

US EPA ARCHIVE DOCUMENT



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

December 14, 2009

OFFICE OF  
SOLID WASTE AND  
EMERGENCY RESPONSE

VIA E-MAIL AND FEDERAL EXPRESS

Mr. Allen Wood  
American Electric Power  
1 Riverside Plaza,  
Columbus, Ohio 43215-2373

Dear Mr. Wood,

On September 1, 2009 the United States Environmental Protection Agency ("EPA") and its engineering contractors conducted a coal combustion residual (CCR) site assessment at the Cardinal 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 Cardinal 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 Cardinal 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 Cardinal 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 January 15, 2010. Please send your response to:

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

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,  
/Matt Hale/, Director  
Office of Resource Conservation and Recovery

Enclosures

#### **4.2 Maintaining and Controlling Vegetation Growth**

The grass cover on Fly Ash Dam No. 2 appeared to be reasonably maintained with only isolated areas of mild cover loss. This practice should continue. Vegetation did, however, become more evident in the rock lined abutment groins and downstream slope ditch line where mowing is not possible. In these areas, herbicide (in accordance with applicable laws/rules) is recommended to control weed growth. Woody plants may require hand removal. A grass cover on the Bottom Ash Pond and Recirculation Pond dikes will likely be difficult to establish and maintain, due to the granular surface, operations traffic, and routine grading operations. An exception is the east dike facing the Ohio River where vegetation has been able to grow. In this area the plant growth should be cut and reseeded as required. The heavier brush and woody vegetation at the northern extent of the east dike should be cut down and appropriately seeded with grass. CHA recommends that vegetation be cut prior to each quarterly inspection performed by AEP representatives so that adequate visual inspections can be made.

#### **4.3 Bottom Ash Pond and Recirculation Pond – General Crest Areas and Slopes**

These areas typically had intermittent erosion rills, likely exacerbated when grading activities pushed loose material to the crest edge and sheet flow became concentrated during rain events. These erosion rills should be filled in with compacted material and otherwise stabilized. When grading activities push material to the crest edge, a concerted attempt should be made to compact these areas prior to the next rain event.

#### **4.4 Recirculation Pond Outlet Area**

Fairly large, deep erosion gullies were observed on the inside slope of the Recirculation Pond adjacent to the outlet approximately where the incised portion of the pond transitions to the east dike. At the time of the site visit, the pool elevation was such that the water was not going into the gullies. This will likely change as the pool elevation rises to its maximum pool. CHA recommends that these gullies be filled in and stabilized. This area should also be graded to direct run off away from this area.

#### **4.5 Bottom Ash Pond – Primary Spillway/Decanting Tower**

Vegetation had started to establish itself in the skimmer for this unit. Although it has not become a problem presently, removal is recommended to maintain this area before the vegetation fouls the tower outfall or prevents the skimmer from working effectively.

#### **4.6 Bottom Ash Pond and Recirculation Pond – East Dike**

Normal pool of the Ohio River is at about elevation 644 as shown on the design drawings. These drawings also indicate a 100 year flood level at about elevation 664 suggesting that routine high water levels are likely to submerge the downstream toe. During the site visit, slope protection such as rip rap was not observed in this area. CHA recommends an analysis of the flood level water velocities in the area of the downstream slope to determine if rip rap or some similar slope protection is warranted. AEP has indicated that a similar analysis has been performed on another of their facilities along that portion of the Ohio River which suggests the water velocities against the earth structures during flood conditions do not achieve levels at which soil erosion is problematic. In light of this information and CHA field observations, it is not likely that slope protection is necessary, and a site specific analysis, though preferable, should not be considered a critical item at this time.

#### **4.7 Fly Ash Dam No. 2 – Erosion**

An erosion rill and subsequent loss of grass cover was observed on the downstream slope between the upper bench and west groin. Thinning and loss of grass cover due to sheet flow was noted in other isolated areas on the downstream slope as well. CHA recommends filling the rill and reseeding the areas.

#### **4.8 Fly Ash Dam No. 2 – Steel Weir Repair**

One of the steel V-notch weirs had become undermined so that water does not flow through the notch where it can be measured. CHA recommends replacing the weir or removing it.

#### **4.9 Bottom Ash Pond and Recirculation Pond Hydraulic Analysis**

AEP was not able to provide CHA with a hydraulic analysis showing the Bottom Ash Complex's ability to safely pass the 50% PMF event. However, preliminary analyses performed by CHA suggest there is enough storage capacity at the current operating pool to safely withstand this rainfall event. We recommend AEP perform a complete study to confirm this, and update the study if operating levels of the pond change in the future.

#### **4.10 Additional Stability Analyses – Bottom Ash Pond and Recirculation Pond**

Based on our review of available information for the Bottom Ash Complex we recommend that the following tasks be performed to confirm that the embankments are indeed stable under the various loading conditions outlined in Section 3.3.

CHA recommends that a stability analysis model be developed for the maximum surcharge pool (flood) condition.

CHA recommends modeling the upstream slope stability for seismic and steady state seepage load cases.

CHA recommends that the rapid draw-down load case be evaluated for the bottom ash complex for reasons explained in section 3.3

We recommend that a liquefaction analysis be performed in light of some of the loose to very loose alluvial soils encountered during the subsurface investigation for the site.

#### **4.11 Fly Ash Dam No. 2 Recommendations for Additional Stability Analyses**

Based on our review of available information for Fly Ash Dam No. 2 we recommend that the following tasks be performed to confirm that the embankment with its present buttressed geometry installed during the 1998 construction repair is indeed stable under the various loading conditions outlined in Section 3.3.

CHA recommends a maximum surcharge stability evaluation be performed for the steady state conditions on the upstream and downstream slopes.

CHA recommends modeling the upstream and downstream slope stability for seismic and steady state seepage load cases from the maximum storage pool elevation.

CHA recommends a rapid drawdown analysis be performed for the current conditions for reasons explained in Section 3.3