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2021 – 2022 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

LINED POND
NEW MADRID POWER PLANT
NEW MADRID, MISSOURI

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Associated Electric Cooperative, Inc.
Springfield, Missouri

File No. 0129342-045
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1. Introduction

This 2021 – 2022 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the inactive Lined Pond (Lined Pond) at the New Madrid Power Plant (NMPP), operated by Associated Electric Cooperative, Inc. (AECI). This Annual Report was developed in accordance with the U.S. Environmental Protection Agency Coal Combustion Residuals (CCR) Rule effective 19 October 2015 (Rule) including subsequent revisions, specifically Code of Federal Regulations Title 40 (40 CFR), subsection 257.90(e). The Annual Report documents the groundwater monitoring system for the Lined Pond consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2021) and document compliance with the Rule. The specific requirements listed in § 257.90(e)(1)-(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 July 2021), the Lined Pond was operating under an assessment monitoring program in compliance with 40 CFR § 257.95.

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 (30 June 2022), the Lined Pond was operating under an assessment monitoring program in compliance with 40 CFR § 257.95.

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

The Lined Pond at NMPP is operating under an assessment monitoring program; therefore, no statistical evaluations were conducted on Appendix III constituents from July 2021 through June 2022.

1.1.3.2 40 CFR § 257.90(e)(6)(iii)(b)

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

An assessment monitoring program for the Lined Pond was established on 30 December 2019 to meet the requirements of 40 CFR § 257.95. The Lined Pond remained in assessment monitoring from July 2021 through June 2022.

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

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

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

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

No statistically significant levels were identified above the groundwater protection standard for those constituents listed in Appendix IV to this part from July 2021 through June 2022.

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 from July 2021 through June 2022 for this unit. The Lined Pond remained in assessment monitoring during this annual period.

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

An assessment of corrective measures was not initiated for the Lined Pond from July 2021 through June 2022; therefore, a public meeting was not held.

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.

No assessment of corrective measures was required to be completed from July 2021 through June 2022 for this unit. The Lined Pond remained in assessment monitoring during this annual period.

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 Lined Pond remains in assessment monitoring; no remedy was required to be selected.

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

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

No remedial activities have been initiated from July 2021 through June 2022; therefore, no demonstration or certification is applicable for this unit.

2. 40 CFR § 257.90 Applicability

2.1 40 CFR § 257.90(a)

Except as provided for in § 257.100 for inactive CCR surface impoundments, 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) of this section.

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

2.2 40 CFR § 257.90(e) – SUMMARY

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

40 CFR 257.100(e)(5)(ii)
No later than August 1, 2019, prepare the initial groundwater monitoring and corrective action report as set forth in § 257.90(e)

This Annual Report describes monitoring completed and actions taken at the NMPP Lined Pond as required by the Rule. Groundwater sampling and analysis was conducted in accordance with requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 and § 257.95 is also provided in this report. This Annual Report documents the applicable groundwater-related activities completed from July 2021 through June 2022.

2.2.1 Status of the Groundwater Monitoring Program

Results of the detection monitoring statistical analysis completed in July 2019 identified 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 December 2019, and AECI is currently implementing an assessment monitoring program.

2.2.2 Key Actions Completed

The July 2020 through June 2021 Annual Groundwater Monitoring and Corrective Action Report was completed in July 2021. Statistical analysis of analytical data from the February 2021 semi-annual assessment monitoring sampling event was completed in July 2021. A summary including the sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program of the NMPP Lined Pond is presented in Table I of this report. The statistical analyses completed in July 2021 did not identify any statistically significant level (SSL) from the February 2021 sampling event.

A semi-annual assessment monitoring event was completed in August 2021 for detected Appendix IV constituents identified from the December 2020 annual assessment monitoring sampling event. Statistical analysis was completed within 90 days of receipt of verified laboratory data for the August 2021 sampling event, and no Appendix IV SSLs were identified.

An annual assessment monitoring sampling event was completed in November 2021 to identify detected Appendix IV constituents for subsequent semi-annual sampling events in February 2022 and planned for August 2022. GWPSs for detected Appendix IV constituents were established or updated at this time. The background concentrations (upper tolerance limits) and GWPS utilized for the statistical analyses completed for the February 2021 and August 2021 assessment monitoring sampling events are presented in Table II. Statistical analysis of the results from the February 2022 semi-annual assessment monitoring sampling event is due to be completed in July 2022 and will be reported in the next annual report.

2.2.3 Problems Encountered

No problems (i.e., problems could include damaged wells, issues with sample collection or lack of sampling, or problems with analytical analysis) were encountered at the NMPP Lined Pond from July 2021 through June 2022.

2.2.4 Actions to Resolve Problems

No problems were encountered at the NMPP Lined Pond from July 2021 through June 2022; therefore, no actions to resolve the problems were required.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for July 2022 through June 2023 include the July 2021 – June 2022 Annual Groundwater Monitoring and Corrective Action Report; statistical analysis of assessment monitoring analytical data collected in February 2022; conducting semi-annual assessment monitoring and subsequent statistical analyses; and annual assessment monitoring.

2.3 40 CFR § 257.90(e) – INFORMATION

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

2.3.1 40 CFR § 257.90(e)(1)

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

As required by § 257.90(e)(1), a map showing the locations of the CCR unit and associated upgradient and downgradient monitoring wells for the Lined Pond 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 April 2019 as required by § 257.105(h)(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 from July 2021 through June 2022.

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

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

In accordance with § 257.95(b), three independent assessment monitoring samples were collected from each background and downgradient well from July 2021 through June 2022. A summary including sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program for the NMPP Lined Pond is presented in Table I of this report.

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

The assessment monitoring program was established on 30 December 2019 to meet the requirements of 40 CFR § 257.95. The NMPP Lined Pond remained in assessment monitoring from July 2021 through June 2022.

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

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

This Annual Report documents activities conducted to comply with §§ 257.90 through 257.95 of the Rule. It is understood that there are supplemental references in §§ 257.90 through 257.98 that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for activities completed from July 2021 through June 2022.

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

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

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

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

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

This unit is in assessment monitoring; therefore, no detection monitoring alternative source demonstration 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 from June 2021 through July 2022. Analytical results for both downgradient and upgradient wells are provided in Table I. The background concentrations (upper tolerance limits) and GWPSs established for the NMPP Lined Pond that were utilized for statistical analyses completed on the February 2021 and August 2021 analytical results are included in Table II.

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.

No appendix IV SSLs were indicated by statistical analyses completed from July 2021 through June 2022; consequently, no alternative source demonstration or certification is applicable.

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.

No assessment of corrective measures was required to be initiated from July 2021 through June 2022; therefore, no demonstration or certification is applicable for this unit.

2.4 40 CFR § 257.90(f)

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

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

Pursuant to § 257.105(h)(1), this Annual Report must be placed in the facility's operating record.

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

Pursuant to § 257.107(h)(1), this Annual Report must be posted to the AECI CCR website within 30 days of this Annual Report being placed in the facility's operating record [§ 257.107(d)].

TABLES

TABLE I
SUMMARY OF ANALYTICAL RESULTS - 2021 THROUGH 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - LINED POND (INACTIVE)
NEW MADRID, MISSOURI

Location	Upgradient									Downgradient (Part 1 of 3)	
	B-123	B-123	B-123	B-126	B-126	B-126	MW-16	MW-16	MW-16	P-6	P-6
Measure Point (TOC)	292.7	292.70	292.7	293.63	293.63	293.63	292.85	292.85	292.85	310.88	310.88
Sample Name	B-123	B-123	B-123	B-126	B-126	B-126	MW-16	MW-16	MW-16	P-6	P-6
Sample Date	8/17/2021	11/2/2021	1/31/2022	8/17/2021	11/2/2021	1/31/2022	8/17/2021	11/2/2021	2/1/2022	8/23/2021	11/4/2021
Final Lab Report Date	9/30/2021	1/13/2022	3/18/2022	9/30/2021	1/13/2022	3/18/2022	9/30/2021	1/13/2022	3/18/2022	10/8/2021	1/13/2022
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	9/27/2021	1/10/2022	3/18/2022	9/27/2021	1/10/2022	3/18/2022	9/27/2021	1/10/2022	3/18/2022	10/7/2021	1/10/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	12/2/2021	1/26/2022	5/17/2022	12/2/2021	1/26/2022	5/17/2022	12/2/2021	1/26/2022	5/17/2022	12/2/2021	1/26/2022
Depth to Water (ft btoc)	17.47	19.45	19.37	18.67	21.13	21.75	23.22	26.61	23.40	43.00	44.74
Temperature (Deg C)	16.96	16.17	16.36	18.55	17.14	16.83	18.17	17.05	17.14	17.54	17.42
Conductivity, Field (µS/cm)	761	765	667	611	988	1470	1076	1077	988	1050	1114
Turbidity, Field (NTU)	24.1	23.5	14.4	94.6	51.8	38.8	16.5	0.8	9.4	0.0	6.1
Boron, Total (mg/L)	**0.031**	-	**0.072**	**0.097**	-	**0.082**	**0.062**	-	**0.12**	**1.5**	-
Calcium, Total (mg/L)	**81**	-	**78**	**71**	-	**180**	**140**	-	**140**	**170**	-
Chloride (mg/L)	**2.7**	-	**2.4**	**32**	-	**14**	**7.2**	-	< 5.0	**12**	-
Fluoride (mg/L)	**0.588**	-	**0.503**	**0.517**	-	< 0.250	**1.32**	-	**1.32**	< 0.250	-
Sulfate (mg/L)	**27**	-	**27**	**42**	-	**170**	**88**	-	**65**	**32**	-
pH (lab) (su)	**7.11**	-	**7.28**	**6.87**	-	**6.99**	**6.91**	-	**6.95**	**6.69**	-
TDS (mg/L)	**410**	-	**420**	**370**	-	**890**	**550**	-	**590**	**580**	-
Antimony, Total (mg/L)	-	< 0.0030	-	-	< 0.0030	-	-	< 0.0030	-	-	<0.0030
Arsenic, Total (mg/L)	**0.0027**	**0.0026**	**0.0018**	**0.0040**	**0.0036**	**0.0032**	**0.0021**	**0.0024**	**0.0022**	< 0.0010	< 0.0010
Barium, Total (mg/L)	**0.19**	**0.18**	**0.17**	**0.22**	**0.33**	**0.40**	**0.62**	**0.68**	**0.63**	**0.21**	**0.21**
Beryllium, Total (mg/L)	-	< 0.0010	-	-	< 0.0010	-	-	< 0.0010	-	-	< 0.0010
Cadmium, Total (mg/L)	-	< 0.00089	-	-	<0.00089	-	-	<0.00089	-	-	< 0.00089
Chromium, Total (mg/L)	-	<0.0040	-	-	<0.0040	-	-	<0.0040	-	-	< 0.0040
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	<0.0020	<0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	<0.0020
Lead, Total (mg/L)	-	<0.0010	-	-	<0.0010	-	-	<0.0010	-	-	<0.0010
Lithium, Total (mg/L)	**0.022**	**0.022**	**0.027**	**0.012**	**0.015**	**0.027**	**0.022**	**0.022**	**0.024**	**0.022**	**0.021**
Molybdenum, Total (mg/L)	**0.0038**	**0.0029**	**0.0038**	< 0.0010	<0.0010	< 0.0010	< 0.0010	<0.0010	<0.0010	**0.0013**	< 0.0010
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
Thallium, Total (mg/L)	-	<0.0010	-	-	<0.0010	-	-	<0.0010	-	-	< 0.0010
Mercury, Total (mg/L)	-	< 0.0020	-	-	< 0.0020	-	-	< 0.0020	-	-	< 0.00020
Radium 226 & 228 Combined (pCi/L)	0.820 ± 0.727 (1.26)	0.726 ± 0.849 (1.67)	0.476 ± 1.10 (2.16)	**1.20 ± 0.738 (0.975)**	1.53 ± 1.01 (1.69)	0.870 ± 1.15 (2.27)	1.45 ± 1.00 (1.59)	**1.68 ± 0.897 (1.26)**	**1.49 ± 0.853 (0.875)**	0.536 ± 0.919 (1.78)	0.501 ± 0.836 (1.70)

Notes and Abbreviations:

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 I
SUMMARY OF ANALYTICAL RESULTS - 2021 THROUGH 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - LINED POND (INACTIVE)
NEW MADRID, MISSOURI

Location	Downgradient (Part 2 of 3)										
	P-6 (Duplicate)	P-6	P-7	P-7	P-7	P-7 (Duplicate)	MW-8	MW-8	MW-8	MW-9	MW-9
Measure Point (TOC)	310.88	310.88	308.60	308.60	308.60	308.60	310.63	310.63	310.63	310.24	310.24
Sample Name	DUPLICATE	P-6	P-7	P-7	P-7	LP-DUP-02-2022	MW-8	MW-8	MW-8	MW-9	MW-9
Sample Date	11/4/2021	2/9/2022	8/23/2021	11/4/2021	2/9/2022	2/9/2022	8/23/2021	11/4/2021	2/1/2022	8/23/2021	11/4/2021
Final Lab Report Date	1/13/2022	4/13/2022	10/8/2021	1/13/2022	4/13/2022	4/13/2022	10/5/2021	1/13/2022	2/23/2022	10/5/2021	1/13/2022
Final Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3/14/2022	N/A	N/A
Final Radiation Lab Report Date	1/10/2022	3/25/2022	10/7/2021	1/10/2022	3/25/2022	3/25/2022	10/5/2021	1/10/2022	3/14/2022	10/5/2021	1/10/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	1/26/2022	5/17/2022	12/2/2021	1/26/2022	5/17/2022	5/17/2022	12/2/2021	1/26/2022	5/17/2022	12/2/2021	1/26/2022
Depth to Water (ft btoc)	-	40.45	38.60	41.40	38.64	-	41.20	44.14	40.32	42.40	44.34
Temperature (Deg C)	-	15.94	16.16	16.00	15.84	-	17.04	17.32	16.87	17.40	17.54
Conductivity, Field (µS/cm)	-	1040	993	1057	1044	-	1380	1363	1284	820	873
Turbidity, Field (NTU)	-	1.9	1.5	2.9	18.2	-	0.5	12.3	0.7	0.0	2.0
Boron, Total (mg/L)	**-**	**1.3**	**0.13**	**-**	**0.12**	**0.12**	**17**	**-**	**16**	**2.5**	**-**
Calcium, Total (mg/L)	**-**	**170**	**150**	**-**	**150**	**150**	**210**	**-**	**190**	**110**	**-**
Chloride (mg/L)	**-**	**8.1**	**11**	**-**	**17**	**14**	**8.8**	**-**	**8.1**	**15**	**-**
Fluoride (mg/L)	-	< 0.250	< 0.250	-	**0.264**	**0.285**	**0.260**	**-**	< 0.250	**0.417**	**-**
Sulfate (mg/L)	**-**	**35**	**83**	**-**	**73**	**74**	**270**	**-**	**230**	**110**	**-**
pH (lab) (su)	**-**	**6.93**	**6.74**	**-**	**6.90**	**6.91**	**6.97**	**-**	**7.07**	**6.98**	**-**
TDS (mg/L)	**-**	**580**	**540**	**-**	**640**	**600**	**930**	**-**	**900**	**510**	**-**
Antimony, Total (mg/L)	<0.0030	-	-	< 0.0030	-	-	-	< 0.0030	-	-	< 0.0030
Arsenic, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	**0.011**	**0.010**	**0.0033**	**0.0038**	**0.0051**	< 0.0010	<0.0010
Barium, Total (mg/L)	**0.21**	**0.23**	**0.27**	**0.27**	**0.38**	**0.37**	**0.099**	**0.066**	**0.078**	**0.074**	**0.069**
Beryllium, Total (mg/L)	< 0.0010	**-**	**-**	< 0.0010	**-**	**-**	**-**	< 0.0010	**-**	**-**	< 0.0010
Cadmium, Total (mg/L)	< 0.00089	-	**-**	< 0.00089	-	-	**-**	<0.00089	-	**-**	<0.00089
Chromium, Total (mg/L)	< 0.0040	-	**-**	<0.0040	-	-	**-**	<0.0040	-	**-**	<0.0040
Cobalt, Total (mg/L)	<0.0020	<0.0020	< 0.0020	<0.0020	**0.015**	**0.014**	< 0.0020	**0.0023**	< 0.0020	< 0.0020	<0.0020
Lead, Total (mg/L)	<0.0010	-	**-**	<0.0010	-	-	**-**	<0.0010	-	**-**	<0.0010
Lithium, Total (mg/L)	**0.021**	**0.024**	**0.015**	**0.014**	**0.018**	**0.021**	**0.017**	**0.014**	**0.027**	**0.024**	**0.021**
Molybdenum, Total (mg/L)	< 0.0010	< 0.0010	**0.0012**	< 0.0010	**0.0044**	**0.0044**	**0.99**	**0.74**	**0.76**	**0.29**	**0.31**
Selenium, Total (mg/L)	< 0.0010	< 0.0010	**0.0016**	< 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
Mercury, Total (mg/L)	< 0.00020	-	**-**	< 0.00020	-	-	-	< 0.0020	-	-	< 0.00020
Radium 226 & 228 Combined (pCi/L)	1.33 ± 0.899 (1.54)	1.08 ± 0.917 (1.81)	0.358 ± 0.723 (1.54)	0.717 ± 0.792 (1.60)	1.03 ± 1.00 (1.85)	**1.94 ± 1.12 (1.71)**	0.235 ± 0.775 (1.74)	1.13 ± 0.711 (1.14)	0.454 ± 0.739 (1.40)	0.262 ± 0.903 (1.99)	0.902 ± 0.860 (1.60)

Notes and Abbreviations:

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 I
SUMMARY OF ANALYTICAL RESULTS - 2021 THROUGH 2022 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - LINED POND (INACTIVE)
NEW MADRID, MISSOURI

Location	Downgradient (Part 3 of 3)							
	MW-9	MW-17	MW-17	MW-17	MW-18	MW-18 (Dup)	MW-18	MW-18
Measure Point (TOC)	310.24	299.20	299.20	299.20	301.19	301.19	301.19	301.19
Sample Name	MW-9	MW-17	MW-17	MW-17	MW-18	DUPLICATE MW-18	MW-18	MW-18
Sample Date	2/1/2022	8/25/2021	11/3/2021	2/14/2022	8/25/2021	8/25/2021	11/3/2021	2/14/2022
Final Lab Report Date	2/23/2022	10/8/2021	1/13/2022	3/14/2022	10/8/2021	10/8/2021	1/13/2022	3/14/2022
Final Lab Report Revision Date	3/14/2022	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	3/14/2022	10/7/2021	1/10/2022	3/11/2022	10/7/2021	10/7/2021	1/10/2022	3/11/2022
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	5/17/2022	12/2/2021	1/26/2022	5/17/2022	12/2/2021	12/2/2021	1/26/2022	5/17/2022
Depth to Water (ft btoc)	40.25	28.15	31.40	26.05	30.20	-	23.36	30.90
Temperature (Deg C)	17.28	16.76	16.13	14.79	16.61	-	15.93	14.48
Conductivity, Field (µS/cm)	875	704	740	707	533	-	490	490
Turbidity, Field (NTU)	0.8	101	9.7	1.18	83.4	-	4.3	0
Boron, Total (mg/L)	**2.8**	**0.038**	-	**0.095**	**0.050**	**0.048**	-	**0.079**
Calcium, Total (mg/L)	**120**	**93**	-	**92**	**63**	**62**	-	**56**
Chloride (mg/L)	**15**	**12**	-	**12**	**16**	**15**	-	**12**
Fluoride (mg/L)	**0.442**	**0.322**	-	<0.250	**0.386**	**0.388**	-	**0.358**
Sulfate (mg/L)	**120**	**42**	-	**46**	**35**	**36**	-	**41**
pH (lab) (su)	**7.11**	**6.67**	-	**7.11**	**6.63**	**6.73**	-	**7.07**
TDS (mg/L)	**620**	**420**	-	**470**	**370**	**340**	-	**370**
Antimony, Total (mg/L)	-	-	< 0.0030	-	-	-	< 0.0030	-
Arsenic, Total (mg/L)	< 0.0010	**0.0023**	**0.0028**	**0.0028**	< 0.0010	< 0.0010	<0.0010	<0.0010
Barium, Total (mg/L)	**0.074**	**0.24**	**0.26**	**0.27**	**0.14**	**0.13**	**0.12**	**0.12**
Beryllium, Total (mg/L)	-	-	< 0.0010	-	-	-	<0.0010	-
Cadmium, Total (mg/L)	-	-	< 0.00089	-	-	-	< 0.00089	-
Chromium, Total (mg/L)	-	-	< 0.0040	-	-	-	< 0.0040	-
Cobalt, Total (mg/L)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	**0.0034**	**0.0034**	**0.0026**	**0.0027**
Lead, Total (mg/L)	-	-	< 0.0010	-	-	-	<0.0010	-
Lithium, Total (mg/L)	**0.025**	**0.013**	**0.013**	**0.015**	**0.010**	**0.011**	<0.010	**0.012**
Molybdenum, Total (mg/L)	**0.25**	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010	<0.0010
Selenium, Total (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	**0.0015**	**0.0014**	**0.0016**	<0.0010
Thallium, Total (mg/L)	-	-	< 0.0010	-	-	-	<0.0010	-
Mercury, Total (mg/L)	-	-	< 0.0020	-	-	-	<0.00020	-
Radium 226 & 228 Combined (pCi/L)	0.417 ± 0.735 (1.45)	0.959 ± 1.04 (1.91)	1.37 ± 0.929 (1.62)	0.564 ± 0.787 (1.57)	0.368 ± 0.834 (1.71)	0.524 ± 0.881 (1.76)	0.549 ± 0.762 (1.57)	0.426 ± 0.822 (1.66)

Notes and Abbreviations:

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
BACKGROUND CONCENTRATIONS AND GROUNDWATER PROTECTION STANDARDS
FEBRUARY AND AUGUST 2021 ASSESSMENT MONITORING SAMPLING EVENTS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - LINED POND
NEW MADRID, MISSOURI

Constituent	Background Concentration (UTL) (mg/L[1])	Groundwater Protection Standard (mg/L[1])
Arsenic	0.0059	0.010*
Barium	0.690	2*
Cobalt	0.0044	0.006**
Fluoride	2.500	4.0*
Lithium	0.032	0.04**
Molybdenum	0.0046	0.100**
Radium 226 & 228	2.35	5 pCi/L*
Selenium	0.0031	0.05*

Notes:

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

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

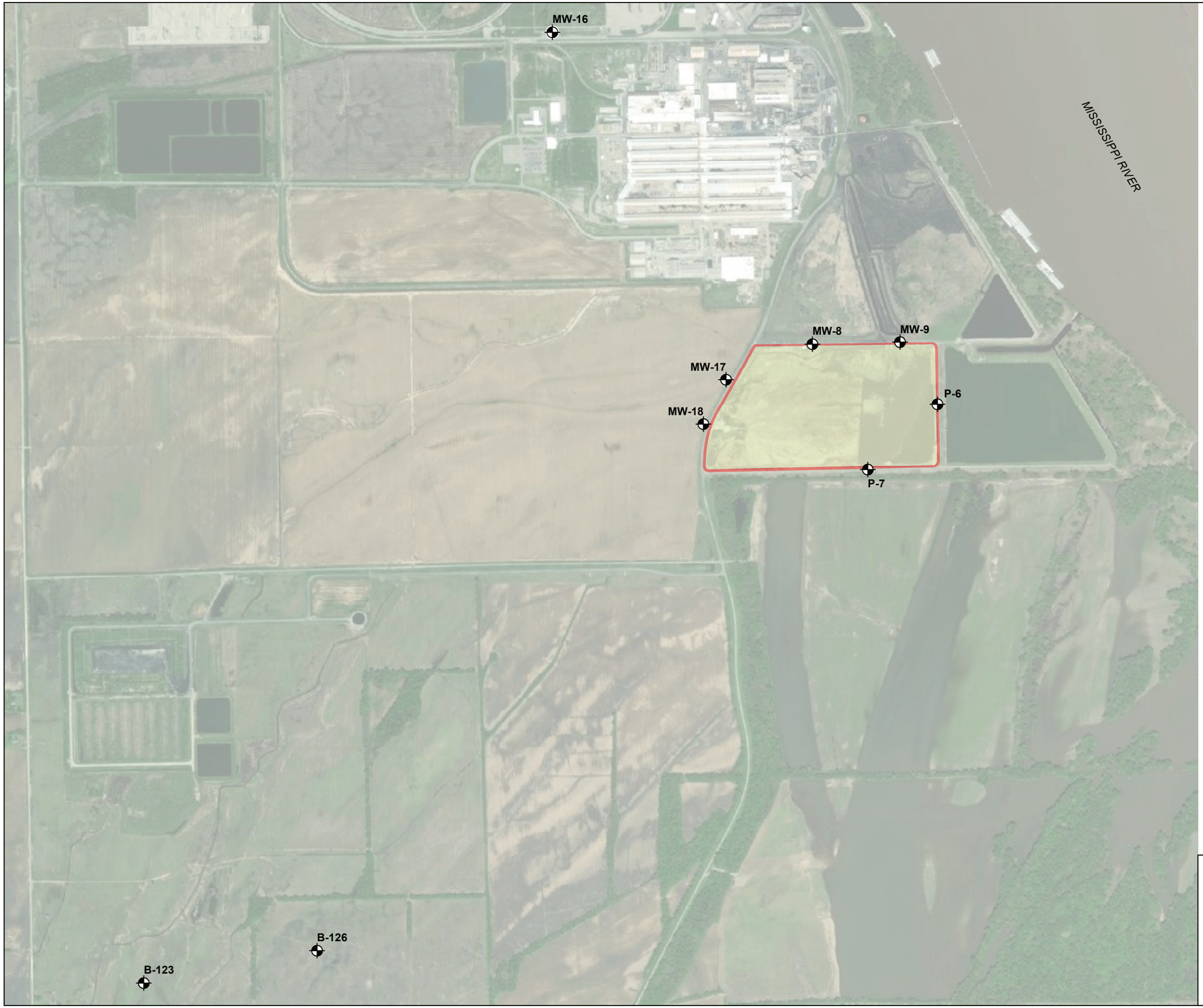
[1] = unit unless otherwise noted

mg/L = milligrams per liter

pCi/L = picoCuries per liter

UTL = upper tolerance limit

FIGURE



LEGEND

MONITORING WELL

LINED ASH POND

NOTES

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

N

0 1,100 2,200

SCALE IN FEET

HALEY ALDRICH

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

INACTIVE LINED POND MONITORING WELL LOCATION MAP

aeci
Associated Electric Cooperative, Inc.

AUGUST 2022
SCALE AS SHOWN

FIGURE 1