FINAL

ANNUAL INSPECTION REPORT NEARMAN CREEK BOTTOM ASH IMPOUNDMENT

Kansas City, Kansas

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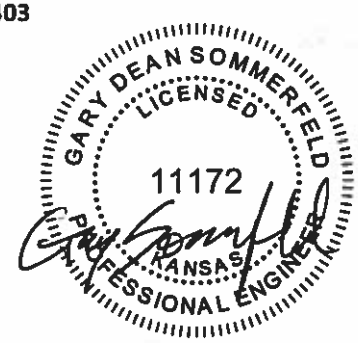

12/28/2017

PREPARED FOR

KANSAS CITY BPU
THE POWER OF COMMUNITY

Kansas City Board of Public Utilities

28 DECEMBER 2017

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Building a world of difference.

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1.0 Executive Summary

This report presents a summary of the annual inspection for the Kansas City Kansas Board of Public Utilities (KCBPU) Nearman Bottom Ash Impoundment in Kansas City, Kansas. The annual inspection was completed by Black & Veatch on December 8, 2017. The annual inspection was completed in compliance with 40 CFR § 257.83 and included review of available information regarding the impoundment as well as a visual inspection of the impoundment and appurtenant structures.

1.1 SUMMARY OF FINDINGS

Inspection of the bottom ash impoundment did not identify any signs of structural weakness or conditions that would disrupt or affect the safety of the impoundment. There were no current concerns with existing conditions or the existing maintenance.

1.2 RECOMMENDATIONS

Based on the results of the inspection, Black & Veatch has no recommendations for improvements of the existing conditions or the maintenance program.

2.0 Inspection Team and Date of Inspection

2.1 INSPECTION TEAM

The inspection team consisted of one KCBPU Staff Scientist and one Black & Veatch geotechnical engineer. The inspection team members included:

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2.2 DATE OF INSPECTION

The inspection team began their work at 1:00 p.m. on Friday, December 8, 2017 and completed their work at 2:00 p.m.

2.3 WEATHER DURING INSPECTION

The weather on the day of the inspection was sunny with an ambient temperature about 48° Fahrenheit and no wind. There had been no significant precipitation within the previous week and all surrounding conditions were dry.

3.0 Description of Surface Impoundment

3.1 LOCATION AND GENERAL DESCRIPTION

The KCBPU Nearman Creek Power Station Surface Impoundment is located in Kansas City, Kansas, within Wyandotte County, in northeastern Kansas. The surface impoundment is a bottom ash settling pond and a clear water pond that are separated by an internal dike. Descriptions within this report may identify the facility as the surface impoundment, bottom ash pond, or ash pond. The two ponds are hydraulically connected by a 24-inch diameter reinforced concrete pipe (RCP). The impoundment operates as a closed loop system that is designed to accumulate and store bottom ash that is sluiced form the existing Unit 1 coal-fired boiler then recirculate clean water from the clear water pond back to the plant operations. The clear water is recycled by way of a pump located in an adjoining pump house.

The impoundment was designed by Lutz, Daily & Brain of Shawnee Mission, Kansas. Construction was completed May 30, 1980 and was permitted by the Kansas Department of Health and Environment (KDHE) on February 11, 1982. The impoundment was constructed by building a perimeter dike consisting of on-site clay and clayey silt materials on the existing soils. Both ponds were designed with a 3-foot thick layer of impervious fill as a base.

The bottom ash pond was originally designed with a discharge structure that consisted of a 30-inch diameter RCP. The original purpose of the pipe was to permit emergency inflow into the pond in case of exterior flooding to help stabilize the embankments and to allow emergency discharge of impounded water. Since completion of construction, the pipe has been closed by mechanical means and was later sealed with concrete.

3.2 POND DIMENSIONS AND CAPACITIES

Based on the original construction drawings, the impoundment's exterior and internal dikes have a nominal crest elevation of 763 feet. The side slopes of the dikes, both interior and external are designed with 3 horizontal to 1 vertical slopes. The exterior slopes are covered with riprap on the northern portion only and grass vegetation cover on all other external slopes. The interior slopes were originally designed without riprap cover; however, due to erosion issues, riprap was later placed on all interior slope surfaces.

The impoundment covers approximately 21.5 acres and has a design storage capacity of 294,870 cubic yards. Bottom ash is reclaimed from the pond and stockpiled in the southwest corner of the bottom ash pond. In 2009, volume of material stored in the pond was estimated as 107,282 cubic yards. Since 2009, subsequent operation of the impoundment has further reduced the volume of the bottom ash.

3.3 POND INSTRUMENTATION

There is a level indicator on the interior slope near the conduit between the ponds. The water level indicators are set to Elevation 760.59 at the top of the red marker, 759.55 at the top of the green marker and 758.49 at the bottom of the green marker. The approximate water elevation in the pond at the time of the inspection was Elevation 756.3 feet.

Figure 3-1 Water Level Indictor

3.4 POND OPERATING AND INSPECTION PROCEDURES

In accordance with the Operations Plan prepared by Blackstone Environmental, dated November 11, 2015, the impoundment is inspected on a weekly, monthly and an annual basis by plant personnel. Weekly and monthly inspections were initiated on October 19, 2015. The weekly and monthly reports have been completed during the past year and were reviewed for this inspection.

4.0 Inspection Findings

Black & Veatch completed the annual inspection based on the requirements of §257.83 of the CCR rules. The inspection was completed as a visual inspection with the main goals of identifying signs of distress or malfunction of the impoundment, appurtenant, and hydraulic structures. As part of this inspection, Black & Veatch also performed a review of the available information which included the following documents;

a. Geotechnical Engineering Report, Bottom Ash Pond Evaluation, prepared by GeoSource, LLC September 2, 2015.

b. Geotechnical Report, Erosion, Ash Ponds Dike Slopes, prepared by Terracon, June 20, 2008.

c. Original Ash Pond Design Drawings and Specifications, prepared by Lutz, Daily & Brain, various dates.

d. Operations Plan KCBPU Nearman Creek Power Plant Bottom Ash Surface Impoundment, prepared by Blackstone Environmental, November 11, 2015.

e. Bottom Ash Surface Impoundment Hazard Potential Classification Assessment, prepared by Black & Veatch, October 2016.

f. History of Construction Report – Nearman Creek Bottom Ash Surface Impoundment, prepared by Black & Veatch, October 2016.

g. Bottom Ash Impoundment Liner Assessment, prepared by Black & Veatch, October 2016.

Black & Veatch also reviewed the weekly and monthly inspection reports. The KCBPU personnel responsible for the completion of the inspection reports was part of the inspection team. Field inspection of the impoundment included a site walk to observe the dam crest, upstream slope, downstream slope, and discharge structures.

4.1 RESULTS OF INSPECTION

4.1.1 Crest

The interior and exterior dike crest surfaces are covered with gravel road base material. The crest of the dikes were in good condition (Figure 4-1). No signs of cracking, settlement, movement, erosion or deterioration were observed during the assessment.

No vegetation was observed along the crest. The KCBPU staff indicated that vegetation has been periodically sprayed as part of the landscape maintenance and dead vegetation was observed.

Figure 4-1 Interior Dike Crest Condition

4.1.2 Interior Slopes

The interior slopes of the bottom ash and clear water pond dikes are protected by riprap and were in excellent condition (See Figure 3-1). There were no signs of erosion or surface instability. No vegetation was observed within the slopes. The previous water levels could be observed as the darker riprap materials. As shown in Figure 3-1, the top of a vertical pipe can be observed above the water. The vertical pipe is an indicator of the water elevations between the two ponds.

4.1.3 Exterior Slopes

In the northern portion of the impoundment, the exterior dike slope surface is covered with large riprap and appears to be in excellent condition (Figure 4-2). There were no indications of slumping or instability observed on this portion of the impoundment. No vegetation was noted within the riprap. The maintenance program includes periodic spraying of vegetation. The base of the slope is dry.

Figure 4-2 Exterior Dike Slope in North Facing Slope of Impoundment

During the previous annual inspection, additional riprap had been placed near the outlet structure. The outlet structure is plugged, but the riprap had been placed to protect the grade below the outlet. Prior to this year's inspection, more riprap had been placed around the plugged outlet and extended to meet the east embankment (Figure 4-3). The riprap placement had been spread evenly along the face of the slope and was composed of intact limestone cobbles and boulders with little to no shale seams.

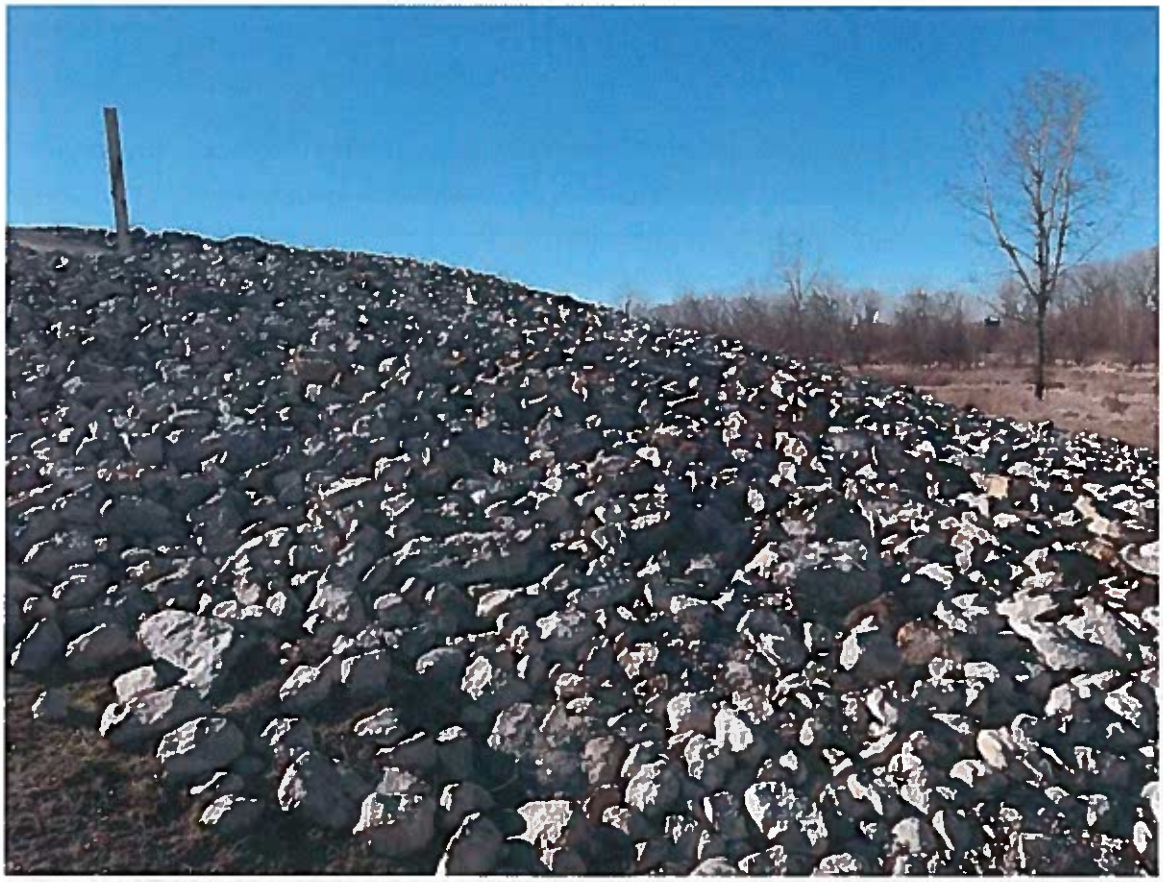

Figure 4-3 Exterior Dike Riprap Placement.

In the remaining portions of the impoundment, the exterior slopes are generally covered with grass and low vegetation cover. There were no indications of slumping, instability, or erosion observed on these portions of the dike. Minor indentation along the slope were from the tires of the mowing operations.

There were fewer observed animal burrows than the previous annual inspection. Animal tracks observed on recent weekly observations have been controlled with the use of traps (Figure 4-4). Trapping animals is part of the maintenance plan.

Figure 4-4 Animal trap placed due to weekly observation.

4.1.4 Discharge Structures

The former discharge structure was not visible due to the additional rip rap that had been placed during the past year (see Figure 4-3). There were no signs of seepage or structural instability. The new riprap has been placed over the structure and extended the rip rap to the south and east along the slope.

The 24 inch diameter pipe that connects the bottom ash and the clear water ponds is designed to be below water level and was not visible for inspection.

4.1.5 Appurtenant Structures

Additional structures observed during the inspection included the clear water pump house and bottom ash sluice pipes. A visual inspection of the exterior of the pump house indicated that the pump house was in good condition. The KCBPU staff indicated that the monthly equipment inspection of the sluicing system includes confirming the operation of the pump and gauges. The bottom ash sluice pipes were also visually inspected and found to be in good working order.

5.0 Conclusions and Recommendations

Based on the condition of the surface impoundment, as observed during the inspection in December 2017, the impoundment is considered sufficient to function as intended. There were no signs of distress or instability problems associated with the impoundment.

There are no recommendations for the future of the impoundment area or the related structures.