Green CCR Landfill

Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
CCR Landfill 2021 Annual Inspection Report

February 4, 2022

Prepared By:

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Project ID: 21-0215

Big Rivers Electric Corporation
Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
CCR Landfill 2021 Annual Inspection Report

CCR Landfill Information

Name:	Green CCR Landfill
Operator:	Sebree Generating Station
Address:	9000 Highway 2096 Robards, KY 42452

Qualified Professional Engineer

Name:	Justin S. Lamb
Company:	Associated Engineers, Inc.
Kentucky P.E. Number:	32660

Regulatory Applicability

Per 40 CFR §257.84(b), annual inspections by a qualified professional engineer must ensure that the design, construction, operation, and maintenance of the CCR landfill is consistent with recognized and generally accepted good engineering standards.

Annual inspections of any CCR landfill must include, at a minimum: (1) 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 (2) a visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

Additionally, following each annual inspection, the qualified professional engineer must prepare an inspection report which documents the following: (1) any changes in geometry of the structure since the previous annual inspection, (2) the approximate volume of CCR at the time of the inspection, (3) 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 (4) any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

Inspection Description

This is the seventh annual inspection report for the Green CCR Landfill pursuant to the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule which

became effective April 17, 2015. The initial 2021 inspection was conducted on November 17th, 2021 by Justin S. Lamb P.E. and Brandon Watts of Associated Engineers, Inc. of Madisonville, Kentucky. A follow up inspection was conducted on January 29, 2022 by Justin S. Lamb, P.E. The purpose of the follow up inspection was to observe the completion of maintenance activities that were underway during the initial 2021 inspection. Weekly (7-day) inspections conducted by Big Rivers Electric Corporation are kept in the facility operating record.

The inspection consisted of a visual assessment of the landfill and associated drainage control features; and began on the west side of the landfill adjacent to the vertical expansion combination wall (expansion wall). Evidence of the recent subsurface drainage improvement activities along the toe of the wall were observed during the initial inspection and during the follow up inspection all subsurface improvements had been completed. These improvements included the installation of a perforated subsurface pipe and trench filled with drainage medium to route the seepage underground to strategically placed pump stations surrounding the landfill. These subsurface drainage improvements were not only completed on the west side of the landfill but were installed throughout the entire perimeter except for a small section on the north end. In the areas where higher concentrations of moisture were previously present laterals and/or parallel subsurface draining structures were added to further reduce the presence and effects of seepage at the surface. At the time of the January reinspection virtually all the seepage from the landfill had been routed underground to the subsurface drainage system which flows to a series of pump stations. These pump stations are then pumped to the target manhole which is then pumped through a series of permitted KPDES discharge points. The area in which the subsurface drainage system was installed lacked vegetative cover due to the recent construction activities, but seeding and final grading of the surface is scheduled for the spring per BREC. The drainage ditch adjacent to the west access road that parallels the expansion wall and reports to Pond 012 at the south end of the landfill has been regraded and repurposed to primarily convey non-contact surface run off. As previously mentioned, this ditch is unvegetated and at rough grade at this time. It will be final graded and seeded in the spring per BREC.

During the November inspection maintenance and cleaning activities were underway in and surrounding Pond 012. At the time of the January reinspection these activities were primarily completed with only a few areas of finish grading to be finalized and seeding to be performed when weather allows (per BREC). The maintenance activities included the removal of landfill sedimentation from the pond, regrading, and cleanup around the perimeter of the pond which has increased the storage capacity and slope stability of the structure. At the time of the reinspection a section of the subsurface drainage system between the pond and toe of the slope remained open and uncovered. Cover and seeding of this section were delayed due to weather and is scheduled to be completed as soon as weather allows (per BREC).

The initial inspection proceeded from the west side landfill to the inactive east side along the access road adjacent to the embankment toe. Proceeding north, during the initial inspection standing water was observed in a ditch along the embankment toe, and seepage of discolored water was visible. During the January follow up inspection the completion of the subsurface seepage collection system appears to have re-routed most if not all the seepage previously noted underground. Although tall stands of dormant invasive vegetation as well as periodic wet areas were still present along the eastern ditch line during the reinspection the water no longer appeared discolored, and the quantity and extent of water present was drastically reduced. Per BREC, mowing of the ditch is scheduled for the next appropriate weather period. Along the lower bench at approximately the midpoint a small surficial slope failure of the cover material due to mower activity was noted. The initial inspection of the lower slope continued to the north side of the inactive landfill where an area of seepage was observed centrally along the toe of the north slope and drained east in a ditch to Pond 014. During the follow up inspection this section of seepage was not visually observed at the surface. It is assumed that it has been effectively routed to the subsurface drainage system.

After the inspection of the lower slope and toe the inspection proceeded to the first bench of the landfill on the west side which is comprised by the top of Poz-O-Tec fill placed against the expansion wall. The inspection then proceeded along the south, east, and north sides continuing bench by bench to the top of the landfill. The CCR fill material was firm and had been compacted in all permeant areas of placement. There were areas along the northwest side of the fist bench in the active placement area where Poz-O-Tec had been placed in over steepened piles due to road grading and bench construction. These piles pose no significant threat to the overall structural integrity of the landfill. As inspection activities proceeded upward areas of minor to moderate erosion were noted. Particularly: The southeast inlet on the 3rd bench exhibited moderate erosion around its perimeter. The southwest inlet along the 3rd bench exhibited moderate erosion around its perimeter. The west ditch on the 2nd bench exhibited minor erosion and had placed small quantities of CCR material atop the temporary cover. Lastly, the top bench exhibited minor to moderate erosion at the southeast corner.

Inspection Report Specifications

(i) CCR Landfill Geometry

The Green CCR Landfill is used for the placement of coal combustion residual material, currently fly ash, bottom ash and related material. The landfill is raised above adjacent ground to a maximum elevation of approximately 608 feet above mean sea level. The original ground surface within the landfill footprint was irregular and the predominant features were small stream valleys draining towards the Green River which is located just east of the landfill; and towards Groves Creek which is located just south of the landfill.

Changes to the landfill geometry since the previous (2020) annual inspection include continued placement of CCR material behind the constructed vertical expansion wall on the

west exterior slope; and the placement of additional CCR and cover material on the landfill.

(ii) CCR Landfill Volume

The total volume of CCR material contained in the Green CCR Landfill was estimated to be 23.2 million cubic yards. This volume was calculated from available baseline topography compared to October 2021 flight derived topographic contours.

(iii) 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.

(iv) CCR Landfill Changes

There have been no changes to the Green CCR Landfill since the previous 2020 annual inspection that have the potential to affect the stability or operation of the landfill. Changes include placement of additional CCR and cover material as well as the improvement of the seepage collection system and Pond 012

Flight Date: September 17, 2021

BIG RIVERS ELECTRIC CORPORATION

Green CCR Landfill
2021 Annual Inspection Aerial Photo

Project Number:	21-0170
Date:	01/05/2022
Scale:	1" = 500'
Drawn By:	A.E.I.

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BREC Final Rule CCR Landfill 2021 Annual Inspection Checklist

Operator:	Sebree Generating Station	Weather:	Overcast
CCR Landfill:	Green	Temperature (Degrees F):	58 (high)
Date:	November 17, 2021 (Follow Up January 29, 2022)	Inspector/Qualified Person:	Justin S. Lamb P.E., Brandon Watts

	ITEM	STATUS			OBSERVATIONS
		YES	NO	N/A	
1	**CONDITION OF INACTIVE AREA**				
	Access road deterioration (potholes, rutting, etc.)	☒	☐	☐	
	Any erosion	☒	☐	☐	Some surficial erosion/rills in cover material
	Longitudinal cracks	☐	☒	☐	
	Transverse cracks	☐	☒	☐	
	Visual depressions	☒	☐	☐	Some low areas in bench flowlines and longitudinal tracking from tractor/mower tires
	Visual settlement	☐	☒	☐	
	Bulging or slumping	☐	☒	☐	
	Any drainage features obstructed or damaged	☒	☐	☐	Some runoff ditches are eroded/contain sediment in areas
	Are drainage features flowing	☒	☐	☐	
	Is seepage present	☒	☐	☐	Seepage has primarily been routed and contained to the subsurface seepage collection system.
	Is seepage or discharge carrying sediment	☐	☒	☐	
	Adequate vegetative cover	☒	☐	☐	Isolated bare areas and invasive species monocultures
	Are trees growing on the slope	☐	☒	☐	
	Are there any animal burrows	☒	☐	☐	Sporadic animal burrows; primarily rodent
	Any stone deterioration	☐	☐	☒	
	Adequate riprap/slope protection	☐	☐	☒	
	Debris or trash present	☐	☒	☐	
	Is there exposed CCR material	☒	☐	☐	Isolated areas
2	**CONDITION OF ACTIVE AREA**				
	Access road deterioration (potholes, rutting, etc.)	☐	☒	☐	
	Any erosion	☒	☐	☐	Minor to moderate erosion on active disposal areas and haul roads
	Any cracks	☐	☒	☐	
	Any slides	☐	☒	☐	
	Visual depressions	☐	☒	☐	
		STATUS			OBSERVATIONS

		YES	NO	N/A	
	Visual settlement	☐	☒	☐	
	Bulging or slumping	☐	☒	☐	
	Any drainage features obstructed or damaged	☐	☒	☐	
	Is seepage present	☒	☐	☐	Minor quantities along face of combination wall remainder is routed to the subsurface collection system.
	Is seepage or discharge carrying sediment	☐	☒	☐	
	Debris or trash present	☐	☒	☐	
3	**LINER AND LEACHATE COLLECTION SYSTEM**				
	Are liners intact and being installed correctly	☐	☐	☒	
	Is the leachate collection operating correctly	☐	☐	☒	
	Is the leachate collection pond/storage functioning correctly	☐	☐	☒	
	Is there any slope/bank erosion on pond	☐	☐	☒	
	Are there any animal burrows on pond	☐	☐	☒	
	Is the spillway functioning and discharging correctly	☐	☐	☒	
4	**RUN-ON/RUNOFF-CONTROLS**				
	Are run-on/runoff controls in place	☒	☐	☐	
	Are run-on/runoff controls functioning	☒	☐	☐	
	Are run-on/runoff controls effective	☒	☐	☐	
	Are run-on runoff controls being maintained	☒	☐	☐	
	Signs of seepage or wetness	☒	☐	☐	
	Sediment transport or deposition	☐	☒	☐	

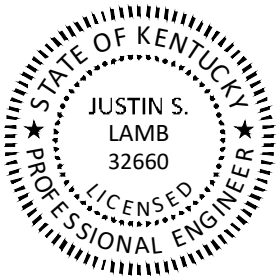
DEFICIENCIES AND MAINTENANCE ITEMS

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.

Completion of the landfill toe drain/seepage collection control design has routed the grand majority of the landfill seepage underground as observed during the January supplemental inspections.

Professional Engineer Certification [Per 40 CFR §257.84(b)]
Green CCR Landfill
Annual Inspections by a Qualified Professional Engineer

I hereby certify that myself or an agent under my review has prepared this Annual Inspection Report (Report), and being familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA), attest that this Report has been prepared in accordance with good engineering practices and meets the intent of 40 CFR Part 257.84(b). To the best of my knowledge and belief, the information contained in this Report is true, complete, and accurate.



Justin S. Lamb P.E.

State of Kentucky License No. 32660

Date: February 4, 2022