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## **Green CCR Landfill**

### **Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule Run-on and Run-off Control System Plan**

**October 11, 2016  
Revised September 19, 2017  
Revised October 28, 2019**

**Prepared By:**



**Project IDs: 160029, 170137 & 170137C**

**Big Rivers Electric Corporation  
Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule  
Run-on and Run-off Control System Plan**

**CCR Landfill Information**

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

**Qualified Professional Engineer**

Name: David A. Lamb  
Company: Associated Engineers, Inc.  
Kentucky P.E. Number: 17822

**Regulatory Applicability**

As part of the § 257.81 for existing CCR landfill requirements, the owner or operator of an existing or new CCR landfill must design, construct, operate, and maintain a run-on and run-off control system plan as specified below. The owner or operator of the CCR unit must prepare the initial inflow design flood control system plan no later than October 17, 2016.

The owner or operator of an existing CCR landfill must design, construct, operate, and maintain:

- (1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour, 25-year storm; and
- (2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

Run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under § 257.3-3 (Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices Subpart A - Classification of Solid Waste Disposal Facilities and Practices Section 257.3-3 - Surface water):

Run-on and run-off control system plan:

- (1) *Content of the plan.* The owner or operator must prepare initial and periodic run-on and run-off control system plans for the CCR unit. These plans must document how the run-

on and run-off control systems have been designed and constructed to meet the applicable requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator has completed the initial run-on and run-off control system plan when the plan has been placed in the facility's operating record.

- (2) *Amendment of the plan.* The owner or operator may amend the written run-on and run-off control system plan at any time provided the revised plan is placed in the facility's operating record. The owner or operator must amend the written run-on and run-off control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.

### **Description of Landfill**

An aerial photo of the CCR unit is provided as Attachment A and an excerpt from U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps showing the location of the CCR unit is provided as Attachment B.

The CCR unit is used for the placement of coal combustion residual material; currently fly ash, bottom ash and related material. The approximate total volume of CCR contained in the unit at the time of the September 2019 aerial photo provided as Attachment A is approximately 22.4 million cubic yards. This volume was calculated from derived baseline topography compared to the September 2019 flight derived topographic contours. The Green CCR landfill is raised above adjacent ground to a maximum elevation of approximately 606 feet AMSL. 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.

### **Run-on and Run-off Control System Plan**

The initial run-on and run-off control system plan documents that the run-on control system will prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour/25-year storm; and that the run-off control system from the active portion of the CCR unit will collect and control at least the water volume resulting from a 24-hour/25-year storm.

#### **Run-on Control Analysis**

An evaluation of the Green CCR landfill configuration and topography resulted in the determination that because of the elevated position of active portions of the landfill, no significant run-on can occur and the only drainage onto active areas is storm water generated from direct precipitation; thus the CCR unit run-on system will prevent flow onto the active portion of the CCR unit during the peak discharge from the design storm event.

Run-off Control Analysis

Analysis of the Green CCR landfill drainage and sedimentation basin configurations and designs via SEDCAD modeling demonstrates that the design flood control system adequately manages flow out of the CCR unit during and following the specified 24-hour/25-year storm event. SEDCAD by Civil Software Design, LLC is a widely recognized comprehensive hydrology and sedimentology package, useful for runoff and sediment control design calculations. The SEDCAD modeling results for the Green CCR landfill are attached to this report.

The operating facility has verified that discharge from the Green CCR landfill is handled in accordance with the surface water requirements under § 257.3-3 (Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices Subpart A - Classification of Solid Waste Disposal Facilities and Practices Section 257.3-3 - Surface water).

Leachate Control Analysis

Per Part 257.53 of the CCR rule, the definitions for run-on and run-off both include leachate. Big Rivers Electric Corporation manages leachate through several options. In the event of leachate outbreaks, the leachate drainage would be routed to a sedimentation basin and permitted KPDES outfall. An alternative would be to mitigate the leachate drainage by removing the impacted area and replacing the cover material with compacted clay and then covering the clay with new cover material and seeding and mulching the area. Specifically, Big Rivers Electric Corporation has developed and implemented per this plan revision, the Leachate Management Standard Operating Procedures set forth in Attachment C, which have been reviewed and approved by the Kentucky Department for Environmental Protection.

**Sources of Information**

Geotechnical and other information provided by Associated Engineers, Inc.

Engineering design drawings and other information provided by Big Rivers Electric Corporation

United States Geological Survey U.S. Geological Survey (USGS) 7.5 minute Robards and Delaware topographic quadrangle maps

**Professional Engineer Certification [Per 40 CFR § 257.81]  
Green CCR Landfill Run-on and Run-off Control System Plan**

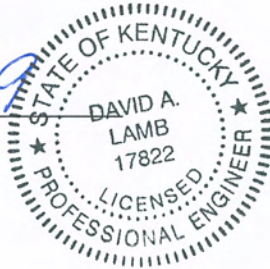
I hereby certify that myself or an agent under my review has prepared this Run-on and Run-off Control System Plan (Plan), and being familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA), attest that this Plan has been prepared in accordance with good engineering practices and meets the intent of 40 CFR Part 257.81. To the best of my knowledge and belief, the information contained in this Plan is true, complete, and accurate.

David A. Lamb

David A. Lamb P.E.

State of Kentucky License No. 17822

Date: 10-29-2019





Attachment A. Aerial Photo of the Green CCR Landfill



Attachment B. Topographic Map showing the Green CCR Landfill

## **Attachment C. Leachate Management Standard Operating Procedures**

### **Subject: Surface Seep and Leachate Outbreaks Repair**

To ensure compliance with 40 CFR 257 Subpart D and 401 KAR Chapters 45 and 46, the following procedure will be utilized for identification and repair of seeps and leachate outbreaks at the Green CCR landfill. For purposes of this SOP, a leachate outbreak is wastewater/seepage flowing directly from the covered CCR that has passed through or emerged from solid waste and contains soluble, suspended or miscible materials removed from such wastes. Seeps are flows that emerge from the ground immediately below the actual waste disposal area and that may contain leachate that is mixed with water from saturated soils or surface water infiltration.

- An inspection by a qualified person will be conducted once per week to identify any seeps and leachate outbreaks at the Green CCR landfill. The inspection will include the entire perimeter of the Green CCR Landfill as weather conditions allow at the time of the inspection. The weather conditions at the time of the inspection must be documented on the inspection form.
- Identified seeps and leachate outbreaks must be located and documented by Global Positioning Satellite (GPS) and digital photography.
- Identified seeps and leachate outbreaks must be quantified as to the amount of standing or flowing water in gallons per minute. Measurements or estimates of the impacted area in square feet must be included. Other information relevant to remediation of the outbreak or seep shall be included on the Big Rivers Electric Corporation (BREC) inspection form.
- All information fields on the BREC inspection form shall be completed.
- Categorize the seep or leachate outbreak into one of three categories:
  - Category 1 – Leachate/seep flow is contained within a drainage ditch and pond system that flows to a KPDES permitted outfall and the outbreak or seep is readily repairable by removing the impacted area and replacing the cover dirt with compacted clay, seeded and mulched, when the soil conditions are not too wet to preclude typical construction activities or the ambient temperature is not too low to preclude typical construction activities. For purposes of this determination, readily repairable is an outbreak or seep that can reasonably be believed to be remediated by removing the impacted area and replacing the cover with compacted clay. This determination requires the judgment of the inspector based upon the size, flow, and any repeat history of the outbreak or seep. For any area where there is no visible flow and no rutting/erosion of the soil from prior flow(s), but only saturated soil, then such an area will not be identified as a seep/leachate outbreak but will be identified and recorded as



- “saturated soil” in the log and monitored during subsequent weekly inspections.
- Category 2 – Leachate/seep is contained within a drainage ditch and pond system that flows to a KPDES permitted outfall but requires further investigation and evaluation prior to any attempt at remediation or if initial remediation efforts prove to be unsuccessful.
  - Category 3 – Leachate/seep is not contained within the KPDES permitted ditch and pond system. Any areas of leachate/seep discharges that are identified must be remediated, contained or routed to the KPDES permitted ditch and pond system if the seep displays a visible flow. Actions must begin immediately to prevent an unpermitted point source discharge to a water of the United States by remediating the outbreak or seep.
- Steps to take if a Category 1 – Leachate/seep outbreak reappears:
    - If a Category 1 – Leachate/seep outbreak reappears more than 30 days after a previous repair and the flow from the seep/leachate outbreak has been reduced or the extent of the impact is reduced from the initial identification of the seep/leachate outbreak, then BREC may classify the reappearance of the seep/leachate outbreak as a Category 1 – Leachate/seep outbreak and commence repairs per the Agreed Order (excavate, compact, seed, and mulch).
    - For any area where there is no visible flow and no rutting/erosion of the soil from prior flow(s), but only saturated soil, then such an area will not be identified as a seep/leachate outbreak but will be identified and recorded as “saturated soil” in the log and monitored during subsequent weekly inspections.
    - Seeps/leachate outbreaks that reappear less than 30 days after a repair or that reappear at a later date with increased flow or impact area will be classified as a Category 2.
  - Collect water samples for constituents listed in Table 1. A water sample will only be collected for analysis when a sufficient amount of water is flowing on the surface to collect a sample without disturbing the underlying soil. Samples will be collected once for each categorization unless there are visual changes such as color in the leachate. Seep/leachate water samples will be collected once when identified as a Category 1 and again if reclassified as a Category 2. The analysis will be performed by a laboratory certified in the State of Kentucky. The analysis must contain the chain of custody and complete analysis with QA/QC results. Results will be maintained in the Landfill operating log on-site.
  - Place categorized information in the Landfill operating log.
  - Corrective actions for readily repairable seeps and leachate outbreaks must begin as soon as reasonably feasible with consideration given to inclement weather patterns and soil moisture conditions.

- Remediation areas outside the KPDES permitted ditch and pond system must include the installation of sedimentation controls as found in the Storm Water Pollution Prevention Plan/Best Management Plan guidance document published by the Kentucky Division of Water. Water samples from seeps containing a visible flow shall be taken for impacted areas outside the KPDES permitted ditch and pond system and analyzed for the constituents found in Table 1.
- Cover soil and/or special waste removed during the remediation process must be placed in an active area of a CCR landfill or reused during the remediation of the unit if practicable.
- Replacement soil must be compacted, seeded and mulched.
- Environmental Services shall evaluate and determine remediation plans for a Category – 2 Leachate/seep outbreak that is deemed not readily repairable based upon flow and landfill conditions. Until remediation occurs, the seep/leachate flow shall be visually monitored, conveyed to a KPDES permitted outfall, and treated as necessary to ensure compliance with KPDES discharge limits and applicable water quality standards in the receiving stream. Remediation activities required for a Category 2 outbreak will be sent to the Division of Waste Management, 300 Sower Boulevard, Frankfort, Kentucky 40601 within five (5) business days of finalizing the report.
- Category 3 seeps displaying a visual flow will be reported to the Kentucky Division of Water - Surface Water Permits Branch in Frankfort, Kentucky and the Madisonville Field Office consistent with the Section 2.12 reporting provisions of the KPDES permit for leachate/seep outbreaks. Category 3 seeps with a visual flow will also be reported to the Kentucky Division of Waste Management - Field Operations Branch in Frankfort, Kentucky and the Madisonville Field Office. Reporting of the seeps shall occur as soon as feasible after discovery of such a seep, but no later than ten (10) days after discovery. Environmental Services shall evaluate and determine remediation plans for a Category 3 seep that is deemed not readily repairable based upon flow and landfill conditions.

These protocols shall be followed at CCR units subject to the federal CCR Rule and 401 KAR Chapter 46.

- Table 1
  - From 40 CFR 257 App. III
    - Boron
    - Calcium
    - Chloride
    - Fluoride
    - pH
    - Sulfate
    - Total Dissolved Solids

- From 40 CFR 257 App. IV
  - Antimony
  - Arsenic
  - Barium
  - Beryllium
  - Cadmium
  - Chromium
  - Cobalt
  - Fluoride
  - Lead
  - Lithium
  - Mercury
  - Molybdenum
  - Selenium
  - Thallium
  - Radium 226 and 228 combined
- From 401 KAR 45:160
  - \*Chemical Oxygen Demand
  - \*Total Organic Carbon
  - \*Specific Conductance
  - \*Copper
  - \*Nickel
  - \*Zinc
  - \*Iron
  - \*Sodium
  - \*Magnesium
  - \*Potassium
  - \*Bicarbonate
  - \*Carbonate