

2017 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT BOTTOM ASH SETTLING POND TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

by Haley & Aldrich, Inc. Cleveland, Ohio

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

File No. 129778-041 January 2018

Revised: March 2021

Table of Contents

			Page
1.	Intro	1	
2.	40 C	FR § 257.90 Applicability	2
	2.1	40 CFR § 257.90(A)	2
	2.2	40 CFR § 257.90(E)	2
	2.3	40 CFR § 257.90(E) – INFORMATION	2
		2.3.1 40 CFR § 257.90(e)(1)	2
		2.3.2 40 CFR § 257.90(e)(2) – Monitoring System Changes	3
		2.3.3 40 CFR § 257.90(e)(3) – Summary of Sampling Events	3
		2.3.4 40 CFR § 257.90(e)(4) – Monitoring Transition Narrative	3
		2.3.5 40 CFR § 257.90(e)(5) – Other Requirements	4

Revision No.	Date	Notes
0	January 2018	Original
1	March 2021	Revised to include groundwater potentiometric contour maps for covered in this 2017 annual report

i



List of Tables

Table No. Title

I Summary of Analytical Results

List of Figures

Figure No.	Title
1	Bottom Ash Settling Area Monitoring Well Location Map
2	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – August 17, 2016
3	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – September 19, 2016
4	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – October 31, 2016
5	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – December 12, 2016
6	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – February 6, 2017
7	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – April 5, 2017
8	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – May 23, 2017
9	Bottom Ash Settling Area Groundwater Potentiometric Elevation Contour Map – June 26, 2017

i



This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Tecumseh Energy Center (TEC) Bottom Ash Settling Area consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2017) and documents compliance with the U.S. Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2017 Annual Groundwater Monitoring and Corrective Action Report for the TEC Bottom Ash Settling Area 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 2017 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Bottom Ash Settling Area (BASA) 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 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 TEC BASA consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2017) 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)

Except as provided for in § 257.100 for inactive CCR surface impoundments, all CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under §§ 257.90 through 257.98.

The Bottom Ash Settling Area at the TEC, which is the CCR management unit addressed in this Annual Report, is subject to the groundwater monitoring and corrective action requirements described under 40 CFR §§ 257.90 through 257.98. In particular, 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)

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 is the initial report for the TEC BASA as required by the Rule as the groundwater monitoring system was established and certified by 17 October 2017. Prior to October 17, 2017, Evergy installed a groundwater monitoring system at the BASA consistent with § 257.91. 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 is provided in this report. This Annual Report documents the activities completed in the calendar year 2017.

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 BASA is included in this report as Figure 1. In addition, this information is presented in the CCR Groundwater Monitoring Network Description Report prepared for Evergy, which was placed in the facility's operating record by October 17, 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;

The design and construction of the monitoring well network for the TEC BASA are described in the CCR Groundwater Monitoring Network Description Report dated October 17, 2017. This report was placed in the facility's operating record by October 17, 2017, as required by § 257.105(h)(2). Since the groundwater monitoring system was certified, no new monitoring wells were installed or decommissioned.

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 § 257.94(b), eight independent samples from each background and downgradient monitoring well were collected prior to October 17, 2017. A summary table including the sample names, dates of sample collection, reason for sample collection (detection or assessment), and monitoring data obtained for the groundwater monitoring program for the BASA is presented in Table I of this report. In 2017, the groundwater monitoring sampling and laboratory analyses were completed under the detection monitoring program. Groundwater potentiometric elevation contour maps associated with each groundwater monitoring sampling event in 2016 and 2017 are provided in Figures 2 through 9.

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

Detection monitoring was conducted in accordance with § 257.94(b), and no transitions between monitoring programs occurred for the BASA in calendar year 2017.



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 initial Annual Report documents activities conducted to comply with § 257.90 through § 257.94 of the Rule. It is understood that there are supplemental references in § 257.90 through § 257.98 to information that must be placed in the Annual Report; however, none of the activities referenced as required in the Annual Report are relevant to the groundwater monitoring program for activities completed in calendar year 2017.



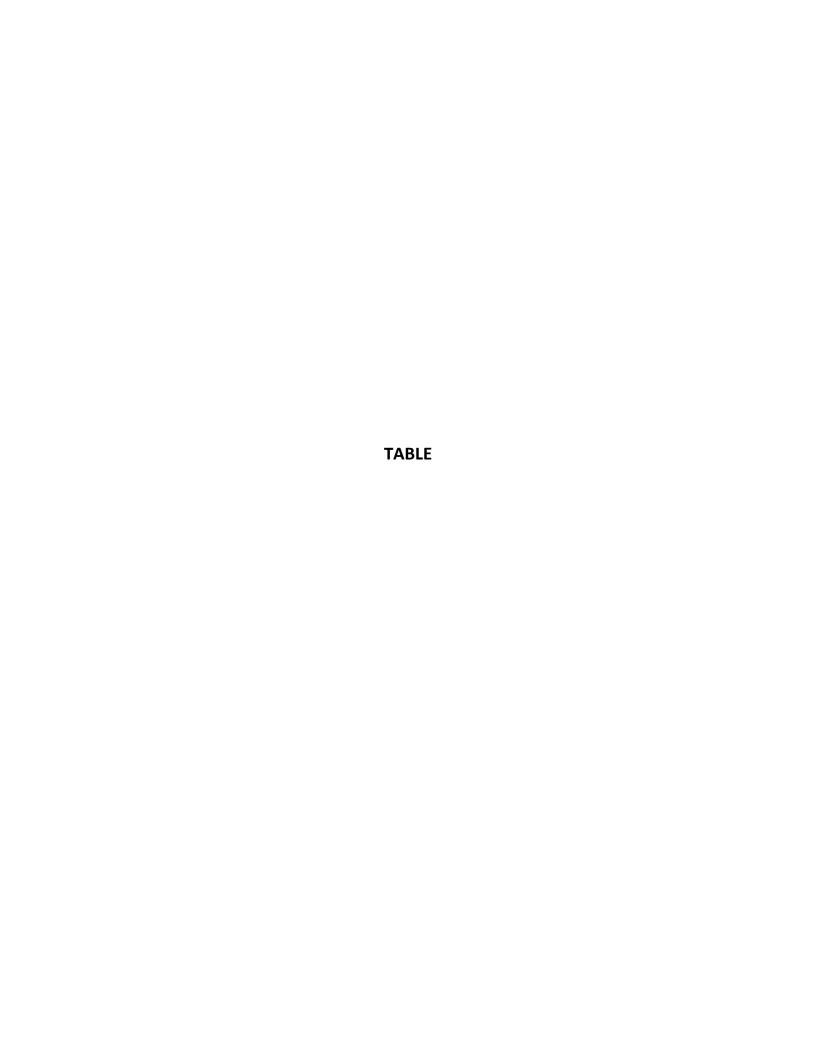


TABLE I SUMMARY OF ANALYTICAL RESULTS

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER **BOTTOM ASH SETTLING AREA** TECUMSEH, KANSAS

Location		Measure Point	Sample Name	Sample Date	Depth to Water	Groundwater Elevation	Field Parameters				USEPA Appendix III Constituents (mg/L)								USEPA Appendix IV Constituents (mg/L)											USEPA Appendix IV Constituents (pCi/L)		
	cution	Elevation (TOC)	запріе напе	Sample Bate	(btoc)	(ft AMSL)	Temperature (Deg C)	Conductivity (μS/cm)	Turbidity (NTU)	pH (su)	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	рН	TDS	Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Lead, Total	Lithium, Total	Molybdenum, Total	Selenium, Total	Thallium, Total	Mercury, Total	Fluoride	Radium-226 & 228 Combined
			MW-7-083016	8/30/2016	21.75	856.53	21.99	1780	9.5	8.45	0.73	152	201	0.26	455	7.3	1120	<0.0010	0.0021	0.10	<0.0010	<0.00050	<0.0050	0.0022	<0.0050	0.024	0.011	<0.0010	<0.0010	<0.00020	0.26	1.22
			MW-7-092016	9/20/2016	20.47	857.81	21.26	1790	7.6	6.99	0.75	146	187	0.32	466	7.2	1110	<0.0010	0.0015	0.079	<0.0010	<0.00050	<0.0050	0.0019	<0.0050	0.024	0.012	<0.0010	<0.0010	<0.00020	0.32	5.88
ent	MW-7		MW-7-110116	11/1/2016	21.93	856.35	18.83	1740	4.2	6.65	0.73	148	193	0.33	459	7.1	1100	<0.0010	0.0014	0.074	<0.0010	<0.00050	<0.0050	0.0016	<0.0050	0.024	0.012	<0.0010	<0.0010	<0.00020	0.33	0.454
adi		878.28	MW-7-121316	12/13/2016	22.68	855.6	12.61	1770	6.8	6.72	0.71	147	201	0.32	454	7.2	1110	<0.0010	0.0015	0.073	<0.0010	<0.00050	<0.0050	0.0013	<0.0050	0.025	0.012	<0.0010	<0.0010	<0.00020	0.32	0.497
ō.			MW-7-020717	2/7/2017	23.16	855.12	13.86	1790	6.0	6.74	0.74	151	198	0.32	469	6.9	1170	<0.0010	0.0016	0.076	<0.0010	<0.00050	<0.0050	0.0014	<0.0050	0.024	0.013	<0.0010	0.0011	<0.00020	0.32	0.555
5			MW-7-040617	4/6/2017	16.01	862.27	13.99	1790	8.5	6.52	0.77	161	197	0.33	511	7.2	1220	<0.0010	0.0015	0.083	<0.0010	<0.00050	<0.0050	0.0012	<0.0050	0.024	0.0099	<0.0010	<0.0010	<0.00020	0.33	0.766
			MW-7-052417	5/24/2017	21.32	856.96	16.72	1780	5.5	6.66		152	195	0.29	504	7.0	1150	<0.0010	0.0013	0.072	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.023	0.0089	<0.0010	<0.0010	<0.00020	0.29	1.13
			MW-7-062717	6/27/2017	21.70	856.58	18.77	1720	3.1	6.64	0.69	151	186	0.32	446	7.1	1130	<0.0010	0.0016	0.066	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.017	0.010	<0.0010	<0.0010	<0.00020	0.32	0.791
			MW-8-083116	8/31/2016	33.24	854.77	22.03	1960	25.6	7.89	1.3	201	194	0.25	720	6.8	1420	<0.0010	0.0023	0.058	<0.0010	<0.00050	<0.0050	0.0018	<0.0050	0.021	0.044	<0.0010	<0.0010	<0.00020	0.25	0.724
			MW-8-092116	9/21/2016	30.96	857.05	24.04	2010	4.9	6.68	1.3	217	190	0.26	718	6.9	1410	<0.0010	0.0026	0.058	<0.0010	<0.00050	<0.0050	0.0015	<0.0050	0.020	0.041	<0.0010	<0.0010	<0.00020	0.26	0.56
			MW-8-110216	11/2/2016	32.64	855.37	20.90	1830	7.1	6.54		214	185	0.29	785	7.0	1390	<0.0010	0.0020	0.058	<0.0010	<0.00050	<0.0050	0.0015	<0.0050	0.022	0.042	<0.0010	<0.0010	<0.00020	0.29	1.31
	MW-8	888.01	MW-8-121416	12/14/2016	33.71	854.3	12.42	1980	16.3	6.48	1.2	188	188	0.27	714	6.9	1300	<0.0010	0.0018	0.057	<0.0010	<0.00050	<0.0050	0.0012	<0.0050	0.024	0.036	<0.0010	<0.0010	<0.00020	0.27	0.837
			MW-8-020717	2/7/2017	34.39	853.62	10.14	1950	23.4	6.74	1.2	198	194	0.25	711	6.8	1430	<0.0010	0.0017	0.062	<0.0010	<0.00050	<0.0050	0.0017	<0.0050	0.018	0.042	<0.0010	<0.0010	<0.00020	0.25	0.210
			MW-8-040617	4/6/2017	29.63	858.38	17.26	2010	17.1	6.46	1.5	244	170	0.30	377	6.7	1500	<0.0010	0.0021	0.063	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.017	0.034	<0.0010	<0.0010	<0.00020	0.30	0.665
			MW-8-052417	5/24/2017	32.54	855.47	17.88	1970	9.2	6.33		195	174	0.25	775	6.5	1300	<0.0010	0.0013	0.055	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	0.014	0.042	<0.0010	<0.0010	<0.00020	0.25	1.08
			MW-8-062717	6/27/2017	32.65	855.36	20.66	1980	4.4	6.41	1.3	218	165	0.25	688	6.8	1490	<0.0010	0.0023	0.055	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	0.012	0.039	<0.0010	<0.0010	<0.00020	0.25	1.19
			MW-9-083116	8/31/2016	33.83	853.15	22.31	1990	131.0	7.85	0.34	199	205	0.34	298	6.8	1420	<0.0010	0.11	0.74	<0.0010	0.00070	<0.0050	0.031	0.0063	0.018	0.0079	<0.0010	<0.0010	<0.00020	0.34	2.23
÷.			MW-9-092116	9/21/2016	34.71	852.27	21.91	2070	58.1	6.76	0.22	230	205	0.39	254	6.8	1280	<0.0010	0.13	0.87	<0.0010	<0.00050	<0.0050	0.017	<0.0050	0.014	0.0050	<0.0010	<0.0010	<0.00020	0.39	3.25
die			MW-9-110216	11/2/2016	35.49	851.49	19.46	1890	22.6	6.49	0.15	232	187	0.39	124	6.8		<0.0010	0.14	0.85	<0.0010	<0.00050	<0.0050	0.013	<0.0050	0.014	0.0029	<0.0010	<0.0010	<0.00020	0.39	1.58
Gra	MW-9	886.98	MW-9-121616	12/16/2016	35.92	851.06	12.15	1980	162.0	6.52	0.10	216	174	0.36	31.8	6.8	1160	<0.0010	0.10	0.81	<0.0010	<0.00050	0.0050	0.011	0.0082	0.014	0.0019	<0.0010	<0.0010	<0.00020	0.36	2.02
N N		-	MW-9-020717	2/7/2017	36.00	850.98	13.18	2020	181.0	6.59		217	186	0.37	122	6.6	1170	<0.0010	0.12	0.77	<0.0010	<0.00050	<0.0050	0.013	<0.0050	<0.010	0.0022	<0.0010	<0.0010	<0.00020	0.37	1.39
۵		_	MW-9-040617	4/6/2017	33.03	853.95	15.56	2120	55.1	6.65		221	218	0.45	477	7.0	1370	<0.0010	0.086	0.65	<0.0010	<0.00050	<0.0050	0.023	0.0078	0.015	0.0060	<0.0010	<0.0010	<0.00020	0.45	1.31
		_	MW-9-052417	58/24/17	35.06	851.92	19.13	2070	16.1	6.62		212	201	0.42	239	6.9		<0.0010	0.099	0.74	<0.0010	0.00053	<0.0050	0.024	<0.0050	0.011	0.0048	<0.0010	<0.0010	<0.00020	0.42	1.64
			MW-9-062717	6/27/2017	35.42	851.56	20.78	2060	11.1	6.56		226	193	0.56	264	6.6	1380	<0.0010	0.11	0.74	<0.0010	<0.00050	<0.0050	0.022	<0.0050	<0.010	0.0046	<0.0010	<0.0010	<0.00020	0.56	1.35
			MW-10-083016	8/30/2016	33.96	853.12	22.73	2060	9.4	7.81		168	238	0.41	171	6.7		<0.0010	0.061	0.27	<0.0010	<0.00050	<0.0050	0.0051	<0.0050	<0.010	0.0038	<0.0010	<0.0010	<0.00020	0.41	2.90
			MW-10-092116	9/21/2016	32.67	854.41	19.23	2110	6.4	6.71	0.25	172	232	0.44	208	6.8	1260	<0.0010	0.068	0.27	<0.0010	<0.00050	<0.0050	0.0065	<0.0050	0.010	0.0042	<0.0010	<0.0010	<0.00020	0.44	1.70
		887.08	MW-10-110216	11/2/2016	33.65	853.43	17.40	1930	7.0	6.43		182	229	0.46	177	6.8		<0.0010	0.065	0.30	<0.0010	<0.00050	<0.0050	0.0043	<0.0050	0.011	0.0034	<0.0010	<0.0010	<0.00020	0.46	2.08
	MW-10		MW-10-121416	12/14/2016	34.06	853.02	12.59	2100	9.4	6.65		169	234	0.42	167	6.9		<0.0010	0.071	0.31	<0.0010	<0.00050	<0.0050	0.0032	<0.0050	0.010	0.0037	<0.0010	<0.0010	<0.00020	0.42	2.25
			MW-10-020717	2/7/2017	34.09	852.99	13.73	2070	10.6	6.52		170	235	0.47	165	6.6	1250	<0.0010	0.077	0.30	<0.0010	<0.00050	<0.0050	0.0033	<0.0050	<0.010	0.0042	<0.0010	<0.0010	<0.00020	0.47	1.87
			MW-10-040617	4/6/2017	31.63	855.45	14.94	2060	7.2	6.50		175	233	0.48	226	7.0	1280	<0.0010	0.062	0.28	<0.0010	<0.00050	<0.0050	0.0061	<0.0050	<0.010	0.0049	<0.0010	<0.0010	<0.00020	0.48	1.39
			MW-10-052417	5/24/2017	32.86	854.22	17.66	2110	6.2	6.59		177	228	0.46	205	6.9	1150	<0.0010	0.050	0.28	<0.0010	<0.00050	<0.0050	0.0042	<0.0050	<0.010	0.0028	<0.0010	<0.0010	<0.00020	0.46	2.19
			MW-10-062717	6/27/2017	33.50	853.58	18.60	2100	3.2	6.55	0.25	180	217	0.42	178	6.6	1260	<0.0010	0.064	0.29	<0.0010	<0.00050	<0.0050	0.0035	<0.0050	<0.010	0.0033	<0.0010	<0.0010	<0.00020	0.42	2.41

ABBREVIATIONS AND NOTES:

Bold value: Detection above laboratory reporting limit

USEPA. 2016. Final Rule: Disposal of Coal Combustion Residuals from 'Electric Utilities. July 26. 40 CFR Part 257. https://www.epa.gov/coalash/coal-ash-rule

μS/cm = microSiemen per centimeter btoc = below top of casing

C = Celsius CCR = coal combustion residuals

ft AMSL = feet above mean sea level

MCL = maximum contaminant level

mg/L = milligrams per liter

NA = not applicable

NTU = Nephelometric Turbidity Units pCi/L = picoCurie per liter

su = standard units

TDS = total dissolved solids

TOC = top of casing

USEPA = United States Environmental Protection Agency



