



HALEY & ALDRICH, INC.  
6500 Rockside Road  
Suite 200  
Cleveland, OH 44131  
216.706.1303

31 January 2018  
File No. 129778-004

Westar Energy, Inc.  
818 South Kansas Avenue  
Topeka, Kansas 66612

Attention: Jared Morrison  
Manager, Water and Waste Programs

Subject: 2017 Annual Groundwater Monitoring and Corrective Action Report for  
the Bottom Ash Settling Pond  
Tecumseh Energy Center  
Tecumseh, Kansas

Dear Mr. Morrison:

Haley & Aldrich, Inc. is pleased to submit this Annual Groundwater Monitoring and Corrective Action Report (Annual Report) for the Bottom Ash Settling Pond at the Tecumseh Energy Center. This Annual Report was developed in accordance with the United States Environmental Protection Agency CCR Rule effective 19 October 2015 (Rule), specifically Code of Federal Regulations Title 40, subsection § 257.90(e). The annual report documents the design and construction of the groundwater monitoring system for the Bottom Ash Settling Pond consistent with applicable sections of § 257.90 through 257.98.

This report describes activities conducted in the prior calendar year and documents compliance with the Rule. The specific requirements listed in Sections § 257.90(e)(1)-(5) of the Rule are provided below in bold/italic type, followed by a short narrative describing how the Rule has been met.

Sincerely yours,  
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read "Steve Putrich".

Steve Putrich, P.E.  
Project Principal

A handwritten signature in blue ink, appearing to read "Mark Nicholls".

Mark Nicholls, P.G.  
Lead Hydrogeologist

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

by Haley & Aldrich, Inc.  
Cleveland, Ohio

for Westar Energy, Inc.  
Topeka, Kansas

File No. 129778-004  
January 2018



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## 1. 40 CFR § 257.90 Applicability

### 1.1 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 Pond at the Tecumseh Energy Center (TEC), which is the coal combustion residuals (CCR) management unit addressed in this Annual Groundwater Monitoring and Corrective Action Report (Annual Report), is subject to the groundwater monitoring and corrective action requirements described under Code of Federal Regulations Title 40 (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).

### 1.2 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 Bottom Ash Settling Pond as required by the Rule as the groundwater monitoring system was established and certified by 17 October 2017. Prior to 17 October 2017, Westar installed a groundwater monitoring system at the Bottom Ash Settling Pond 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.

***At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:***

- (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 Bottom Ash Settling Pond is included in this report as Figure 1. In addition, this information is presented in the CCR Groundwater Monitoring Network Description

Report prepared for Westar, which was placed in the facility's operating record by 17 October 2017 as required by § 257.105(h)(2).

***(2) 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 Bottom Ash Settling Pond at TEC are described in the CCR Groundwater Monitoring Network Description Report dated 17 October 2017. This report was placed in the facility's operating record by 17 October 2017, as required by § 257.105(h)(2). Since the groundwater monitoring system was certified, no new monitoring wells were installed or decommissioned.

***(3) 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 17 October 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 Bottom Ash Settling Pond is presented in Table I of this report. In 2017, the groundwater monitoring sampling and laboratory analyses were completed under the detection monitoring program.

***(4) 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 Bottom Ash Settling Pond in calendar year 2017.

***(5) 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.

**1.3 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).***

To comply with the Rule recordkeeping requirements:

- 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 Westar 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**  
 Westar Tecumseh Energy Center  
 Bottom Ash Settling Pond  
 Tecumseh, Kansas

Location	Measure Point Elevation (TOC)	Sample Name	Sample Date	Depth to Water (btoc)	Groundwater Elevation (ft AMSL)	Field Parameters				USEPA Appendix III Constituents (mg/L)						USEPA Appendix IV Constituents (mg/L)										USEPA Appendix IV Constituents (pCi/L)						
						Temperature (Deg C)	Conductivity (µS/cm)	Turbidity (NTU)	pH (su)	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	pH	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	
Up Gradient	MW-7	878.28	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
			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
			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
			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
			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
Down Gradient	MW-8	888.01	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	1.4	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-8-121416	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-9	886.98	MW-8-052417	5/24/2017	32.54	855.47	17.88	1970	9.2	6.33	1.2	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
			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	1230	<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
			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	<0.0010	0.0082	0.014	0.0019	<0.0010	<0.0010	<0.00020	0.36	2.02
	MW-10	887.08	MW-9-020717	2/7/2017	36.00	850.98	13.18	2020	181.0	6.59	0.14	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
			MW-9-040617	4/6/2017	33.03	853.95	15.56	2120	55.1	6.65	0.41	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	5/24/2017	35.06	851.92	19.13	2070	16.1	6.62	0.36	212	201	0.42	239	6.9	1310	<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	0.30	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	0.23	168	238	0.41	171	6.7	1210	<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		
	MW-10-110216	11/2/2016	33.65	853.43	17.40	1930	7.0	6.43	0.25	182	229	0.46	177	6.8	1220	<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-10-121416	12/14/2016	34.06	853.02	12.59	2100	9.4	6.65	0.23	169	234	0.42	167	6.9	1150	<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	0.23	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	0.27	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	0.26	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






## FIGURES

GIS FILE PATH: G:\Projects\Westar\Tecumseh Energy Center (TEC)\GIS\MXDs\2018\_01\TEC\_BOTTOM ASH SETTLING POND\_MW\_LOC\_map.mxd — USER: ratrown — LAST SAVED: 1/26/2018 2:39:26 PM



**LEGEND**

-  MONITORING WELL
-  PIEZOMETRIC OBSERVATION ONLY
-  ASH SETTLING PONDS

**NOTE**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2015.



**HALEY ALDRICH** WESTAR ENERGY  
TECUMSEH ENERGY CENTER  
TECUMSEH, KANSAS

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

JANUARY 2018  
SCALE: AS SHOWN

FIGURE 1