

2020 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
BOTTOM ASH SETTLING AREA  
TECUMSEH ENERGY CENTER  
TECUMSEH, KANSAS

by Haley & Aldrich, Inc.  
Cleveland, Ohio

for Evergy Kansas Central, Inc.  
Topeka, Kansas

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Revision No.	Date	Notes
0	2/1/2021	Original

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**2020 Annual Groundwater Monitoring  
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This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Tecumseh Energy Center (TEC) Bottom Ash Settling Area (BASA) 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 U.S. Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2020 Annual Groundwater Monitoring and Corrective Action Report for the TEC BASA is, to the best of my knowledge, accurate and complete.

Signed:   
Professional Geologist

Print Name: Mark Nicholls  
Kansas License No.: Professional Geologist No. 881  
Title: Technical Expert 2  
Company: Haley & Aldrich, Inc.



## 1. Introduction

This 2020 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Bottom Ash Settling Area (BASA; also known as the Bottom Ash Settling Pond) at the Tecumseh Energy Center (TEC), operated by Evergy Kansas Central, Inc. (Evergy). This Annual Report was developed in accordance with the U.S. Environmental Protection Agency Coal Combustion Residual (CCR) Rule (Rule) effective October 19, 2015, 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 BASA 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 for the Annual Report listed in § 257.90(e) 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 (January 1, 2020), the BASA 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 (December 31, 2020), the BASA was closed in accordance with the requirements of 40 CFR § 257.102(c). Upon documentation of CCR waste material removal from the unit on September 5, 2019, two consecutive sampling events, October 2019 and December 2019, were used to document that detected appendix IV constituents did not exceed the groundwater protection standards for the BASA pursuant to § 257.95(h). The TEC BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

#### 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):*

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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 BASA was operating under an assessment monitoring program until August 2020 prior to closure; therefore, no statistical evaluations were completed 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 was initiated on July 17, 2018 for the BASA with a notification establishing assessment monitoring provided on August 15, 2018 to meet the requirements of 40 CFR § 257.95. The TEC BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

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 in 2020 for the BASA.

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. The BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

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 the BASA in 2020; therefore, a public meeting was not held.

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**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. The BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

**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 BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c), 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 in 2020.

## 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.*

Energy has installed and certified a groundwater monitoring system at the TEC BASA. The BASA 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).

### 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 monitoring completed and actions taken for the groundwater monitoring system at the TEC BASA as required by the Rule. Groundwater sampling and analysis was conducted per the 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

The BASA unit was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

#### 2.2.2 Key Actions Completed

The 2019 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2020. Statistical evaluations, in support of § 257.95(e), were completed in January and April 2020 on analytical data from the October and December 2019 semi-annual assessment monitoring sampling events, respectively.

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During the December 2019 semi-annual assessment monitoring sampling event, downgradient monitoring well MW-9 was identified as being dry. The monitoring well was unable to be sampled; therefore, statistical evaluation was not completed for MW-9 for the December 2019 sampling event. Monitoring well MW-9 was re-confirmed to be dry in March 2020.

The TEC BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c). No sampling events were completed at the TEC BASA in 2020.

### 2.2.3 Problems Encountered

No noteworthy problems (i.e., problems could include damaged wells, issues with sample collection or lack of sampling, and problems with analytical analysis) were encountered at the BASA in 2020.

### 2.2.4 Actions to Resolve Problems

No problems were encountered at the BASA in 2020, therefore, no actions to resolve problems were required.

### 2.2.5 Project Key Activities for Upcoming Year

The TEC BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c). No key activities are planned to be completed in 2021 at the unit under the CCR Rule.

## 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 upgradient) and downgradient 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 TEC BASA is included in this report as Figure 1.

### 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 downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;*

Upon completion of the statistical evaluation of the December 2019 semi-annual assessment monitoring sampling event, the TEC BASA was closed in accordance with the requirements of § 257.102(c). No sampling events were completed at the TEC BASA in 2020.

**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 initiated on July 17, 2018 with a notification establishing assessment monitoring provided on August 15, 2018 to meet the requirements of 40 CFR § 257.95. Upon documentation of CCR waste material removal from the unit on September 5, 2019, two consecutive sampling events, October 2019 and December 2019, were used to document that detected appendix IV constituents did not exceed the groundwater protection standards for the BASA pursuant to § 257.95(h). The TEC BASA surface impoundment was closed on August 11, 2020 in accordance with the requirements of § 257.102(c).

**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).*

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This unit was closed on August 11, 2020 in accordance with § 257.102(c). Prior to that date, the unit was operating under an assessment monitoring program; 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.***

The TEC BASA was closed on August 11, 2020 in accordance with § 257.102(c). Prior to that date, the unit was operating under an assessment monitoring program; 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 assessment monitoring sampling and analysis frequency was not established for this unit; therefore, no demonstration or certification is applicable. This unit was closed on August 11, 2020 in accordance with § 257.102(c).

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 was implemented at the CCR unit until closure on August 11, 2020. The background concentrations (upper tolerance limits) and groundwater protection standards established for detected appendix IV constituents for the TEC BASA are included in Table I. The background concentrations and groundwater protection standards provided in Table I were utilized for the statistical evaluations completed in 2020 for the October 2019 and December 2019 semi-annual assessment monitoring sampling events.

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 assessment monitoring alternative source demonstration or certification was required in 2020.

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***

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***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 in 2020; therefore, no demonstration or certification is applicable for this unit.

## TABLE

**TABLE I**  
**ASSESSMENT GROUNDWATER MONITORING - DETECTED APPENDIX IV GWPS**  
 SEPTEMBER AND DECEMBER 2019 SAMPLING EVENT  
 TECUMSEH ENERGY CENTER  
 BOTTOM ASH SETTLING AREA

Well Number	Background Value <sup>1</sup>	GWPS
<b>CCR Appendix-IV Arsenic, Total (mg/L)</b>		
MW-7 (upgradient)	0.0021	NA
MW-10 <sup>2,3</sup>	0.118	0.118
MW-8		0.010
MW-9 <sup>2,3</sup>	0.198	0.198
<b>CCR Appendix-IV Barium, Total (mg/L)</b>		
MW-7 (upgradient)	0.0953	NA
MW-10		2
MW-8		2
MW-9		2
<b>CCR Appendix-IV Cadmium, Total (mg/L)</b>		
MW-7 (upgradient)	0.0005	NA
MW-10		0.005
MW-8		0.005
MW-9		0.005
<b>CCR Appendix-IV Cobalt, Total (mg/L)</b>		
MW-7 (upgradient)	0.00217	NA
MW-10		0.006
MW-8		0.006
MW-9 <sup>2,3</sup>	0.0641	0.064
<b>CCR Appendix-IV Fluoride, Total (mg/L)</b>		
MW-7 (upgradient)	0.371	NA
MW-10		4.0
MW-8		4.0
MW-9		4.0
<b>CCR Appendix-IV Lithium, Total (mg/L)</b>		
MW-7 (upgradient)	0.0295	NA
MW-10		0.040
MW-8		0.040
MW-9		0.040
<b>CCR Appendix-IV Molybdenum, Total (mg/L)</b>		
MW-7 (upgradient)	0.0138	NA
MW-10		0.100
MW-8		0.100
MW-9		0.100
<b>CCR Appendix-IV Radium-226 &amp; 228 Combined (pCi/L)</b>		
MW-7 (upgradient)	5.88	NA
MW-10		5.88
MW-8		5.88
MW-9		5.88

**Notes and Abbreviations:**

<sup>1</sup> Interwell background value based on background data collected through September 2018.

<sup>2</sup> Denotes intrawell evaluation for the listed constituent. All other constituents are interwell evaluation.

<sup>3</sup> Intrawell background value based on background data collected through June 2019.

CCR = Coal Combustion Residuals

GWPS = Groundwater Protection Standard

mg/L = milligrams per Liter

NA = Not Applicable

pCi/L = picoCuries per Liter

**FIGURE**



**LEGEND**

-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  BOTTOM ASH SETTLING AREA

**NOTES**

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



**HALEY ALDRICH** EVERGY KANSAS CENTRAL, INC.  
 TECUMSEH ENERGY CENTER  
 TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA  
 MONITORING WELL LOCATION MAP**