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Big Rivers ELECTRIC CORPORATION

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Green CCR Landfill

Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
CCR Landfill 2018 Annual Inspection Report

Big Rivers Electric Corporation

Project number: 60577417

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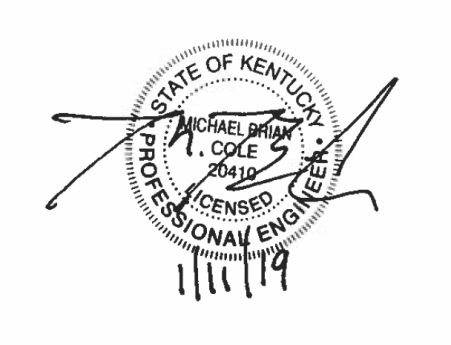

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1. Project Background

Per United States Environmental Protection Agency (USEPA) Final Coal Combustion Residual (CCR) Rule §257.84 annual inspection by a qualified professional engineer is required for each CCR unit. At the request of Big Rivers Electric Corporation (BREC), AECOM completed the annual inspection in accordance with the CCR Rule requirements and prepared this annual Inspection report for the Green CCR Landfill at the Sebree Generating Station, located in Robards, Kentucky.

The CCR Rule requires a visual inspection by a licensed civil engineer of each CCR unit to ensure that the design, construction, operation and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. This inspection was performed in accordance with the scope of work presented in our proposal number OPP-800542, dated June 6, 2018, executed under purchase order 249941 as part of general services agreement with Big Rivers Electric Corporation dated November 16, 2017.

2. Regulatory Requirements

The annual inspection criteria are specified in CCR Rule Section 257.84(b) (1) which at a minimum includes:

(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 the previous annual inspections); and

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

In addition to the annual inspections, 7-day inspection per CCR Rule Section 257.84 (a) are completed by BREC and are documented in the facility operating record.

Once the annual inspection has been completed, the CCR Rule Section 257.84(b) (2) requires the qualified professional engineer to 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 of operation of the CCR unit since the previous annual inspection.

3. Review of Available Information

Prior to completing the visual inspection of the CCR unit, AECOM reviewed the 2017 Annual Inspection Report for the CCR unit, prepared by Associated Engineers, Inc. dated January 11, 2018. Any areas in need of repair were addressed by the report and BREC completed the appropriate repairs where necessary. The observations from the 2017 annual inspection completed by Associated Engineers, Inc. December 21, 2017 include:

- Sporadic small to large animal burrows, primarily rodent to larger mammal of inactive area on the southern portion of the east side of the landfill;

- Isolated bare areas and invasive species monocultures of inactive area;
- An isolated low spot holding water was present on the first bench of the southeast corner of the inactive portion of the landfill;
- Erosion of a drainage ditch along the haul road in the active area and nonfunctioning pipe to the east of the haul road was exposed due to erosion;
- Some surficial erosion/rills in cover material; particularly northeast corner;
  - Significant erosion and an area of thin cover soil at the northeast corner of the fifth bench up to the sixth bench near the topsoil stockpile;
  - Minor to moderate erosion on active disposal areas and haul roads of the active area (working face);
- Seepage was present along the base of the expansion wall construction near the south end. The ground between the wall and drainage ditch was noted to be soft;
- Seepage present at the toe and lower slope of the east side of the landfill;

The 2017 inspection concluded “no deficiencies or disrupting conditions that would require immediate measures to remedy were identified in the inspection. The inspection findings consisted of maintenance items that were not observed to be signs or potential signs of significant structural weakness.”

After the inspection observations were made available to BREC, corrective actions at the Sebree station Green CCR Landfill were completed. The observations brought forth in the 2017 annual inspection were addressed in a timely manner by BREC. BREC has taken the following steps to rectify the previous inspections observations, the small depression on the east side of the 6th slope has been repaired, the nonfunctioning drain pipe east of the haul road was removed, and all other areas of minor erosion in the temporary cover will be addressed as the haul road and Mechanically Stabilized Poz-O-Tech (MSP) wall continue to develop.

These observations are repaired as soon as practical based on the mowing schedule and weather. Removing sediment buildup, filling low areas, and re-seeding activities were to be completed when such repair activities don’t exacerbate any required maintenance. Repairing storm drains identified in the inspection will result in creating more damage to the adjacent areas unless performed during the proper conditions therefore will be completed when feasible.

In summary no deficiencies were identified and the previously stated observations are being addressed as part of landfill operations and maintenance.

4. Inspection Procedures & Observations

Per CCR Rule Section 257.84 (b) (3) the owner or operator of the CCR unit (BREC) must complete the initial inspection no later than January 18, 2016. This report summarizes the fourth annual inspection performed by BREC since the CCR Rule took effect April 17, 2015. The forth inspection was completed on July 25, 2018. The inspection was completed by AECOM professional engineer Mark Keown, P.E. and AECOM staff engineer Scott Mesi. In addition to the annual inspection BREC completes 7-day inspections of the CCR unit in accordance with Section 257.84 of the CCR Rule.

The inspection consisted of visual assessment of the landfill and associated protective cover soil, vegetation, and storm water management structures. The inspection began on the west side along the MSP wall moving from north to south at the toe of the wall. The riprap check dams and erosion control matting were in good condition along the toe of the wall. As noted in the previous annual inspection, seepage is present from the MSP wall; note the seepage was directed through weep holes in the wall as designed to relieve hydrostatic pressure behind the wall. Noted corrosion on the H-piling in the wall however, this is minor and does not affect the walls stability. Also as documented in the previous annual inspection report there is soft ground near the wall where seepage is present, the seepage is

directed to a drainage trench adjacent to the wall. The area at the top of the MSP wall is active and appeared to be in good condition at the time of the inspection.

The inspection progressed to the south end of the landfill at the toe of the landfill moving to the east. This area appeared to be in good condition functioning as designed. Continuing to the east side of the landfill along the toe of the slope an area of ponded water was present in the drainage ditch along the access road. There were no signs of flowing water, seepage, as mentioned in the previous annual inspection report, the area appeared to be stable and the ponding water did not appear to be seepage. The water was noted in a surface water drainage ditch. Additionally, BREC had recently seeded an area adjacent to the river near the access road on the east side of the landfill; the area appeared to be in good condition with a silt fence installed while the vegetation is being established.

After inspecting the toe of the south and east sides of the landfill, the inspection proceeded to the 1st bench on the east and south sides of the landfill working up to the top of the landfill. The vegetation, surface water controls, and protective cover within the area appear to be in good condition, with very few areas of sparse vegetation. As part of the regular Green CCR Landfill maintenance BREC re-seeds areas of sparse vegetation during the spring and fall when the weather conditions are conducive to vegetative growth.

The north side of the landfill is also active and appeared to be in good condition at the time of the inspection constructing the landfill as designed. It was noted during the inspection some erosion rills were present in the area between the closed portion of the landfill where protective cover is established and the active (working) portion of the north face. This area is immediately adjacent to the haul road into the active face therefore is anticipated to receive haul road runoff. The area is stable and acts to capture drainage from the north haul road of the working face.

The inspection was limited to the portions of the landfill that had protective cover soils placed and were not part of the working face of the landfill. The working face of the landfill is maintained by BREC operations.

5. Inspection Findings

Per CCR Rule Section 257.84(b) (2) the following observations were made.

CCR Landfill Geometry

The Green CCR Landfill is used for the placement of coal combustion residual (CCR) material including primarily Poz-O-Tec and related materials. The landfill has a maximum elevation of approximately 608 feet above mean sea level (MSL). The Green river lies to the east of the landfill and Groves Creek lies to the south of the landfill. The landfill has approximately 7 continuous benches on the south and east side, each higher in elevation until the top of landfill is reached. The north and west sides of the landfill are receiving CCR placement as part of BREC operations. An aerial photograph of the Green CCR Landfill is presented on the next page in Figure 1.

Figure 1: Big Rivers Green Landfill Overview

Changes to the landfill geometry since the previous 2017 annual inspection includes placement of additional CCR, protective cover soils and establishing vegetation on the landfill.

CCR Landfill Volume

The total volume of CCR material contained in the Green CCR Landfill was estimated in 2018 to be 21.68 million cubic yards. This volume was calculated from available the previous 3 annual inspection reports and the average volume of CCR placed each month over the past 3 years to estimate the 2018 volume at the time of the inspection.

CCR Landfill Structural, Operational, and Safety Items

No deficiencies or disrupting conditions that would require immediate measures to remedy were identified in the inspection. The inspection findings consisted of maintenance items that were not observed to be signs or potential signs of significant structural weakness.

BREC has been made aware of the aforementioned observations and are planning to repair as soon as practical. The observations were limited to sparse vegetation and erosion rills near the active face on the north side of the landfill.

CCR Landfill Changes

There have been no changes to the Green CCR Landfill since the previous 2017 annual inspection that may have the potential to affect the stability or operation of the CCR unit. Changes include typical operations activity such as, placement of additional CCR material and protective cover soil to meet the closure design grades of the landfill. The MSP wall is being constructed as designed and showed no signs of instability at the time of the inspection.

6. Recommendations – General Maintenance and Monitoring Conditions

Overall

1. Continue regular mowing of all berms with vegetation control to prevent the growth of excessive woody plants and brushes.
2. Continue regular maintenance of minor erosion rills in timely manner.
3. Continue weekly inspection as required by the CCR mandated roles and submit Inspection Reports to the facility operating record in a timely manner.
4. The seepage near the MSP wall and the ponded water at the toe of the east side of the landfill should be monitored.
5. Both the 2017 and 2018 inspections noted ponding water at the toe of the slope on the east side of the landfill. Although no seepage was present during the 2018 inspection, it is recommended this area continues to be monitored for flowing seeps or changes in conditions. If the ponding water increases in volume, it is possible surface water collects in this ditch and increasing the slope of the ditch will allow the small amount of ponded water to drain.

Active Areas

1. Continue current maintenance practices.
2. Continue to monitor surface water drainage around the east side of the haul road on the north side of the landfill.

Closed Areas

1. Continue current maintenance practices.
2. Continue to complete seasonal repairs such as reseeding where sparse vegetation and filling in ruts caused by the tractor and mowing operations.
3. Continue to check catch basins for obstructions and clear as needed.