HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

Revision 3: March 6, 2026
Revision 2: June 5, 2025
Revision 1: March 09, 2021
Original: October 17, 2017
File No. 0210310

SUBJECT: Tecumseh Energy Center – Groundwater Monitoring Systems Certification
Bottom Ash Settling Pond and Ash Landfill 322
Evergy Kansas Central, Inc.

Evergy Kansas Central, Inc. (Evergy) operates coal combustion residual (CCR) management units referred to as the Bottom Ash Settling Area (BASA; also known as the Bottom Ash Settling Pond) and Ash Landfill 322 (322 Landfill) at the Tecumseh Energy Center (TEC) located in Tecumseh, Kansas. These CCR units are subject to the CCR Rule since they were active as of the effective date of the CCR Rule.

Haley & Aldrich, Inc. is providing this document to address the requirements of § 257.91 *Groundwater Monitoring Systems*, specifically § 257.91(f), of the U.S. Environmental Protection Agency (USEPA) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, Title 40 Code of Federal Regulations (40 CFR) Part 257 (CCR Rule) effective October 19, 2015. This document serves as certification that the units comply with the requirements defined in the CCR Rule. In addition, this document revision provides narratives outlining the basis for the design and geospatial arrangements of the CCR well monitoring networks based on site-specific conditions, established hydrogeologic principles, and industry practice, with consideration for the geometry and physical characteristics of and material contents within the CCR unit(s) being monitored.

Each single-unit groundwater monitoring system has been designed to include at least one upgradient and three downgradient monitoring wells pursuant to § 257.91(c). We also note that each of the single-unit groundwater monitoring systems includes at least one side-gradient piezometer used to support analysis of groundwater elevations and flow direction. In 2016, Evergy submitted the associated design and construction information for the initial monitoring well networks to the Kansas Department of Health and Environment (KDHE) for review and approval that the network met the requirements of the CCR Rule, and KDHE provided approval of both original groundwater monitoring networks in July 2016.

In 2023, and in accordance with Paragraph 10.e. of the *Consent Agreement and Final Order (CAFO) between the USEPA and Evergy In the Matter of Evergy Kansas Central, Inc.: Docket No. RCRA-07-2023-0001* (dated November 7, 2022), four additional monitoring wells were installed downgradient of the BASA to provide additional capacity for groundwater monitoring at the unit boundary.

In 2024, and in accordance with Paragraph 10.f. of the CAFO, seven additional monitoring wells were installed (four downgradient and three upgradient of the 322 Landfill) to provide additional capacity for groundwater monitoring at the unit boundary.

Table 1 below lists the wells in each of the groundwater monitoring systems as certified herein. This certification has been prepared based upon information available in the facility Operating Record pursuant to § 257.91(e)(1).

Table 1. CCR Unit Groundwater Monitoring Well Networks

CCR Unit	Upgradient Monitoring Wells	Downgradient Monitoring Wells		Piezometric Observation Monitoring Well
Bottom Ash Settling Area	MW-7	MW-8	MW-10	MW-9
		MW-11A	MW-12	MW-11
		MW-13	MW-14	
Ash Landfill 322	MW-4	MW-1	MW-5	MW-2
	MW-11	MW-6	MW-7	
	MW-12	MW-8	MW-9	
	MW-13	MW-10		

BASA CCR MONITORING SYSTEM

The BASA monitoring network, as originally designed, included one upgradient and three downgradient monitoring wells, along with one side-gradient well for potentiometric observation. Four additional downgradient monitoring wells (MW-11A, MW-12, MW-13, and MW-14) were subsequently installed to supplement the original monitoring well network to address the reduced water column at the existing monitoring wells downgradient of the BASA. Following completion of baseline sampling events for the newly installed monitoring wells, the BASA monitoring network now includes one upgradient and six downgradient monitoring wells, with one side-gradient well and one downgradient well used for potentiometric observation. Monitoring well MW-9 has been redesignated for potentiometric observation.

The number, spacing, and depths of monitoring wells were determined based on site-specific technical information observed during drilling, installation, and testing of the monitoring wells, including stratigraphy, lithology, hydraulic conductivity, and porosity, along with site-specific data developed during characterization activities. The monitoring network was designed to monitor clay, sand, and gravel of the glacial till, which constitutes the uppermost aquifer beneath the CCR unit and has a saturated thickness of approximately 2 to 5.5 feet based on observations made during drilling at the BASA.

The hydraulic conductivity of the uppermost aquifer beneath the BASA was calculated using data generated from slug tests conducted after monitoring well installation and development and calculated an average of $5.8x10^{-4}$ centimeters per second (cm/sec). Based on slug test results, the effective porosity of the uppermost aquifer is estimated to be 5 percent. The groundwater flow velocity was calculated to be approximately 102 feet per year toward the northwest. Groundwater flowing at this velocity and direction would be expected to convey impacted groundwater from beneath the unit to the downgradient monitoring wells within the monitoring timeframe.

The monitoring wells have been constructed at locations on the west and north sides of the unit which allow them to intercept representative groundwater flow paths passing beneath the unit at the waste boundary. The number and placement of monitoring wells at the BASA is appropriate based on the consistent groundwater flow direction and groundwater flow velocity to detect groundwater constituents present in representative groundwater flow paths within the uppermost aquifer and passing the waste boundary.

322 LANDFILL CCR MONITORING SYSTEM

The 322 Landfill monitoring network, as originally designed, included one upgradient and three downgradient monitoring wells, with one side-gradient monitoring well for potentiometric observation. Prior to the CCR Rule, a certified monitoring network was already operating (MW-1, MW-2, and MW-4) at the 322 Landfill in compliance with KDHE Solid Waste Permit No. 322. The KDHE monitoring network was reviewed for inclusion into the CCR program. Although the KDHE monitoring network was approved by KDHE, the network of wells was expanded and two additional CCR monitoring wells (MW-5 and MW-6) were installed. Groundwater elevation data developed from MW-5 and MW-6 indicate that MW-2 is a side-gradient monitoring well. Well MW-2 remained in the monitoring network for potentiometric observation to support analysis of groundwater elevation and flow direction at the 322 Landfill.

Four additional downgradient monitoring wells (MW-7, MW-8, MW-9, and MW-10) were subsequently installed to supplement the original monitoring well network. Three additional upgradient monitoring wells (MW-11, MW-12, and MW-13) were installed to provide supplemental background groundwater analytical data. Preliminary findings indicate the water column at these newly installed upgradient monitoring wells is insufficient to support groundwater sampling. Following completion of baseline sampling at the newly installed monitoring wells, the 322 Landfill monitoring network has been expanded to include four upgradient and seven downgradient monitoring wells, with one side-gradient well used for potentiometric observation.

The number, spacing, and depths of monitoring wells were determined based on site-specific technical information observed during drilling, installation, and testing of the monitoring wells, including stratigraphy, lithology, hydraulic conductivity, and porosity, together with site-specific data developed during previous characterization activities. The monitoring network was designed to monitor the clay, sand, and gravel of the glacial till, which constitutes the uppermost aquifer beneath the 322 Landfill which has a saturated thickness of approximately 3 to 18 feet based on observations made during drilling at the 322 Landfill.

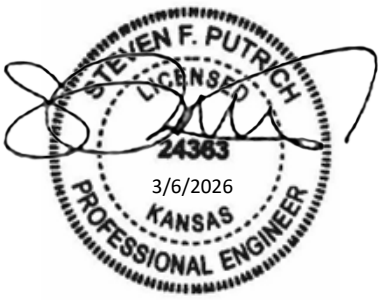
The hydraulic conductivity of the uppermost aquifer beneath the 322 Landfill was calculated using data generated from slug tests conducted after monitoring well installation and development and calculated at $1.5x10^{-4}$ cm/sec. Based on slug test results, effective porosity of the uppermost aquifer is estimated to be 5 percent. The groundwater flow velocity was calculated to be approximately 35 feet per year toward the northeast. Groundwater flowing at this velocity and direction would be expected to convey impacted groundwater from beneath the unit to the downgradient monitoring wells within the monitoring timeframe. The monitoring wells have been constructed at locations on the north and northeast sides of the unit that allow them to intercept representative groundwater flow paths passing beneath the unit at the waste boundary. The number and placement of monitoring wells at the 322 Landfill is appropriate based on the consistent groundwater flow direction and groundwater flow velocity to detect groundwater constituents present in representative groundwater flow paths within the uppermost aquifer and passing the waste boundary.

CERTIFICATION STATEMENT

Pursuant to 40 CFR Chapter I Subchapter I Part 257 Subpart D § 257.91(f), I certify that the groundwater monitoring systems for the BASA and the 322 Landfill have been designed and constructed to meet the requirements of § 257.91. The certification submitted is, to the best of my knowledge, accurate and complete.

Signed:_____
Certifying Engineer

Print Name: Steven F. Putrich, P.E.
Kansas License No.: PE24363
Title: Principal Consultant
Company: Haley & Aldrich, Inc.



Signed:_____
Professional Geologist

Print Name: Mark D. Nicholls, P.G.
Kansas License No.: 881
Title: Principal Consultant
Company: Haley & Aldrich, Inc.

Revision No.	Date	Notes
0	October 2017	Original
1	March 2021	Provide additional information supporting the rationale for the originally certified CCR monitoring well networks at the BASA and 322 Landfill which included the minimum number of monitoring wells.
2	June 2025	Updated to include newly installed monitoring wells at the BASA
3	March 2026	Updated to include newly installed monitoring wells at the 322 Landfill