

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

April 19, 2011

OFFICE OF  
SOLID WASTE AND  
EMERGENCY RESPONSE

VIA E-MAIL AND FEDERAL EXPRESS

Larry Spann  
Power South Energy Cooperative  
P.O. Box 550  
Andalusia, Alabama 36420

Dear Mr. Spann:

On July 1, 2010 the United States Environmental Protection Agency ("EPA") and its engineering contractors conducted a coal combustion residual (CCR) site assessment at the CR Lowman facility. The purpose of this visit was to assess the structural stability of the impoundments or other similar management units that contain "wet" handled CCRs. We thank you and your staff for your cooperation during the site visit. Subsequent to the site visit, EPA sent you a copy of the draft report evaluating the structural stability of the units at the CR Lowman facility and requested that you submit comments on the factual accuracy of the draft report to EPA. Your comments were considered in the preparation of the final report.

The final report for the CR Lowman facility is enclosed. This report includes a specific rating for each CCR management unit and recommendations and actions that our engineering contractors believe should be undertaken to ensure the stability of the CCR impoundment(s) located at the CR Lowman facility. These recommendations are listed in Enclosure 2.

Since these recommendations relate to actions which could affect the structural stability of the CCR management units and, therefore, protection of human health and the environment, EPA believes their implementation should receive the highest priority. Therefore, we request that you inform us on how you intend to address each of the recommendations found in the final report. Your response should include specific plans and schedules for implementing each of the recommendations. If you will not implement a recommendation, please explain why. Please provide a response to this request by May 19, 2011. Please send your response to:

Mr. Stephen Hoffman  
US Environmental Protection Agency (5304P)  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

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If you are using overnight or hand delivery mail, please use the following address:

Mr. Stephen Hoffman  
US Environmental Protection Agency  
Two Potomac Yard  
2733 S. Crystal Drive  
5<sup>th</sup> Floor, N-237  
Arlington, VA 22202-2733

You may also provide a response by e-mail to [hoffman.stephen@epa.gov](mailto:hoffman.stephen@epa.gov)

This request has been approved by the Office of Management and Budget under EPA ICR Number 2350.01.

You may assert a business confidentiality claim covering all or part of the information requested, in the manner described by 40 C. F. R. Part 2, Subpart B. Information covered by such a claim will be disclosed by EPA only to the extent and only by means of the procedures set forth in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when EPA receives it, the information may be made available to the public by EPA without further notice to you. If you wish EPA to treat any of your response as “confidential” you must so advise EPA when you submit your response.

EPA will be closely monitoring your progress in implementing the recommendations from these reports and could decide to take additional action if the circumstances warrant.

You should be aware that EPA will be posting the report for this facility on the Agency website shortly.

Given that the site visit related solely to structural stability of the management units, this report and its conclusions in no way relate to compliance with RCRA, CWA, or any other environmental law and are not intended to convey any position related to statutory or regulatory compliance.

If you have any questions concerning this matter, please contact Mr. Hoffman in the Office of Resource Conservation and Recovery at (703) 308-8413. Thank you for your continued ongoing efforts to ensure protection of human health and the environment.

Sincerely,  
/Suzanne Rudzinski/, Director  
Office of Resource Conservation and Recovery

Enclosures

### 4.3 Maintaining and Controlling Vegetation Growth

CDM recommends that all trees and brush be cleared from the interior and exterior slopes of all ash pond embankments in accordance with the procedures outlined in “FEMA 534 Technical Manual for Dam Owners – Impacts of Plants on Earthen Dams”. CDM further recommends that stumps and all roots greater than 1 inch in diameter be removed. The area should then be graded to adjacent contours, using compacted structural fill and reseeded with desirable grass vegetation.

Bare areas on the interior embankment of the #1 Bottom Ash Pond are void of protective cover (e.g. grass, asphalt, riprap etc.). They are more susceptible to erosion that can lead to localized stability problems such as small slides and sloughs.

CDM recommends bare areas be repaired by establishing a proper grass cover or by installing other protective cover. If using grass, the topsoil must be prepared with fertilizer and then scarified before sowing seed. A type of grass vegetation that has been used successfully in Alabama for full sun exposure, according to the United States Department of Agriculture (USDA) is Bermuda grass.

Areas of surface erosion or sparse vegetation were observed on multiple embankment slopes of the ash ponds as discussed in Section 2. CDM recommends that PSEC perform reseeding maintenance in these areas. CDM recommends that vegetation be cut on a regular basis to ensure that adequate visual observations can be made during scheduled inspections.

CDM observed vegetation growing through riprap along a 350-foot-long section of the north embankment interior slope of the #2/#3 Bottom Ash Pond. CDM recommends removal through chemical spraying, if precautions are taken to protect the local environment. Note that some chemical spraying may require proper training prior to application. If chemical spraying is not an option, weed trimmers or power brush-cutters may be used to control vegetation, not accessible with standard mowing equipment.

### 4.4 Erosion Protection and Repair

Erosion rills, voids in riprap and subsequent loss of riprap, and excavations into embankments were observed on embankment slopes of the ash ponds as discussed in Section 2. CDM recommends corrective actions be taken for the specific conditions identified below:

- Erosion rills – Erosion rills were observed on the interior slopes of the #1 Bottom Ash Pond. Place and compact structural fill in the rills and grade to adjacent existing contours.
- Voids and missing riprap – Locations of voids within riprap armor and missing riprap were observed at the interior slopes of the #2/#3 Bottom Ash Pond and Scrubber Pond. In these areas, remove the existing riprap and restore the embankment face to a slope no steeper than 2.5H:1V or the original contour (whichever is flatter) with compacted structural fill. Place rock riprap consisting of a heterogeneous mixture of irregular shaped rocks placed over the compacted fill and a geotextile fabric, both extending at least 3 feet below the anticipated low water level. The maximum rock size and weight must be large enough to dissipate the energy of the maximum anticipated wave action while holding the smaller stones in place.
- Excavated embankment – A section of the interior slope of the #1 Bottom Ash

Pond south embankment had been excavated to facilitate a sluice line repair. CDM recommends PSEC repair this condition. The suggested repair effort should include:

- Remove loose and eroded materials to neat lines.
- Restore the embankment slope to the original contour; placing select structural fill in 12-inch lifts and compacting to recommended density.
- Stabilize exposed surface of the embankment with sod, hydro seeding, or riprap consisting of a heterogeneous mixture of irregular-shaped rocks placed over the compacted fill and a geotextile fabric, both extending at least 3 feet below the anticipated low water level. The maximum rock size and weight must be large enough to dissipate the energy of the maximum anticipated wave action and hold the smaller stones in place.

All repairs should be designed by a registered professional engineer experienced with earthen dam design.

## 4.5 Animal Control

Evidence of rodent burrows was observed on the west embankments of the Scrubber Waste Pond. Although not seen on other embankments, vegetation cover may have hidden additional rodent burrows, particularly on the exterior slopes of the Process Waste Pond west embankment. CDM recommends that PSEC accurately document areas disturbed by animal activity, remove the animals, and backfill the burrows with compacted structural fill to protect the integrity of the embankments.

## 4.6 Instrumentation

Based on the documents reviewed by CDM, four piezometers were installed by CDG in 2009 in the vicinity of the CCW impoundments. The piezometers were located on the crest of the #1 Bottom Ash Pond and Scrubber Waste Pond at soil boring locations. The approximate locations of the test borings, which included wells, B-2, B-5, B-11, and B-13, are shown on Figure 8. The stand-pipe for piezometer B-2 was the only one observed during the site visit. Based on conversations with CDG personnel and review of the Stability Report, water levels were measured in the piezometers twice in 2009. PSEC indicated the piezometers at B-11 and B-13 were inoperative at the time of the field visit. It should be noted that an earth embankment that is safe under current conditions may not be safe in the future if conditions change. Conditions that may change include changes in the phreatic surface, embankment deformation, or changes in seepage patterns.

CDM recommends installation of additional piezometers at selective locations and parameters related to these conditions be routinely monitored so that preemptive measures can be taken in response to these observations.

## 4.7 Impoundment Hydraulic and Stability Analysis

PSEC provided a hydrologic/hydraulic analysis, prepared by CDG and dated March 2, 2011. The analysis was performed to establish flood elevations for the #1 Bottom Ash Pond, #2/#3 Bottom Ash Pond, Scrubber Waste Pond, and Process Waste Pond resulting from the Probable Maximum Precipitation (PMP) event. The analysis was performed using methodology prescribed in FEMA Dam Safety Guidance. CDG's analysis indicates there is capacity, with existing pumps operating, to manage 100% of the PMP event in the #1 Bottom Ash Pond and the Process Waste Pond without being overtopped. CDG's analysis further indicates that the Unit 2/3 Ash Pond is overtopped by approximately 0.1-foot during the 100% PMP event and the

Scrubber Waste Pond's crest is over topped by approximately 0.67 foot during the 100% PMP event.

CDG performed limited stability analyses for the #1 Bottom Ash Pond and Scrubber Waste Pond that indicated that the embankments were marginally stable and remedial work was required. CDG reported a factor of safety of 1.40 for the Scrubber Pond and 1.59 for the #1 Bottom Ash Pond for steady-state conditions at normal pool elevation. Based on industry standards developed by USACE, a factor of safety of 1.5 is required for the steady-state condition at normal pool elevation. The CDG stability analyses did not consider other potential critical cross-sections or loading conditions for maximum surcharge pool (flood), seismic, or rapid drawdown conditions. CDM was not provided with information regarding stability analyses performed prior to or following construction of the #2/#3 Bottom Ash Pond and Process Waste Pond.

Based on CDMs review of available information for the impoundments, CDM recommends that the following analyses be performed to confirm that the embankments are stable under the various loading conditions outlined in Section 3.

- Additional cross sections should be evaluated, as the geometry of the embankments is not consistent and the cross sections that have been evaluated may not be representative of critical areas. The stability analyses for each pond should include a subsurface investigation to evaluate existing soil parameters in the embankments and foundation soils, and the installation of piezometers to measure the current phreatic surface.
- CDM recommends evaluating the stability of the embankments under maximum surcharge pool (flood) conditions.
- CDM recommends evaluating the stability of the interior slope under seismic and steady-state seepage loading conditions. CDM also recommends that a liquefaction potential analysis be performed.
- CDM recommends evaluating the stability of the interior slope under rapid drawdown loading conditions. While a rapid drawdown is not a scenario that has a high probability of occurrence, CDM recommends evaluating the condition and meeting recommended factor of safety for the unlikely event that an emergency condition develops in one of the embankments.
- CDM recommends the existing stability analyses be re-evaluated for the current normal pool level.

CDM recommends that all analyses be performed by a registered professional engineer experienced in earthen dam design.

## 4.8 Seepage Control

A location of possible seepage was observed at the western exterior toe of the #2/#3 Bottom Ash Pond and the Scrubber Waste Pond. The area of possible seepage was observed by CDM during the assessment and reported by CDG in the Review Report. It should be noted the seepage may be a violation of the NPDES permit depending on the concentration of the constituents in the seepage water. CDM recommends PSEC evaluate alternative methods to manage and control the potential seepage on the #2/#3 Bottom Ash Pond and Scrubber Waste Pond west embankments. Regular monitoring is essential to detect and monitor seepage and to reduce the potential for failure. Without knowledge of the dam's history, the owner may not be able to determine whether the seepage condition is in a steady or changing state. To evaluate the nature of the seepage condition, CDM recommends PSEC take the following actions:

- Develop a regular surveillance program to monitor areas of seepage and

potential seepage to measure the rate, volume, and turbidity of flow emerging from the embankment slopes; and

- Develop and execute a geotechnical exploration program that includes additional test borings and installation of piezometers and other instrumentation to analyze and regularly monitor embankment seepage and stability.

CDM further recommends PSEC evaluate alternative methods to control seepage. Such methods may include:

- Installation of an impervious membrane liner, such as a 60-mil HDPE liner; or
- Installation of a filter berm or french drain with a toe drain and discharge sump to collect seepage water.

## 4.9 Inspection Recommendations

Based on the information reviewed by CDM it does not appear that PSEC has adequate inspection practices. Currently daily informal inspections and monthly walk-down inspections are performed, however they are not documented.

CDM recommends that plant personnel be trained in dam inspection techniques.

CDM also recommends that they develop detailed inspection documentation procedures to aid in ensuring that they are performing adequate inspections and adequately documenting observations over time. Documentation should include a sketch of relevant features observed, and the documentation should be periodically reviewed to identify if conditions are worsening and/or if significant changes are occurring that could lead to additional maintenance issues or safety concerns.

Inspections should be made following heavy rainfall and/or high water events on the Tombigbee River, and the occurrence of these events should be documented. It is recommended that inspection records be retained at the facility for a minimum of three years.

## 4.10 Emergency Action Plan

Currently the State of Alabama does not require Emergency Action Plans (EAPs) for CCW impoundments. PSEC does not have an EAP for the #1 Bottom Ash, #2/#3 Bottom Ash, Scrubber Waste, and Process Waste Ponds, judged by CDM to be Significant Hazard structures. CDM recommends that PSEC develop an EAP for these ponds.