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Molybdenum, Dissolved (mg/L)	**0.32**	**0.33**	**0.34**	**0.074**	**0.16**	**0.69**	**0.02**	**0.018**	< 0.0010	< 0.0010	**0.0097**	**0.0043**	**0.0049**
Radium-226 & 228, Combined (pCi/L)	**1.49 ± 0.958 (1.44)**	**1.90 ± 0.363 (0.534)**	**1.91 ± 1.04 (1.64)**	**1.13 ± 0.242 (0.506)**	1.52 ± 1.14 (2.10)	**0.777 ± 0.283 (0.549)**	1.26 ± 1.04 (1.77)	0.384 ± 0.197 (0.549)	1.48 ± 1.01 (1.54)	**2.11 ± 0.316 (0.414)**	1.45 ± 1.06 (1.78)	**0.765 ± 0.337 (0.514)**	-

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*
Radiological results are presented as activity plus or minus uncertainty with MDC.
Data presented in this table were verified against the laboratory and validation reports.
µS/cm = micro Siemens per centimeter
Deg C = degrees Celsius
ft btoc = feet below top of casing
mg/L = milligrams per liter
N/A = Not Applicable
NTU = Nephelometric Turbidity Unit
pCi/L = picoCuries per liter
su = standard unit
TDS = total dissolved solids
TOC = top of casing

TABLE III
SUMMARY OF 2022 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient									
	MW-25S		MW-25D		MW-26S		MW-26D			
Measure Point (TOC)	299.35		299.25		298.96		298.92			
Sample Name	MW-25S	MW-25S	MW-25D	MW-25D	MW-26S	MW-26S	MW-26D	NE-DUP	MW-26D	NE-DUP2-08-2022
Sample Date	2/28/2022	8/11/2022	2/28/2022	8/11/2022	2/15/2022	8/12/2022	2/15/2022	2/15/2022	8/12/2022	8/12/2022
Lab Data Reviewed and Accepted	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	12/20/2022	7/6/2022	7/6/2022	12/20/2022	12/20/2022
Depth to Water (ft btoc)	27.25	29.43	27.10	29.28	27.90	30.67	27.80	-	30.78	-
Temperature (Deg C)	15.01	17.83	14.95	26.38	17.87	19.10	18.07	-	20.08	-
Conductivity, Field (µS/cm)	676	670	544	487	1220	1280	1070	-	1210	-
Dissolved Oxygen (mg/L)	1.54	0.00	5.69	0.45	3.01	0.00	1.19	-	0.00	-
ORP (mV)	-69	-142	-98	-184	-3	-79	-112	-	-181	-
Turbidity, Field (NTU)	0.30	0.00	0.48	4.40	6.27	0.00	4.98	-	0.90	-
pH, Field (SU)	6.19	6.61	6.51	7.09	7.16	6.65	7.51	-	6.86	-
Boron, Total (mg/L)	**0.042**	**0.043**	**0.12**	**0.11**	**12**	**8.6**	**13**	**12**	**14**	**-**
Calcium, Total (mg/L)	**72**	**63**	**56**	**57**	**160**	**140**	**140**	**140**	**140**	**-**
Chloride (mg/L)	**17**	**15**	**9.7**	**8.9**	**6.1**	**5.7**	**15**	**15**	**12**	**-**
Fluoride (mg/L)	< 0.250	< 0.250	**0.291**	**0.273**	**0.696**	**0.616**	**0.876**	**0.874**	**0.617**	**-**
Sulfate (mg/L)	**71**	**70**	**38**	**41**	**210**	**230**	**290**	**290**	**270**	**-**
pH (lab) (su)	**7.09**	**6.72**	**7.16**	**6.91**	**7.13**	**6.94**	**7.25**	**7.32**	**7.04**	**-**
TDS (mg/L)	**380**	**460**	**270**	**350**	**860**	**780**	**740**	**730**	**810**	**-**
Arsenic, Total (mg/L)	**0.0055**	**0.0049**	**0.0037**	**0.0035**	**0.0026**	**0.0020**	**0.0050**	**0.0048**	**0.0056**	**-**
Barium, Total (mg/L)	**0.36**	**0.33**	**0.13**	**0.13**	**0.075**	**0.065**	**0.092**	**0.091**	**0.091**	**-**
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	**-**
Lithium, Total (mg/L)	< 0.010	< 0.010	< 0.010	< 0.010	**0.026**	**0.023**	**0.021**	**0.020**	**0.021**	**-**
Mercury, Total (mg/L)	-	< 0.00020	-	< 0.00020	-	< 0.00020	-	-	< 0.00020	**-**
Molybdenum, Total (mg/L)	**0.023**	**0.02**	**0.013**	**0.014**	**1.7**	**1.2**	**0.70**	**0.71**	**0.88**	**-**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	**-**
Molybdenum, Dissolved (mg/L)	**0.024**	**0.019**	**0.015**	**0.013**	**1.8**	**1.2**	**0.78**	**0.77**	**0.83**	**-**
Radium-226 & 228, Combined (pCi/L)	1.06 ± 0.966 (1.78)	**1.75 ± 0.354 (0.448)**	1.04 ± 0.942 (1.69)	0.447 ± 0.386 (0.879)	1.38 ± 0.929 (1.54)	**1.80 ± 0.355 (0.500)**	1.61 ± 0.999 (1.62)	1.37 ± 0.893 (1.51)	**1.67 ± 0.357 (0.502)**	**1.27 ± 0.317 (0.430)**

Notes:

Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*

Radiological results are presented as activity plus or minus uncertainty with MDC.

Data presented in this table were verified against the laboratory and validation reports.

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

N/A = Not Applicable

NTU = Nephelometric Turbidity Unit

pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

TABLE IV
BACKGROUND CONCENTRATIONS AND GROUNDWATER PROTECTION STANDARDS
DETECTED APPENDIX IV CONSTITUENTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Constituent	Background Concentration (UTL)	Groundwater Protection Standard
Arsenic (mg/L)	0.0099	0.010*
Barium (mg/L)	0.800	2*
Cobalt (mg/L)	0.005	0.006**
Fluoride (mg/L)	1.710	4.0*
Lithium (mg/L)	0.033	0.040**
Molybdenum (mg/L)	0.010	0.100**
Radium 226 & 228 (pCi/L)	2.54	5*
Selenium (mg/L)	0.0012	0.05*

Notes:

1. Groundwater Protection Standards listed were utilized for statistical analyses for the September 2020 and February 2021 semi-annual assessment monitoring sampling events.

** Value set equal to the maximum contaminant level.*

*** Value set based on 40 CFR § 257.95(h)(1)*

mg/L = milligrams per liter

pCi/L = picoCuries per liter

UTL = upper tolerance limit

FIGURES

LEGEND

MONITORING WELL

POND 003

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

4. AERIAL IMAGERY SOURCE: ESRI, 21 APRIL 2019

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

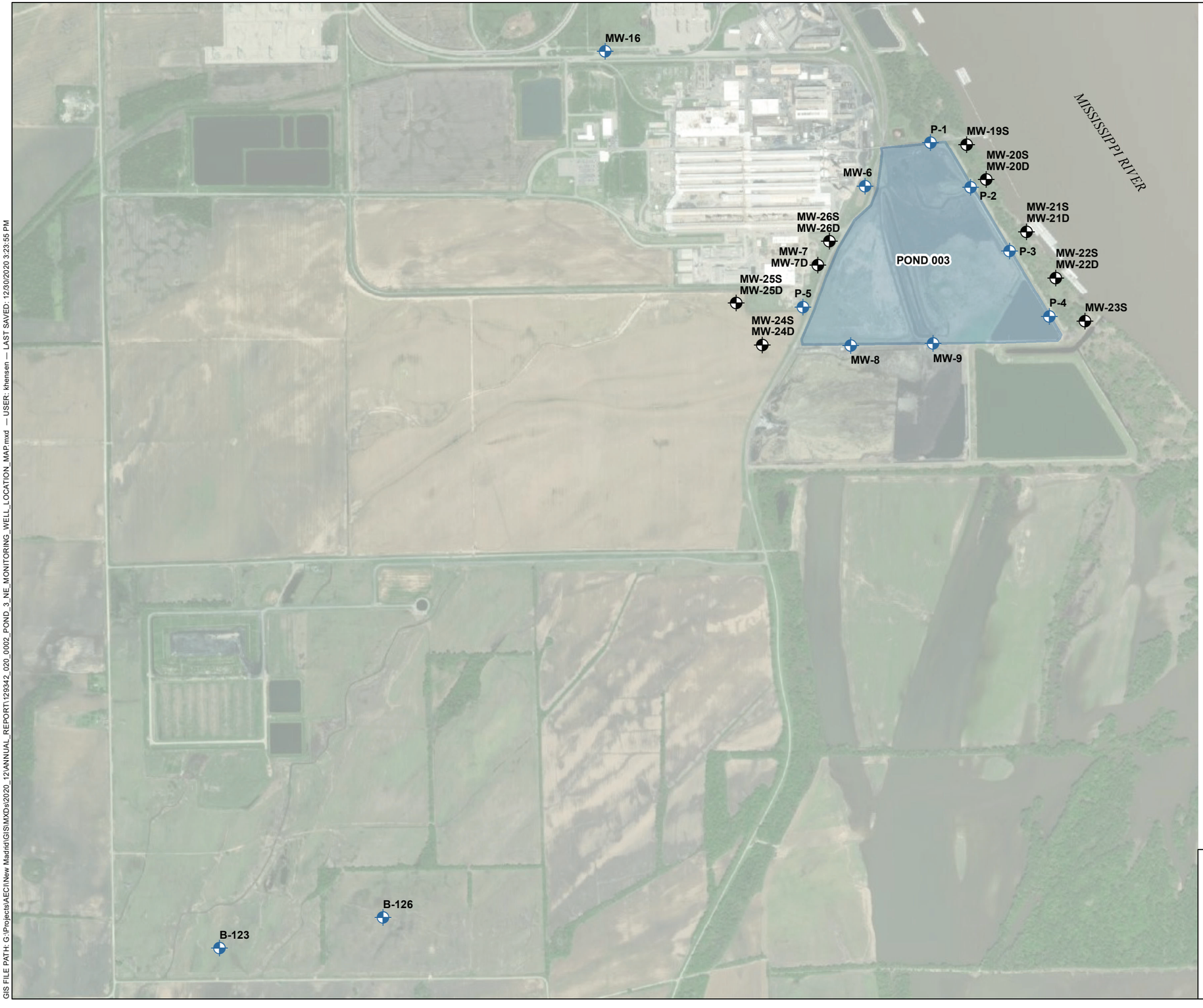
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT
MARSTON, MISSOURI

POND 003 MONITORING WELL LOCATION MAP

JANUARY 2023

FIGURE 1

GIS FILE PATH: G:\Projects\AEC\New Madrid\GIS\MXDs\2020_12\ANNUAL_REPORT\129342_020_0001_POND_3_WELL_LOCATION_MAP.mxd — USER: khensen — LAST SAVED: 12/30/2020 3:20:03 PM



LEGEND

- COMPLIANCE MONITORING WELL
- NATURE AND EXTENT MONITORING WELL
- POND 003

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
4. AERIAL IMAGERY SOURCE: ESRI, 21 APRIL 2019

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT
MARSTON, MISSOURI

POND 003 NATURE AND EXTENT MONITORING WELL LOCATION MAP

JANUARY 2023

FIGURE 2

GIS FILE PATH: G:\Projects\AEC\New Madrid\GIS\MXDs\2020_12\ANNUAL_REPORT\129342_020_0002_POND_3_NE_MONITORING_WELL_LOCATION_MAP.mxd — USER: khensen — LAST SAVED: 12/30/2020 3:23:55 PM