

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

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Table of Contents

	Page
1. Introduction	1
2. 40 CFR § 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

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

**2017 Annual Groundwater Monitoring
and Corrective Action Report**

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.

**2017 Annual Groundwater Monitoring
and Corrective Action Report**

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

FIGURES

GIS FILE PATH: G:\Projects\Western\Tecumseh Energy Center (TEC)\GIS\MXDs\2018_01\TEC_BOTTOM ASH SETTLING POND_MW_LOC_map.mxd — USER: ratbrown — LAST SAVED: 1/26/2018 2:39:26 PM

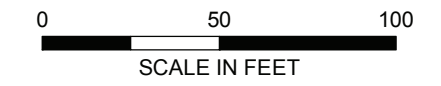


LEGEND

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

NOTE

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









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

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

MARCH 2021
SCALE: AS SHOWN

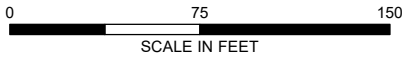


LEGEND

- MW-8** WELL NAME AND GROUNDWATER ELEVATION (AUGUST 17, 2016)
- 849.64**
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 17 AUGUST 2016.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
AUGUST 17, 2016








MARCH 2021

FIGURE 2

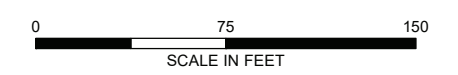


LEGEND

- MW-8** WELL NAME AND GROUNDWATER ELEVATION (SEPTEMBER 19, 2016)
- 849.64**
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 19 SEPTEMBER 2016.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
SEPTEMBER 19, 2016









MARCH 2021

FIGURE 3

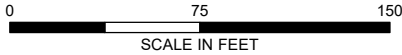


LEGEND

- MW-8** WELL NAME AND GROUNDWATER ELEVATION (OCTOBER 31, 2016)
- 849.64**
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 31 OCTOBER 2016.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
OCTOBER 31, 2016



MARCH 2021

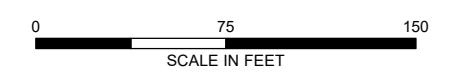


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (DECEMBER 12, 2016)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 12 DECEMBER 2016.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
DECEMBER 12, 2016**



MARCH 2021

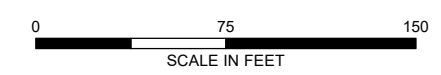


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (FEBRUARY 6, 2017)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 06 FEBRUARY 2017.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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
**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
FEBRUARY 06, 2017**



MARCH 2021

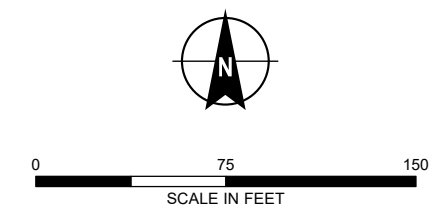


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (APRIL 5, 2017)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 05 APRIL 2017.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019









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

**BOTTOM ASH SETTLING AREA
 GROUNDWATER POTENTIOMETRIC
 ELEVATION CONTOUR MAP
 APRIL 05, 2017**

evergy MARCH 2021 FIGURE 7

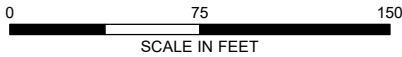


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (MAY 23, 2017)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 23 MAY 2017.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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
BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
MAY 23, 2017



MARCH 2021

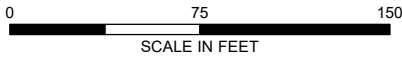


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (JUNE 26, 2017)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 26 JUNE 2017.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
JUNE 26, 2017



MARCH 2021