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Green CCR Landfill

Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule CCR Landfill 2016 Annual Inspection Report

January 10, 2017

Prepared By:



Project ID: 160122B

**Big Rivers Electric Corporation
Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule
CCR Landfill 2016 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: David A. Lamb
Company: Associated Engineers, Inc.
Kentucky P.E. Number: 17822

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 second 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 inspection was conducted on November 8 and 14, 2016 by Tim Brown P.E. and Matthew Lile of Associated Engineers, Inc. of Madisonville, Kentucky. 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 south slope of the landfill. The inspection noted that the area between the toe and adjacent road (to the south) was rutted and saturated; red staining was visible. The slope and benches showed some erosion and bare areas with thick accumulations of grass clippings. Some very bare areas with poor cover and erosion were visible above the second bench. Some areas with longitudinal tracking and rutting from mowing equipment were visible and minimal small animal burrowing was present. A storm drain inlet on the southeast corner showed minimal erosion and small animal burrowing in exterior backfill.

The inspection continued to the east slope which was in similar condition as the south slope. More specifically, standing water was present in places along the toe with some seepage of discolored water visible. Thick phragmites growth was prevalent in these areas although some areas had been mowed. Some erosion (areas of repaired erosion were also present) and bare areas were visible and some longitudinal tracking and rutting from mowing equipment was present. Areas of poor drainage and depressions with ponded water were visible although some areas showed surficial ground cracks from dry conditions. Some erosion extended from the top of the slope to the toe; a pile of CCR material was present on the third bench. On the northeast corner, the ditch located adjacent to the inactive area by the haul road was excessively eroded and contained a nonfunctioning pipe that had been washed out. Cover material had been recently placed above the third bench. On the fifth bench of the northeast corner, a new catch basin was nearly completed and the collection box contained significant silt from recently placed cover material. The collection box needs to be cleaned and adjacent sediment control provided. Large surficial cracks on the top edge of the landfill were visible along most of the east side; most likely due to dry conditions.

Inspection of the north side of the landfill showed significant erosion in places with some top to bottom rills and gullies. An area of significant seepage and accumulation of discolored water is located centrally along the toe of the north slope and drains east in a ditch to a sediment control structure. Erosion and minor scarping has occurred in the upper cover material in the general area of seepage and the plunge pool west and adjacent to the haul road has become over steepened from erosion. Significant erosion and rills in bare soil were visible below the third bench. Some areas of small animal burrowing, longitudinal tracking

from equipment and poor vegetation occur throughout the slope, although the upper slopes are in better condition than the lower slopes.

Inspection of the west side began at the northwest corner where significant erosion in cover material was visible on the lower slope below the first bench. The west side is mostly disturbed for a width of approximately 50 feet along the length of the first bench where a vertical pile wall is being constructed to provide additional landfill capacity. Both the first slope and second bench are also disturbed due to ongoing wall construction. Several very wet areas were visible along the base of the wall and appeared to be seepage. Generally: some areas of erosion consisting of rills and minor washouts; bare areas; longitudinal tracking from equipment and trucks; and thick grass clippings were visible on the west side. More specifically in the area of the third bench: vegetation is poor and significant gullyng was visible in the bench flow line near the south end; the area around the storm water collection box in the south west corner was eroded; and clumps of soil were visible from recent placement of soil cover. Most of the areas of recent cover on the upper slopes appear to have been seeded and mulched. In the area of the second bench near the south end, the storm water collection box inlet pipe extends towards the pile wall but appears to be disturbed by construction.

The majority of CCR material placement was visible on the upper north slope and the top of the landfill, and to facilitate wall construction on the west side.

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 600 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 (2015) annual inspection include the ongoing construction of a vertical wall along the west side of the landfill to increase storage capacity for CCR material; and the continued 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 at the time of inspection is approximately 20.7 million cubic yards. This volume was calculated from

available flight derived baseline topography compared to October 2016 flight derived topographic contours.

(iii) CCR Landfill Structural, Operational, and Safety Items

Noted Deficiencies

1. Erosion and minor scarping in upper cover material along toe and on lower slope of the landfill's north side caused by significant seepage of discolored water.

(iv) CCR Landfill Changes

A change to the Green CCR Landfill since the previous (2015) annual inspection that may have the potential to affect the stability or operation of the CCR unit is construction of the vertical expansion wall. The wall was designed per accepted engineering standards and if constructed as designed, should achieve required factors of safety.



Flight Date: October 23, 2016



BIG RIVERS ELECTRIC CORPORATION

Green CCR Landfill
2016 Annual Inspection Aerial Photo

Project Number:	16-0122B
Date:	12/12/2016
Scale:	NOT TO SCALE
Drawn By:	A.E.I.

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BREC Final Rule CCR Landfill 2016 Annual Inspection Checklist

Operator: Sebree Generating Station CCR Landfill: Green Date: November 8 & 14, 2016					Weather: Overcast - 8 th , Clear - 14 th Temperature (Degrees F): 60 (average) 8 th & 14 th Inspector/Qualified Person: Tim Brown P.E. & Matthew Lile (AEI)	
ITEM		STATUS			OBSERVATIONS	
		YES	NO	N/A		
1	CONDITION OF INACTIVE AREA					
	Access road deterioration (potholes, rutting, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Any erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Surficial erosion/rills in cover material	
	Longitudinal cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minimal surficial cracking from dry conditions	
	Transverse cracks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minimal surficial cracking from dry conditions	
	Visual depressions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some low areas in bench flowlines & longitudinal tracking/rutting from tractor & mower tires	
	Visual settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Bulging or slumping	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minor slope failure in seepage zone along north side toe and lower slope	
	Any drainage features obstructed or damaged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some catch basins obstructed by sediment	
	Are drainage features flowing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Is seepage present	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Is seepage or discharge carrying sediment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minimal sediment transport in seepage	
	Adequate vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Isolated bare areas & invasive species monocultures	
	Are trees growing on the slope	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Are there any animal burrows	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sporadic small animal burrows; primarily rodent	
	Any stone deterioration	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
	Adequate riprap/slope protection	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
	Debris or trash present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Is there exposed CCR material	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Isolated areas	
2	CONDITION OF ACTIVE AREA					
	Access road deterioration (potholes, rutting, etc.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Any erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Any cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Any slides	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Visual depressions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Minimal depressions due to incomplete grading	

		STATUS			OBSERVATIONS
		YES	NO	N/A	
	Visual settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Bulging or slumping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Any drainage features obstructed or damaged	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Is seepage present	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Along base of wall construction
	Is seepage or discharge carrying sediment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Debris or trash present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	LINER AND LEACHATE COLLECTION SYSTEM				
	Are liners intact and being installed correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Is the leachate collection operating correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Is the leachate collection pond/storage functioning correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Is there any slope/bank erosion on pond	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Are there any animal burrows on pond	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Is the spillway functioning and discharging correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	RUN-ON/RUNOFF-CONTROLS				
	Are run-on/runoff controls in place	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Are run-on/runoff controls functioning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Are run-on/runoff controls effective	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Are run-on runoff controls being maintained	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Signs of seepage or wetness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Sediment transport or deposition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DEFICIENCIES AND MAINTENANCE ITEMS					
<p>1. Erosion and minor scarping in upper cover material along toe and on lower slope of the landfill's north side caused by significant seepage of discolored water.</p>					

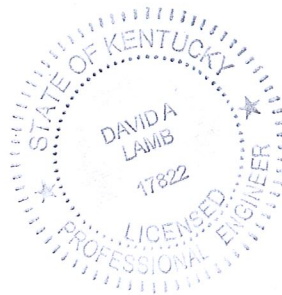
**Professional Engineer Certification [Per 40 CFR §257.84(b)]
Green CCR Landfill
Annual Inspections by a Qualified Professional Engineer**

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.



David A. Lamb P.E.

State of Kentucky License No. 17822



Date: 1-11-2017