HALEY ALDRICH

www.haleyaldrich.com

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
POND 004
NEW MADRID POWER PLANT
NEW MADRID, MISSOURI

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Associated Electric Cooperative, Inc.
Springfield, Missouri

File No. 129342-029
February 2021

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Mark Nicholls, PG
Name

Signature

Senior Hydrogeologist
Title

February 1, 2021
Date

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1. Introduction

This 2020 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses Pond 004 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 Code of Federal Regulations Title 40 (40 CFR), subsection 257.90(e). The Annual Report documents the groundwater monitoring system for Pond 004 consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2020) and documents 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 January 2020), Pond 004 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 (31 December 2020), Pond 004 was operating under an assessment monitoring program in compliance with 40 CFR § 257.95. AECI has initiated closure by removal in accordance with the requirements of 40 CFR § 257.102(c) at Pond 004.

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 004 is operating under an assessment monitoring program; therefore, no statistical evaluations were conducted on appendix III constituents in 2020.

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 004 was established on 15 August 2018 to meet the requirements of 40 CFR § 257.95. Pond 004 remained in assessment monitoring in 2020.

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 (SSL) were identified above the groundwater protection standard (GWPS) for those constituents listed in appendix IV to this part in 2020 for Pond 004.

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 2020 for this unit. Pond 004 remained in assessment monitoring during 2020.

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 required for Pond 004 in 2020; 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 initiated in 2020 for this unit. Pond 004 remained in assessment monitoring during 2020.

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

Pond 004 remains in assessment monitoring, and 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 were required to be initiated in 2020; therefore, no demonstration or certification is applicable for this unit.

2. 40 CFR § 257.90 Applicability

2.1 40 CFR § 257.90(a)

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

AECI has installed and certified a groundwater monitoring system at the NMPP Pond 004. Pond 004 is subject to the groundwater monitoring and corrective action requirements described under 40 CFR §§ 257.90 through 257.98. This document addresses the requirement for the Owner/Operator to prepare an Annual Report per § 257.90(e) (Rule).

2.2 40 CFR § 257.90(e) – SUMMARY

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

This Annual Report describes the monitoring completed and actions taken at the NMPP Pond 004 as required by the Rule. Groundwater sampling and analysis was conducted in accordance with requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 and § 257.95 is also provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 2020.

2.2.1 Status of the Groundwater Monitoring Program

Results of the detection monitoring statistical analysis completed in January 2018 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 May 2018, and AECI is currently implementing an assessment monitoring program.

2.2.2 Key Actions Completed

The 2019 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2020. Statistical analysis was completed in January 2020 on analytical data from the August 2019 assessment monitoring sampling event. The statistical analysis did not identify any appendix IV SSLs.

A semi-annual assessment monitoring sampling event was completed in February 2020 for detected appendix IV constituents identified from the June 2019 annual assessment monitoring sampling event. Due to elevated turbidity during the February 2020 semi-annual assessment monitoring sampling event at MW-11 and MW-12, elevated analytical results were observed for multiple appendix IV constituents. Additional samples were collected at MW-11 and MW-12 in May 2020 and June 2020, respectively, to verify the original reported results. Statistical analysis was completed within 90 days of receipt of verified laboratory data for the February 2020 sampling event, and no appendix IV SSLs were identified.

An annual assessment monitoring sampling event was completed in May 2020 to identify detected appendix IV constituents for subsequent semi-annual sampling events. GWPSs for detected appendix IV constituents were established or updated at this time. Semi-annual assessment monitoring was completed in August 2020 for detected appendix IV constituents identified during the May 2020 annual monitoring event. Statistical analysis of the results from the August 2020 semi-annual assessment monitoring sampling event are due to be completed in January 2021 and will be reported in the next annual report.

2.2.3 Problems Encountered

Elevated turbidity results were identified during the February 2020 semi-annual assessment monitoring sampling event at monitoring wells MW-11 and MW-12, which resulted in elevated analytical results being observed for multiple appendix IV constituents.

2.2.4 Actions to Resolve Problems

An additional sample was collected at monitoring well MW-11 in May 2020 to verify the original reported results. In June 2020, maintenance was completed at the monitoring wells to address the elevated turbidity observed at MW-11 and MW-12, and an additional sample was collected at MW-12 to verify the original reported results. The results were revised accordingly and are documented in Table I.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2021 include completion of the 2020 Annual Groundwater Monitoring and Corrective Action Report, statistical analysis of assessment monitoring analytical data collected in August 2020, and 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 NMPP Pond 004 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).

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

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

No monitoring wells were installed or decommissioned during 2020.

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

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

In accordance with § 257.94(b), three independent assessment monitoring samples from each background and downgradient monitoring well were collected in 2020. A summary including the sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program for the NMPP Pond 004 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 15 August 2018 to meet the requirements of 40 CFR § 257.95. The NMPP Pond 004 remained in assessment monitoring during 2020. AECI has initiated closure by removal in accordance with the requirements of 40 CFR § 257.102(c) at Pond 004.

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

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

This Annual Report documents activities conducted to comply with §§ 257.90 through 257.95 of the Rule. It is understood that there are supplemental references in §§ 257.90 through 257.98

that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for activities completed in calendar year 2020.

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 alternate 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 events were completed in 2020. 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 Pond 004 that were utilized for statistical analyses completed in 2020 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.

Statistical analyses of assessment monitoring samples collected in August 2019 and February 2020 did not identify any appendix IV SSLs exceeding the established GWPSs; therefore, no assessment monitoring alternative source demonstration is applicable. The NMPP Pond 004 remains in assessment monitoring.

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.

Statistical analyses of assessment monitoring samples collected in August 2019 and February 2020 did not identify any appendix IV SSLs exceeding the established GWPSs; therefore, this criterion is not applicable.

2.4 40 CFR § 257.90(f)

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

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

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

TABLES

TABLE I
SUMMARY OF ANALYTICAL RESULTS - 2020 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 004
NEW MADRID, MISSOURI

Location	Upgradient								
	B-123			B-126			MW-16		
Measure Point (TOC)	292.7			293.63			292.85		
Sample Name	B-123	B-123	B-123	B-126	B-126	B-126	MW-16	MW-16	MW-16
Sample Date	02/21/2020	5/20/2020	8/10/2020	02/21/2020	5/20/2020	8/10/2020	02/21/2020	5/19/2020	8/10/2020
Final Lab Report Date	4/3/2020	7/2/2020	9/29/2020	4/3/2020	7/2/2020	9/29/2020	4/3/2020	7/2/2020	9/29/2020
Final Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	4/2/2020	7/2/2020	9/29/2020	4/2/2020	7/2/2020	9/29/2020	4/2/2020	7/2/2020	9/29/2020
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	4/8/2020	7/14/2020	10/19/2020	4/8/2020	7/14/2020	10/19/2020	4/8/2020	7/14/2020	10/19/2020
Depth to Water (ft btoc)	11.00	7.85	12.89	12.68	9.23	13.85	10.90	10.86	18.58
Temperature, Field (Deg C)	16.26	16.05	17.71	16.56	16.35	18.75	16.95	17.19	18.46
Conductivity, Field (µS/cm)	616	631	675	417	594	575	804	821	872
Turbidity, Field (NTU)	90.7	98.3	10.0	98.7	61.7	34.6	0	8.7	0.0
Boron, Total (mg/L)	**0.029**	-	**0.059**	**0.031**	-	**0.058**	**0.064**	-	**0.13**
Calcium, Total (mg/L)	**62**	-	**75**	**62**	-	**74**	**120**	-	**120**
Chloride (mg/L)	**3.1**	-	**3.1**	**3.9**	-	**11**	**13**	-	**14**
Fluoride (mg/L)	**0.457**	**0.518**	**0.415**	**0.376**	**0.339**	**0.329**	**1.68**	**1.52**	**1.58**
Sulfate (mg/L)	**28**	-	**29**	**27**	-	**46**	**56**	-	**74**
pH (lab) (su)	**7.43**	-	**7.51**	**7.07**	-	**7.27**	**7.08**	-	**7.18**
TDS (mg/L)	**270**	-	**380**	**230**	-	**370**	**510**	-	**490**
Antimony, Total (mg/L)	-	<0.0030	-	-	<0.0030	-	-	<0.0030	-
Arsenic, Total (mg/L)	**0.0041**	**0.0034**	**0.0018**	**0.0040**	**0.0037**	**0.0039**	**0.0024**	**0.0021**	**0.0018**
Barium, Total (mg/L)	**0.18**	**0.21**	**0.18**	**0.18**	**0.20**	**0.22**	**0.56**	**0.53**	**0.56**
Beryllium, Total (mg/L)	-	<0.0010	-	-	<0.0010	-	-	<0.0010	-
Cadmium, Total (mg/L)	< 0.00089	<0.00089	-	<0.00089	<0.00089	-	<0.00089	<0.00089	-
Chromium, Total (mg/L)	< 0.0040	<0.0040	-	< 0.0040	<0.0040	-	< 0.0040	<0.0040	-
Cobalt, Total (mg/L)	**0.00098**	<0.00086	< 0.0020	**0.00086**	**0.0015**	< 0.0020	< 0.00086	<0.00086	< 0.0020
Lead, Total (mg/L)	< 0.0010	<0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010
Lithium, Total (mg/L)	**0.017**	**0.024**	**0.027**	**0.018**	**0.011**	**0.013**	**0.030**	**0.022**	**0.025**
Molybdenum, Total (mg/L)	< 0.0010	**0.0037**	**0.0036**	< 0.0010	<0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010
Selenium, Total (mg/L)	< 0.0010	<0.0010	< 0.0010	<0.0010	<0.0010	**0.0011**	<0.0010	<0.0010	< 0.0010
Thallium, Total, (mg/L)	-	<0.0010	<0.0010	-	<0.0010	< 0.0010	-	<0.0010	< 0.0010
Mercury, Total (mg/L)	-	<0.00020	-	-	<0.00020	-	-	<0.00020	-
Radium 226 & 228 Combined (pCi/L)	0.892 ± 0.810 (1.39)	0.467 +/- 0.834 (1.72)	0.470 +/- 0.812 (1.75)	0.469 ± 0.556 (1.03)	1.08 +/- 0.841 (1.43)	**1.25 +/- 0.728 (1.16)**	**1.26 ± 0.793 (1.19)**	1.31 +/- 0.928 (1.61)	**1.37 +/- 0.835 (1.35)**

Notes:

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

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

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

**= resample due to elevated turbidity and analytical results reported in February 2020.*

***= resample due to erroneous turbidity and analytical results reported in February 2020 and May 2020. Well maintenance completed in June 2020.*

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 - 2020 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 004
NEW MADRID, MISSOURI

Location	Downgradient									
	MW-10				MW-11			MW-12		
Measure Point (TOC)	297.81				295.32			297.97		
Sample Name	MW-10	MW-10	DUPLICATE 2	MW-10	MW-11	MW-11	MW-11	MW-12	MW-12	MW-12
Sample Date	02/19/2020	5/19/2020	5/19/2020	8/4/2020	02/18/2020	5/19/2020*	8/12/2020	02/18/2020	5/22/2020*	6/22/2020**
Final Lab Report Date	3/24/2020	7/2/2020	7/2/2020	9/15/2020	3/24/2020	7/2/2020	9/18/2020	3/24/2020	7/2/2020	7/15/2020
Final Lab Report Revision Date	3/31/2020	N/A	N/A	N/A	3/31/2020	N/A	10/16/2020	3/31/2020	N/A	N/A
Final Radiation Lab Report Date	3/23/2020	7/2/2020	7/2/2020	9/14/2020	3/23/2020	7/2/2020	9/16/2020	3/23/2020	7/2/2020	N/A
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	4/8/2020	7/6/2020	7/6/2020	10/19/2020	4/8/2020	7/6/2020	10/19/2020	4/8/2020	7/6/2020	7/16/2020
Depth to Water (ft btoc)	11.40	19.23	-	27.95	9.27	17.38	25.85	11.24	19.30	23.54
Temperature, Field (Deg C)	17.55	18.44	-	18.88	17.42	17.92	25.85	18.89	19.75	20.64
Conductivity, Field (µS/cm)	926	840	-	785	1228	1240	863	729	941	903
Turbidity, Field (NTU)	4.4	3.1	-	0.0	897	100	0.5	1432	0	0.4
Boron, Total (mg/L)	**0.38**	-	-	**0.40**	**0.63**	-	**1.3**	**0.28**	-	-
Calcium, Total (mg/L)	**150**	-	-	**110**	**230**	-	**120**	**180**	-	-
Chloride (mg/L)	**5.6**	-	-	**6.8**	**11**	-	**13**	**11**	-	-
Fluoride (mg/L)	**0.497**	**0.513**	**0.552**	**0.626**	**0.58**	**0.405**	**0.442**	**1.21**	**1.18**	**1.08**
Sulfate (mg/L)	**91**	-	-	**58**	**220**	-	**140**	**120**	-	-
pH (lab) (su)	**6.93**	-	-	**7.16**	**6.86**	-	**7.10**	**7.21**	-	-
TDS (mg/L)	**610**	-	-	**380**	**810**	-	**450**	**430**	-	-
Antimony, Total (mg/L)	-	<0.0030	<0.0030	-	-	<0.0030	-	-	<0.0030	<0.0030
Arsenic, Total (mg/L)	**0.0021**	<0.0010	<0.0010	**0.0011**	**0.0060**	**0.0014**	< 0.0010	**0.0078**	**0.010**	**0.0019**
Barium, Total (mg/L)	**0.14**	**0.11**	**0.11**	**0.11**	**0.89**	**0.25**	**0.094**	**0.79**	**1.3**	**0.41**
Beryllium, Total (mg/L)	-	<0.0010	<0.0010	-	-	<0.0010	-	-	**0.0012**	< 0.0010
Cadmium, Total (mg/L)	-	<0.00089	<0.00089	-	-	<0.00089	-	-	**0.0011**	<0.00089
Chromium, Total (mg/L)	< 0.0040	<0.0040	<0.0040	-	**0.014**	< 0.0040	-	**0.020**	**0.040**	<0.0040
Cobalt, Total (mg/L)	**0.0013**	**0.0024**	**0.0024**	**0.00097**	**0.0095**	**0.0050**	**0.0021**	**0.0060**	**0.0092**	**0.0012**
Lead, Total (mg/L)	< 0.0010	<0.0010	<0.0010	< 0.0010	**0.013**	**0.0021**	< 0.0010	**0.016**	**0.029**	<0.0010
Lithium, Total (mg/L)	**0.017**	**0.016**	**0.015**	**0.014**	**0.032**	**0.025**	**0.022**	**0.031**	**0.042**	**0.022**
Molybdenum, Total (mg/L)	< 0.0010	**0.0011**	**0.0011**	< 0.0010	**0.0063**	**0.0043**	**0.0098**	**0.0039**	**0.0056**	**0.023**
Selenium, Total (mg/L)	-	<0.0010	<0.0010	< 0.0010	-	**0.0011**	< 0.0010	-	**0.0051**	<0.0010
Thallium, Total, (mg/L)	-	<0.0010	<0.0010	< 0.0010	-	<0.0010	< 0.0010	-	<0.0010	<0.0010
Mercury, Total (mg/L)	-	<0.00020	<0.00020	-	-	<0.00020	-	-	**0.00053**	<0.00020
Radium 226 & 228 Combined (pCi/L)	0.822 ± 0.894 (1.72)	0.569 +/- 0.787 (1.48)	0.657 +/- 0.770 (1.51)	0.641 ± 0.755 (1.48)	1.15 ± 1.22 (1.66)	0.0855 +/- 0.921 (2.01)	0.220 +/- 0.824 (1.68)	1.15 ± 0.843 (1.20)	0.178 +/- 0.947 (2.07)	0.900 +/- 0.801 (1.37)

TABLE I
SUMMARY OF ANALYTICAL RESULTS - 2020 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 004
NEW MADRID, MISSOURI

Location	Downgradient									
	MW-12		MW-13					MW-14		
Measure Point (TOC)	297.97		304.05					298.01		
Sample Name	DUPLICATE	MW-12	MW-13	POND 4 DUPLICATE	MW-13	MW-13	DUP CCR POND 004	MW-14	MW-14	MW-14
Sample Date	6/22/2019	8/12/2020	02/19/2020	02/19/2020	5/23/2020	8/18/2020	8/18/2020	02/19/2020	5/23/2020	8/18/2020
Final Lab Report Date	7/15/2020	9/18/2020	3/24/2020	3/24/2020	7/2/2020	9/29/2020	9/29/2020	3/24/2020	7/2/2020	9/29/2020
Final Lab Report Revision Date	N/A	10/16/2020	3/31/2020	3/31/2020	N/A	10/16/2020	10/16/2020	3/31/2020	N/A	10/16/2020
Final Radiation Lab Report Date	N/A	9/16/2020	3/23/2020	3/23/2020	7/2/2020	9/25/2020	9/25/2020	3/23/2020	7/2/2020	9/25/2020
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	7/16/2020	10/19/2020	4/8/2020	4/8/2020	7/6/2020	10/19/2020	10/19/2020	4/8/2020	7/6/2020	10/19/2020
Depth to Water (ft btoc)	-	27.60	16.51	-	27.10	34.90	-	11.51	20.66	28.53
Temperature, Field (Deg C)	-	20.65	14.93	-	17.54	16.46	-	15.84	20.62	15.70
Conductivity, Field (µS/cm)	-	985	759	-	806	544	-	626	217	954
Turbidity, Field (NTU)	-	3.5	0.6	-	36.9	0.0	-	4.4	111	0.0
Boron, Total (mg/L)	-	**0.36**	**0.073**	**0.072**	-	**0.062**	**0.060**	**0.094**	-	**0.13**
Calcium, Total (mg/L)	-	**150**	**140**	**140**	-	**73**	**72**	**100**	-	**130**
Chloride (mg/L)	-	**13**	**19**	**19**	-	**17**	**17**	**16**	-	**11**
Fluoride (mg/L)	**1.08**	**1.05**	**0.416**	**0.419**	**0.398**	**0.527**	**0.495**	**0.861**	**0.891**	**0.754**
Sulfate (mg/L)	-	**170**	**69**	**69**	-	**39**	**39**	**47**	-	**87**
pH (lab) (su)	-	**7.08**	**7.29**	**7.21**	-	**7.47**	**7.66**	**7.27**	-	**7.42**
TDS (mg/L)	-	**600**	**440**	**430**	-	**290**	**280**	**330**	-	**520**
Antimony, Total (mg/L)	<0.0030		-	-	<0.0030	-	-	-	<0.0030	-
Arsenic, Total (mg/L)	**0.0018**	**0.0030**	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010
Barium, Total (mg/L)	**0.40**	**0.33**	**0.19**	**0.19**	**0.19**	**0.11**	**0.11**	**0.10**	**0.086**	**0.15**
Beryllium, Total (mg/L)	<0.0010	-	-	-	<0.0010	-	-	-	<0.0010	-
Cadmium, Total (mg/L)	<0.00089	-	-	-	<0.00089	-	-	-	<0.00089	-
Chromium, Total (mg/L)	<0.0040	-	< 0.0040	< 0.0040	<0.0040	-	-	< 0.0040	<0.0040	-
Cobalt, Total (mg/L)	**0.0012**	< 0.0020	**0.0013**	**0.0012**	**0.0016**	< 0.0020	< 0.0020	**0.0019**	**0.0012**	**0.0030**
Lead, Total (mg/L)	<0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010	< 0.0010
Lithium, Total (mg/L)	**0.021**	**0.025**	< 0.010	< 0.010	<0.010	< 0.010	< 0.010	**0.012**	**0.011**	**0.014**
Molybdenum, Total (mg/L)	**0.0022**	**0.0021**	**0.0014**	**0.0015**	**0.0012**	**0.0020**	**0.0016**	**0.0019**	**0.0018**	**0.0015**
Selenium, Total (mg/L)	<0.0010	< 0.0010	-	-	<0.0010	< 0.0010	< 0.0010	-	<0.0010	< 0.0010
Thallium, Total, (mg/L)	<0.0010	< 0.0010	-	-	**0.0012**	< 0.0010	< 0.0010	-	<0.0010	< 0.0010
Mercury, Total (mg/L)	<0.00020	-	-	-	<0.00020	-	-	-	<0.00020	-
Radium 226 & 228 Combined (pCi/L)	0.416 +/- 0.963 (1.91)	1.50 +/- 0.988 (1.56)	1.25 ± 0.914 (1.69)	0.0571 ± 0.857 (1.89)	0.951 +/- 0.937 (1.67)	0.300 +/- 0.700 (1.47)	1.42 +/- 0.886 (1.49)	0.555 ± 0.737 (1.62)	0.182 +/- 0.766 (1.60)	0.825 +/- 0.827 (1.42)

TABLE I
SUMMARY OF ANALYTICAL RESULTS - 2020 ASSESSMENT MONITORING
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 004
NEW MADRID, MISSOURI

Location	Downgradient		
	MW-15		
Measure Point (TOC)	292.85		
Sample Name	MW-15	MW-15	MW-15
Sample Date	02/19/2020	5/22/2020	8/18/2020
Final Lab Report Date	3/24/2020	7/2/2020	9/29/2020
Final Lab Report Revision Date	3/31/2020	N/A	10/16/2020
Final Radiation Lab Report Date	3/23/2020	7/2/2020	9/25/2020
Final Radiation Lab Report Revision Date	N/A	N/A	N/A
Lab Data Reviewed and Accepted	4/8/2020	7/6/2020	10/19/2020
Depth to Water (ft btoc)	10.11	21.38	29.30
Temperature, Field (Deg C)	15.53	16.34	15.87
Conductivity, Field (µS/cm)	466	511	960
Turbidity, Field (NTU)	0	0.2	0.0
Boron, Total (mg/L)	**0.29**	-	**0.41**
Calcium, Total (mg/L)	**61**	-	**120**
Chloride (mg/L)	**18**	-	**12**
Fluoride (mg/L)	**0.380**	**0.450**	**0.313**
Sulfate (mg/L)	**52**	-	**99**
pH (lab) (su)	**6.86**	-	**7.23**
TDS (mg/L)	**290**	-	**510**
Antimony, Total (mg/L)	-	<0.0030	-
Arsenic, Total (mg/L)	**0.0021**	**0.0014**	**0.0021**
Barium, Total (mg/L)	**0.10**	**0.11**	**0.21**
Beryllium, Total (mg/L)	-	<0.0010	-
Cadmium, Total (mg/L)	-	<0.00089	-
Chromium, Total (mg/L)	< 0.0040	<0.0040	-
Cobalt, Total (mg/L)	< 0.00086	<0.00086	< 0.0020
Lead, Total (mg/L)	< 0.0010	<0.0010	< 0.0010
Lithium, Total (mg/L)	**0.010**	<0.010	**0.016**
Molybdenum, Total (mg/L)	**0.0011**	**0.0012**	< 0.0010
Selenium, Total (mg/L)	-	<0.0010	< 0.0010
Thallium, Total, (mg/L)	-	<0.0010	< 0.0010
Mercury, Total (mg/L)	-	<0.00020	-
Radium 226 & 228 Combined (pCi/L)	0.305 ± 0.821 (1.41)	0.206 +/- 0.762 (1.59)	1.10 +/- 0.913 (1.91)

TABLE II
BACKGROUND CONCENTRATIONS AND GROUNDWATER PROTECTION STANDARDS
ASSOCIATED ELECTRIC COOPERATIVE, INC.
NEW MADRID POWER PLANT - POND 004
NEW MADRID, MISSOURI

Constituent	Background Concentration (UTL)	Groundwater Protection Standard
Arsenic (mg/L)	0.0099	0.010*
Barium (mg/L)	0.800	2*
Chromium (mg/L)	0.0098	0.1*
Cobalt (mg/L)	0.005	0.006**
Fluoride (mg/L)	1.71	4.0*
Lead (mg/L)	0.0047	0.015*
Lithium (mg/L)	0.033	0.040**
Molybdenum (mg/L)	0.01	0.100**
Radium 226 & 228 (pCi/L)	2.5157	5*

Notes:

1. Groundwater Protection Standards listed were utilized for statistical analyses for the September 2019 and February 2020 semi-annual assessment monitoring sampling events.

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

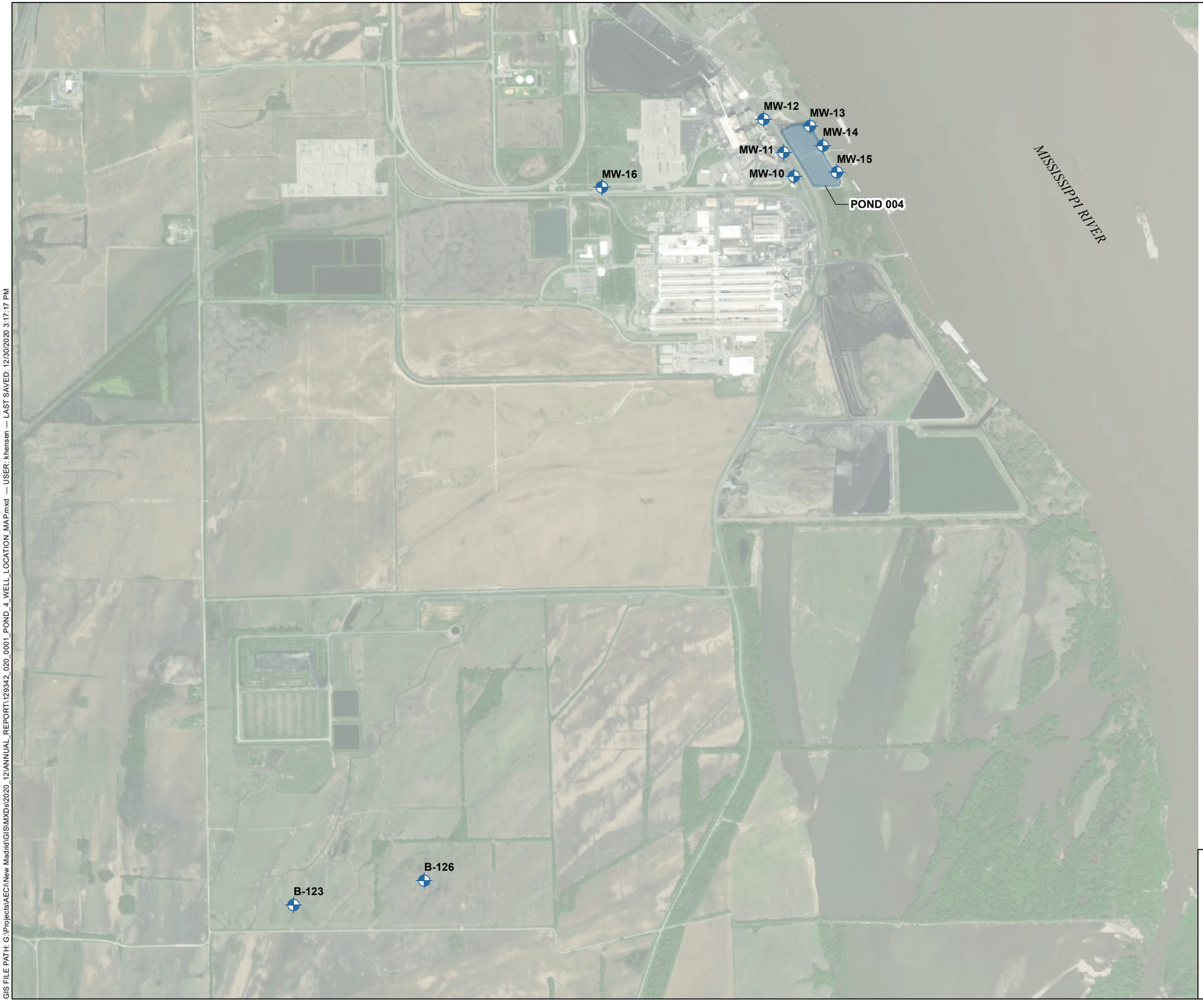
*** Value set based on 40 CFR § 257.95(h)(1)*

mg/L = milligrams per liter

pCi/L = picoCuries per liter

UTL = upper tolerance limit

FIGURE



LEGEND

MONITORING WELL

POND 004

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

4. AERIAL IMAGERY SOURCE: ESRI, 21 APRIL 2019

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0 1,500 3,000

SCALE IN FEET

HALEY ALDRICH

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

POND 004 MONITORING WELL LOCATION MAP

FEBRUARY 2021

FIGURE 1

GIS FILE PATH: G:\Projects\AEC\New Madrid\GIS\MXDs\2020_12\ANNUAL_REPORT\129342_020_0001_POND_4_WELL_LOCATION_MAP.mxd — USER: khensen — LAST SAVED: 12/30/2020 3:17:17 PM