

2018 ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT
BOTTOM ASH SETTLING AREA /BOTTOM ASH LANDFILL
JEFFREY ENERGY CENTER
ST. MARYS, KANSAS

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Westar Energy, Inc.
Topeka, Kansas

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**2018 Annual Groundwater Monitoring
and Corrective Action Report**

This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring system for the Jeffrey Energy Center (JEC) Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL) consistent with applicable sections of § 257.90 through 257.98, and describes activities conducted in the prior calendar year (2018) and documents compliance with the United States Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for the JEC BASA/BAL 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 2018 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL) at the Jeffrey Energy Center (JEC), operated by Westar Energy, Inc. (Westar). This Annual Report was developed in accordance with the United States Environmental Protection Agency Coal Combustion Residual (CCR) Rule effective 19 October 2015 (Rule), specifically Code of Federal Regulations Title 40 (40 CFR), subsection § 257.90(e). The Annual Report documents the groundwater monitoring system for the BASA/BAL consistent with applicable sections of § 257.90 through 257.98, and describes activities conducted in the prior calendar year (2018) 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.

Westar has installed and certified a groundwater monitoring system at the JEC BASA/BAL. The BASA/BAL is a multi-unit system 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) (Rule).

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 JEC BASA/BAL 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 is provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 2018.

2.2.1 Status of the Groundwater Monitoring Program

Statistical analyses of detection monitoring data completed in 2018 indicated no Appendix III statistically significant increases (SSIs) at the BASA/BAL. The BASA/BAL remains in the detection monitoring program.

2.2.2 Key Actions Completed

The 2017 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2018. Statistical analysis was completed in January 2018 on analytical data from the

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initial detection monitoring sampling event. The statistical analyses indicated no SSIs for Appendix III constituents. Sampling for the first semi-annual detection monitoring event was completed in March 2018. Statistical analysis was completed within 90 days of receipt of finalized laboratory data. No SSIs were determined for this sampling event. Sampling for the second semi-annual detection monitoring event was completed in September 2018. Statistical analysis of the results from the second semi-annual detection monitoring sampling event are due to be completed in January 2019 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 at the JEC BASA/BAL in 2018.

2.2.4 Actions to Resolve Problems

No problems were encountered at the JEC BASA/BAL in 2018, therefore, no actions to resolve the problems were required.

2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2019 include the 2018 Annual Groundwater Monitoring and Corrective Action Report, statistical analysis of detection monitoring analytical data collected in September 2018, and semi-annual detection monitoring and subsequent statistical analysis.

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/BAL is included in this report as Figure 1.

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 in 2018.

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), two independent detection monitoring samples from each background and downgradient monitoring well were collected during 2018. A summary table including the sample names, dates of sample collection, and monitoring data obtained for the groundwater monitoring program for the BASA/BAL 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

Initial detection monitoring statistical analyses were completed in January 2018, in accordance with § 257.94(b). The analyte concentrations from the downgradient wells for each of the Appendix III constituents from the 2017 detection monitoring sampling event from each location were compared to their respective predicative limit (PL). Once data is validated, a sample concentration greater than the PL is considered to represent a SSI over background. The statistical analyses indicated no SSIs for Appendix III constituents.

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 to information that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for the activities completed in calendar year 2018.

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).

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.

No Appendix III SSIs were indicated by statistical analyses completed in 2018, consequently, no alternative 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).

The BASA/BAL remains in detection monitoring and 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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and Corrective Action Report

The BASA/BAL has not transitioned into assessment monitoring, and no assessment monitoring samples were collected or analyzed in 2018. Consequently, Westar is not required to establish groundwater protection standards for this CCR unit and this criterion is not applicable.

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.

Assessment monitoring statistical analyses were not required or completed in 2018. Therefore, this criterion is not applicable.

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

Assessment monitoring statistical analyses were not required or completed in 2018. Therefore, this criterion is not applicable.

TABLE

TABLE I
SUMMARY OF ANALYTICAL RESULTS - DETECTION MONITORING
WESTAR ENERGY, INC.
JEFFREY ENERGY CENTER
BOTTOM ASH SETTLING AREA/BOTTOM ASH LANDFILL
ST. MARYS, KANSAS

Location	Upgradient		Downgradient					
	MW-BAA-6		MW-BAA-2		MW-BAA-3		MW-BAA-7	
Measure Point (TOC)	1301.81		1226.56		1222.00		1213.15	
Sample Name	BAA-6-031318	BAA-6-091218	BAA-2-031318	BAA-2-091218	BAA-3-031318	BAA-3-091218	BAA-7-031318	BAA-7-091218
Sample Date	3/13/2018	9/12/2018	3/13/2018	9/12/2018	3/13/2018	9/12/2018	3/13/2018	9/12/2018
Lab Data Reviewed and Accepted	4/16/2018	10/15/2018	4/16/2018	10/15/2018	4/16/2018	10/15/2018	4/16/2018	10/15/2018
Depth to Water (ft btoc)	80.00	78.67	14.94	15.52	15.43	12.79	18.88	19.81
Temperature (Deg C)	50.40	17.50	56.80	20.04	51.90	18.56	56.00	18.91
Conductivity (µS/cm)	3554	4100	1087	2270	3235	3430	2239	2280
Turbidity (NTU)	1.50	0.53	0.73	0.09	2.09	0.91	0.64	0.14
Boron, Total (mg/L)	4.6	5.9	0.72	1.38	2.2	2.3	0.90	0.837
Calcium, Total (mg/L)	513	490	135	214	506	487	216	208
Chloride (mg/L)	252	314	70.0	220	149	172	194	211
Fluoride (mg/L)	0.43	0.79	0.57	0.63	0.72	0.92	0.77	0.79
Sulfate (mg/L)	2120	2190	387	983	1940	2170	914	914
pH (su)	7.0	7.1	7.4	8.5	7.2	6.9	7.5	7.4
TDS (mg/L)	3570	3630	949	1790	3330	3430	1800	1800

Notes:

µS/cm = micro Siemens per centimeter

ft btoc = feet below top of casing

Deg C = degrees Celsius

mg/L = milligrams per liter

NTU = Nephelometric Turbidity Unit

su = standard unit

TDS = total dissolved solids

TOC = top of casing

Bold value: Detection above laboratory reporting limit

FIGURE

GIS FILE PATH: G:\Projects\Westar\Jeffrey Energy Center (JEC)\GIS\MXDs\2018_01\JEC_BOTTOM ASH_AREA1_MW_LOCATION_MAP_REV2.mxd — USER: DZrmaster — LAST SAVED: 1/24/2019 3:04:48 PM



LEGEND

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

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI



HALEY ALDRICH WESTAR ENERGY
JEFFREY ENERGY CENTER
ST. MARY'S, KANSAS

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

JANUARY 2019

FIGURE 1