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2024 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT POND 003 NEW MADRID POWER PLANT MARSTON, MISSOURI

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Associated Electric Cooperative, Inc.
Springfield, Missouri

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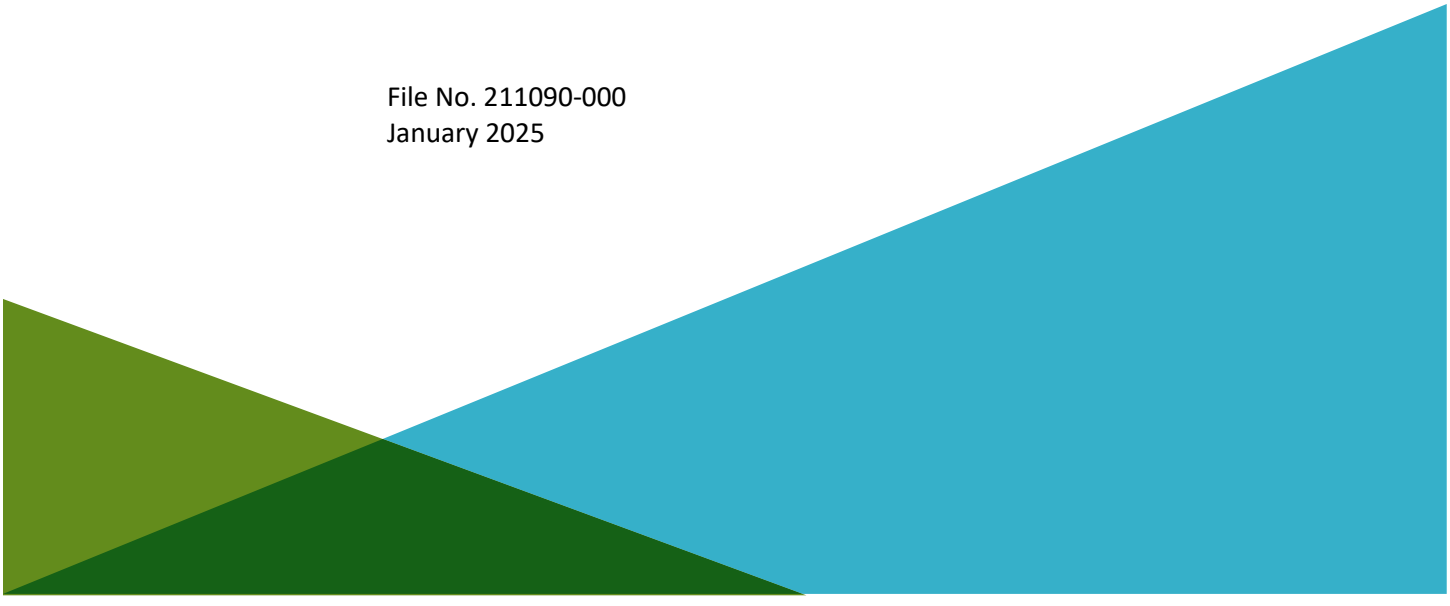

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Mark Nicholls, PG
Name

Signature

Principal Consultant
Title

January 31, 2025
Date

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1. Introduction

This 2024 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) § 257.90(e). The Annual Report documents the groundwater monitoring system for Pond 003 consistent with applicable sections of 40 CFR §§ 257.90 through 257.98, and describes activities conducted in the prior calendar year (2024) for compliance with the Rule. The specific requirements listed in 40 CFR § 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 2024), 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 2024), 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 2024.

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 2024 for all constituents except molybdenum. A corrective measures program implemented for molybdenum in accordance with 40 CFR § 257.96 was in place during 2024.

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 2024, following completion of statistical analyses in accordance with 40 CFR § 257.93 at Pond 003 for the August 2023 and February 2024 semiannual assessment monitoring sampling events, are listed in Table I. In 2024, statistical analyses were completed for semiannual sampling events in August 2023 and February 2024 based on the allowable timeframes to complete statistical analyses in accordance with 40 CFR § 257.93(h)(2). Although a semiannual sampling event was completed in August 2024, statistical analyses were not completed within the 2024 calendar year based on allowable timing to complete the statistical analyses in accordance with 40 CFR § 257.93(h)(2).

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 2024 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 2024. Therefore, a public meeting related to a new assessment of corrective measures was not held in 2024.

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. No new assessment of corrective measures was required to be completed in 2024 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 was certified on 29 March 2023 for molybdenum at the select monitoring wells with SSLs at Pond 003. No new remedy selection was required to be completed in 2024 for this unit.

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.

Remedial activities were initiated within 90 days of selecting a remedy for molybdenum in accordance with 40 CFR § 257.97(a) and are ongoing. No new remedial activities were required to be initiated in 2024 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 40 CFR § 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 groundwater monitoring activities completed and related actions taken at the NMPP Pond 003 as required by the Rule. Groundwater sampling and analysis was conducted in accordance with requirements described in 40 CFR § 257.93, and the status of the groundwater monitoring program described in 40 CFR § 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 2024.

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 40 CFR § 257.97 was completed in March 2023 for molybdenum at Pond 003, and the implementation of the selected remedy has been initiated. AECI is currently implementing an assessment monitoring program for all other constituents.

2.2.2 Key Actions Completed

The 2023 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2024. Statistical analysis of analytical data from the August 2023 semiannual assessment monitoring sampling event was completed in February 2024. A summary including the sample names, sampling dates, 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 February 2024 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 2023 sampling event.

A semiannual assessment monitoring event was completed in February 2024 for Appendix IV constituents detected during the June 2023 annual assessment monitoring sampling event. Statistical analysis was completed within 90 days of receipt of verified laboratory data for the February 2024 sampling event. Appendix IV SSLs were identified consistent with previous monitoring events for molybdenum, along with new Appendix IV SSL above the GWPS for selenium at monitoring well P-1. AECI completed and certified a successful alternative source demonstration (ASD) for selenium at P-1 in October 2024, determining that a source other than the CCR unit caused the SSL. A summary of Appendix IV SSLs identified in the August 2023 and February 2024 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 40 CFR § 257.95(g).

The determination of the nature and extent of the Appendix IV SSLs was initiated in 2019 pursuant to 40 CFR § 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 2024 are provided in Table III.

An annual assessment monitoring sampling event was completed in May 2024 to identify detected Appendix IV constituents for subsequent semiannual sampling events in August 2024 and planned for February 2025. GWPSs for detected Appendix IV constituents were established. GWPSs utilized for the statistical analyses completed in 2024 for the August 2023 and February 2024 semiannual groundwater sampling events are shown on Table IV and Table V, respectively. Semiannual assessment monitoring was completed in August 2024 for Appendix IV constituents detected during the May 2024 annual monitoring event. Statistical analysis of the results from the August 2024 semiannual assessment monitoring sampling event are due to be completed in January 2025 and will be reported in the next calendar year annual report.

Remedial activities were initiated within 90 days of selecting a remedy in accordance with 40 CFR § 257.97(a) for molybdenum at Pond 003. Remedial activities for molybdenum at Pond 003 are ongoing.

2.2.3 Problems Encountered

Problems (i.e., problems could include damaged wells, issues with sample collection or lack of sampling, or problems with analytical analysis) encountered at the NMPP Pond 003 in 2024 are summarized below:

- At monitoring well MW-7, elevated constituent concentrations were observed during the August 2024 semiannual assessment monitoring sampling event. A verification sample was collected in October 2024. The analytical results were revised accordingly.

- Difficulties were encountered with groundwater sampling of upgradient monitoring well B-126 due to slow groundwater recharge and elevated turbidity during the February and May 2024 groundwater sampling events. The elevated turbidity observed in the groundwater samples collected during these sampling events resulted in elevated analytical results for select constituents. Select constituents were unable to be collected due to insufficient water available during sampling.

2.2.4 Actions to Resolve Problems

Actions to resolve the problems encountered in 2024 include:

- Laboratory reanalysis of the groundwater sample from monitoring well MW-7 was completed, and a verification sample was collected in October 2024 for select constituents, as described above. The analytical results were updated accordingly.
- AECI has installed a monitoring well adjacent to monitoring well B-126 to address ongoing difficulties with insufficient water column during sampling events which resulted in elevated turbidity. An evaluation of the replacement monitoring well B-126R will be completed upon conclusion of baseline sampling. The monitoring network certification will be updated accordingly at that time.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2025 include completion of the 2024 Annual Groundwater Monitoring and Corrective Action Report, statistical analysis of assessment monitoring analytical data collected in August 2024, completing an assessment monitoring annual sampling event, and conducting semiannual assessment monitoring sampling events and subsequent statistical analysis. AECI is also implementing initial steps of the selected remedy for molybdenum at Pond 003, which includes additional sampling criteria for select monitoring wells and evaluation of the need for additional monitoring wells to evaluate effectiveness of the selected remedy.

2.3 40 CFR § 257.90€ – 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 40 CFR § 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, along with monitoring wells installed to monitor the effectiveness of the selected remedy, are shown on 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 as part of the certified groundwater monitoring network during 2024.

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 40 CFR § 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 2024. 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 2024 during the semiannual sampling events pursuant to 40 CFR § 257.95(g)(1)(iv). Analytical results associated with the nature and extent investigation conducted in 2023 are reported in Table III.

Four independent samples were collected from each monitoring well installed to support the evaluation of the selected remedy for molybdenum at Pond 003. Due to decreased water levels in the region, groundwater samples were unable to be collected from select monitoring wells. Analytical results collected from these new nature and extent monitoring wells in 2024 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 ASD in April 2019 for molybdenum 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 40 CFR § 257.97 was completed in March 2023, and implementation of the selected remedy was initiated within 90 days of the selection of remedy. 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 40 CFR §§ 257.90(e) of the Rule. It is understood that there are supplemental references in 40 CFR §§ 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 2024.

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 2024. Analytical results for both downgradient and upgradient compliance wells are provided in Table II. The background concentrations (upper tolerance limits) and GWPS values established for the NMPP Pond 003 that were applied to statistical analyses completed in 2024 on the August 2023 and February 2024 analytical results are included in Table IV and Table V, respectively.

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 ASD was completed in October 2024 for the February 2024 sampling event SSL for selenium and is included in this report as Attachment 1. An alternate source was not identified for molybdenum SSLs identified in 2024 at Pond 003. Pond 003 remained in assessment monitoring during 2024 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 2024. 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 40 CFR § 257.105(h)(1), this Annual Report must be placed in the facility operating record.
- Pursuant to 40 CFR § 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 operating record [40 CFR § 257.106(d)].
- Pursuant to 40 CFR § 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 operating record [40 CFR § 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 2023	MW-7	0.100*
		MW-8	
		MW-9	
		P-2	
		P-3	
		P-5	
	February 2024	MW-7	
		MW-8	
		MW-9	
		P-2	
		P-3	
		P-5	
Selenium		P-1	0.05**

Notes:

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

*** Value set equal to the Maximum Contaminant Level.*

mg/L = milligrams per liter

SSL = statistically significant level

TABLE II
SUMMARY OF ANALYTICAL RESULTS - 2024 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Upgradient									Downgradient		
	B-123			B-126			MW-16			MW-6		
Measure Point (TOC)	292.70			293.63			292.85			300.27		
Sample Name	B-123	B-123	B-123	B-126	B-126	B-126	MW-16	MW-16	MW-16	MW-6	MW-6	MW-6
Sample Date	2/5/2024	5/1/2024	8/5/2024	2/6/2024	5/3/2024	8/6/2024	2/5/2024	5/1/2024	8/5/2024	2/8/2024	5/3/2024	8/7/2024
Final Lab Report Date	3/5/2024	5/21/2024	9/18/2024	3/5/2024	5/29/2024	9/18/2024	3/5/2024	5/21/2024	9/18/2024	2/28/2024	5/21/2024	9/18/2024
Final Lab Report Revision Date	5/9/2024	N/A	N/A	5/9/2024	N/A	N/A	5/9/2024	N/A	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	3/20/2024	6/6/2024	10/18/2024	3/20/2024	6/19/2024	10/18/2024	3/1/2024	6/6/2024	10/18/2024	3/19/2024	7/5/2024	10/3/2024
Lab Data Reviewed and Accepted	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024
Depth to Water (ft btoc)	26.40	25.37	23.65	28.52	26.96	24.88	31.48	25.10	23.88	33.86	29.75	31.18
Temperature (Deg C)	16.42	17.11	17.08	15.19	**	18.01	16.95	18.53	18.40	17.44	18.10	18.08
Conductivity, Field (µS/cm)	672	700	699	409	**	888	766	851	817	718	830	944
Turbidity, Field (NTU)	61.5	36.4	185	52.3	**	89.7	7.4	3.2	9.9	3.1	16.1	3.2
pH (field) (su)	6.67	5.98	6.80	5.63	**	6.11	6.41	6.07	6.75	7.15	5.62	6.81
Dissolved Oxygen, Field (mg/L)	0.00	0.00	0.00	5.77	**	1.69	0.00	2.05	0.00	0.00	0.00	0.00
ORP, Field (mV)	13	-98	-148	180	**	169	-108	-219	-200	-20	39	32
Boron, Total (mg/L)	**0.033**	-	**0.045**	**0.043**	-	**0.088**	**0.052**	-	**0.087**	**0.34**	-	**0.25**
Calcium, Total (mg/L)	**78**	-	**82**	**67**	-	**130**	**100**	-	**110**	**96**	-	**140**
Chloride (mg/L)	**2.4**	-	**2.6**	**6.1**	-	**9.7**	**6.1**	-	**5.6**	**8.0**	-	**8.3**
Fluoride (mg/L)	**0.513**	**0.500**	**0.529**	**0.511**	**	**0.451**	**0.994**	**1.18**	**1.10**	**0.824**	**0.660**	**0.543**
Sulfate (mg/L)	**26**	-	**24**	**51**	-	**66**	**56**	-	**51**	**66**	-	**88**
pH (lab) (su)	**7.22**	-	**7.28**	**6.59**	-	**6.89**	**6.85**	-	**7.10**	**7.14**	-	**7.04**
TDS (mg/L)	**400**	-	**340**	**360**	-	**560**	**440**	-	**380**	**320**	-	**520**
Arsenic, Total (mg/L)	**0.0014**	**0.0014**	**0.0023**	< 0.0010	< 0.0010	**0.0012**	**0.0017**	**0.0018**	**0.0018**	< 0.0010	< 0.0010	< 0.00090
Barium, Total (mg/L)	**0.16**	**0.17**	**0.20**	**0.22**	**0.31**	**0.41**	**0.47**	**0.52**	**0.53**	**0.10**	**0.13**	**0.16**
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	< 0.0036	-	< 0.0040	< 0.0036	-	< 0.0040	< 0.0036	-	< 0.0040	< 0.0036
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	< 0.00050	< 0.00050	< 0.00090	< 0.00050	< 0.0010	< 0.00090	< 0.00050	< 0.00050	< 0.00090	< 0.00050	< 0.0010	-
Lithium, Total (mg/L)	**0.025**	**0.025**	**0.026**	**0.011**	**0.013**	**0.019**	**0.019**	**0.020**	**0.022**	**0.012**	**0.015**	**0.016**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	**0.00055**	**0.00045**	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.0032**	**0.0032**	**0.0038**	**0.0019**	**0.0014**	**0.0021**	< 0.0010	< 0.0010	**0.00093**	**0.056**	**0.038**	**0.020**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.00090	**0.0018**	**0.0017**	**0.0018**	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-	-	< 0.0010	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	**0.458 ± 0.253 (0.426)**	0.109 ± 0.356 (0.633)	**2.21 ± 0.463 (0.582)**	**	**1.26 ± 0.544 (0.765)**	**2.09 ± 0.402 (0.502)**	**1.27 ± 0.407 (0.539)**	**0.909 ± 0.381 (0.524)**	**1.72 ± 0.407 (0.566)**	**0.793 ± 0.414 (0.670)**	**1.44 ± 0.457 (0.532)**	**1.08 ± 0.485 (0.540)**

Notes:

*** = Results not analyzed due to insufficient water in well*

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

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

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 - 2024 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient										
	MW-7				MW-8			MW-9			
Measure Point (TOC)	301.50				310.63			310.24			
Sample Name	MW-7	MW-7	MW-7	MW-7	MW-8	MW-8	MW-8	MW-9	MW-9	DUP-POND3-MAY24	MW-9
Sample Date	2/8/2024	5/3/2024	8/7/2024	10/14/2024	2/14/2024	5/6/2024	8/5/2024	2/14/2024	5/6/2024	5/6/2024	8/6/2024
Final Lab Report Date	2/28/2024	5/21/2024	9/18/2024	10/24/2024	3/5/2024	5/21/2024	9/18/2024	3/5/2024	5/21/2024	5/21/2024	9/18/2024
Final Lab Report Revision Date	N/A	N/A	N/A	N/A	4/11/2024	N/A	N/A	4/11/2024	N/A	N/A	N/A
Final Radiation Lab Report Date	3/19/2024	7/5/2024	10/23/2024	N/A	3/20/2024	7/5/2024	10/18/2024	3/1/2024	7/5/2024	7/5/2024	10/18/2024
Lab Data Reviewed and Accepted	6/25/2024	9/9/2024	12/17/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	9/9/2024	12/17/2024
Depth to Water (ft btoc)	38.24	32.21	31.87	40.64	46.67	41.53	40.93	44.60	39.99	-	40.87
Temperature (Deg C)	16.85	17.90	17.83	17.31	17.38	21.80	19.66	17.59	18.86	-	18.92
Conductivity, Field (µS/cm)	817	807	849	809	845	732	1020	865	840	-	921
Turbidity, Field (NTU)	1.3	9.5	12.9	102	0.0	40.0	24.8	0.0	6.2	-	1.0
pH (field) (su)	6.65	5.54	6.61	6.60	6.76	5.97	6.62	7.02	6.05	-	7.00
Dissolved Oxygen, Field (mg/L)	0.08	0.00	0.00	0.09	0.00	0.00	0.00	2.09	0.00	-	6.39
ORP, Field (mV)	-15	-67	2	24	-104	-197	-154	20	-8	-	169
Boron, Total (mg/L)	**6.0**	-	**4.5**	-	**3.7**	-	**5.4**	**4.4**	-	-	**4.3**
Calcium, Total (mg/L)	**110**	-	**120**	-	**130**	-	**150**	**120**	-	-	**120**
Chloride (mg/L)	**17**	-	**11**	-	**9.8**	-	**9.3**	**14**	-	-	**18**
Fluoride (mg/L)	**0.259**	**0.368**	**0.378**	-	< 0.250	**0.301**	**0.254**	**0.542**	**0.589**	**0.603**	**0.575**
Sulfate (mg/L)	**110**	-	**80**	-	**51**	-	**64**	**150**	-	-	**150**
pH (lab) (su)	**6.73**	-	**6.90**	-	**7.50**	-	**7.10**	**7.13**	-	-	**7.36**
TDS (mg/L)	**440**	-	**510**	-	**560**	-	**560**	**540**	-	-	**500**
Arsenic, Total (mg/L)	**0.0049**	**0.0042**	**0.0037**	-	**0.0047**	**0.0048**	**0.0054**	< 0.0010	< 0.0010	< 0.0010	< 0.00090
Barium, Total (mg/L)	**0.11**	**0.095**	**0.12**	-	**0.11**	**0.11**	**0.15**	**0.078**	**0.070**	**0.070**	**0.083**
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	< 0.0036	-	-	< 0.0040	< 0.0036		< 0.0040	< 0.0040	< 0.0036
Cobalt, Total (mg/L)	**0.0035**	**0.0051**	**0.0085**	**0.0074**	< 0.0020	< 0.0020	**0.0024**	< 0.0020	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	< 0.00050	< 0.0010	-		< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.0010	< 0.00090
Lithium, Total (mg/L)	**0.017**	**0.016**	**0.018**	-	**0.018**	**0.017**	**0.017**	**0.022**	**0.023**	**0.023**	**0.023**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	-	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**1.2**	**1.3**	**1.3**	-	**0.29**	**0.46**	**0.42**	**0.44**	**0.44**	**0.43**	**0.39**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	**0.048**	**0.11**	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	-	< 0.0010	-	-	-	< 0.0010	-		< 0.0010	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	**0.580 ± 0.376 (0.552)**	**1.20 ± 0.478 (0.653)**	**1.93 ± 0.682 (1.11)**	**-**	**0.511 ± 0.246 (0.404)**	**1.01 ± 0.431 (0.730)**	**1.11 ± 0.366 (0.536)**	**1.26 ±0.326 (0.409)**	**0.536 ± 0.325 (0.714)**	**1.09 ± 0.333 (0.630)**	**1.74 ± 0.403 (0.636)**

Notes:

*** = Results not analyzed due to insufficient water in well*
Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*
Radiological results are presented as activity plus or minus uncertainty with MDC.
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 - 2024 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	P-1				P-2				P-3			
Measure Point (TOC)	313.35				309.84				310.72			
Sample Name	P-1	DUP-P3-02-2024	P-1	P-1	P-2	P-2	P-2	DUP-P3-08-2024	P-3	P-3	P-3	
Sample Date	2/13/2024	2/13/2024	5/3/2024	8/6/2024	2/13/2024	5/6/2024	8/6/2024	8/6/2024	2/13/2024	5/6/2024	8/7/2024	
Final Lab Report Date	3/5/2024	3/5/2024	5/21/2024	9/18/2024	3/5/2024	5/21/2024	9/18/2024	9/18/2024	3/5/2024	5/21/2024	9/18/2024	
Final 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	
Final Radiation Lab Report Date	3/20/2024	3/20/2024	7/5/2024	10/3/2024	3/20/2024	7/5/2024	10/3/2024	10/3/2024	3/20/2024	7/5/2024	10/3/2024	
Lab Data Reviewed and Accepted	6/25/2024	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024	
Depth to Water (ft btoc)	44.95	44.95	42.68	45.50	41.23	38.98	42.05	-	42.33	39.69	43.09	
Temperature (Deg C)	18.28	-	24.38	20.37	19.06	19.50	19.78	-	16.80	17.91	17.99	
Conductivity, Field (µS/cm)	1140	-	943	1130	1090	1030	1170	-	1090	945	1000	
Turbidity, Field (NTU)	6.1	-	2.6	1.6	4.5	8.2	0.6	-	3.9	1.8	3.0	
pH (field) (su)	6.82	-	5.58	6.91	7.34	5.67	6.98	-	7.28	5.72	6.76	
Dissolved Oxygen, Field (mg/L)	1.72	-	3.81	3.46	4.57	5.29	6.21	-	5.49	0.00	1.84	
ORP, Field (mV)	149	-	154	53	164	242	112	-	170	213	183	
Boron, Total (mg/L)	**1.6**	**1.6**	-	**1.6**	**1.8**	-	**1.8**	**1.8**	**4.6**	-	**6.0**	
Calcium, Total (mg/L)	**170**	**170**	-	**180**	**140**	-	**160**	**160**	**160**	-	**160**	
Chloride (mg/L)	**15**	**15**	-	**16**	**17**	-	**16**	**16**	**16**	-	**17**	
Fluoride (mg/L)	< 0.250	**0.250**	**0.363**	**0.323**	**0.402**	**0.517**	**0.493**	**0.370**	**0.519**	**0.608**	**0.640**	
Sulfate (mg/L)	**180**	**190**	-	**190**	**260**	-	**290**	**270**	**85**	-	**100**	
pH (lab) (su)	**6.83**	**6.94**	-	**7.26**	**6.68**	-	**7.29**	**7.32**	**6.84**	-	**7.23**	
TDS (mg/L)	**690**	**680**	-	**700**	**630**	-	**720**	**680**	**540**	-	**560**	
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.00090	< 0.00090	< 0.0010	< 0.0010	< 0.00090	
Barium, Total (mg/L)	**0.082**	**0.083**	**0.082**	**0.086**	**0.078**	**0.081**	**0.089**	**0.089**	**0.10**	**0.10**	**0.11**	
Beryllium, Total (mg/L)	-	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-	
Cadmium, Total (mg/L)	-	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-	
Chromium, Total (mg/L)	-	-	**0.0071**	< 0.0036	-	< 0.0040	< 0.0036	< 0.0036	-	< 0.0040	< 0.0036	
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018	< 0.0018	< 0.0020	< 0.0020	< 0.0018	
Lead, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	-	< 0.0010	< 0.0010	-	-	< 0.0010	< 0.0010	-	
Lithium, Total (mg/L)	**0.024**	**0.023**	**0.037**	**0.023**	**0.019**	**0.019**	**0.020**	**0.019**	**0.021**	**0.021**	**0.023**	
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	
Molybdenum, Total (mg/L)	**0.017**	**0.015**	**0.017**	**0.016**	**0.25**	**0.28**	**0.27**	**0.27**	**0.76**	**0.80**	**0.83**	
Selenium, Total (mg/L)	**0.058**	**0.062**	**0.023**	**0.0078**	**0.0017**	**0.0015**	**0.0039**	**0.0036**	**0.0034**	**0.0036**	**0.0055**	
Thallium, Total (mg/L)	-	-	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	-	
Radium 226 & 228 Combined (pCi/L)	**1.33 ± 0.735 (1.27)**	**0.731 ± 0.332 (0.497)**	**1.05 ± 0.341 (0.552)**	**3.02 ± 0.599 (0.534)**	**0.836 ± 0.412 (0.485)**	**1.87 ± 0.404 (0.469)**	**1.32 ± 0.420 (0.480)**	**0.591 ± 0.389 (0.672)**	**2.06 ± 0.564 (0.605)**	**0.513 ± 0.391 (0.253)**	**0.807 ± 0.296 (0.499)**	

Notes:

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Bold value: *Detection above laboratory reporting limit or minimum detectable concentration (MDC).*
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µS/cm = micro Siemens per centimeter
Deg C = degrees Celsius
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TDS = total dissolved solids
TOC = top of casing

TABLE II
SUMMARY OF ANALYTICAL RESULTS - 2024 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient					
	P-4			P-5		
Measure Point (TOC)	311.07			301.97		
Sample Name	P-4	P-4	P-4	P-5	P-5	P-5
Sample Date	02/13/2024	5/6/2024	8/7/2024	2/8/2024	5/3/2024	8/7/2024
Final Lab Report Date	3/5/2024	5/21/2024	9/18/2024	2/28/2024	5/21/2024	9/18/2024
Final Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	3/20/2024	7/5/2024	10/3/2024	3/19/2024	7/5/2024	10/3/2024
Lab Data Reviewed and Accepted	6/25/2024	9/9/2024	12/17/2024	6/25/2024	9/9/2024	12/17/2024
Depth to Water (ft btoc)	42.41	39.68	43.38	39.38	33.23	32.30
Temperature (Deg C)	17.2	18.16	18.38	16.56	17.70	16.91
Conductivity, Field (µS/cm)	767	856	922	984	959	1040
Turbidity, Field (NTU)	0.0	1.3	2.9	12.9	6.4	5.4
pH (field) (su)	6.77	5.80	6.92	6.69	5.44	6.55
Dissolved Oxygen, Field (mg/L)	0.28	0.00	0.92	0.00	0.00	3.4
ORP, Field (mV)	205	120	163	-77	-175	-145
Boron, Total (mg/L)	**0.65**	-	**0.64**	**5.5**	-	**5.1**
Calcium, Total (mg/L)	**120**	-	**130**	**140**	-	**150**
Chloride (mg/L)	**17**	-	**19**	**7.0**	-	**8.3**
Fluoride (mg/L)	< 0.250	**0.309**	**0.290**	< 0.250	< 0.250	< 0.250
Sulfate (mg/L)	**59**	-	**69**	**96**	-	**140**
pH (lab) (su)	**6.85**	-	**7.23**	**6.81**	-	**6.85**
TDS (mg/L)	**430**	-	**600**	**460**	-	**530**
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.00090	**0.0057**	**0.0056**	**0.0058**
Barium, Total (mg/L)	**0.14**	**0.15**	**0.16**	**0.13**	**0.13**	**0.14**
Beryllium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-
Cadmium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-
Chromium, Total (mg/L)	-	< 0.0040	< 0.0036	-	< 0.0040	< 0.0036
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	< 0.0010	< 0.0010	-	< 0.00050	< 0.0010	-
Lithium, Total (mg/L)	**0.034**	**0.036**	**0.036**	**0.018**	**0.019**	**0.017**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	**0.00089**	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.018**	**0.017**	**0.020**	**0.30**	**0.29**	**0.29**
Selenium, Total (mg/L)	**0.012**	**0.0085**	**0.011**	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	**1.45 ± 0.540 (0.716)**	**0.776 ± 0.342 (0.565)**	**1.16 ± 0.307 (0.513)**	**1.09 ± 0.328 (0.476)**	**1.14 ± 0.437 (0.605)**	**0.846 ± 0.414 (0.654)**

Notes:

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NTU = Nephelometric Turbidity Unit
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su = standard unit
TDS = total dissolved solids
TOC = top of casing

TABLE III
SUMMARY OF 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	MW-7I				MW-7D				MW-7L			
Measure Point (TOC)	301.90				302.07				298.73			
Sample Name	MW-7I	MW-7I	MW-7I	MW-7I	MW-7D	MW-7D	MW-7D	MW-7D	MW-7L	MW-7L	MW-7L	MW-7L
Sample Date	1/12/2024	2/16/2024	6/7/2024	8/7/2024	1/10/2024	2/8/2024	6/7/2024	8/7/2024	1/9/2024	2/16/2024	6/7/2024	8/7/2024
Final Lab Report Date	2/8/2024	3/5/2024	7/3/2024	9/19/2024	1/31/2024	2/28/2024	7/3/2024	9/19/2024	1/29/2024	3/5/2024	7/3/2024	9/19/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	2/8/2024	3/20/2024	7/10/2024	10/2/2024	2/5/2024	3/19/2024	7/10/2024	10/3/2024	1/29/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	43.29	36.92	29.37	33.11	45.22	38.53	28.91	32.23	42.23	38.01	29.39	32.79
Temperature (Deg C)	16.08	15.9	18.54	19.06	12.05	16.68	17.89	18.43	14.54	14.86	22.90	19.91
Conductivity, Field (µS/cm)	515	671	551	910	596	769	769	1060	407	384	280	490
Turbidity, Field (NTU)	0.0	145	4.3	6.5	6.7	1.8	3.9	3.2	3.8	16.7	17.8	2.2
pH (field) (su)	6.98	6.98	6.42	3.81	6.05	7.19	6.94	7.00	6.93	7.21	6.16	3.87
Dissolved Oxygen, Field (mg/L)	1.95	0.00	0.00	3.45	1.03	0.00	8.81	0.00	3.37	0.06	3.31	3.12
Oxidation Reduction Potential (ORP), Field (mv)	-161	-129	-122	-156	-80	-118	-121	-193	-138	-161	-109	-153
Boron, Total (mg/L)	**0.76**	**2.2**	**3.1**	**3.4**	**2.2**	**3.4**	**5.8**	**9.1**	**0.028**	**0.023**	**0.028**	**0.060**
Calcium, Total (mg/L)	**56**	**87**	**90**	**84**	**100**	**110**	**130**	**130**	**49**	**47**	**47**	**49**
Chloride (mg/L)	**9.6**	**8.1**	**8.0**	**8.6**	**10**	**8.9**	**9.2**	**2.2**	**5.3**	**4.4**	**1.5**	**2.3**
Fluoride (mg/L)	< 0.250	< 0.250	< 0.250	< 0.250	**0.511**	**0.589**	**0.636**	**0.618**	< 0.250	< 0.250	< 0.250	< 0.250
Sulfate (mg/L)	**48**	**91**	**120**	**120**	**58**	**62**	**89**	**130**	**8.7**	**1.9**	< 1.0	< 1.0
pH (lab) (su)	**7.32**	**7.09**	**7.19**	**7.05**	**7.08**	**7.19**	**7.21**	**7.23**	**7.37**	**7.14**	**7.11**	**7.21**
TDS (mg/L)	**240**	**390**	**420**	**470**	**400**	**360**	**480**	**600**	**230**	**230**	**140**	**210**
Antimony, Total (mg/L)	< 0.0030	< 0.0030	-	-	< 0.0030	-	-	-	< 0.0030	< 0.0030	-	-
Arsenic, Total (mg/L)	**0.0051**	**0.0043**	**0.0055**	**0.0025**	**0.0041**	**0.0041**	**0.0042**	**0.0038**	< 0.0010	< 0.0010	< 0.0010	**0.0012**
Barium, Total (mg/L)	**0.12**	**0.11**	**0.12**	**0.11**	**0.093**	**0.11**	**0.13**	**0.14**	**0.33**	**0.33**	**0.34**	**0.36**
Beryllium, Total (mg/L)	< 0.0010	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	< 0.0010	-	-
Cadmium, Total (mg/L)	< 0.0010	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	< 0.0010	-	-
Chromium, Total (mg/L)	< 0.0040	< 0.0040	-	< 0.0040	< 0.0040	-	-	< 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	< 0.0020	< 0.0020
Lead, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	-	< 0.0010	< 0.00050	< 0.0010	-	< 0.0010	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	< 0.02	< 0.010	< 0.010	< 0.010	**0.021**	**0.021**	**0.022**	**0.021**	< 0.02	**0.014**	**0.014**	**0.015**
Mercury, Total (mg/L)	< 0.00020	**0.00032**	< 0.00020	< 0.00020	< 0.0002	< 0.00020	< 0.00020	< 0.00020	< 0.0002	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.11**	**0.26**	**0.41**	**0.36**	**0.3**	**0.32**	**0.37**	**0.49**	**0.0019**	**0.0042**	**0.0028**	**0.0025**
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
Thallium, Total (mg/L)	< 0.0010	< 0.0010	-	-	< 0.0010	-	-	-	< 0.0010	< 0.0010	-	-
Radium 226 & 228 Combined (pCi/L)	**1.64 ± 0.450 (0.690)**	**0.941 ± 0.384 (0.356)**	**1.91 ± 0.366 (0.269)**	**0.672 ± 0.264 (0.234)**	**0.316 ± 0.350 (0.543)**	**1.35 ± 0.433 (0.379)**	**1.14 ± 0.313 (0.285)**	**2.57 ± 0.413 (0.323)**	**2.37 ± 0.490 (0.567)**	**3.43 ± 0.605 (0.364)**	**4.28 ± 0.487 (0.293)**	**3.25 ± 0.610 (0.296)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	MW-19S				MW-20S				MW-20D			
Measure Point (TOC)	293.87				293.56				293.45			
Sample Name	MW-19S	NE DUP1-02-2024	MW-19S	MW-19S	MW-20S	MW-20S	MW-20S	MW-20S	MW-20D	MW-20D	MW-20D	MW-20D
Sample Date	2/15/2024	2/15/2024	6/6/2024	8/7/2024	1/11/2024	2/15/2024	6/5/2024	8/12/2024	1/11/2024	2/15/2024	6/5/2024	8/12/2024
Final Lab Report Date	3/8/2024	3/8/2024	7/3/2024	9/19/2024	1/31/2024	3/8/2024	7/3/2024	9/20/2024	1/31/2024	3/8/2024	7/3/2024	9/20/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	3/20/2024	3/20/2024	7/10/2024	10/3/2024	2/8/2024	3/20/2024	7/10/2024	10/2/2024	2/8/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	25.10	25.10	17.41	27.32	37.02	24.69	16.02	30.07	37.12	24.66	16.12	30.24
Temperature (Deg C)	17.72	-	14.81	16.09	16.24	18.54	15.38	17.82	16.63	18.45	16.55	18.63
Conductivity, Field (µS/cm)	689	-	413	713	873	1120	364	720	624	940	692	739
Turbidity, Field (NTU)	3	-	0.0	3.2	0.0	8.2	9.2	5.8	0.0	4.7	4.9	55
pH (field) (su)	7.17	-	7.27	7.00	6.48	7.24	7.35	6.98	6.78	7.48	7.23	7.32
Dissolved Oxygen, Field (mg/L)	0.62	-	2.67	0.21	0.00	6.5	0.23	1.73	0.00	0.00	0.00	0.00
Oxidation Reduction Potential (ORP), Field (mv)	220	-	91	34	-85	-71	-142	-184	-113	-93	-133	-196
Boron, Total (mg/L)	**0.37**	**0.35**	**0.18**	**0.34**	**2.2**	**2.3**	**0.35**	**1.4**	**0.81**	**1.4**	**1.6**	**1.6**
Calcium, Total (mg/L)	**98**	**100**	**67**	**90**	**130**	**160**	**56**	**91**	**80**	**120**	**110**	**85**
Chloride (mg/L)	**20**	**19**	**26**	**26**	**17**	**14**	**30**	**23**	**25**	**19**	**20**	**23**
Fluoride (mg/L)	< 0.250	< 0.250	**0.341**	**0.325**	**0.627**	**0.515**	**0.875**	**0.682**	**0.750**	**0.542**	**0.700**	**0.621**
Sulfate (mg/L)	**88**	**87**	**43**	**79**	**300**	**290**	**45**	**82**	**170**	**230**	**230**	**130**
pH (lab) (su)	**7.05**	**6.87**	**7.56**	**7.40**	**7.24**	**6.89**	**7.34**	**7.37**	**7.44**	**7.05**	**7.61**	**7.37**
TDS (mg/L)	**420**	**410**	**240**	**400**	**700**	**740**	**260**	**360**	**480**	**570**	**600**	**390**
Antimony, Total (mg/L)	-	-	-	-	< 0.0030	-	-	-	< 0.0030	-	-	-
Arsenic, Total (mg/L)	< 0.0010	< 0.0020	< 0.0010	< 0.0010	**0.0026**	**0.0024**	**0.0020**	**0.0020**	< 0.0010	**0.0012**	< 0.0010	**0.0016**
Barium, Total (mg/L)	**0.066**	**0.070**	**0.061**	**0.083**	**0.12**	**0.13**	**0.071**	**0.13**	**0.072**	**0.097**	**0.092**	**0.082**
Beryllium, Total (mg/L)	-	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-	-
Cadmium, Total (mg/L)	-	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-	-
Chromium, Total (mg/L)	-	-	-	< 0.0040	< 0.0040	-	-	< 0.0036	< 0.0040	-	-	< 0.0036
Cobalt, Total (mg/L)	< 0.0020	< 0.00040	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	< 0.0010	< 0.00010	< 0.00050	-	< 0.0010	< 0.0010	< 0.0010	-	< 0.0010	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	**0.014**	**0.014**	< 0.010	**0.011**	< 0.02	**0.019**	< 0.010	**0.015**	< 0.02	**0.015**	**0.013**	**0.014**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.013**	**0.014**	**0.011**	**0.011**	**0.34**	**0.31**	**0.24**	**0.43**	**0.16**	**0.20**	**0.21**	**0.25**
Selenium, Total (mg/L)	**0.0020**	**0.0022**	< 0.0010	**0.0015**	< 0.0010	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	-	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-	-
Radium 226 & 228 Combined (pCi/L)	**0.871 ± 0.326 (0.313)**	0.100 ± 0.187 (0.238)	**0.497 ± 0.310 (0.323)**	**0.755 ± 0.389 (0.326)**	**1.80 ± 0.416 (0.441)**	**0.775 ± 0.360 (0.310)**	**0.266 ± 0.341 (0.329)**	**0.857 ± 0.317 (0.285)**	**1.59 ± 0.312 (0.413)**	**0.963 ± 0.370 (0.289)**	**0.504 ± 0.380 (0.388)**	**0.641 ± 0.429 (0.352)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient									
	MW-20L				MW-21S			MW-21D		
Measure Point (TOC)	293.19				289.90			289.95		
Sample Name	MW-20L	MW-20L	MW-20L	MW-20L	MW-21S	MW-21S	MW-21S	MW-21D	MW-21D	MW-21D
Sample Date	1/12/2024	2/15/2024	6/5/2024	8/7/2024	2/15/2024	6/8/2024	8/8/2024	2/15/2024	6/6/2024	8/8/2024
Final Lab Report Date	2/8/2024	3/12/2024	7/3/2024	9/19/2024	3/8/2024	7/3/2024	9/20/2024	3/8/2024	7/3/2024	9/20/2024
Final Lab Report Revision Date	-	-	-	10/28/2024	-	-	-	-	-	-
Final Radiation Lab Report Date	-	3/20/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	35.61	27.61	19.02	29.55	21.23	15.06	24.43	21.14	13.71	24.45
Temperature (Deg C)	18.75	18.94	15.21	20.26	16.48	15.22	16.64	16.64	16.12	17.04
Conductivity, Field (µS/cm)	778	704	569	771	1040	480	884	830	333	779
Turbidity, Field (NTU)	3.4	90.1	200	784	22	1.7	4.3	11.7	0.0	6.4
pH (field) (su)	6.96	7.31	7.13	4.14	7.09	7.09	6.60	7.43	7.48	7.00
Dissolved Oxygen, Field (mg/L)	1.52	0.00	0.00	3.47	1.5	0.00	2.85	6.44	0.11	0.00
Oxidation Reduction Potential (ORP), Field (mv)	-184	-166	-148	-163	135	-12	-33	-100	-145	-218
Boron, Total (mg/L)	**4**	**4.0**	**4.2**	**2.2**	**5.1**	**1.9**	**3.9**	**3.3**	**1.1**	**2.7**
Calcium, Total (mg/L)	**96**	**98**	**100**	**82**	**160**	**76**	**130**	**120**	**48**	**98**
Chloride (mg/L)	**9.6**	**9.6**	**9.3**	**22**	**15**	**24**	**19**	**16**	**23**	**22**
Fluoride (mg/L)	< 0.250	< 0.250	< 0.250	**0.425**	**0.578**	**1.02**	**0.795**	**0.331**	**0.618**	**0.463**
Sulfate (mg/L)	**200**	**190**	**210**	**110**	**96**	**55**	**74**	**99**	**46**	**92**
pH (lab) (su)	**7.33**	**7.22**	**7.26**	**7.15**	**7.00**	**7.43**	**7.23**	**7.11**	**7.50**	**7.45**
TDS (mg/L)	**410**	**460**	**460**	**390**	**600**	**320**	**480**	**480**	**200**	**400**
Antimony, Total (mg/L)	< 0.0030	< 0.0030	-	-	-	-	-	-	-	-
Arsenic, Total (mg/L)	**0.015**	< 0.0010	**0.0019**	**0.013**	< 0.0010	< 0.0010	< 0.00090	**0.0018**	**0.0014**	**0.0017**
Barium, Total (mg/L)	**0.19**	**0.16**	**0.15**	**0.15**	**0.11**	**0.053**	**0.089**	**0.12**	**0.054**	**0.12**
Beryllium, Total (mg/L)	< 0.0010	< 0.0010	-	-	-	-	-	-	-	-
Cadmium, Total (mg/L)	< 0.0010	< 0.0010	-	-	-	-	-	-	-	-
Chromium, Total (mg/L)	**0.032**	< 0.0040	-	**0.027**	-	-	< 0.0036	-	-	< 0.0036
Cobalt, Total (mg/L)	**0.01**	< 0.0020	< 0.0020	**0.010**	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	**0.0068**	< 0.0010	< 0.0010	-	< 0.0010	< 0.0010	-	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	< 0.02	< 0.010	< 0.010	**0.013**	**0.018**	**0.011**	**0.017**	**0.024**	**0.014**	**0.022**
Mercury, Total (mg/L)	**0.00039**	< 0.00020	< 0.00020	**0.00021**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.018**	**0.020**	**0.013**	**0.20**	**0.77**	**0.92**	**1.0**	**0.33**	**0.25**	**0.34**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	< 0.0010	< 0.0010	-	-	-	-	-	-	-	-
Radium 226 & 228 Combined (pCi/L)	-	**0.961 ± 0.419 (0.282)**	**0.862 ± 0.510 (0.411)**	**1.91 ± 0.478 (0.294)**	**1.85 ± 0.404 (0.276)**	**1.18 ± 0.477 (0.387)**	0.344 ± 0.572 (0.505)	**0.902 ± 0.347 (0.268)**	**0.821 ± 0.278 (0.302)**	**1.35 ± 0.433 (0.302)**

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.
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
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TDS = total dissolved solids
TOC = top of casing

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SUMMARY OF 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	MW-22S					MW-22D				MW-22L		
Measure Point (TOC)	293.66					293.54				293.27		
Sample Name	MW-22S	MW-22S	MW-22S	MW-22S	NE-DUP1-08-2024	MW-22D	MW-22D	MW-22D	MW-22D	MW-22L	MW-22L	MW-22L
Sample Date	1/11/2024	2/15/2024	6/6/2024	8/8/2024	8/8/2024	1/11/2024	2/15/2024	6/6/2024	8/8/2024	2/15/2024	6/8/2024	8/7/2024
Final Lab Report Date	1/31/2024	3/8/2024	7/3/2024	9/20/2024	9/20/2024	1/31/2024	3/8/2024	7/3/2024	9/20/2024	3/5/2024	7/3/2024	9/19/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	2/8/2024	3/20/2024	7/10/2024	10/2/2024	10/2/2024	2/8/2024	3/20/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	-	25.84	17.20	28.01	28.01	36.65	24.79	17.15	28.07	28.70	21.51	30.23
Temperature (Deg C)	14.88	16.38	14.97	15.43	-	15.07	16.48	15.30	17.32	17.15	17.89	21.87
Conductivity, Field (µS/cm)	918	904	421	745	-	753	1010	456	790	393	272	507
Turbidity, Field (NTU)	0.0	5.2	0.0	5.6	-	0.0	2.8	0.0	10.0	3.0	353	5.4
pH (field) (su)	6.12	7.10	7.23	6.81	-	6.81	7.57	7.51	7.34	6.99	6.25	4.07
Dissolved Oxygen, Field (mg/L)	0.00	0.94	8.35	0.54	-	0.00	0.00	0.00	4.71	0.26	0.33	3.56
Oxidation Reduction Potential (ORP), Field (mv)	-23	104	52	15	-	-116	-99	-152	-232	-102	-65	-126
Boron, Total (mg/L)	**4.9**	**4.6**	**0.37**	**1.2**	**1.2**	**4.9**	**7.3**	**3.3**	**5.5**	**0.021**	**0.051**	**0.042**
Calcium, Total (mg/L)	**140**	**120**	**72**	**95**	**95**	**120**	**130**	**64**	**87**	**47**	**43**	**48**
Chloride (mg/L)	**22**	**17**	**25**	**24**	**24**	**15**	**17**	**25**	**24**	**19**	**5.0**	**15**
Fluoride (mg/L)	< 0.250	< 0.250	< 0.250	**0.266**	**0.276**	**0.591**	**0.512**	**0.726**	**0.662**	< 0.250	< 0.250	< 0.250
Sulfate (mg/L)	**200**	**110**	**45**	**54**	**51**	**130**	**150**	**67**	**100**	**32**	**11**	**18**
pH (lab) (su)	**7.03**	**6.75**	**7.42**	**7.34**	**7.29**	**7.50**	**7.14**	**7.63**	**7.58**	**7.16**	**7.17**	**7.02**
TDS (mg/L)	**660**	**530**	**290**	**400**	**380**	**520**	**580**	**300**	**420**	**240**	**160**	**210**
Antimony, Total (mg/L)	< 0.0030	-	-	-	-	< 0.0030	-	-	-	< 0.0030	-	-
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.00090	< 0.00090	**0.0039**	**0.0043**	**0.0032**	**0.0036**	**0.0035**	**0.0017**	**0.0045**
Barium, Total (mg/L)	**0.18**	**0.11**	**0.063**	**0.087**	**0.086**	**0.087**	**0.10**	**0.056**	**0.079**	**0.24**	**0.25**	**0.24**
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	-	-	< 0.0036	< 0.0036	< 0.0040	-	-	< 0.0036	< 0.0040	-	< 0.0040
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0018	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	**0.0026**
Lead, Total (mg/L)	< 0.0010	< 0.0010	< 0.00050	-	-	< 0.0010	< 0.0010	< 0.00050	-	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	< 0.02	**0.017**	< 0.010	**0.013**	**0.013**	**0.022**	**0.020**	**0.012**	**0.018**	**0.016**	**0.014**	**0.017**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	**0.00023**	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.19**	**0.061**	**0.067**	**0.11**	**0.11**	**0.54**	**0.67**	**0.52**	**0.74**	**0.0023**	**0.0015**	**0.0017**
Selenium, Total (mg/L)	< 0.0010	**0.0011**	**0.0011**	**0.0012**	**0.0014**	< 0.0010	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.0010
Thallium, Total (mg/L)	< 0.0010	-	-	-	-	< 0.0010	-	-	-	< 0.0010	-	-
Radium 226 & 228 Combined (pCi/L)	**1.69 ± 0.540 (0.742)**	**0.477 ± 0.272 (0.235)**	**1.76 ± 0.486 (0.336)**	**1.83 ± 0.488 (0.326)**	0.220 ± 0.357 (0.319)	**1.08 ± 0.363 (0.519)**	**1.22 ± 0.376 (0.295)**	**1.29 ± 0.465 (0.439)**	**0.987 ± 0.377 (0.318)**	**2.92 ± 0.446 (0.270)**	**2.44 ± 0.564 (0.450)**	**2.05 ± 0.429 (0.275)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient											
	MW-23S			MW-24S			MW-24D			MW-25S		
Measure Point (TOC)	292.32			300.66			300.67			299.35		
Sample Name	MW-23S	MW-23S	MW-23S	MW-24S	MW-24S	MW-24S	MW-24D	MW-24D	MW-24D	MW-25S	MW-25S	MW-25S
Sample Date	2/14/2024	6/7/2024	8/8/2024	2/7/2024	6/6/2024	8/13/2024	2/7/2024	6/6/2024	8/13/2024	2/7/2024	6/6/2024	8/13/2024
Final Lab Report Date	3/8/2024	7/3/2024	9/20/2024	3/5/2024	7/3/2024	11/4/2024	3/5/2024	7/3/2024	11/4/2024	3/5/2024	7/3/2024	11/4/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	3/20/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/3/2024	3/20/2024	7/10/2024	10/3/2024	3/20/2024	7/10/2024	10/3/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	24.69	16.70	26.60	38.58	29.21	31.36	38.50	29.16	31.31	37.29	28.11	30.04
Temperature (Deg C)	17.66	17.20	17.69	15.57	17.97	16.98	17.11	17.66	17.63	16.18	18.40	17.26
Conductivity, Field (µS/cm)	849	759	995	631	473	637	566	400	615	627	450	602
Turbidity, Field (NTU)	0.0	2.0	4.6	1.7	0.0	3.5	4.6	0.0	3.1	5.6	0.0	8.7
pH (field) (su)	6.58	6.70	6.58	6.96	6.24	6.90	7.10	6.20	7.02	6.57	6.20	6.25
Dissolved Oxygen, Field (mg/L)	2.3	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxidation Reduction Potential (ORP), Field (mv)	140	97	-82	-83	-24	-165	-76	-64	-197	-77	-62	-128
Boron, Total (mg/L)	**0.97**	**0.64**	**0.96**	**0.048**	**0.051**	**0.048**	**0.029**	**0.033**	**0.029**	**0.026**	**0.029**	**0.030**
Calcium, Total (mg/L)	**120**	**120**	**130**	**88**	**87**	**92**	**67**	**65**	**81**	**69**	**64**	**67**
Chloride (mg/L)	**17**	**21**	**19**	**7.1**	**9.2**	**8.5**	**11**	**9.9**	**13**	**12**	**13**	**21**
Fluoride (mg/L)	< 0.250	**0.315**	**0.334**	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250
Sulfate (mg/L)	**76**	**140**	**81**	**46**	**46**	**50**	**35**	**40**	**50**	**58**	**59**	**75**
pH (lab) (su)	**6.81**	**7.09**	**7.09**	**7.09**	**7.22**	**7.02**	**6.94**	**7.04**	**7.02**	**6.75**	**6.92**	**6.79**
TDS (mg/L)	**500**	**510**	**540**	**360**	**360**	**340**	**300**	**320**	**350**	**330**	**340**	**380**
Antimony, Total (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.00090	**0.0029**	**0.0032**	**0.0036**	**0.0023**	**0.0030**	**0.0029**	**0.0054**	**0.0050**	**0.0048**
Barium, Total (mg/L)	**0.11**	**0.11**	**0.13**	**0.17**	**0.18**	**0.19**	**0.13**	**0.13**	**0.15**	**0.33**	**0.31**	**0.32**
Beryllium, Total (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium, Total (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
Chromium, Total (mg/L)	-	-	< 0.0036	-	-	< 0.0036	-	-	< 0.0036	-	-	< 0.0036
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	**0.0044**	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	< 0.0018
Lead, Total (mg/L)	< 0.0010	< 0.0010	-	< 0.00050	< 0.00050	-	< 0.00050	< 0.00050	-	< 0.00050	< 0.00050	-
Lithium, Total (mg/L)	**0.025**	**0.020**	**0.026**	**0.014**	**0.011**	**0.014**	**0.011**	< 0.010	**0.011**	**0.010**	< 0.010	**0.011**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	**0.00024**	< 0.00020	< 0.00020	**0.00058**	< 0.00020	**0.00027**
Molybdenum, Total (mg/L)	**0.013**	**0.014**	**0.020**	< 0.0010	< 0.0010	< 0.00090	**0.0033**	**0.0059**	**0.0046**	**0.0069**	**0.019**	**0.018**
Selenium, Total (mg/L)	**0.0095**	**0.0049**	**0.0020**	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.00090
Thallium, Total (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
Radium 226 & 228 Combined (pCi/L)	**1.02 ± 0.257 (0.253)**	**0.718 ± 0.308 (0.318)**	**0.296 ± 0.321 (0.311)**	**1.00 ± 0.280 (0.235)**	**0.796 ± 0.333 (0.308)**	**0.443 ± 0.353 (0.365)**	**0.702 ± 0.296 (0.243)**	**0.821 ± 0.389 (0.325)**	0.00808 ± 0.311 (0.349)	**0.747 ± 0.419 (0.296)**	**0.773 ± 0.27 (0.281)**	**1.55 ± 0.460 (0.362)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient										
	MW-25D			MW-26S				MW-26D		HAB-21-OWN	
Measure Point (TOC)	299.25			298.96				298.92		321.03	
Sample Name	MW-25D	MW-25D	MW-25D	MW-26S	MW-26S	MW-26S	MW-26S	MW-26D	MW-26D	HAB-21-OWN	HAB-21-OWN
Sample Date	2/7/2024	6/6/2024	8/13/2024	2/8/2024	2/8/2024	6/8/2024	8/14/2024	6/8/2024	8/14/2024	2/15/2024	8/9/2024
Final Lab Report Date	3/5/2024	7/3/2024	11/4/2024	2/28/2024	2/8/2024	7/3/2024	11/4/2024	7/3/2024	11/4/2024	3/12/2024	11/4/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	3/20/2024	7/10/2024	10/3/2024	3/19/2024	3/19/2024	7/10/2024	10/3/2024	7/10/2024	10/3/2024	3/20/2024	10/3/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	37.14	37.90	29.89	34.77	34.77	-	30.35	25.54	30.32	55.80	56.86
Temperature (Deg C)	16.39	20.44	17.88	17.24	17.24	-	18.01	18.77	18.32	17.91	22.22
Conductivity, Field (µS/cm)	528	393	548	1000	1000	-	954	782	1130	747	877
Turbidity, Field (NTU)	6.4	0.0	4.4	9.9	9.9	-	7.4	0.0	1.8	0.0	0.0
pH (field) (su)	6.91	6.39	6.75	7.04	7.04	-	6.56	6.80	6.92	7.36	4.59
Dissolved Oxygen, Field (mg/L)	5.22	0.00	6.18	0.00	0.00	-	0.00	0.00	0.00	3.59	7.74
Oxidation Reduction Potential (ORP), Field (mv)	-102	-100	-175	-82	-82	-	-55	-110	-172	184	113
Boron, Total (mg/L)	**0.030**	**0.050**	**0.065**	**8.7**	**8.5**	**8.2**	**4.2**	**10**	**12**	**1.0**	**1.2**
Calcium, Total (mg/L)	**58**	**58**	**61**	**120**	**120**	**120**	**130**	**130**	**140**	**94**	**130**
Chloride (mg/L)	**10**	**9.6**	**12**	**11**	**34**	**27**	**14**	**13**	**12**	**20**	**18**
Fluoride (mg/L)	**0.266**	**0.302**	**0.310**	**0.542**	**0.540**	**0.693**	**0.548**	**0.725**	**0.508**	**0.303**	**0.276**
Sulfate (mg/L)	**41**	**46**	**44**	**140**	**65**	**120**	**140**	**250**	**240**	**210**	**270**
pH (lab) (su)	**6.99**	**7.01**	**6.93**	**7.07**	**6.91**	**7.14**	**6.83**	**7.30**	**7.03**	**7.38**	**7.58**
TDS (mg/L)	**280**	**300**	**330**	**510**	**480**	**630**	**540**	**730**	**770**	**530**	**690**
Antimony, Total (mg/L)	-	-	-	-	-	-	-	-	-	< 0.0030	-
Arsenic, Total (mg/L)	**0.0030**	**0.0034**	**0.0035**	**0.0048**	**0.0035**	**0.0038**	**0.0023**	**0.0045**	**0.0051**	**0.0014**	**0.0017**
Barium, Total (mg/L)	**0.14**	**0.13**	**0.14**	**0.090**	**0.13**	**0.14**	**0.13**	**0.092**	**0.10**	**0.062**	**0.082**
Beryllium, Total (mg/L)	-	-	-	-	-	-	-	-	-	< 0.0010	-
Cadmium, Total (mg/L)	-	-	-	-	-	-	-	-	-	< 0.0010	-
Chromium, Total (mg/L)	-	-	< 0.0036	-	-	-	< 0.0036	-	< 0.0036	< 0.0040	< 0.0040
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0018	< 0.0020	< 0.0020	**0.0032**	**0.0088**	< 0.0020	< 0.0018	< 0.0020	< 0.0020
Lead, Total (mg/L)	< 0.00050	< 0.00050	-	< 0.00050	< 0.00050	< 0.0010	-	< 0.0010	-	< 0.0010	< 0.00050
Lithium, Total (mg/L)	< 0.010	< 0.010	< 0.0090	**0.023**	**0.022**	**0.022**	**0.024**	**0.022**	**0.026**	**0.012**	**0.014**
Mercury, Total (mg/L)	**0.00070**	< 0.00020	**0.00023**	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.0032**	**0.0077**	**0.012**	**0.55**	**1.6**	**1.2**	**0.77**	**0.61**	**0.77**	**0.074**	**0.073**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.00090	< 0.0010	< 0.0010	< 0.0010	**0.00094**	< 0.0010	< 0.0036	< 0.0010	**0.0018**
Thallium, Total (mg/L)	-	-	-	-	-	-	-	-	-	< 0.0010	-
Radium 226 & 228 Combined (pCi/L)	**1.14 ± 0.297 (0.233)**	**0.724 ± 0.228 (0.227)**	**1.28 ± 0.407 (0.367)**	**1.29 ± 0.359 (0.285)**	**0.750 ± 0.361 (0.291)**	**0.824 ± 0.343 (0.399)**	**1.29 ± 0.437 (0.366)**	**2.45 ± 0.652 (0.553)**	**1.27 ± 0.540 (0.517)**	**0.994 ± 0.328 (0.299)**	**1.15 ± 0.402 (0.337)**

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.

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

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NTU = Nephelometric Turbidity Unit

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TDS = total dissolved solids

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SUMMARY OF 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient												
	HAB-22-OWN				HAB-23-OWN		HAB-24-OWN		HAB-25-OWN		HAB-26-OWN		
Measure Point (TOC)	310.42				314.29		314.31		318.76		313.90		
Sample Name	HAB-22-OWN	HAB-22-OWN	DUP1-POND3-MAY24	HAB-22-OWN	HAB-23-OWN	HAB-23-OWN	HAB-24-OWN	HAB-24-OWN	HAB-25-OWN	HAB-25-OWN	HAB-26-OWN	HAB-26-OWN	HAB-26-OWN
Sample Date	2/14/2024	6/5/2024	6/5/2024	8/8/2024	6/8/2024	8/6/2024	2/15/2024	8/9/2024	6/6/2024	8/8/2024	2/14/2024	6/8/2024	8/8/2024
Final Lab Report Date	3/5/2024	7/3/2024	7/3/2024	9/19/2024	7/3/2024	9/19/2024	3/12/2024	11/4/2024	7/3/2024	9/19/2024	3/5/2024	7/3/2024	9/19/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	3/20/2024	7/10/2024	7/10/2024	10/2/2024	7/10/2024	10/2/2024	3/20/2024	10/3/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	47.54	38.74	38.74	44.05	39.91	45.10	49.10	49.54	45.67	50.18	50.36	42.80	48.45
Temperature (Deg C)	19.88	20.57	-	23.59	22.07	22.41	18.27	22.22	20.48	22.79	21.39	22.19	24.88
Conductivity, Field (µS/cm)	669	637	-	861	744	791	1000	975	911	1200	1180	1210	1480
Turbidity, Field (NTU)	28.1	5.5	-	8.6	7.0	18.9	2.0	0.0	8.1	1.7	58.1	15.2	0.0
pH (field) (su)	7.02	6.73	-	4.83	7.07	4.17	6.99	4.44	6.47	4.70	7.22	7.23	4.78
Dissolved Oxygen, Field (mg/L)	0.06	0.85	-	5.47	3.45	4.46	7.62	7.74	0.00	1.73	0.03	0.00	4.44
Oxidation Reduction Potential (ORP), Field (mv)	-86	-60	-	-110	64	58	178	131	3	-59	-29	-57	-70
Boron, Total (mg/L)	**3.0**	**2.6**	**2.5**	**3.2**	**2.2**	**2.2**	**2.8**	**2.8**	**14**	**15**	**21**	**14**	**16**
Calcium, Total (mg/L)	**85**	**120**	**120**	**130**	**110**	**120**	**160**	**160**	**140**	**140**	**130**	**130**	**170**
Chloride (mg/L)	**17**	**18**	**18**	**18**	**18**	**19**	**16**	**17**	**3.3**	**4.0**	**6.9**	**12**	**6.1**
Fluoride (mg/L)	**0.557**	**0.675**	**0.705**	**0.493**	**0.408**	**0.325**	**0.570**	**0.658**	**1.45**	**0.499**	**0.995**	**1.20**	**1.44**
Sulfate (mg/L)	**110**	**190**	**210**	**200**	**140**	**150**	**190**	**220**	**200**	**220**	**380**	**350**	**290**
pH (lab) (su)	**7.34**	**7.38**	**7.27**	**6.96**	**7.23**	**7.21**	**7.16**	**7.26**	**7.03**	**6.91**	**7.11**	**7.41**	**7.41**
TDS (mg/L)	**440**	**540**	**540**	**660**	**540**	**520**	**700**	**740**	**780**	**860**	**900**	**860**	**1100**
Antimony, Total (mg/L)	< 0.0030	-	-	-	-	-	< 0.0030	-	-	-	< 0.0030	-	-
Arsenic, Total (mg/L)	**0.015**	**0.018**	**0.018**	**0.010**	< 0.0010	< 0.0010	< 0.0010	< 0.0010	**0.019**	**0.015**	**0.0060**	**0.0058**	**0.0030**
Barium, Total (mg/L)	**0.10**	**0.13**	**0.13**	**0.15**	**0.11**	**0.12**	**0.14**	**0.14**	**0.092**	**0.096**	**0.065**	**0.075**	**0.095**
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	< 0.0040	< 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	**0.0055**	**0.0055**	< 0.0020	< 0.0020	< 0.0020
Lead, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	-	< 0.0010	-	< 0.0010	< 0.0010	< 0.00050	-	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	**0.014**	**0.014**	**0.014**	**0.016**	**0.026**	**0.028**	**0.023**	**0.024**	**0.022**	**0.025**	**0.022**	**0.021**	**0.032**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.54**	**0.47**	**0.46**	**0.27**	**0.15**	**0.14**	**0.30**	**0.26**	**1.1**	**1.1**	**1.3**	**1.2**	**1.0**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	**0.0011**	< 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)	**0.744 ± 0.302 (0.290)**	**0.636 ± 0.359 (0.364)**	0.232 ± 0.362 (0.340)	**1.68 ± 0.513 (0.320)**	**1.13 ± 0.359 (0.280)**	**1.19 ± 0.446 (0.386)**	**0.621 ± 0.392 (0.370)**	**0.998 ± 0.379 (0.399)**	**1.14 ± 0.389 (0.366)**	**2.19 ± 0.514 (0.344)**	**0.876 ± 0.299 (0.269)**	**1.80 ± 0.458 (0.343)**	**0.992 ± 0.635 (0.607)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient										
	HAB-27-OWN					HAB-28-OWN			HAB-29-OWN		
Measure Point (TOC)	306.27					311.45			306.56		
Sample Name	HAB-27-OWN	HAB-22-OWN DUP-021324	HAB-27-OWN	HAB-27-OWN	DUP1-POND3-N&E-AUG24	HAB-28-OWN	HAB-28-OWN	HAB-28-OWN	HAB-29-OWN	HAB-29-OWN	HAB-29-OWN
Sample Date	2/13/2024	2/13/2024	6/8/2024	8/9/2024	8/9/2024	2/14/2024	6/8/2024	8/6/2024	2/14/2024	6/5/2024	8/8/2024
Final Lab Report Date	2/26/2024	2/26/2024	7/3/2024	11/4/2024	11/4/2024	3/5/2024	7/3/2024	9/19/2024	3/5/2024	7/3/2024	9/19/2024
Final Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-
Final Radiation Lab Report Date	3/14/2024	3/14/2024	7/10/2024	10/3/2024	10/3/2024	3/20/2024	7/10/2024	10/2/2024	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date	-	-	-	-	-	-	-	-	-	-	-
Depth to Water (ft btoc)	41.56	41.56	34.41	41.75	41.75	47.79	39.76	44.68	45.65	36.69	40.73
Temperature (Deg C)	16.67	-	18.89	19.86	-	20.69	24.51	21.58	15.03	19.17	18.84
Conductivity, Field (µS/cm)	763	-	682	868	-	882	757	1140	987	699	1450
Turbidity, Field (NTU)	8.7	-	3.5	0.0	-	42.4	121	9.8	3.1	5.4	0.0
pH (field) (su)	7.31	-	6.74	4.33	-	7.15	6.85	4.17	6.8	6.70	4.36
Dissolved Oxygen, Field (mg/L)	5.38	-	6.84	7.44	-	1.85	2.23	3.63	0.00	0.15	1.77
Oxidation Reduction Potential (ORP), Field (mv)	127	-	135	136	-	62	117	111	-2	30	-6
Boron, Total (mg/L)	**6.7**	**6.6**	**5.7**	**5.4**	**5.4**	**3.8**	**4.3**	**7.3**	**4.3**	**4.9**	**9.4**
Calcium, Total (mg/L)	**140**	**140**	**140**	**150**	**150**	**130**	**150**	**160**	**160**	**150**	**240**
Chloride (mg/L)	**16**	**15**	**18**	**19**	**19**	**14**	**16**	**13**	**8.6**	**8.0**	**3.9**
Fluoride (mg/L)	**1.17**	**1.17**	**1.11**	**1.24**	**1.28**	**0.521**	**0.585**	**0.615**	**0.408**	**0.460**	**0.503**
Sulfate (mg/L)	**120**	**120**	**130**	**170**	**170**	**100**	**120**	**200**	**85**	**89**	**110**
pH (lab) (su)	**7.49**	**7.34**	**7.33**	**7.50**	**7.49**	**7.18**	**7.36**	**7.38**	**7.05**	**7.19**	**7.12**
TDS (mg/L)	**520**	**560**	**550**	**650**	**620**	**590**	**610**	**780**	**660**	**570**	**1000**
Antimony, Total (mg/L)	< 0.0030	< 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	< 0.0010
Barium, Total (mg/L)	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.099**	**0.11**	**0.12**	**0.14**	**0.11**	**0.16**
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	< 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	**0.0027**	**0.0022**	**0.0024**
Lead, Total (mg/L)	< 0.00050	< 0.00050	< 0.0010	< 0.0010	< 0.00050	< 0.0010	< 0.0010	-	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	**0.016**	**0.015**	**0.017**	**0.015**	**0.016**	**0.033**	**0.036**	**0.036**	**0.054**	**0.052**	**0.077**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**1.5**	**1.5**	**0.75**	**0.76**	**0.75**	**0.63**	**0.45**	**0.72**	**0.12**	**0.18**	**0.27**
Selenium, Total (mg/L)	**0.010**	**0.010**	**0.0047**	**0.0015**	**0.0015**	**0.0011**	**0.0045**	**0.0014**	< 0.0010	< 0.0010	**0.0011**
Thallium, Total (mg/L)	< 0.0010	< 0.0010	-	-	-	< 0.0010	-	-	< 0.0010	-	-
Radium 226 & 228 Combined (pCi/L)	**0.283 ± 0.326 (0.290)**	**1.11 ± 0.258 (0.231)**	**0.691 ± 0.464 (0.416)**	**1.31 ± 0.419 (0.369)**	**1.60 ± 0.455 (0.345)**	**0.248 ± 0.314 (0.281)**	**0.443 ± 0.396 (0.333)**	**1.13 ± 0.508 (0.392)**	**0.982 ± 0.418 (0.329)**	**0.576 ± 0.309 (0.256)**	**1.00 ± 0.465 (0.412)**

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.

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 2024 NATURE AND EXTENT ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
MARSTON, MISSOURI

Location	Downgradient		
	HAB-30-OWN		
Measure Point (TOC)	307.83		
Sample Name	HAB-30-OWN	HAB-30-OWN	HAB-30-OWN
Sample Date	2/14/2024	6/5/2024	8/8/2024
Final Lab Report Date	3/5/2024	7/3/2024	9/19/2024
Final Lab Report Revision Date	-	-	-
Final Radiation Lab Report Date	3/20/2024	7/10/2024	10/2/2024
Final Radiation Lab Report Revision Date		-	-
Depth to Water (ft btoc)	45.78	36.59	43.33
Temperature (Deg C)	18.22	20.12	22.03
Conductivity, Field (µS/cm)	1470	1180	1010
Turbidity, Field (NTU)	48.7	7.5	5.3
pH (field) (su)	6.84	6.72	4.61
Dissolved Oxygen, Field (mg/L)	1.49	0.00	1.20
Oxidation Reduction Potential (ORP), Field (mv)	37	87	64
Boron, Total (mg/L)	**15**	**11**	**5.6**
Calcium, Total (mg/L)	**220**	**230**	**170**
Chloride (mg/L)	< 5.0	**6.8**	**11**
Fluoride (mg/L)	**0.295**	**0.252**	< 0.250
Sulfate (mg/L)	**140**	**180**	**120**
pH (lab) (su)	**7.24**	**7.27**	**7.16**
TDS (mg/L)	**960**	**920**	**740**
Antimony, Total (mg/L)	< 0.0030	-	-
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010
Barium, Total (mg/L)	**0.22**	**0.24**	**0.20**
Beryllium, Total (mg/L)	< 0.0010	-	-
Cadmium, Total (mg/L)	< 0.0010	-	-
Chromium, Total (mg/L)	< 0.0040	-	< 0.0040
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020
Lead, Total (mg/L)	< 0.0010	< 0.0010	-
Lithium, Total (mg/L)	**0.077**	**0.065**	**0.061**
Mercury, Total (mg/L)	< 0.00020	< 0.00020	< 0.00020
Molybdenum, Total (mg/L)	**0.13**	**0.092**	**0.048**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	**0.0012**
Thallium, Total (mg/L)	< 0.0010	-	-
Radium 226 & 228 Combined (pCi/L)	**1.36 ± 0.398 (0.322)**	**0.459 ± 0.392 (0.313)**	**1.01 ± 0.456 (0.411)**

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.
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 - AUGUST 2023
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)	2.47	5*
Selenium (mg/L)	0.0012	0.05*

Notes:

1. Groundwater Protection Standards listed were utilized for statistical analyses for the August 2023 semiannual assessment monitoring sampling event.

** 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

TABLE V
BACKGROUND CONCENTRATIONS AND GROUNDWATER PROTECTION STANDARDS - FEBRUARY 2024
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)	0.0058	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)	2.47	5*
Selenium (mg/L)	0.0039	0.05*

Notes:

1. Groundwater Protection Standards listed were utilized for statistical analyses for the February 2024 semiannual assessment monitoring sampling event.

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

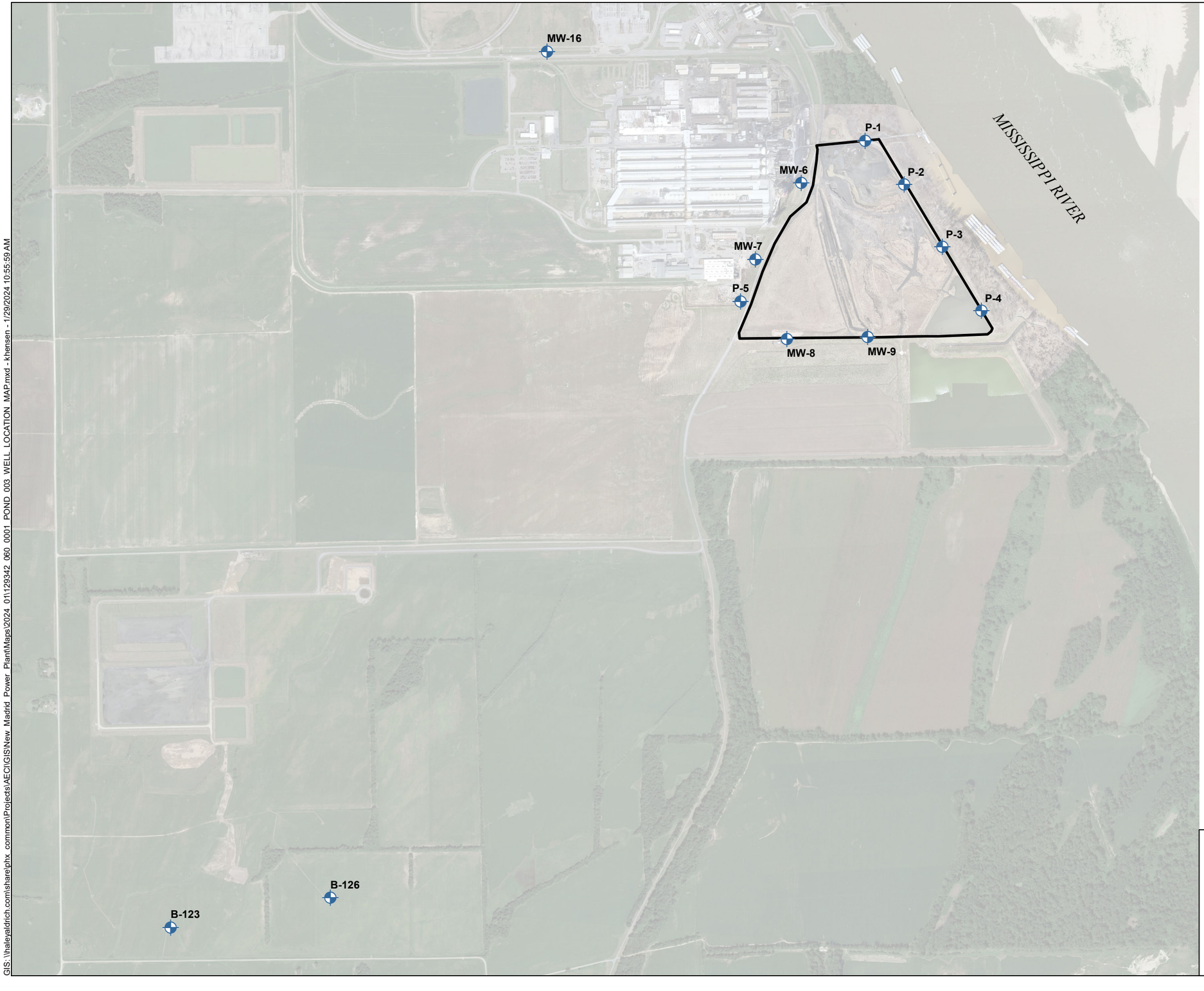
*** Value set based on 40 CFR § 257.95(h)(1)*

mg/L = milligrams per liter

pCi/L = picoCuries per liter

UTL = upper tolerance limit

FIGURES



LEGEND

MONITORING WELL

POND 003 BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. AERIAL IMAGERY SOURCE: GOOGLE EARTH, 6 SEPTEMBER 2021, AND UNMANNED AERIAL VEHICLE (UAV), 2 JUNE 2023

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER GENERATING FACILITY
NEW MADRID COUNTY, MISSOURI

POND 003 MONITORING WELL LOCATION MAP

aeci

JANUARY 2025

FIGURE 1

GIS: \\haleyaldrich.com\share\phx_common\Projects\AECI\GIS\New Madrid Power Plant\Maps\2024_01\129342_060_0001_POND_003_WELL_LOCATION_MAP.mxd - khensen - 1/29/2024 10:55:59 AM

LEGEND

- NEW NATURE AND EXTENT MONITORING WELL
- NATURE AND EXTENT MONITORING WELL
- POND 003 BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. LOCATIONS OF NEW NATURE AND EXTENT MONITORING WELLS MW-7I, MW-7L, MW-20L, AND MW-22L ARE APPROXIMATE AND WILL BE UPDATED ONCE A SURVEY HAS BEEN COMPLETED.

3. AERIAL IMAGERY SOURCE: GOOGLE EARTH, 6 SEPTEMBER 2021, AND UNMANNED AERIAL VEHICLE (UAV), 2 JUNE 2023

N

0 350 700

SCALE IN FEET

HALEY ALDRICH

ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER GENERATING FACILITY
NEW MADRID COUNTY, MISSOURI

POND 003 NATURE AND EXTENT MONITORING WELL LOCATION MAP

aeci

JANUARY 2025

FIGURE 2

GIS:\\haleyaldrich.com\share\phx_common\Projects\AEC\GIS\New_Madrid_Power_Plant\Maps\2024_011129342_060_0002_POND_003_N&E_GROUNDWATER_MONITORING_WELL_LOCATION_MAP.mxd - khensen - 1/29/2024 11:03:50 AM

ATTACHMENT 1
Alternate Source Demonstration Appendix IV SSL, Pond 003, February 2024

HALEY ALDRICH

www.haleyaldrich.com

ALTERNATE SOURCE DEMONSTRATION
APPENDIX IV SSL
POND 003
NEW MADRID POWER PLANT
NEW MADRID, MISSOURI

Prepared by
Haley & Aldrich, Inc.
Cleveland, Ohio

For
Associated Electric Cooperative, Inc.
Springfield, Missouri

File No. 0211090
October 2024

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1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by Associated Electric Cooperative, Inc. (AECI) to perform an evaluation of groundwater quality at Pond 003 combustion coal residuals (CCR) management unit at the New Madrid Power Plant (NMPP) located in New Madrid, Missouri. The purpose of the evaluation is to identify the source of elevated selenium concentrations detected in groundwater samples collected from monitoring well P-1 located downgradient of Pond 003.

1.1 BACKGROUND

Consistent with Title 40 Code of Federal Regulations (40 CFR) § 257.90 through § 257.95, AECI has installed and certified a groundwater monitoring network for Pond 003 at NMPP and collected 10 rounds of groundwater samples for the analysis of Appendix III and Appendix IV baseline constituents. Results of the detection monitoring statistical analyses completed in January 2018 identified statistically significant increased (SSI) concentrations of Appendix III constituents in downgradient monitoring wells relative to concentrations observed in upgradient monitoring wells. No alternative source was identified for the Appendix III constituents with SSIs. Accordingly, the groundwater monitoring program transitioned to assessment monitoring in May 2018, and AECI is currently implementing an assessment monitoring program.

In July 2024, AECI completed statistical analyses of groundwater quality results collected in February 2024, with data reviewed and accepted in June 2024, to determine if any of the Appendix IV constituents were present in groundwater samples collected from downgradient monitoring wells at concentrations at a statistically significant level (SSL) above background. The statistical evaluation of the Appendix IV constituents detected a potential SSL for selenium above background at monitoring well P-1, downgradient of Pond 003. The analyses described in this report were conducted to identify the source of the elevated selenium concentration downgradient of Pond 003.

Pursuant to 40 CFR §257.95(g)(3)(ii), ***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 Rule provides 90 days from determination that an SSL over background exists to complete an Alternate Source Demonstration (ASD) for Appendix IV constituents. If a successful demonstration is completed and certified by a qualified professional engineer, the CCR unit may continue in assessment monitoring. If, however, an alternate source of the Appendix IV SSL is not identified, the owner or operator must initiate the assessment of corrective measures. This report documents the findings and conclusions of an ASD completed for selenium at Pond 003 at NMPP.

1.2 SITE SETTING

The NMPP is located approximately 2 miles east of Marston on the western bank of the Mississippi River in New Madrid County, Missouri. The location of NMPP is shown on Figure 1. The site is located within the Southern Lowlands physiographic province which is the northernmost extent of the larger Mississippi Alluvial Plain and is characterized as a relatively flat alluvial plain which is used extensively for agricultural production. Pond 003 is a surface impoundment that encompasses approximately 110 acres and is located approximately 0.3 mile southeast of the NMPP plant site. Pond 003 has ground

surface elevations varying from 290 to 360 feet above mean sea level. The western boundary for Pond 003 is the Mississippi River Levee which is operated and maintained by the St. Francis Levee District of Missouri and the United States Army Corps of Engineers. Pond 003 and the associated groundwater monitoring network are shown on Figure 1.

1.3 SITE DESCRIPTION

NMPP is an active energy production facility that generates electricity through coal combustion. The CCR materials are generated as byproducts of the combustion process and include fly ash and boiler slag material. Historically, boiler slag, economizer ash, coal fines, and minor residual waste streams were sluiced from the power generating system to the northern end of Pond 003, where the flows traveled south through maintained channels to the impoundment outlet. Based on plant operational changes, only boiler slag is currently sluiced to Pond 003, along with other non-CCR low volume waste streams. Historically, fly ash was also sluiced to this impoundment. Fly ash is now handled in a dry condition and hauled to the on-site Utility Waste Landfill (UWL). The boiler slag is removed from Pond 003 for either beneficial use or disposal in the UWL.

2. Site Geology and Hydrogeology

Geologic and hydrogeologic conditions beneath Pond 003 have been characterized based on information obtained during installation and testing of the monitoring wells installed around Pond 003 in 2009 and 2016, and monitoring wells installed as part of the CCR groundwater monitoring network.

2.1 SITE GEOLOGY

Pond 003 is located in the Southeastern Lowlands physiographic province. The Southeastern Lowlands is the northernmost extent of the larger Mississippi Alluvial Plain and is characterized by alluvial, fluvial, and deltaic deposits ranging in age from Cretaceous to Holocene. The plant site and Pond 003 are underlain by an unconsolidated alluvium which constitutes a regionally extensive aquifer.

Pond 003 is underlain by unconsolidated alluvium, the Wilcox Group, the Porters Creek Clay, the Clayton, Owl Creek, and McNairy formations (in order from ground surface downward). Only the Tertiary formations (unconsolidated alluvium, Wilcox Group, and Porters Creek formation) are described below because they represent the uppermost and regional aquifer system.

Surficial geologic materials in the vicinity of and beneath Pond 003 include alluvium consisting of moderate to poorly sorted clay, silt, sand, and gravel of Holocene age (Miller and Vandike, 1997). The alluvium varies from approximately 250 to 300 feet thick in the vicinity of Pond 003 (Gredell Engineering Resources, Inc. [Gredell], 2003). Alluvial sediments were predominantly deposited by the Mississippi and Ohio River systems. The alluvium yields substantial quantities of water to shallow wells installed primarily for irrigation use and is considered the primary local aquifer (Burns & McDonnell, 2006).

The Holocene alluvium is underlain by unconsolidated Tertiary strata representing transgressions and regressions of marine, near-shore, and onshore depositional environments. The uppermost Tertiary unit is the Wilcox Group consisting primarily of sand deposits with some interbedded clays and lignites (Burns & McDonnell, 2006). The Wilcox Group is 400 to 500 feet thick at the plant site, lying approximately 250 to 300 feet below ground surface, and stratigraphically overlies the Porters Creek Clay.

The Porters Creek Clay is approximately 650 feet in thickness in the vicinity of Pond 003. The Porters Creek Clay is composed entirely of light grey to black clay (Burns & McDonnell, 2006). The clay is a groundwater flow barrier and barrier to infiltration (Miller and Vandike, 1997). The Porters Creek Clay overlies the Clayton Formation. The Clayton Formation has a total thickness of approximately 30 feet near the plant site and is comprised of sand and limestone (Burns & McDonnell, 2006).

2.2 SITE HYDROGEOLOGY AND HYDROLOGY

The water-bearing geologic formation nearest the natural ground surface at Pond 003 is alluvium consisting of moderately to poorly sorted clay, silt, sand, and gravel of Holocene age. The aquifer is used locally for irrigation and by a treatment plant for domestic water supply, but known existing wells are located upgradient of Pond 003. Water levels in the uppermost aquifer are influenced by the Mississippi River stage.

Based on groundwater elevations measured between November 2016 and August 2017, the groundwater gradient in the upper aquifer unit is approximately 0.0008 to 0.003 feet per foot (feet/foot) and is unconfined. The predominate groundwater flow direction beneath Pond 003 is to the northeast; however, since Pond 003 lies adjacent to the Mississippi River and the alluvial aquifer immediately beneath Pond 003 is in communication with the river, seasonal changes in river stage cause the groundwater flow direction to change and occasionally reverse. Due to the heavy influence of the adjacent Mississippi River, the groundwater flow in the alluvial aquifer is generally to the southwest during high river stage and generally to the northeast during low river stage. Due to the changing groundwater flow directions, monitoring wells were sited at locations to encircle Pond 003.

Hydraulic conductivity of the uppermost aquifer is based on data collected during slug testing of wells installed during development of the CCR monitoring network. The hydraulic conductivity was calculated to be 75 feet per day (2.65×10^{-2} centimeters per second [cm/sec]) to 81 feet per day (2.86×10^{2} cm/sec).

The Wilcox Formation underlying the alluvial aquifer is comprised of sand deposits with interbedded clay and lignite. Because the alluvial aquifer provides a more accessible resource for groundwater production in the area, the Wilcox Formation has not been developed locally as a source of groundwater. The clay and lignite present within the Wilcox Formation have lower hydraulic conductivity than the overlying alluvial aquifer. Published hydraulic conductivity values for the Wilcox Formation are available from areas where it has been investigated that indicate the hydraulic conductivity ranges from 9 to 25 feet per day (Office of Nuclear Waste Isolation, 1982 and Prudic, 1991). The Wilcox Formation in the vicinity of Pond 003 is estimated to be approximately 400 to 500 feet thick (Gredell, 2003).

3. Alternative Source Demonstration

Haley & Aldrich conducted an evaluation of potential alternative sources that included review of sampling procedures, laboratory procedures, and statistical analyses to determine if potential errors may have been made that would result in the apparent SSL of selenium downgradient of Pond 003. Haley & Aldrich also evaluated potential point and non-point sources of contamination in the vicinity of Pond 003 and evaluated natural geologic conditions and the effect of those conditions on native groundwater chemistry. Each of these analyses and the resulting findings are described below.

3.1 REVIEW OF SAMPLING, ANALYSIS, AND STATISTICAL PROCEDURES

3.1.1 Field Sampling Procedures

AECI and Haley & Aldrich conducted the field sampling activities in accordance with a Groundwater Sampling and Analysis Plan (SAP; Haley & Aldrich, 2021) that was prepared in accordance with § 257.93 of the CCR Rule. The SAP prescribes the site-specific activities and methodologies for groundwater sampling and included procedures for field data collection, sample collection, sample preservation and shipment, interpretation, laboratory analytical methods, and reporting for groundwater sampling for Pond 003. The administrative procedures and frequency for collection of groundwater elevation measurements, determination of flow directions, and gradients were also provided in the SAP.

Haley & Aldrich reviewed the field sampling and equipment calibration logs and the field indicator parameters collected during sample collection. Specific conductivity during the February 2024 sampling at P-1 was the highest observed since sampling began at P-1 in 2016 at 1,140 micro-siemens per centimeter. Although conductivity marginally elevated compared to historic sampling events, Haley & Aldrich did not identify apparent deviation or errors in sampling that would result in a potential SSL for selenium downgradient of Pond 003.

3.1.2 Laboratory Quality Control

The groundwater samples collected downgradient of Pond 003 were initially analyzed using standard methods. The data generated from these laboratory analyses are stored in a project database that incorporates hydrogeologic and groundwater quality data and was established to allow efficient management of chemical and physical data collected in the field and produced in the laboratory. The analytes, analytical methods, sample containers, field preservation, and maximum analytical holding times for monitoring are summarized in the SAP (Haley & Aldrich, 2021).

Haley & Aldrich conducted a quality assurance/quality control review of each groundwater quality dataset generated for Pond 003 and has not identified apparent errors that would result in a potential SSL for selenium downgradient of Pond 003.

3.1.3 Analytical Data

During the February 2024 sampling event, the selenium concentration at monitoring well P-1 was detected at 0.058 milligrams per liter (mg/L), which was above the Groundwater Protection Standard (GWPS) of 0.05 mg/L; therefore, a potential SSL was recorded. A duplicate sample was also collected from monitoring well P-1 during the February 2024 sampling event that yielded a selenium

concentration of 0.062 mg/L. The February 2024 selenium concentration was the highest detected selenium concentration detected at monitoring well P-1 since the monitoring wells was installed in 2016 and groundwater monitoring began. Subsequent groundwater samples collected from monitoring well P-1 during the May 2024 annual assessment monitoring sampling event and August 2024 semiannual assessment monitoring sampling event produced selenium concentrations of 0.023 mg/L and 0.0078 mg/L, respectively. These subsequent selenium results are below the previous analytical results and the selenium GWPS. A graphical depiction of the selenium values over time at monitoring well P-1 are presented in Figure 2.

A total of 36 groundwater samples, including five duplicates, have been collected at P-1 since November 2016. All 36 samples were analyzed for selenium. Total selenium concentrations at P-1 have fluctuated over time, with concentrations in primary samples ranging from less than the laboratory reporting limit of 0.0010 mg/L to 0.062 mg/L in duplicate sample collected in February 2024). The previous highest concentration of selenium was detected in February 2023 at 0.035 mg/L. A summary of field parameters and selenium results are provided in Table I.

3.1.4 Statistical Evaluation

AECI collected groundwater samples from each of the upgradient (MW-16, B-123, and B-126) and downgradient (MW-6, MW-7, MW-8, MW-9, P-1, P-2, P-3, P-4, and P-5) monitoring wells at Pond 003 in February 2024 for CCR Rule compliance. Haley & Aldrich has reviewed the statistical analysis of groundwater quality data for monitoring well P-1 and has not identified apparent errors that would result in a potential SSL for selenium. The February 2024 concentration at monitoring well P-1 is a statistical outlier by the Rosner's Test for Outliers, and the selenium concentrations at monitoring well P-1 present a stable trend by Mann-Kendall analysis. The statistical test method used met the performance standard established in the CCR Rule, and statistical evaluation complies with the requirements of the Rule.

The Statistical Procedure Certification for Pond 003 states that if a constituent concentration is greater than the GWPS for that unit, pursuant to 40 CFR § 257.93 (f)(5), the confidence interval method can be used to evaluate if that Appendix IV constituent is present at an SSL. Specifically, the lower confidence limit (LCL) will be compared to the GWPS. An LCL greater than the GWPS would confirm an SSL for the constituent. The LCL of the mean was analyzed for monitoring well P-1 and has a result of 0.0015 mg/L, which is below the GWPS, indicating that an SSL for selenium at P-1 is not present. Supporting documents used in calculating the LCL are provided in Figure 3.

3.2 POTENTIAL POINT AND NON-POINT SOURCES

Haley & Aldrich conducted a review of potential point and non-point sources of elevated selenium values in the vicinity of Pond 003 to determine if previous or adjacent site activities, land uses, or practices might have caused elevated selenium values to occur downgradient of Pond 003. Potential point sources would include discharging activities or other activities occurring at a discrete location in the vicinity of the observed SSL that may potentially concentrate selenium in that area. Non-point sources would include diffuse discharging activities or practices that may result in a low level but widespread increase in selenium concentrations detected at the downgradient side of Pond 003.

3.2.1 Point Sources

Prior to construction of Pond 003, the site and the surrounding vicinity was agricultural land. Review of historical aerial photographs and topographic maps show undeveloped land prior to the construction of the plant site and Pond 003. No known industrial, mining, or other activities were conducted at the site prior to construction of the pond that would potentially constitute a point source to concentrate selenium in groundwater in the vicinity of the observed SSL. Historic agricultural land use is not expected to constitute a point source of selenium at the location of the observed SSL.

3.2.2 Non-Point Sources

No mining, industrial, or other activities have been documented in the vicinity of Pond 003 that might constitute a non-point source of selenium at the location of the observed SSL. Agricultural land use could potentially constitute a non-point source of selenium at the location of the observed SSL, as selenium is a vital nutrient for crop growth (Council for Agriculture Science and Technology, 1994).

3.3 HISTORICAL LAND USE REVIEW

Haley & Aldrich assessed past usage of the site and adjoining properties through a review of the following records:

- Environmental Data Resources, Inc. (EDR) – Aerial Photographs dated 1950, 1969, 1978, 1980, 1993, 1996, 2006, 2009, 2012, 2016, and 2020 (Appendix A); and
- EDR – Topographic Maps dated 1931/1934, 1939, 1951, 1954/1955, 1971, 1973, 1982, 2015, 2017, and 2021 (Appendix B).

Unless otherwise noted below, sources were reviewed dating back to 1940 or first developed use, whichever is earlier, and at five-year intervals if the use of the property has changed within the time period. This review was completed to assess potential alternate sources based on land use.

3.3.1 Historical Aerial Photographs

Haley & Aldrich reviewed aerial photographs depicting the development of the site and vicinity as summarized in the table below. The historical aerial photograph search includes photographs from the United States Geological Survey, United States Department of Agriculture, Digital Orthophoto Quarter Quads, National Aerial Photography Program, and the National Agriculture Information Program (EDR, 2024) and are included in Appendix A.

Photographs suggest that the site was undeveloped up until at least 1988. Aerial photos from 2009 through 2020 show the history of Pond 003 configuration from its current footprint.

Historical Aerial Photograph Review Summary

Dates	Description of Site and Adjacent Properties	Sources
1950 – 1969	Agricultural use of site and adjacent properties with some road use.	USGS
1978 – 1980	The plant site is active. CCR ponds appear present at subject site. Agricultural use of adjacent properties surrounding the subject site.	USGS
1993 – 1996	Presence of structure in river northeast of Pond 003	NAPP

Historical Aerial Photograph Review Summary

Dates	Description of Site and Adjacent Properties	Sources
1996	No apparent changes observed.	USGS, DOQQ
2006	Development of additional pond south of Pond 003	USDA, NAIP
2009 – 2020	The plant site and Pond 003 are active. No apparent changes observed.	USDA, NAIP

Notes:
DOQQ = Digital Orthophoto Quarter Quads
NAIP = National Agriculture Information Program
NAPP = National Aerial Photography Program
USDA = United States Department of Agriculture
USGS = United States Geological Survey

3.3.2 Historical Topographic Maps

Haley & Aldrich reviewed historical topographic maps depicting the development of the site and vicinity, as summarized in the table below. The topographic maps were provided for review by EDR. Copies of the topographic maps are included in Appendix B.

Historical Topographic Map Review Summary

Dates	Description of Site and Adjacent Properties	Map Name
1931 – 1955	The map shows the site as undeveloped land with several roads and a railroad within the site vicinity.	15-Minute Series, New Madrid, Missouri Quadrangle
1971	Plant site appears to be active.	7.5-Minute Series, New Madrid SE, Missouri Quadrangle
1982	Additional development of the plant and apparent Pond 003 development	7.5-Minute Series, New Madrid, Missouri Quadrangle
2015 – 2021	Development of roadways on adjacent properties observed.	7.5-Minute Series, New Madrid, Missouri Quadrangle

3.4 REGIONAL WATER QUALITY OBSERVATIONS

3.4.1 Selenium Values in Regional Groundwater

The NMPP site is located in the Southeast Missouri groundwater province, which includes aquifers composed of Missouri and Mississippi River alluvium (Brookshire, 1997). This aquifer is used as a regional water supply aquifer. Table II shows reported dissolved selenium values in groundwater reported by the National Water Quality Monitoring Council for select historical monitoring wells in New Madrid County, Missouri. Dissolved selenium concentrations consistently yielded non-detect analytical results (National Water Quality Monitoring Council, 2024). The selenium values are reported as dissolved selenium, whereas selenium values collected from AECI compliance monitoring were analyzed as total selenium. Based on this information, there is no evidence that regionally reported dissolved selenium concentrations had values that are higher than the total selenium values at monitoring well P-1 reported in February 2024. Total selenium concentrations from P-1 have ranged from 0.0010 to 0.058 mg/L, which are above reported naturally occurring selenium values in groundwater in the region.

4. Findings and Conclusions

Haley & Aldrich conducted an evaluation of groundwater quality at the NMPP Pond 003 to identify the source of the potential SSL of selenium detected in the groundwater sample collected from monitoring well P-1 located downgradient of Pond 003. The evaluation included review of sampling procedures, laboratory procedures, and statistical analyses to determine if potential errors may have been made that would result in the apparent SSL of selenium downgradient of Pond 003. Haley & Aldrich also evaluated potential point and non-point sources of contamination in the vicinity of Pond 003 and evaluated natural geologic conditions and the effect of those conditions on native groundwater chemistry.

Haley & Aldrich found no apparent errors in sampling, laboratory analysis, data management, or statistical analysis that would result in a potential SSL for selenium downgradient of Pond 003. Haley & Aldrich found no apparent evidence of historical point or non-point sources of potential selenium values in the vicinity of Pond 003.

Haley & Aldrich evaluated data and information describing the historical regional water quality, reviewed the historical selenium data of P-1, and confirmed statistical analyses of selenium concentrations at P-1. Key findings regarding the selenium in groundwater at P-1 are summarized below:

- The selenium concentration from February 2024 at P-1 was identified as a statistical outlier. Selenium results from the two most recent sampling events have decreased below the GWPS by an order of magnitude, further supporting the February 2024 selenium concentration as an outlier.
- The selenium concentrations observed in P-1 are statistically stable and do not exhibit an upward trend.
- The Statistical Procedure allows for the confidence interval method to be used to evaluate the condition if the Appendix IV constituent is present at an SSL. Specifically, the LCL is compared to the GWPS. Statistical analyses evaluated the LCL of the mean at P-1 and determined a result of 0.0015 mg/L, which is below the GWPS, indicating that an SSL for selenium at P-1 is not present.

Based on these findings, the selenium concentration detected in the groundwater at Pond 003 monitoring well P-1 in February 2024 was an erroneous sampling error or analytical result that is not representative of groundwater passing the waste boundary downgradient of Pond 003. A review of historic and current selenium data at P-1 presents a statistically stable concentration trend and an LCL below the GWPS.

Based on the data, information, research, and analyses conducted to date and presented in this document, Haley & Aldrich concludes that the source of selenium resulting in an SSL at P-1, downgradient of Pond 003, is a sampling or laboratory error, along with statistical evaluations that do not confirm the apparent selenium SSL.

5. Closing

Pursuant to 40 CFR § 257.94(e)(2), AECI conducted an alternate source evaluation to demonstrate that a source other than Pond 003 caused the SSL over background identified during assessment monitoring. This demonstration and the underlying data support the conclusion that a source other than the CCR unit is the cause of the SSL over background levels for the Appendix IV constituent (selenium) detected during assessment monitoring of this unit.

The information contained in this evaluation is, to the best of our knowledge, true, accurate and complete.

Steven F. Putrich, P.E.
Project Principal
Haley & Aldrich, Inc.

Mark Nicholls, P.G.
Lead Hydrogeologist
Haley & Aldrich, Inc.

References

1. Brookshire C.N., 1997. Missouri Water Quality Assessment, Missouri State Water Plan Series Volume III, Water Resources Report Number 47. Missouri Department of Natural Resources.

2. Burns & McDonnell, 2006. Groundwater Monitoring Program.

3. Council for Agriculture Science and Technology, 1994. Risks and Benefits of Selenium in Agriculture – Issue Paper, Number 3. June.

4. Environmental Data Resources, Inc., 2024. Database Report, August.

5. Gredell Engineering Resources, Inc., 2003. Detailed Site Investigation Work Plan, Proposed AECI New Madrid Utility Waste Landfill. 13 June.

6. Haley & Aldrich, Inc., 2021. Groundwater Sampling and Analysis Pan, New Madrid Power Plant. August.

7. Miller, Don E., and Vandike, James E., 1997. *Missouri State Water Plan Series Volume II, Groundwater Resources of Missouri,* Missouri Department of Natural Resources Division of Geology and Land Survey, Water Resources Report No. 46, 1997.

8. National Water Quality Monitoring Council, 2024. Water Quality Data – https://www.waterqualitydata.us/portal/#statecode=US%3A29&countycode=US%3A29%3A143&mimeType=csv. Accessed on 30 July.

9. Office of Nuclear Waste Isolation (ONWI), 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VI Technical Report.

10. Prudic, David E., United States Geological Survey, 1991. Estimates of Hydraulic Conductivity from Aquifer-Test Analyses and Specific-Capacity Data, Gulf Coast Regional Aquifer Systems, South-Central United States. Water Resources Investigations Report 90-4121.

TABLES

TABLE I
SUMMARY OF P-1 SELENIUM ANALYTICAL RESULTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
NEW MADRID, MISSOURI

Sample ID	Sample Date	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)	Field Paramters				Selenium, Total (mg/L)
				Temperature (Deg C)	Conductivity (µS/cm)	Turbidity (NTU)	pH (su)	
P-1-11052016	11/5/2016	48.97	264.38	17.03	956	0.95	6.8	**0.0014**
P-1-120816	12/8/2016	52.70	260.65	14.9	937	1.49	7.18	<0.0010
P-1-010617	1/6/2017	45.21	268.14	15.6	970	0.48	6.86	<0.0010
P-1-012817	1/28/2017	42.11	271.24	18	1000	2.82	6.9	**0.0062**
P-1-022117	2/21/2017	44.18	269.17	18.8	1080	1.24	6.96	**0.0051**
P-1-033017	3/30/2017	44.11	269.24	19.1	1125	7.79	6.9	**0.0038**
P-1-042617	4/26/2017	40.63	272.72	19.9	1060	3.86	6.9	**0.0037**
P-1-051717	5/17/2017	29.48	283.87	19.9	1097	4.98	6.8	**0.0052**
P-1-062117	6/21/2017	41.38	271.97	19.7	1073	2.99	6.9	**0.0054**
P-1-081617	8/16/2017	45.00	268.35	20.04	1000	3.10	6.88	**0.0033**
P-1	5/29/2018	39.39	273.96	19.65	963	-	19.65	**0.0054**
P-1	9/12/2018	48.27	265.08	20.62	965	4.40	7.82	**0.0044**
P-1	3/7/2019	24.09	289.26	18.38	947	35.70	7.06	**0.0022**
P-1	6/5/2019	25.70	287.65	20.64	954	10.90	7.39	**0.0044**
P-1	9/3/2019	44.82	268.53	20.92	935	0.00	7.74	<0.0010
P-1	2/24/2020	26.39	286.96	18.65	928	14.60	7.03	<0.0010
P-1	5/20/2020	34.38	278.97	19.48	944	1.50	7.38	**0.0020**
P-1	8/11/2020	42.96	270.39	23.03	803	0.10	6.86	<0.0010
P-1	3/5/2021	37.48	275.87	16.3	1080	1.50	7.48	**0.0014**
P-1	5/19/2021	39.73	273.62	19.48	1075	0.00	7.27	**0.0027**
P-1	8/18/2021	50.23	263.12	20.62	929	0.00	6.61	<0.0010
P-1	2/14/2022	39.95	273.40	17.04	1940	6.73	6.92	**0.0012**
P-1	5/13/2022	33.50	279.85	18.95	1040	0.80	8.13	**0.0015**
P-1	8/15/2022	48.71	264.64	22.46	572	1.40	6.97	**0.0018**
P-1	2/22/2023	44.60	268.75	19.32	1020	7.60	6.36	**0.035**
P-1	5/3/2023	44.61	268.74	19.25	1010	3.40	7.43	**0.0049**
P-1	8/10/2023	53.65	259.70	21.52	897	0.68	7.37	**0.015**
P-1	2/13/2024	44.95	268.40	18.28	1140	6.10	6.82	**0.058**
P-1	5/3/2024	41.32	272.03	24.38	943	2.60	5.58	**0.023**
P-1	8/6/2024	45.50	267.75	20.37	1130	1.60	6.91	**0.0078**

Notes:

BOLD value: *Detection above Groundwater Protection Standard*
µS/cm = micro Siemens per centimeter
Deg C = degrees Celsius
ft amsl = feet above mean sea level
ft btoc = feet below top of casing
mg/L = milligrams per liter
NTU = Nephelometric Turbidity Unit
su = standard unit

TABLE II
HISTORICAL REGIONAL GROUNDWATER SELENIUM DATA
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 003
NEW MADRID, MISSOURI

Organization	Sample Media	Sample Date	Sample Time	Location Identifier	Latitude	Longitude	Aquifer	Formation Type	Dissolved Selenium Results (mg/L)	Data Provider Name
USGS Missouri Water Science Center	Groundwater	8/2/1984	11:00	USGS-363107089363401	36.51867256	-89.6095233	Mississippi Embayment Aquifer System	Quaternary System	ND	NWIS
	Groundwater	10/23/2018	11:00	MO005-363533089365801	36.5925	-89.6161111	Mississippi River Valley Alluvial Aquifer	Holocene Alluvium	ND	NWIS
	Groundwater	11/2/1983	7:45	USGS-363107089363401	36.51867256	-89.6095233	Mississippi Embayment Aquifer System	Quaternary System	ND	NWIS
	Groundwater	10/13/1983	13:15	USGS-362705089544801	36.4514502	-89.9139778	Mississippi Embayment Aquifer System	McNairy Formation	ND	NWIS
	Groundwater	10/27/1983	17:45	USGS-363309089492001	36.5525595	-89.8223076	Mississippi Embayment Aquifer System	Quaternary System	ND	NWIS

Notes:

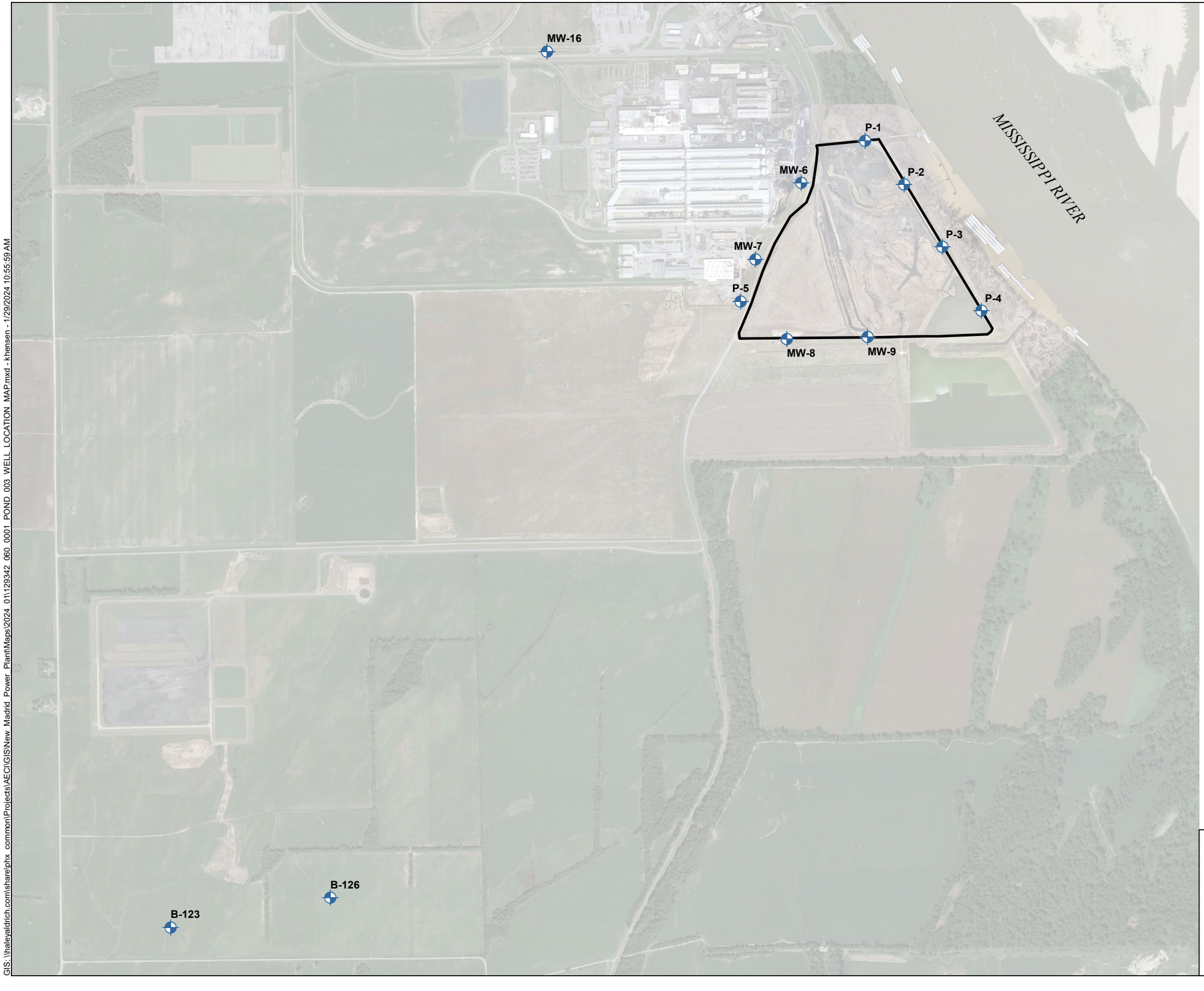
Data from the National Water Quality Monitoring Council, https://www.waterqualitydata.us/portal/#statecode=US%3A29&countycode=US%3A29%3A143&mimeType=csv

ND = Nondetection

mg/L = milligrams per liter

USGS = United States Geological Survey

FIGURES



LEGEND

MONITORING WELL

POND 003 BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. AERIAL IMAGERY SOURCE: GOOGLE EARTH, 6 SEPTEMBER 2021, AND UNMANNED AERIAL VEHICLE (UAV), 2 JUNE 2023

N

0 1,200 2,400

SCALE IN FEET

HALEY ALDRICH

ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER GENERATING FACILITY
NEW MADRID COUNTY, MISSOURI

POND 003 MONITORING WELL LOCATION MAP

aeci

OCTOBER 2024

FIGURE 1

GIS: \\haleyaldrich.com\share\phx_common\Projects\AECI\GIS\New Madrid Power Plant\Maps\2024_01\129342_060_0001_POND_003_WELL_LOCATION_MAP.mxd - khensen - 1/29/2024 10:55:59 AM

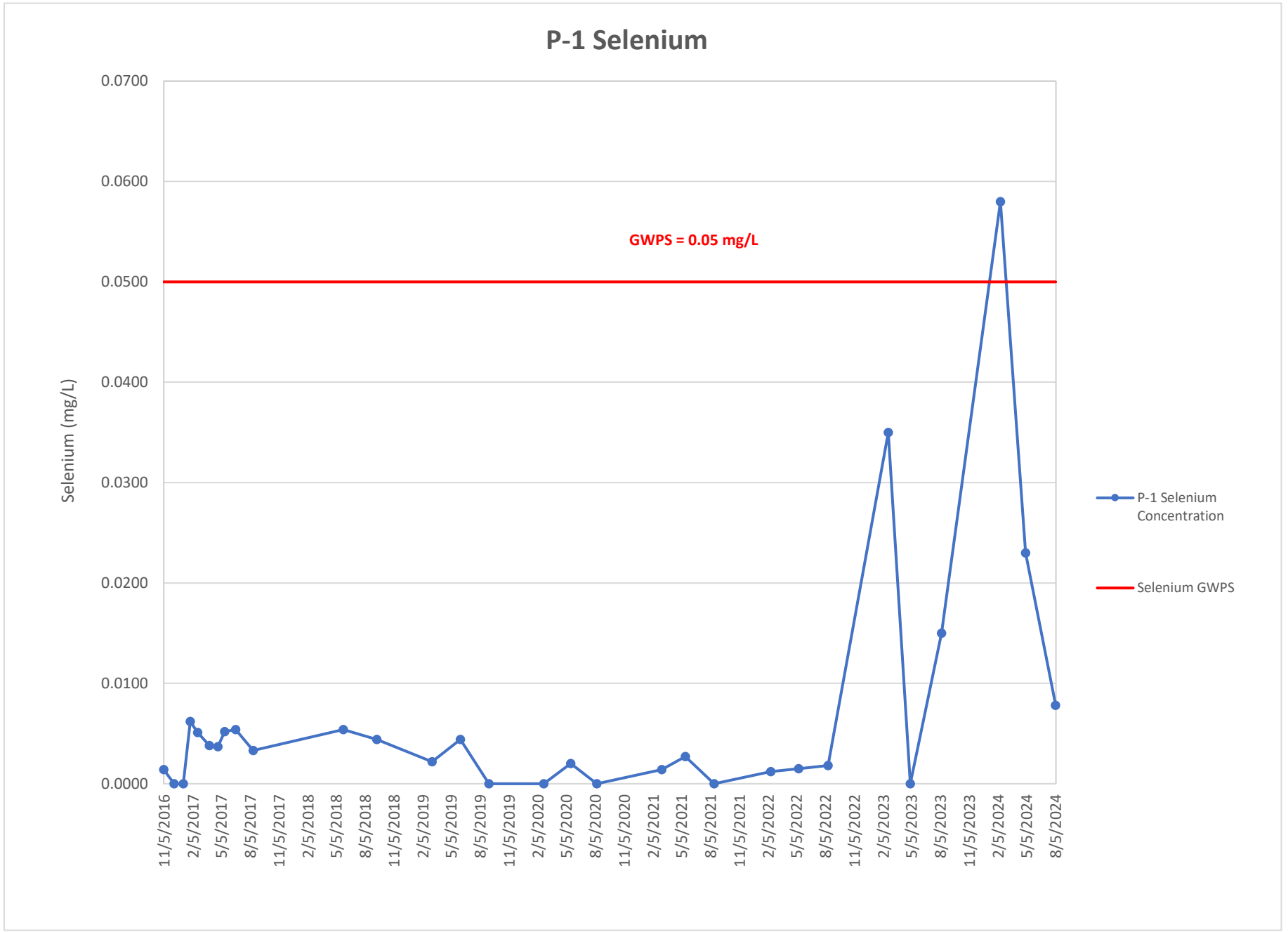
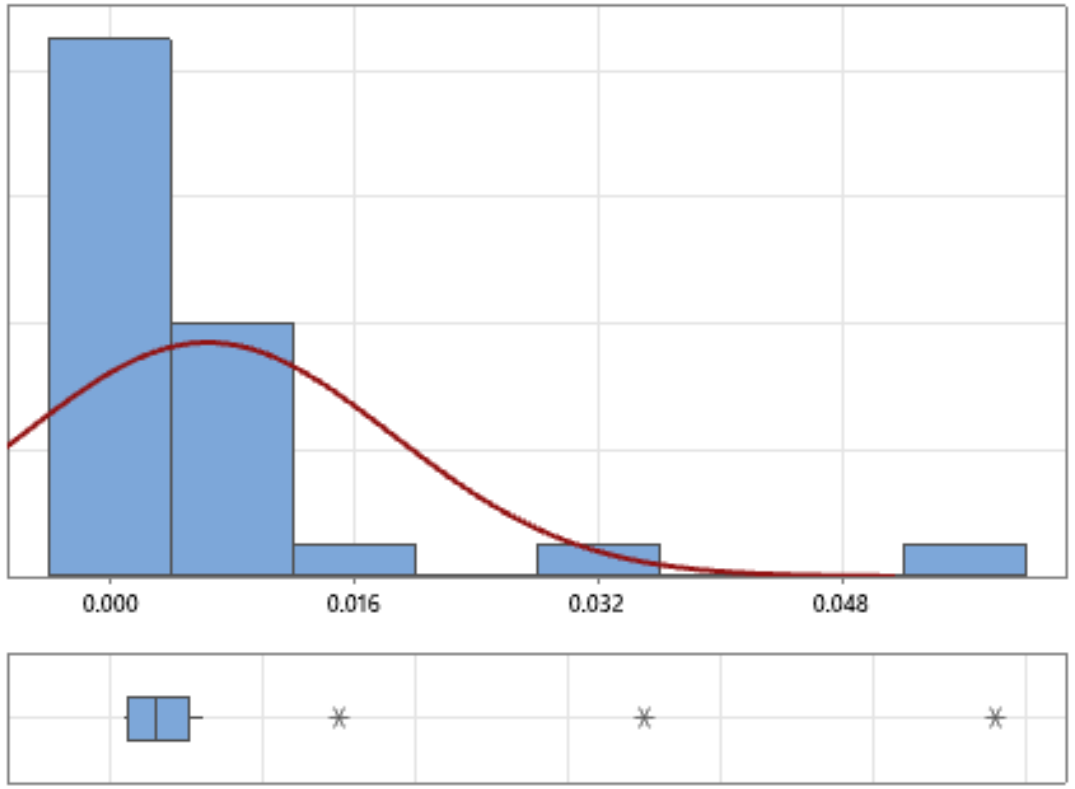
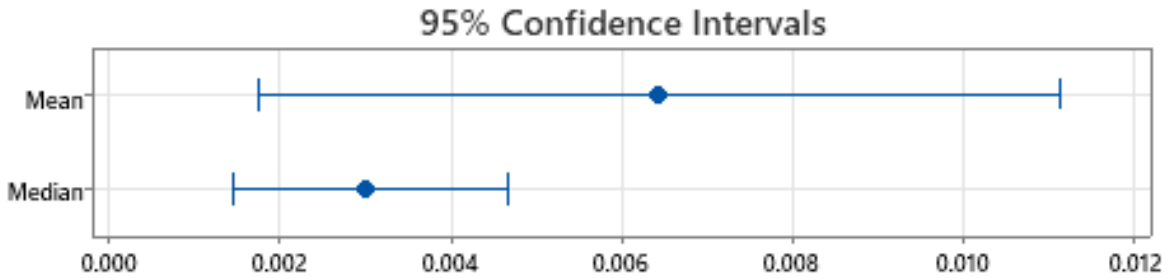


FIGURE 2: P-1 SELENIUM DATA

OCTOBER 2024

Summary Report for P-1
Selenium





Anderson-Darling Normality Test

A-Squared	5.86
P-Value	<0.005
Mean	0.006429
StDev	0.012082
Variance	0.000146
Skewness	3.6009
Kurtosis	13.4727
N	28
Minimum	0.001000
1st Quartile	0.001250
Median	0.003000
3rd Quartile	0.005175
Maximum	0.058000

95% Confidence Interval for Mean

0.001744	0.011114

95% Confidence Interval for Median

0.001445	0.004676

95% Confidence Interval for StDev

0.009552	0.016445

FIGURE 3: LCL STATISTICAL ANALYSIS NM-P-1 SELENIUM

OCTOBER 2024

APPENDIX A
EDR Historical Aerial Photograph Report

AECI New Madrid

1400-1498 St Jude Rd

Marston, MO 63866

Inquiry Number: 7726162.2

August 07, 2024

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/07/24

Site Name:

AECI New Madrid
1400-1498 St Jude Rd
Marston, MO 63866
EDR Inquiry # 7726162.2

Client Name:

Haley & Aldrich
600 South Meyer Ave Suite 100
Tucson, AZ 85701-0000
Contact: Samantha Kaney

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	*Scale*	*Details*	*Source*
2020	1"=500'	Flight Year: 2020	USDA/NAIP
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1996	1"=500'	Acquisition Date: March 22, 1996	USGS/DOQQ
1993	1"=500'	Acquisition Date: January 01, 1993	USGS/DOQQ
1980	1"=500'	Flight Date: April 05, 1980	USGS
1978	1"=500'	Flight Date: May 09, 1978	USGS
1969	1"=500'	Flight Date: March 17, 1969	USGS
1950	1"=500'	Flight Date: April 01, 1950	USGS

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

INQUIRY #: 7726162.2

YEAR: 2020

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 2016

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 2012

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 2009

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 2006

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 1996

= 500'

N

EDR

INQUIRY #: 7726162.2

YEAR: 1993

= 500'

N

EDR


INQUIRY #: 7726162.2
YEAR: 1980
= 500'
N
EDR


INQUIRY #: 7726162.2
YEAR: 1978
= 500'
N
EDR


INQUIRY #: 7726162.2
YEAR: 1969
= 500'
N
EDR


INQUIRY #: 7726162.2
YEAR: 1950
= 500'
N
EDR

APPENDIX B
EDR Historical Topographic Map Report

AECI New Madrid

1400-1498 St Jude Rd

Marston, MO 63866

Inquiry Number: 7726162.1

August 05, 2024

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/05/24

Site Name:

AECI New Madrid
1400-1498 St Jude Rd
Marston, MO 63866
EDR Inquiry # 7726162.1

Client Name:

Haley & Aldrich
600 South Meyer Ave Suite 100
Tucson, AZ 85701-0000
Contact: Samantha Kaney

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Haley & Aldrich were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# 0211090-000
Project: AECI New Madrid

Coordinates:

Latitude:	36.507027 36° 30' 25" North
Longitude:	-89.557529 -89° 33' 27" West
UTM Zone:	Zone 16 North
UTM X Meters:	270958.10
UTM Y Meters:	4043229.90
Elevation:	295.00' above sea level

Maps Provided:

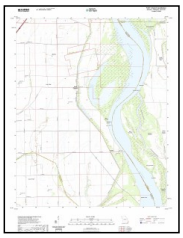
2021	1939
2017	1931, 1934
2015	
1982	
1973	
1971	
1954, 1955	
1951	

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2021 Source Sheets

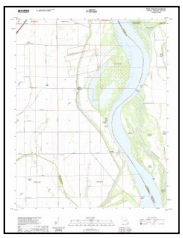
New Madrid
2021
7.5-minute, 24000



Point Pleasant
2021
7.5-minute, 24000

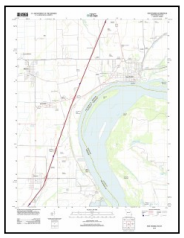
2017 Source Sheets

New Madrid
2017
7.5-minute, 24000

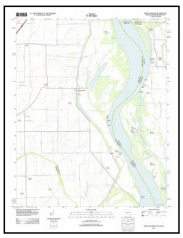


Point Pleasant
2017
7.5-minute, 24000

2015 Source Sheets



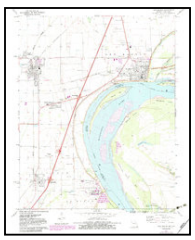
New Madrid
2015
7.5-minute, 24000



Point Pleasant
2015
7.5-minute, 24000

1982 Source Sheets

Point Pleasant
1982
7.5-minute, 24000
Aerial Photo Revised 1981



New Madrid
1982
7.5-minute, 24000
Aerial Photo Revised 1981

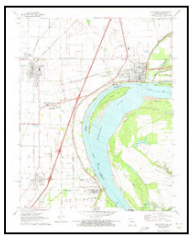
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1973 Source Sheets

Portageville
1973
15-minute, 62500
Aerial Photo Revised 1969

1971 Source Sheets



New Madrid
1971
7.5-minute, 24000
Aerial Photo Revised 1969

Point Pleasant
1971
7.5-minute, 24000
Aerial Photo Revised 1969

1954, 1955 Source Sheets

New Madrid
1954
15-minute, 62500
Aerial Photo Revised 1950

Portageville
1955
15-minute, 62500
Aerial Photo Revised 1950

1951 Source Sheets

New Madrid SE
1951
7.5-minute, 24000
Aerial Photo Revised 1950

Topo Sheet Key

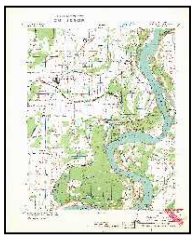
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1939 Source Sheets

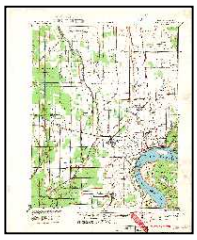
New Madrid
1939
15-minute, 62500

Portageville
1939
15-minute, 62500

1931, 1934 Source Sheets



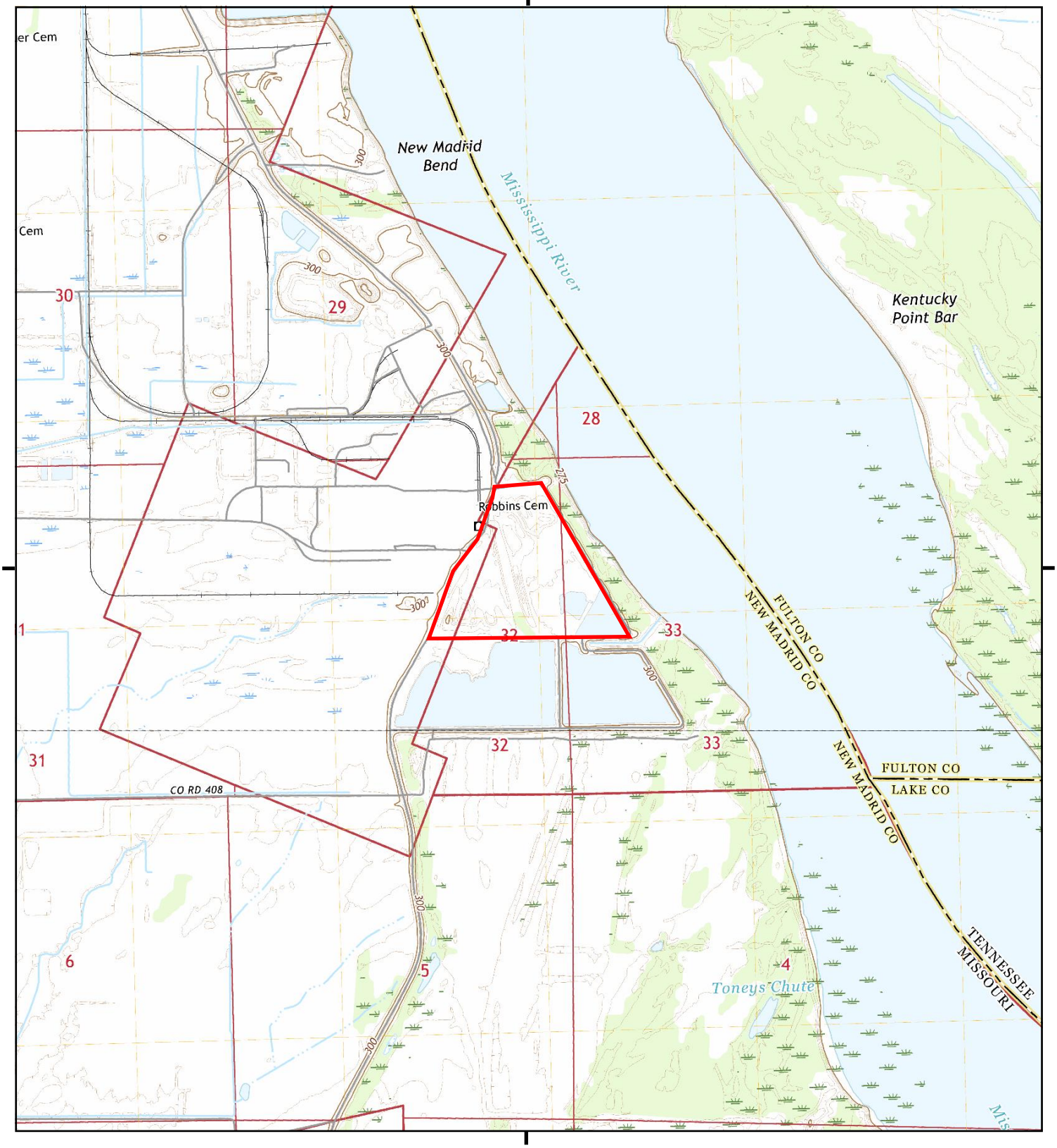
PORTAGEVILLE
1931
15-minute, 62500



NEW MADRID
1934
15-minute, 62500

Historical Topo Map

2021



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 2021, 7.5-minute
S, Point Pleasant, 2021, 7.5-minute

SITE NAME: AECI New Madrid
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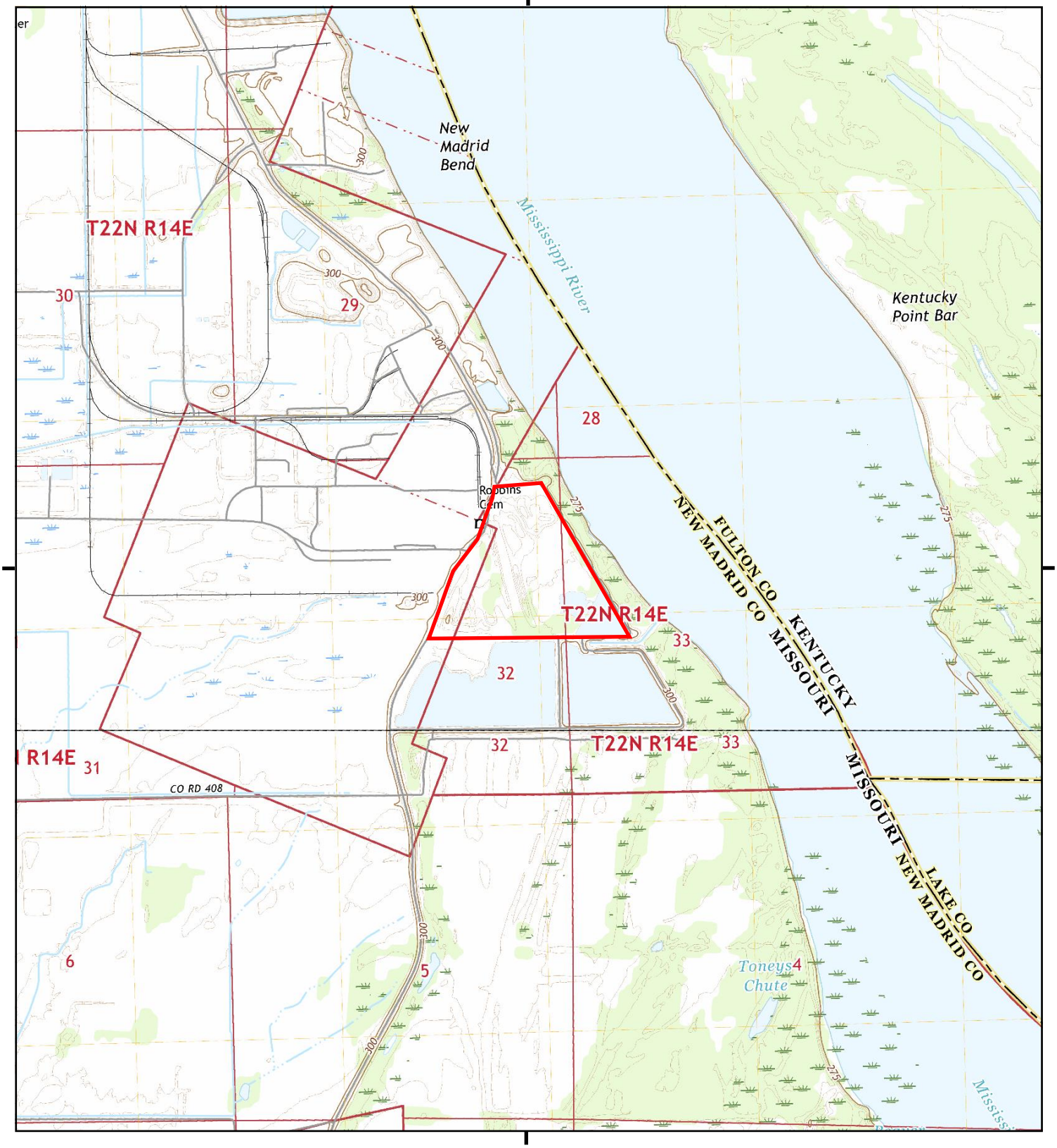
N

Historical Topo Map

2017



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 2017, 7.5-minute
S, Point Pleasant, 2017, 7.5-minute

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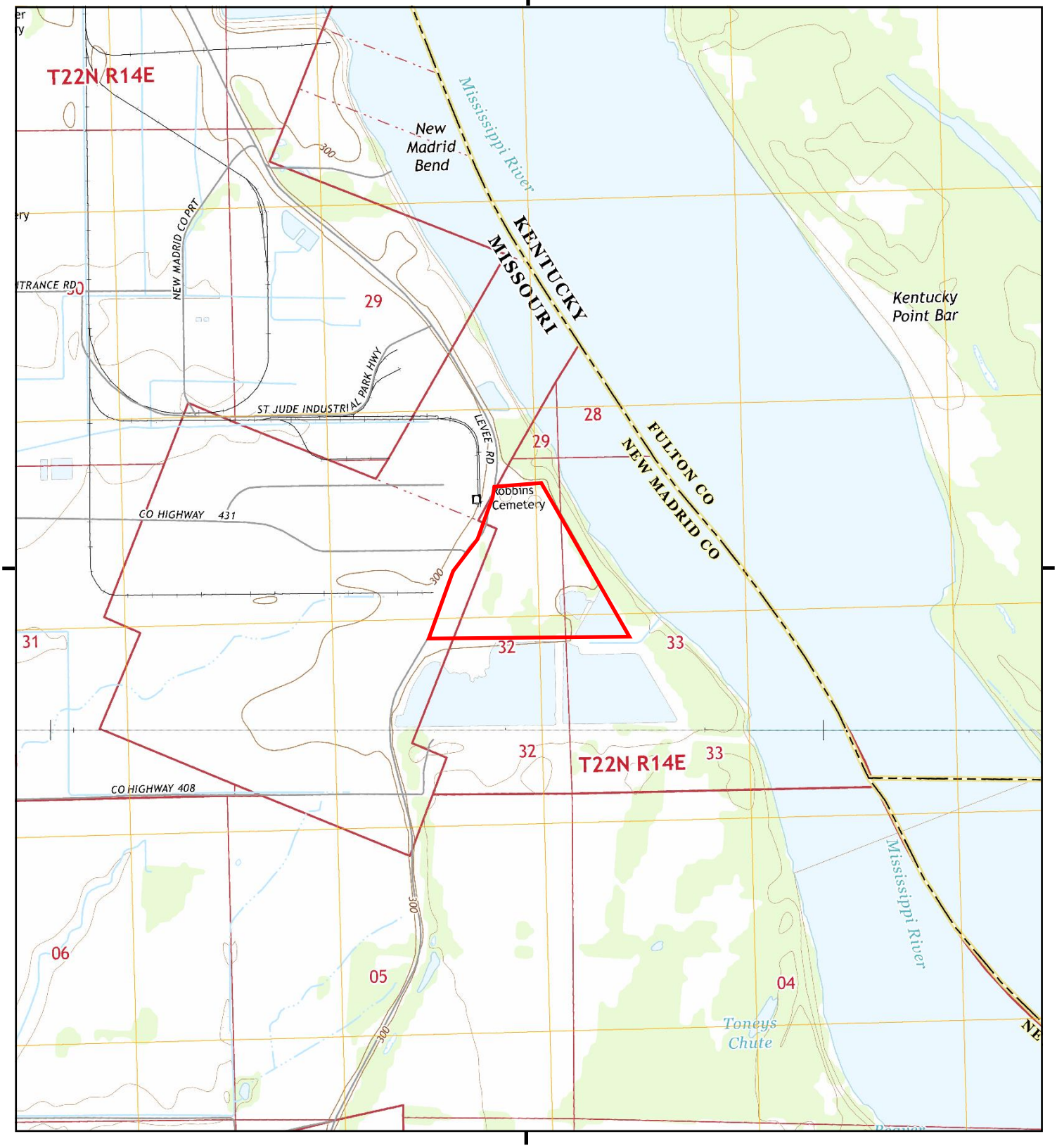
Historical Topo Map

2015



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 2015, 7.5-minute
S, Point Pleasant, 2015, 7.5-minute

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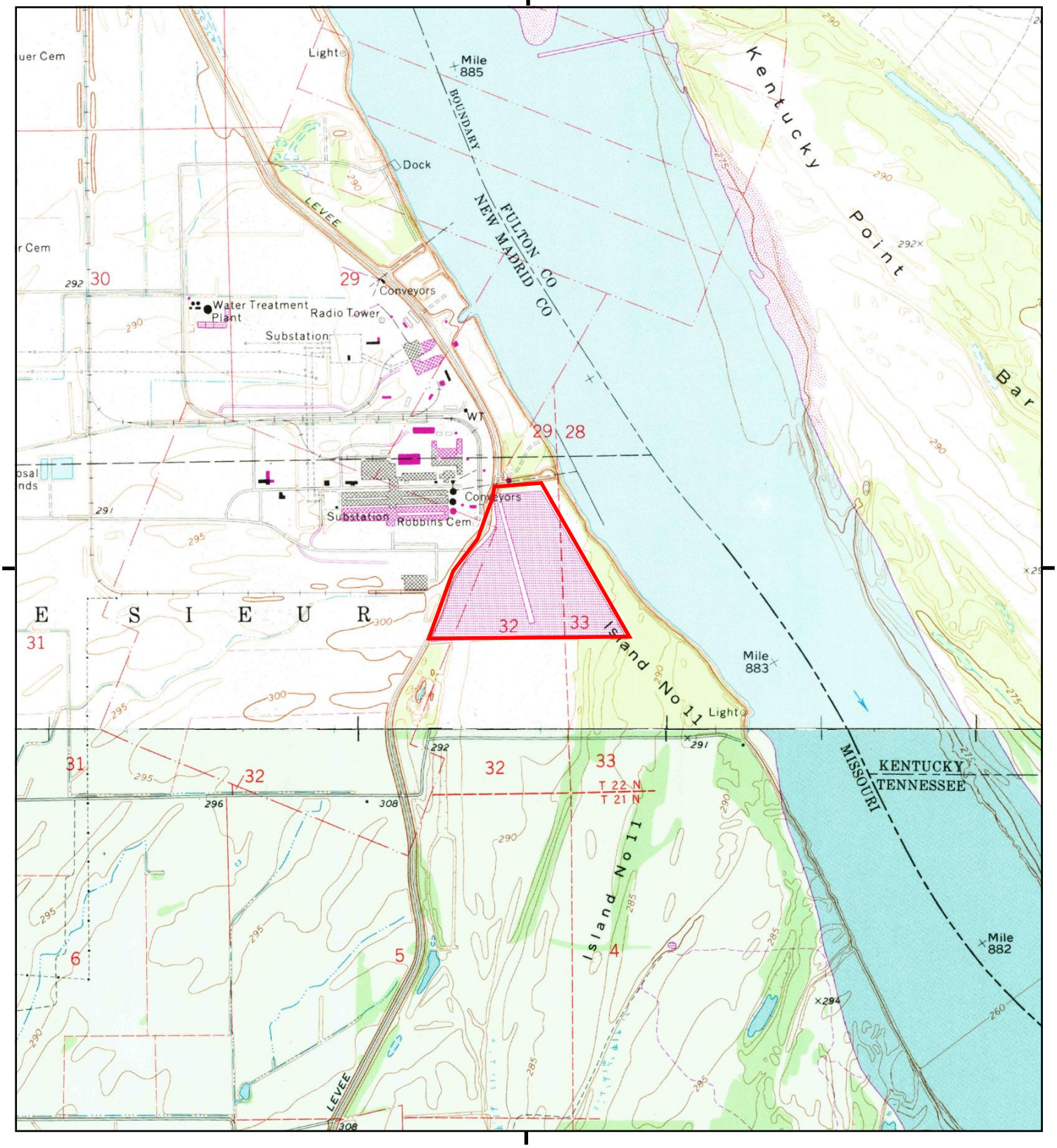
Historical Topo Map

1982



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 1982, 7.5-minute
S, Point Pleasant, 1982, 7.5-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
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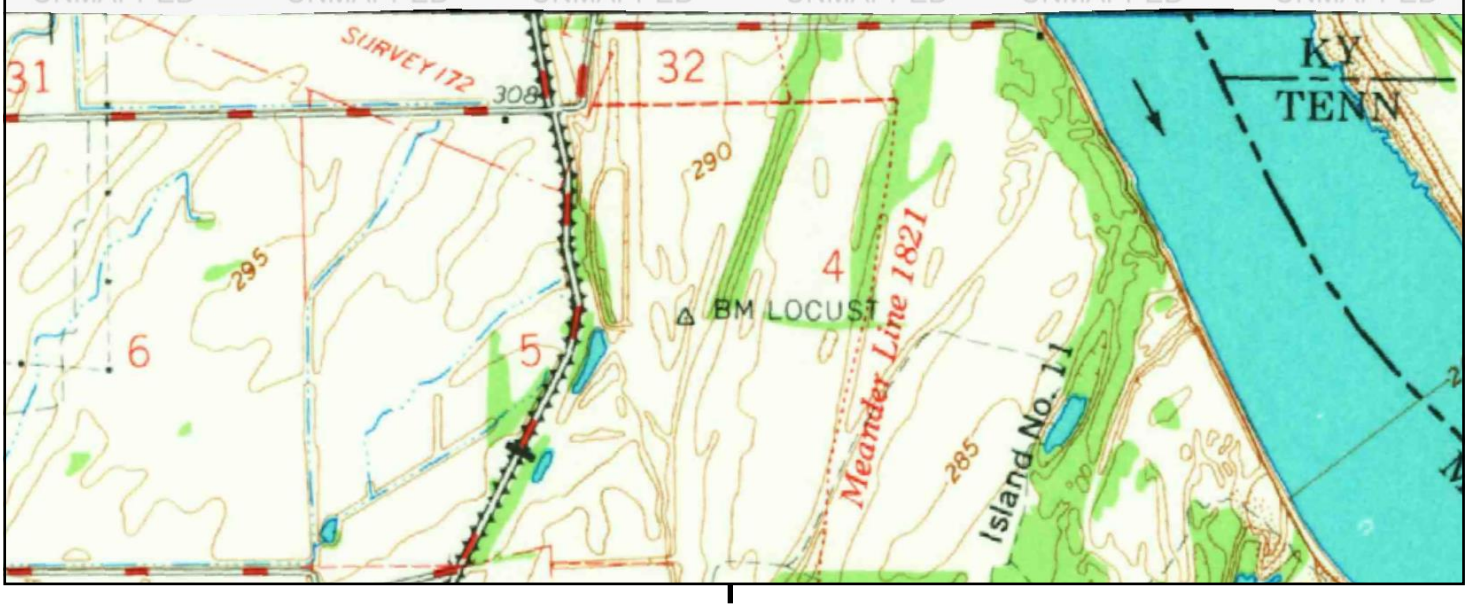

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

S, Portageville, 1973, 15-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
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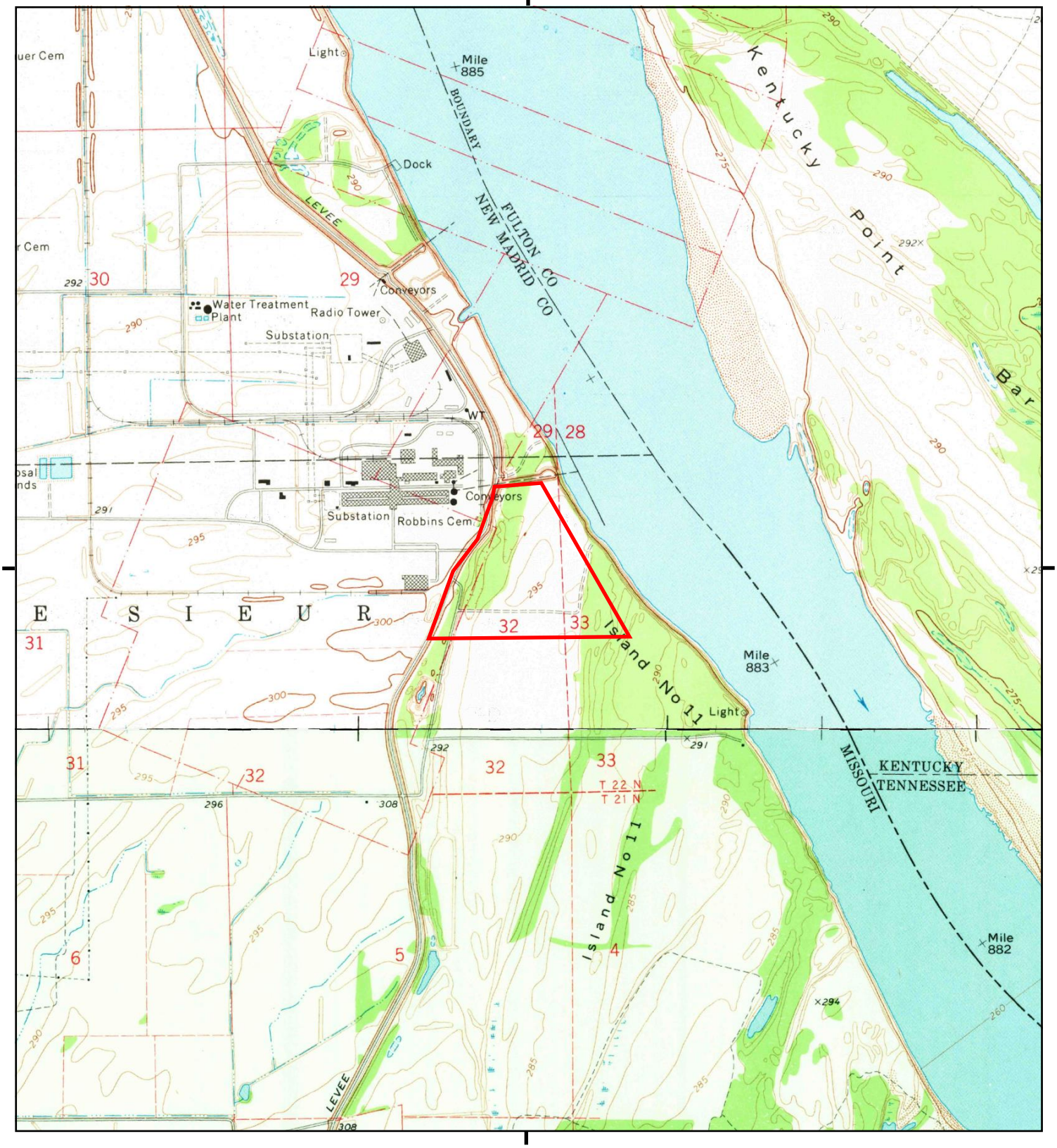
N

Historical Topo Map

1971



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 1971, 7.5-minute
S, Point Pleasant, 1971, 7.5-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
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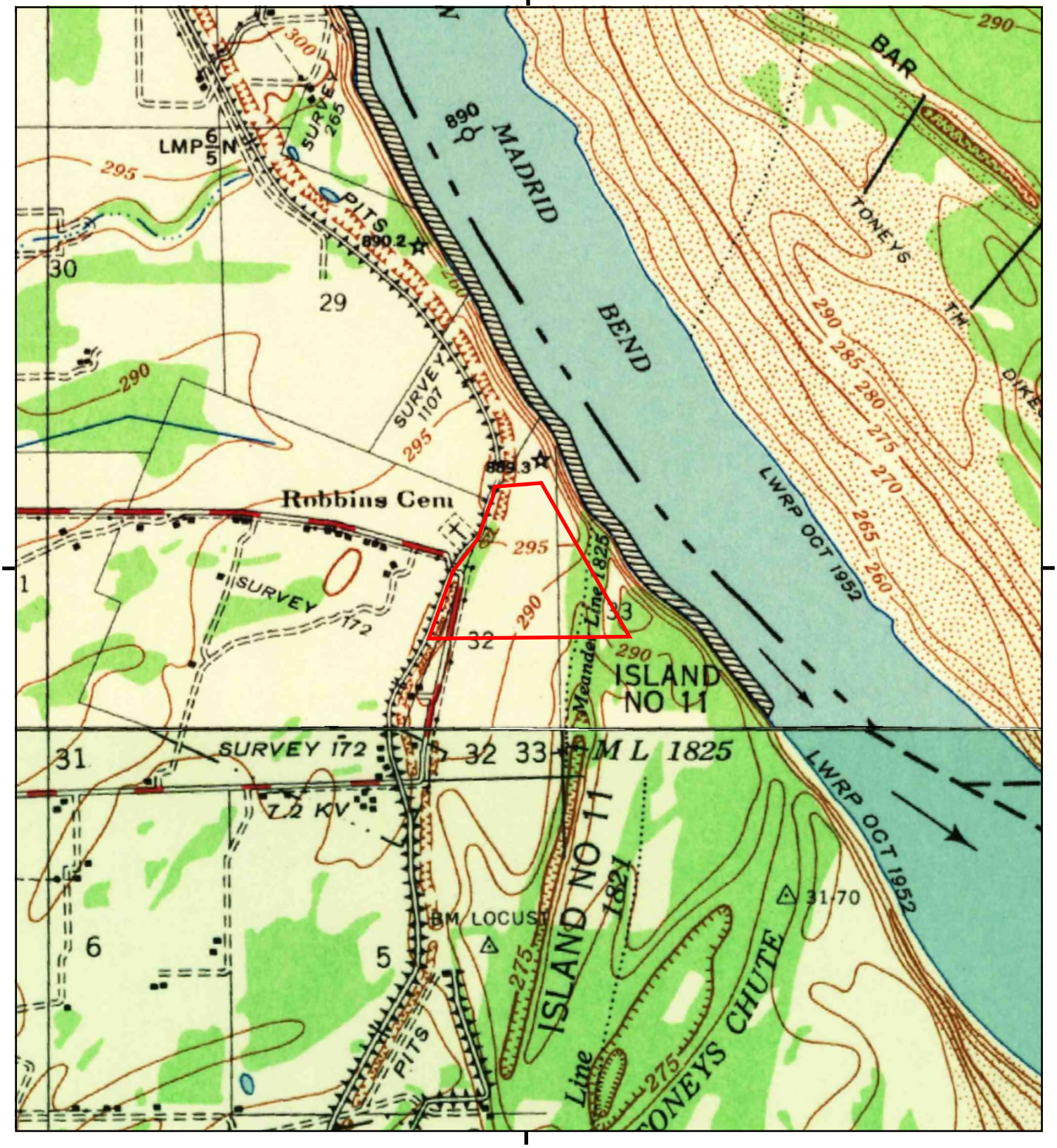


This report includes information from the following map sheet(s).

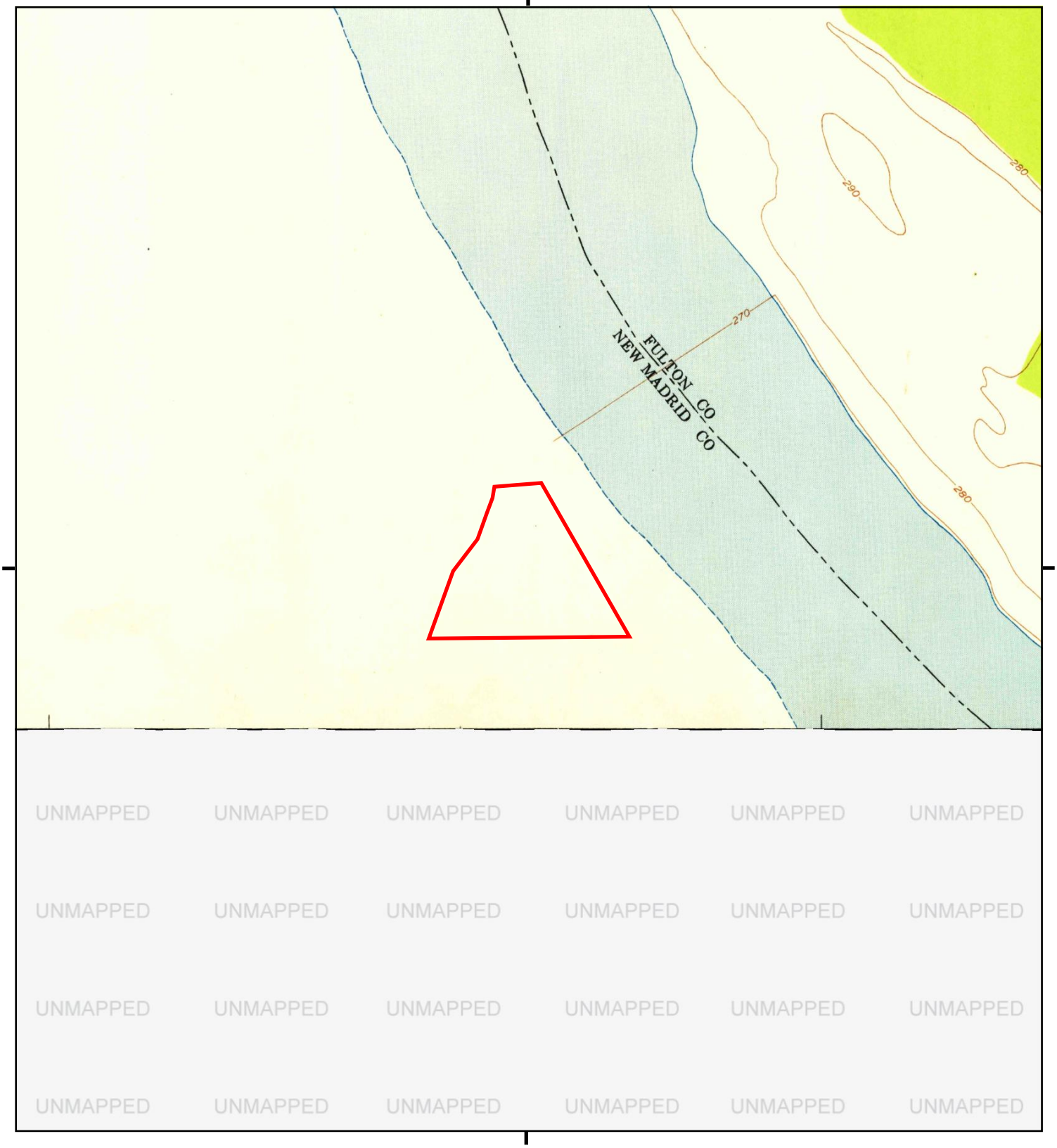
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 1954, 15-minute
S, Portageville, 1955, 15-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
Marston, MO 63866
CLIENT: Haley & Aldrich

N



This report includes information from the following map sheet(s).

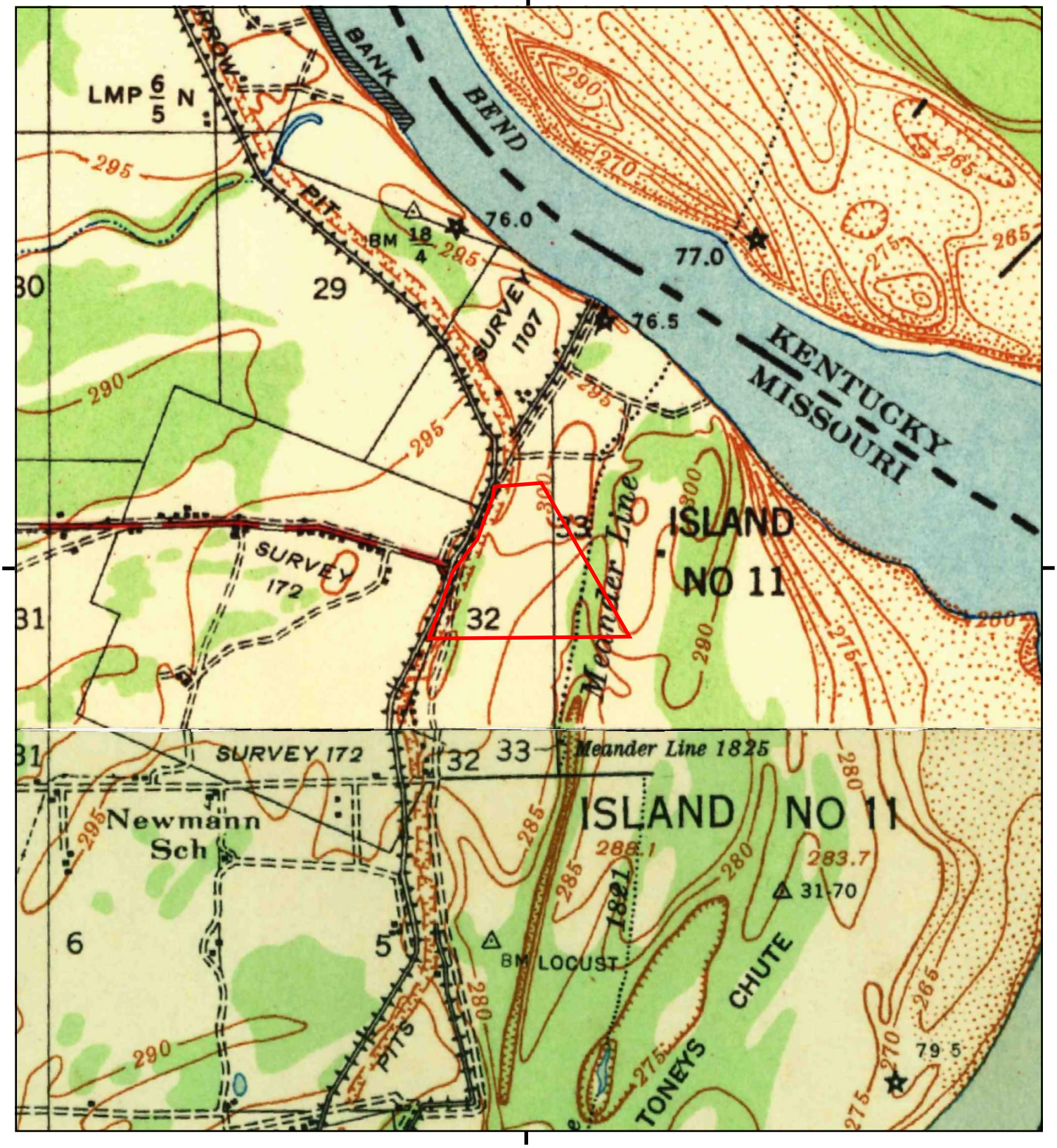
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid SE, 1951, 7.5-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
Marston, MO 63866
CLIENT: Haley & Aldrich

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, New Madrid, 1939, 15-minute
S, Portageville, 1939, 15-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
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CLIENT: Haley & Aldrich

N

Historical Topo Map

1931, 1934

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, NEW MADRID, 1934, 15-minute
S, PORTAGEVILLE, 1931, 15-minute

SITE NAME: AECI New Madrid
ADDRESS: 1400-1498 St Jude Rd
Marston, MO 63866
CLIENT: Haley & Aldrich

N