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2019 ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT
322 LANDFILL
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Evergy Kansas Central, Inc. (f/k/a Westar Energy, Inc.)
Topeka, Kansas

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**2019 Annual Groundwater Monitoring
and Corrective Action Report**

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This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Tecumseh Energy Center (TEC) 322 Landfill consistent with applicable sections of § 257.90 through 257.98, and describes activities conducted in the prior calendar year (2019) and documents compliance with the United States Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the TEC 322 Landfill is, to the best of my knowledge, accurate and complete.

Signed: 
Professional Geologist

Print Name: Mark Nicholls
Kansas License No.: Professional Geologist No. 8
Title: Technical Expert 2
Company: Haley & Aldrich, Inc.



**2019 Annual Groundwater Monitoring
and Corrective Action Report**

1. Introduction

This 2019 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the 322 Landfill at the Tecumseh Energy Center (TEC), operated by Evergy Kansas Central, Inc. (Evergy; f/k/a Westar Energy, Inc.). This Annual Report was developed in accordance with the United States Environmental Protection Agency Coal Combustion Residual (CCR) Rule (Rule) effective 19 October 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 TEC 322 Landfill consistent with applicable sections of § 257.90 through 257.98, and describes activities conducted in the prior calendar year (2019) and documents compliance with the Rule. The specific requirements for the annual report listed in § 257.90(e) of the Rule are provided in Section 2 of this Annual Report and are in bold italic font, followed by a short narrative describing how each Rule requirement has been met.

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.

Every has installed and certified a groundwater monitoring system at the TEC 322 Landfill. The 322 Landfill 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 322 Landfill 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 2019.

2.2.1 Status of the Groundwater Monitoring Program

The 322 Landfill remained in the assessment monitoring program during 2019.

2.2.2 Key Actions Completed

The 2018 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2019. Statistical evaluation was completed in January 2019 on analytical data from the September 2018 assessment monitoring sampling event.

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A semi-annual assessment monitoring sampling event was completed in March 2019 for detected Appendix IV constituents identified from the June 2018 annual assessment monitoring sampling event. Statistical evaluation was completed in July 2019 on analytical data from the March 2019 assessment monitoring sampling event.

An annual assessment monitoring sampling event was completed in June 2019 to identify detected Appendix IV constituents for subsequent semi-annual sampling events in September 2019 and planned for March 2020. Groundwater protection standards for detected Appendix IV constituents were established or updated at that time. Semi-annual assessment monitoring sampling was completed in September 2019 for detected Appendix IV constituents identified during the June 2019 annual monitoring event. Statistical evaluation of the results from the September 2019 semi-annual assessment monitoring sampling event are due to be completed in January 2020 and will be reported in the next annual report.

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 for the 322 Landfill in 2019.

2.2.4 Actions to Resolve Problems

No problems were encountered at the 322 Landfill in 2019; therefore, no actions to resolve problems were required.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2020 include the completion of the 2019 Annual Groundwater Monitoring and Corrective Action Report, statistical evaluation of semi-annual assessment monitoring analytical data collected in September 2019, semi-annual assessment monitoring and subsequent statistical evaluations, 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 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 322 Landfill is included in this report as Figure 1.

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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 2019.

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;

In accordance with § 257.95(b) and § 257.95(d)(1), three independent assessment monitoring samples from each background and downgradient monitoring well were collected in 2019. A summary including sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program for the 322 Landfill 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 in June 2018 to meet the requirements of 40 CFR §257.95. The 322 Landfill remained in assessment monitoring during 2019.

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 2019.

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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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).

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An assessment monitoring program has been implemented at the CCR unit since June 2018. Three rounds of assessment monitoring sampling were completed in 2019. Analytical results for both downgradient and upgradient wells are provided in Table I. The background concentrations (upper tolerance limits) and groundwater protection standards established for detected Appendix IV constituents for the 322 Landfill are included in Table II. The background concentrations and groundwater protection standards provided in Table II were utilized for the statistical evaluations completed in 2019 for September 2018 and March 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 alternate source demonstration or certification was required in 2019. The 322 Landfill remained in assessment monitoring during 2019.

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

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the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

No assessment monitoring of corrective measures was required to be initiated in 2019; therefore, no demonstration or certification is applicable for this unit.

TABLES

TABLE I

SUMMARY OF ANALYTICAL RESULTS - ASSESSMENT MONITORING

EVERGY KANSAS CENTRAL, INC.
 TECUMSEH ENERGY CENTER
 322 LANDFILL
 TECUMSEH, KANSAS

Location	Upgradient			Downgradient											
	MW-4			MW-1				MW-5			MW-6				
Measure Point (TOC)	936.48			904.65				916.18			911.28				
Sample Name	MW-4-032019	MW-4-062619	MW-4	MW-1-032019	MW-1-062619	DUP-062619	MW-1	DUPLICATE	MW-5-032019	MW-5-062619	MW-5	MW-6-032019	DUP-032019	MW-6-062619	MW-6
Sample Date	3/20/2019	6/26/2019	9/7/2019	3/20/2019	6/26/2019	6/26/2019	9/6/2019	9/6/2019	3/20/2019	6/26/2019	9/7/2019	3/20/2019	3/20/2019	6/26/2019	9/7/2019
Final Lab Report Date	4/1/2019	7/9/2019	9/13/2019	4/1/2019	7/9/2019	7/9/2019	9/13/2019	9/13/2019	4/1/2019	7/9/2019	9/13/2019	4/1/2019	4/1/2019	7/9/2019	9/13/2019
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	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	4/3/2019	7/17/2019	10/2/2019	4/3/2019	7/17/2019	7/17/2019	10/2/2019	10/2/2019	4/3/2019	7/17/2019	10/2/2019	4/3/2019	4/3/2019	7/17/2019	10/2/2019
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	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	4/15/2019	7/26/2019	10/22/2019	4/15/2019	7/26/2019	7/26/2019	10/22/2019	10/22/2019	4/15/2019	7/26/2019	10/22/2019	4/15/2019	4/15/2019	7/26/2019	10/22/2019
Depth to Water (ft btoc)	3.49	3.28	4.00	3.99	3.84	--	3.83	--	5.70	5.03	6.09	8.06	8.06	8.10	8.09
Temperature (Deg C)	7.78	17.23	19.32	10.35	15.31	--	15.75	--	9.43	15.00	19.63	11.43	11.43	14.34	17.61
Conductivity ($\mu\text{S}/\text{cm}$)	1530	1660	1628	1203	1257	--	992	--	2370	2270	2262	2080	2080	2110	1899
Turbidity (NTU)	4.13	3.00	1.33	9.01	1.75	--	1.61	--	1.46	0.39	0.49	12.1	12.1	8.31	2.19
Boron, Total (mg/L)	<0.10	--	<0.10	0.12	--	--	0.37	0.39	0.95	--	1.5	0.72	0.71	--	0.71
Calcium, Total (mg/L)	162	--	146	162	--	--	151	154	368	--	328	328	322	--	295
Chloride (mg/L)	280	--	266	43.6	--	--	29.3	30.5	47.5	--	41.9	64.9	66.4	--	66.5
Fluoride (mg/L)	0.24	--	0.21	0.38	--	--	0.30	0.30	0.25	--	0.25	0.30	0.28	--	0.28
Sulfate (mg/L)	150	--	140	394	--	--	364	331	1160	--	857	977	532	--	783
pH (su)	7.2	--	7.0	7.1	--	--	6.9	6.8	6.9	--	6.8	7.0	7.1	--	7.0
TDS (mg/L)	976	--	987	936	--	--	905	893	1980	--	1750	1750	1740	--	1600
Antimony, 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	--
Arsenic (mg/L)	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	<0.0010	--	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	--
Barium, Total (mg/L)	0.094	0.11	0.10	0.066	0.065	0.069	0.076	0.079	0.018	0.022	0.019	0.016	0.017	0.016	0.014
Beryllium, Total (mg/L)	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	--	--	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	--
Cadmium, Total (mg/L)	<0.00050	<0.00050	--	<0.00050	<0.00050	<0.00050	--	--	<0.00050	<0.00050	--	<0.00050	<0.00050	<0.00050	--
Chromium, Total (mg/L)	<0.0050	<0.0050	--	<0.0050	<0.0050	<0.0050	--	--	<0.0050	<0.0050	--	<0.0050	<0.0050	<0.0050	--
Cobalt, Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0017	0.0017	0.014	0.0019	0.0020	0.0022	0.0021	0.0026	0.0024
Lead, Total (mg/L)	<0.010	<0.010	--	<0.010	<0.010	<0.010	--	--	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Lithium, Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.017	0.010	0.012	0.015	--
Molybdenum, Total (mg/L)	<0.0010	<0.0010	--	<0.0010	<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	<0.0010	--	--	<0.0050	<0.0010	--	<0.0050	<0.0010	<0.0010	--
Thallium, Total (mg/L)	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	--	--	<0.0010	<0.0010	--	<0.0010	<0.0010	<0.0010	--
Mercury, Total (mg/L)	<0.00020	<0.00020	--	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	--	<0.00020	<0.00020	<0.00020	--
Fluoride (mg/L)	0.24	0.24	0.21	0.38	0.34	0.35	0.30	0.30	0.25	<0.20	0.25	0.30	0.28	0.46	0.28
Radium-226 & 228 Combined (pCi/L)	1.85 +/- 1.11 (1.73)	1.84 +/- 1.01 (1.59)	1.80 +/- 0.970 (1.29)	0.253 +/- 0.818 (1.75)	0.725 +/- 0.817 (1.54)	1.67 +/- 1.10 (1.61)	1.72 +/- 1.09 (1.74)	0.808 +/- 0.806 (1.52)	1.36 +/- 1.01 (1.66)	1.04 +/- 0.936 (1.59)	1.01 +/- 0.845 (1.40)	0.931 +/- 0.876 (1.55)	1.43 +/- 0.873 (1.41)	2.60 +/- 1.23 (1.47)	0.0676 +/- 0.759 (1.54)

Notes:

The June 2019 sampling event was for Appendix IV constituents only. The September 2019 sampling event included Appendix IV constituents detected in the June 2019 sampling event, and all of the Appendix III constituents.

Radiological results are presented as activity plus or minus uncertainty with minimum detectable concentration (MDC).

Bold value: Detection above laboratory reporting limit or MDC.

$\mu\text{S}/\text{cm}$ = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

NTU = Nephelometric Turbidity Unit

pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

TABLE II**ANNUAL ASSESSMENT GROUNDWATER MONITORING - DETECTED APPENDIX IV GWPS**

JUNE 2019 SAMPLING EVENT

TECUMSEH ENERGY CENTER

322 LANDFILL

Well #	Background Value*	GWPS
CCR Appendix-IV Barium, Total (mg/L)		
MW-4 (upgradient)	0.14	NA
MW-1		2
MW-5		2
MW-6		2
CCR Appendix-IV Cobalt, Total (mg/L)		
MW-4 (upgradient)	0.001	NA
MW-1		0.006
MW-5		0.006
MW-6		0.006
CCR Appendix-IV Fluoride, Total (mg/L)		
MW-4 (upgradient)	0.35	NA
MW-1		4.0
MW-5		4.0
MW-6		4.0
CCR Appendix-IV Lithium, Total (mg/L)		
MW-4 (upgradient)	0.01	NA
MW-1		0.040
MW-5		0.040
MW-6		0.040
CCR Appendix-IV Radium-226 & 228 Combined (pCi/L)		
MW-4 (upgradient)	3.1	NA
MW-1		5
MW-5		5
MW-6		5

Notes:

* Background value based on data collected through June 2018

CCR = Coal Combustion Residuals

GWPS = Groundwater Protection Standard

MCL = Maximum Contaminant Level

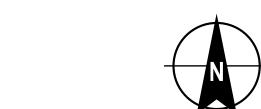
mg/L = milligrams per Liter

NA = Not Applicable

pCi/L = picoCuries per Liter

RSL = Regional Screening Level

FIGURE



0 300 600
SCALE IN FEET

FIGURE 1