

# Location Restrictions Demonstration Report - Aquifer Separation Bottom Ash Settling Area

## Jeffrey Energy Center

Prepared for: Westar Energy, Inc.  
Jeffrey Energy Center  
Pottawatomie County, Kansas

Prepared by:  
Haley & Aldrich, Inc.

October 2018

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## 1.0 INTRODUCTION AND PURPOSE

The Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule (CCR Rule) 40 CFR 257.60 through 257.64 requires owner/operators of existing CCR units to make demonstrations in the event a unit is located in certain areas. The purpose of this report is to demonstrate whether the Bottom Ash Settling Area (Unit), an existing CCR surface impoundment, meets the requirements of §257.60 for placement above the uppermost aquifer.

The Unit is located at the Jeffrey Energy Center (JEC) in Pottawatomie County, Kansas approximately 5.3 miles north-northeast of Belvue, Kansas as indicated in Figure 1.

Haley & Aldrich, Inc. (Haley & Aldrich) has reviewed sufficient documentation provided in Section 3, related available resources, and completed site visit(s) to develop this report. This report provides the demonstrations documenting whether or not the Unit is constructed:

- with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer (40 CFR §257.60).

The CCR Rule requirement for the above is stated in the following section in italics followed by an explanation of the review and determination completed by Haley & Aldrich.

## **2.0 PLACEMENT ABOVE THE UPPERMOST AQUIFER (§257.60(a))**

*New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). The owner or operator must demonstrate by the dates specified in paragraph (c) of this section that the CCR unit meets the minimum requirements for placement above the uppermost aquifer.*

Haley & Aldrich evaluated the location of the base of the Unit with respect to the upper limit of the uppermost aquifer as defined in §257.53. Documentation of the conditions listed in §257.60(a) were evaluated and are discussed below.

Based on this review, Haley & Aldrich determined the base of the Unit is greater than five feet above the upper limit of the uppermost aquifer as defined in §257.53. Consequently, no additional demonstration is necessary.

### **2.1 Base of Unit**

Haley & Aldrich reviewed available information provided by Westar and determined construction documentation was not available to accurately locate the base of the Unit. Therefore, Haley & Aldrich completed a field investigation to locate the base of the Unit. Pre-construction quadrangle maps (U. S. Geologic Survey, 1964) of the area were reviewed to determine the lowest original topographic elevations within the Unit. Using this available information, Haley & Aldrich sited and supervised the drilling of six borings within the Unit in the likely area of lowest base elevations to determine the location of the existing base of the Unit. Based on the field investigation results, Haley & Aldrich determined the lowest base of Unit elevations range from approximately 1212.8 feet to 1220.9 feet in lowest areas of the Unit.

### **2.2 Upper Limit of Uppermost Aquifer**

Haley & Aldrich evaluated groundwater conditions to identify the upper limit of the uppermost aquifer based on previously completed reports (Haley & Aldrich, 2018). Based on the evaluation, the upper limit of the uppermost aquifer is a gradually sloping surface ranging from elevation 1194+/- feet on the western side to elevation 1222+/- feet on the eastern side of the Unit. For elevations within the impoundment footprint, observed elevation data information in the surrounding monitoring wells was interpolated.

### **2.3 Conclusion/Separation Between Uppermost Aquifer and Base of Unit**

When separation distances were estimated between the upper limit of the uppermost aquifer elevations (with associated interpolated elevations provided in the Table 1 column titled "Uppermost Aquifer Elevations") and the base of Unit elevations as determined by the 2018 borings shown in Figure 2, the following minimum separation distances were calculated:

Table 1: Bottom Ash Settling Area Calculated Minimum Separation Distances

<b>Boring</b>	<b>Base of Unit Elevation</b>	<b>Uppermost Aquifer Elevation</b>	<b>Separation (ft.)</b>
HA-BAA-01	1215.5	1200.6	14.9
HA-BAA-02	1212.8	1199.5	13.3
HA-BAA-03	1216.2	1200.3	15.9
HA-BAA-10	1213.0	1205.3	7.7
HA-BAA-11	1213.3	1201.3	12.0
HA-BAA-12	1220.9	1201.7	19.2

Based on these critical points within the Unit, the resulting minimum separation was determined to be approximately 7.7 feet and therefore greater than the 5.0 feet separation criteria of §257.60(a) of the Rule that would require additional demonstration.

### 3.0 REFERENCES

1. Haley & Aldrich, Inc., 2017 Annual Groundwater Monitoring and Corrective Action Report for the Bottom Ash Area 1 Impoundment/Bottom Ash Area 1 Landfill. January 2018.
2. U.S. Geologic Survey (1964), Emmett, Kansas Quadrangle, 7.5 minute series (topographic).

#### 4.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION (§257.60(b))

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined the Unit and/or has supervised examination of the Unit and development of this report by appropriately qualified personnel. I hereby certify based on a review of available information and observations, that this demonstration report and the Unit meets the requirements of paragraphs §257.60(a).

Name of Professional Engineer: Steven F. Putrich, P.E.

Company: Haley & Aldrich, Inc.

Signature: 

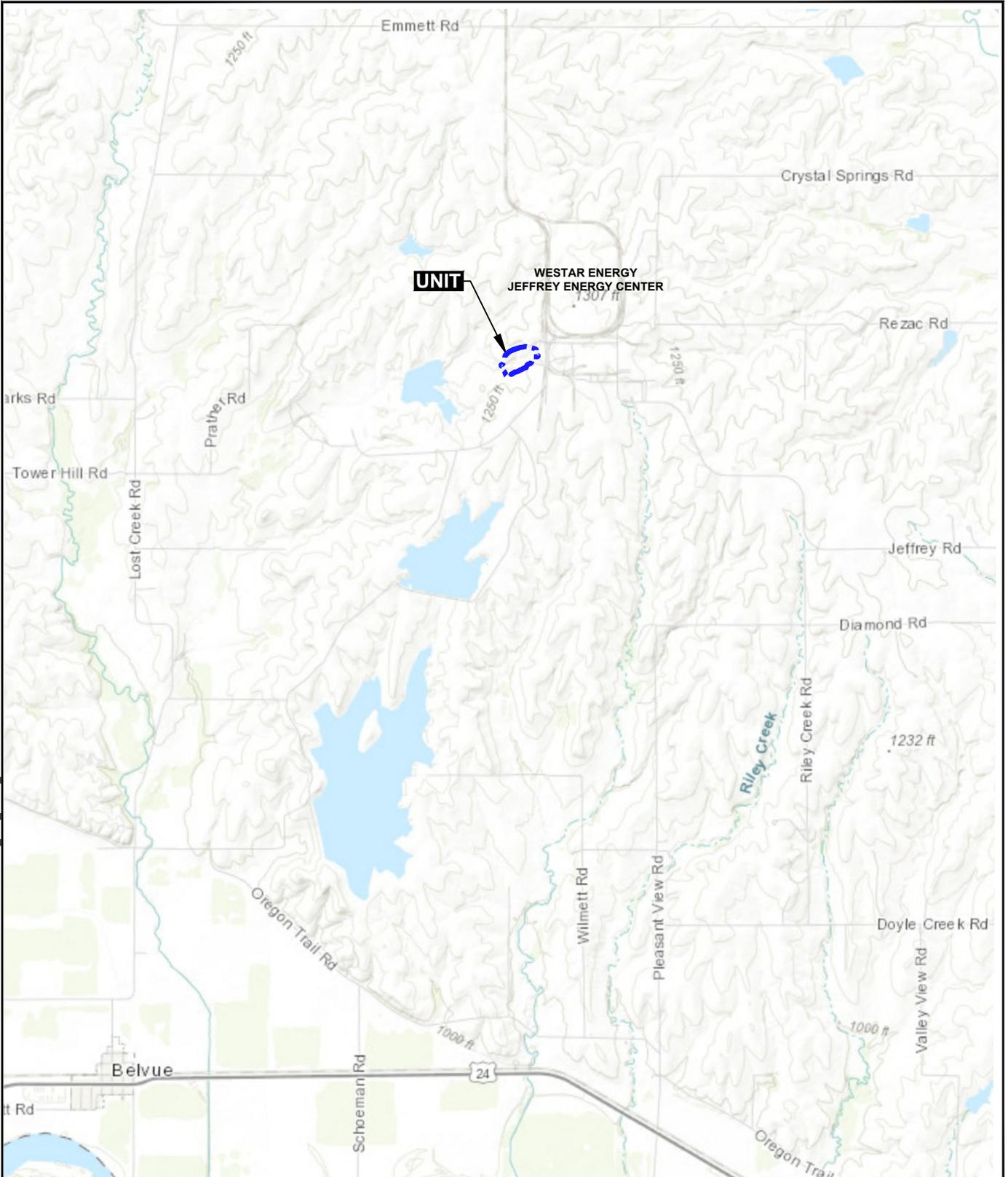
PE Registration State: Kansas

PE Registration Number: 24363

Professional Engineer Seal:



LUCAS, ANDY Printed: 10/10/2018 2:43 PM Layout: FIGURE 1 G:\131363-WESTAR-JEC FGD LANDFILL DESIGN\CAD\FIGURES\LOCATION RESTRICTIONS\131363\_003\_FIG-1\_BAA LOCUS.DWG



MAP SOURCE: ESRI 2018

SITE COORDINATES: 39°17'2"N, 96°7'37"W



WESTAR ENERGY  
JEFFREY ENERGY CENTER  
BOTTOM ASH SETTLING AREA  
ST. MARYS, KANSAS

### UNIT LOCATION MAP

APPROXIMATE SCALE: 1IN = 5000 FT  
OCTOBER 2018

FIGURE 1



**LEGEND**

- EXISTING 2-FT CONTOUR
- - - 1270 --- EXISTING 10-FT CONTOUR
- - - - - APPROXIMATE LIMITS OF UNIT
- HA-BAA-01**  
1238.5 DESIGNATION, LOCATION AND GROUND SURFACE ELEVATION OF GEOPROBE BORINGS PERFORMED BY BELOW GROUND SURFACE, INC. OF LAWRENCE, KANSAS ON 18 SEPTEMBER 2018.

**NOTES**

1. EXISTING TOPOGRAPHY, PROVIDED BY WESTAR, WAS CONDUCTED BY PROFESSIONAL ENGINEERING CONSULTANTS, FLOWN 2014.
2. ELEVATIONS INDICATED IN THIS DRAWING ARE IN FEET AND REFER TO NAVD88 DATUM, HORIZONTAL DATUM IS BASED ON PLANT COORDINATE SYSTEM.
3. TECHNICAL MONITORING OF GEOPROBE TEST BORINGS COMPLETED ON 18 SEPTEMBER 2018 BY HALEY & ALDRICH, INC.
4. AS-DRILLED LOCATIONS AND GROUND SURFACE ELEVATIONS OF THE GEOPROBE TEST BORINGS WERE DETERMINED IN THE FIELD BY WOLF CONSTRUCTION BY OPTICAL SURVEY.



WESTAR ENERGY  
JEFFREY ENERGY CENTER  
BOTTOM ASH SETTLING AREA  
ST. MARYS, KS

**SUBSURFACE EXPLORATION  
LOCATION PLAN**

SCALE: AS SHOWN  
OCTOBER 2018

**FIGURE 2**