Annual Landfill Inspection – 2015

Westar Jeffrey Energy Center
St. Mary’s, KS
KDHE Landfill Permit Number 0359

Prepared for:
Westar Energy
818 S. Kansas Ave.
P.O. Box 889
Topeka, KS 66601

Prepared by:
Blackstone Environmental
9153 West 133rd Street
Overland Park, KS 66213

January 15, 2016
REPORT CERTIFICATION
ANNUAL LANDFILL INSPECTION
JEFFREY ENERGY CENTER – COAL COMBUSTION RESIDUALS LANDFILLS
KDHE SOLID WASTE PERMIT NUMBER 359

The material and data in this report were prepared under the supervision and direction of the undersigned.

Blackstone Environmental, Inc.

[Signature]

Kyle Kukuk, P.E.
Kansas PE #23757

1-15-2016
Table of Contents

1.0 INTRODUCTION ................................................................................................. 1
   1.1 Purpose ........................................................................................................... 1

2.0 EXISTING SITE CONDITIONS ............................................................................. 2
   2.1 Fly Ash Landfill Description and Layout ......................................................... 2
   2.2 FGD Gypsum Landfill Description and Layout ................................................ 2
   2.3 Bottom Ash Landfill Description and Layout .................................................. 2

3.0 ANNUAL INSPECTION FINDINGS ..................................................................... 3
   3.1 Fly Ash Landfill Inspection Findings ............................................................... 3
   3.2 FGD Gypsum Landfill Inspection Findings ..................................................... 3
   3.3 Bottom Ash Landfill Inspection Findings ....................................................... 4

4.0 VOLUME OF WASTE .......................................................................................... 4
   4.1 Fly Ash Waste Volume .................................................................................... 4
   4.2 FGD Gypsum Waste Volume ........................................................................ 4
   4.3 Bottom Ash Waste Volume ........................................................................... 5

5.0 LIMITATIONS ..................................................................................................... 5

APPENDICES

A. Site Map
B. Photo Log
1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide results of the annual inspection as required by Code of Federal Regulations (CFR) Title 40, Chapter I, Subchapter I, Part 257, Subpart D, §257.84(b): Inspection Requirements for Coal Combustion Residue (CCR) Landfills as described below.

§257.84(b) Annual inspections by a qualified professional engineer.

(1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the structure since the previous annual inspection;

(ii) The approximate volume of CCR contained in the unit at the time of the inspection;

(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

(3) Timeframes for conducting the initial inspection—(i) Existing CCR landfills. The owner or operator of the CCR unit must complete the initial inspection required by paragraphs (b)(1) and (2) of this section no later than January 19, 2016.

(ii) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator of the CCR unit must complete the initial annual inspection required by paragraphs (b)(1) and (2) of this section no later than 14 months following the date of initial receipt of CCR in the CCR unit.

(4) Frequency of inspections. The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of
completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(9).

(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.

2.0 EXISTING SITE CONDITIONS

The Jeffrey Energy Center (JEC) is located approximately 4.5 miles north of Belvue, Kansas and approximately 4.5 miles west of Highway 63, in Pottawatomie County, Kansas. The JEC is situated in Sections 1, 2, 11 and 12, Township 9 South, Range 11 East, and in the western-most portions of Sections 6 and 7, Township 9 South, Range 12 East in Pottawatomie County, Kansas. The facility operates under the Kansas Department of Health and Environment – Bureau of Waste Management (KDHE-BWM) Permit Number 359. This permit was issued on January 3, 1980. Fly ash and bottom ash have been disposed at the facility since 1980. Additionally, significant quantities of these materials have been recycled for construction uses both on and off site. In July 2008, the JEC brought an upgraded Flue Gas Desulfurization (FGD) Scrubber System online. FGD scrubber gypsum is disposed in the FGD Gypsum Landfill. A site map for the JEC is included in Appendix A.

2.1 Fly Ash Landfill Description and Layout

The JEC Fly Ash landfill, Area 1 (98.77 acres) is active and accepting fly ash for disposal. Fly ash is generated from electrostatic precipitators and is hauled to the landfill. The fly ash hydrates and hardens quickly into a monolithic mass. The hardened fly ash may be graded once or twice annually to ensure the filling process elevates uniformly to the design elevation. Fly ash generated at JEC may be recycled, landfilled or mixed with bottom ash to provide for road base construction for the JEC facility. Contact water from the fly ash landfill is contained within internal collection areas within the landfill.

2.2 FGD Gypsum Landfill Description and Layout

The JEC FGD gypsum landfill, Phase 1 (56.03 acres), is active and accepting FGD gypsum for disposal. FGD gypsum is generated when sulfur oxides are removed with wet limestone. The FGD gypsum is dewatered to a solids content of about 10 percent and contains a small amount of fly ash. The FGD landfill consists of four phases. Contact water and storm water runoff from the FGD landfill currently flows through several storm water Best Management Practices (BMP) before reaching the Bottom Ash Pond.

2.3 Bottom Ash Landfill Description and Layout

The JEC Bottom Ash Area 1 (52.51 acres) is active and accepting bottom ash waste for disposal. Bottom ash is the by-product in the pulverized coal boilers at JEC resulting from
molten ash being quenched with water. Bottom ash is collected in the bottom ash hopper and is sluiced to the bottom ash settling area. Bottom ash waste consists of a mixture of boiler slag and bottom ash. Boiler slag is ash that sticks to the boiler and bottom ash is ash which doesn’t stick to the boiler. The bottom ash waste is sluiced by gravity in a water slurry to Bottom Ash Area 1 where the initial bottom ash mixture is allowed to settle out. The dry bottom ash is then moved to the disposal area located on the southern portion of Area 1. The dry bottom ash can then be recycled, sold, or disposed of in this location. The annual quantities of bottom ash requiring disposal vary depending on the quantities that are recycled or sold. Contact water in Bottom Ash Area 1 is handled in the settling area in the western portion in Area 1.

3.0 ANNUAL INSPECTION FINDINGS

The Annual Inspection was conducted on December 10, 2015. Photos from the inspection are provided in Appendix B.

3.1 Fly Ash Landfill Inspection Findings

Two areas of shallow soil sloughing were encountered on the fly ash landfill berm on the south end of the landfill berm. The areas of sloughing appeared to have occurred fairly recently and were both approximately 2-3 feet deep. The sloughs were likely formed from high amounts of moisture and weathering on the slopes resulting in a loss of cohesion between the soils. It is recommended to address the areas of shallow sloughing to restore the landfill berm back to the original design and plant native vegetation to deter further sloughing and loss of soil material on the berm slope.

The majority of the southern landfill berm was well vegetated with native grasses and appeared to be in good working condition from the visual inspection. Fly ash landfilling procedures appear to be consistent with the Operational Plan for the landfill. No major operational changes or additions have been made to the Fly Ash Landfill and the layout of Area 1 is consistent with the master plan in the landfill Permit. The hardened fly ash is generally graded within 3-7 days after placement to ensure the filling process elevates uniformly to the design elevations. Erosion control measures are in-place and functioning as designed.

3.2 FGD Gypsum Landfill Inspection Findings

The berms of the FGD landfill appear to be in good working condition with well vegetated outside slopes. Erosion control measures are in-place and are functioning as designed. Stormwater from the exterior berms and slopes are directed to perimeter stormwater channels that direct the water away from the landfill and into the Bottom Ash Pond. No areas of slope failure or sloughing on the exterior landfill berms were observed during the visual inspection of the FGD Gypsum Landfill. Trees and other woody vegetation is continuously monitored and removed from the vegetated berms when necessary.
FGD landfilling operations are consistent with the Operational Plan and have not had major changes or additions to the operating procedures. Current FGD waste is placed and spread in 12-inch lifts and is then compacted by the dozer with a minimum of three passes over the fill area to achieve sufficient compaction. The layout of the FGD landfill is consistent with the master plan of the landfill included in the approved permit. The recently installed standpipe used to carry contact water off the landfill and into the Bottom Ash Pond appears to be working effectively.

3.3 Bottom Ash Landfill Inspection Findings

The bottom ash landfill appeared to be in good working order from the visual inspection. Partial vegetation has grown in the bottom ash disposal area. Erosion control measures are in-place and are functioning as designed. No areas of slope failure or sloughing on the landfill berms were observed during the visual inspection of the bottom ash landfill. Bottom ash landfilling procedures appear to be consistent with the Operational Plan for the landfill. No major operational changes or additions have been made to the bottom ash landfill and the layout of Area 1 is consistent with the master plan in the landfill Permit.

4.0 VOLUME OF WASTE

4.1 Fly Ash Waste Volume

The table below summarizes waste volume information for the fly ash landfill and includes the volume of CCR disposed in the landfill during 2015.

<table>
<thead>
<tr>
<th>Total Capacity (CY)</th>
<th>Airspace Available (CY)</th>
<th>Previous Weight (Tons)</th>
<th>2015 Fly Ash Added (Tons)</th>
<th>Current Weight (Tons)</th>
<th>Current Volume Occupied (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,746,000.00</td>
<td>502,013.00</td>
<td>3,503,505.96</td>
<td>60,359.89</td>
<td>3,570,200.85</td>
<td>3,305,741.53</td>
</tr>
</tbody>
</table>

CY -- cubic yards

4.2 FGD Gypsum Waste Volume

The table below summarizes waste volume information for the FGD landfill and includes the volume of CCR disposed in the landfill during 2015.
<table>
<thead>
<tr>
<th>Total Capacity (CY)</th>
<th>Airspace Available (CY)</th>
<th>Previous Weight (Tons)</th>
<th>2015 FGD Added (Tons)</th>
<th>Current Weight (Tons)</th>
<th>Current Volume Occupied (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,880,000.00</td>
<td>3,491,247.00</td>
<td>419,853.24</td>
<td>70,407.84</td>
<td>490,261.08</td>
<td>388,402.52</td>
</tr>
</tbody>
</table>

CY – cubic yards

4.3 Bottom Ash Waste Volume

The table below summarizes waste volume information for the bottom ash landfill and includes the volume of CCR disposed in the landfill during 2015.

<table>
<thead>
<tr>
<th>Total Capacity (CY)</th>
<th>Airspace Available (CY)</th>
<th>Previous Weight (Tons)</th>
<th>2015 Bottom Ash Added (Tons)</th>
<th>Current Weight (Tons)</th>
<th>Current Wet Ash Volume Occupied* (CY)</th>
<th>Current Dry Ash Volume Occupied (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,593,100.00</td>
<td>823,100.00</td>
<td>831,600.00</td>
<td>6,335.00</td>
<td>837,935.00</td>
<td>572,733.33</td>
<td>203,132.41</td>
</tr>
</tbody>
</table>

CY – cubic yards
* Wet bottom ash volume supplied by others

5.0 LIMITATIONS

The work described herein was performed in accordance with the proposed scope of services approved by our Client. Blackstone has performed the services in a manner consistent with that level of care and skill ordinarily exercised by other members of our profession currently practicing in the same locality and under similar conditions. We have endeavored to meet this standard of care, but may have been limited by conditions encountered during performance, or inability to review information not received by the report date. When appropriate, such limitations are discussed in the report relative to their significance with respect to our findings. No warranties, express or implied, are intended or made.

It should be noted that portions of this report are based on unverified information supplied to Blackstone by third-party sources. Efforts have been made to substantiate third-party information; however, Blackstone cannot guarantee its completeness or accuracy.
NOTES:
1. EXISTING TOPOGRAPHY WAS PROVIDED BY WESTAR AND COMPLETED BY PROFESSIONAL ENGINEERING CONSULTANTS IN 2014.
Photo #092154
Photographer: Kyle Kukuk
Date: December 10, 2015
Direction: N
Description: Fly Ash Landfill Area 1

Photo #092156
Photographer: Kyle Kukuk
Date: December 10, 2015
Direction: NW
Description: Fly Ash Landfill Area 1

Photo #092920
Photographer: Kyle Kukuk
Date: December 10, 2015
Direction: SW
Description: Fly Ash Landfill Area 1

Photo #092930
Photographer: Kyle Kukuk
Date: December 10, 2015
Direction: SW
Description: Fly Ash Landfill stormwater pond
Photo #093634
Photographer: Kyle Kukuk  
Date: December 10, 2015  
Direction: N  
Description: Fly Ash Landfill slope

Photo #093708
Photographer: Kyle Kukuk  
Date: December 10, 2015  
Direction: E  
Description: Fly Ash Landfill slope

Photo #093721
Photographer: Kyle Kukuk  
Date: December 10, 2015  
Direction: NW  
Description: Fly Ash Landfill slope

Photo #093801
Photographer: Kyle Kukuk  
Date: December 10, 2015  
Direction: N  
Description: Fly Ash Landfill slope