

US EPA ARCHIVE DOCUMENT



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

June 13, 2013

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

VIA E-MAIL

Ms. Cynthia Anderson, Senior Manager, Water and Waste Compliance
Fossil Generation Development & Construction
Tennessee Valley Authority
1101 Market Street, BR 4A
Chattanooga, TN 37402-2801

Re: Request for Action Plan regarding Tennessee Valley Authority – Cumberland Fossil Plant

Dear Ms. Anderson,

On September 19, 2011 the United States Environmental Protection Agency ("EPA") and its engineering contractors conducted a coal combustion residual (CCR) site assessment at the Tennessee Valley Authority - Cumberland Fossil Plant 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 Tennessee Valley Authority - Cumberland Fossil Plant 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 Tennessee Valley Authority - Cumberland Fossil Plant facility can be accessed at the secured link below. The secured link will expire on July 31, 2013.

Here is the link: <http://www.yousendit.com/download/UVJnT0NkR0ZEa1cwYjhUQw>

This report includes a specific condition 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 Tennessee Valley Authority - Cumberland Fossil Plant facility. These recommendations are listed in Enclosure 1.

Since these recommendations relate to actions which could affect the structural stability of the CCR management unit(s) 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 provide a rationale. Please provide a response to this request by **July 15, 2013**. Please send your response to:

Mr. Stephen Hoffman
U.S. 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
U.S. Environmental Protection Agency
Two Potomac Yard
2733 S. Crystal Drive
5th Floor, N-5838
Arlington, VA 22202-2733

You may also provide a response by e-mail to hoffman.stephen@epa.gov,
dufficy.craig@epa.gov, kelly.patrickm@epa.gov and englander.jana@epa.gov.

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.

Please be advised that providing false, fictitious, or fraudulent statements of representation may subject you to criminal penalties under 18 U.S.C. § 1001.

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 efforts to ensure protection of human health and the environment.

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

Enclosure

Tennessee Valley Authority - Cumberland Fossil Plant Recommendations (from the final assessment report)**CONCLUSIONS**

Conclusions are based on visual observations from a one-day site visit on September 7, 2011, and review of technical documentation provided by the Tennessee Valley Authority (TVA).

Conclusions Regarding the Structural Soundness of the Management Unit(s)

The dikes containing the Dry Fly Ash Stack, Ash Pond, and Gypsum Disposal Area appear visually to be satisfactory. The dikes have documented acceptable factors of safety under static loading conditions. However, Dewberry's original evaluation considered the overall structural stability of the Ash Pond to be Fair and Gypsum Disposal Area containment dikes and outlet works to be Poor. There was an issue that the pseudostatic factor of safety was not calculated for the correct seismic return period, there was concern about a potential piping failure in the Ash Pond, and there was no liquefaction data for either management unit. In the Draft report Dewberry recommended seepage studies be performed for the Ash Pond, and liquefaction analyses for all three units, but particularly for the Gypsum Disposal Area. At the time of the site visit, the furnished documentation of pseudostatic¹ stability analyses of the critical sections of the Dry Fly Ash Stack and the Gypsum Disposal Area containment dikes under the 500-year seismic event yielded $FS = 1.0$, the acceptance criterion. Thus, it appeared by inspection that for the stronger, 2,500-year seismic event required by the USEPA, a $FS < 1.0$ would result. Subsequent to Dewberry's Draft report being issued TVA provided additional information concerning operating practices, seepage analyses and liquefaction potential assessment (See Doc 22 and Doc 23 Appendix C). The results of the liquefaction and post earthquake stability analyses under the new practices indicate that the Gypsum Disposal Area will remain stable and display adequate performance following the 2,500-year earthquake. TVA's consultant (Stantec) also provided additional documentation for seepage analyses and liquefaction potential assessment for the Ash Pond (See Doc 22, Appendix C) and Dry Fly Ash Stack.¹ The rate of filling of CCR is critical to stability and safe operation, particularly of the Dry Ash Stack, and should be controlled as recommended (below in "Recommendations" Subsection "Recommendations Regarding the Structural Stability," Paragraph 2). Based on the additional information the containment dikes for all three management units are considered Satisfactory.

Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

On the basis of furnished hydrologic/hydraulic documentation, the Ash Pond (CCR Complex) currently meets accepted standards for hydrologic/hydraulic safety.

Conclusions Regarding the Adequacy of Supporting Technical Documentation

The documentation of hydrologic/hydraulic analyses for the Ash Pond (CCR Complex) appears overall to be adequate. Documentation of static slope stability, seepage analysis, and piping potential (where appropriate) of the CCR Complex containment dikes is adequate. The documentation of performance of the Ash Pond containment dike under seismic loading is adequate. The original documentation for the Dry Ash Stack and the Gypsum Disposal Area containment dikes under seismic loading was inadequate; however, subsequent to Dewberry's Draft report being issued TVA provided additional information that demonstrates acceptable safety factors under the design seismic event required by the USEPA.

Conclusions Regarding the Description of the Management Unit(s)

The descriptions of the management units provided by the owner were accurate representations of what Dewberry observed in the field.

Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management unit required to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability although visual observations were hampered by the presence of thick vegetation in some areas. Embankments appear structurally sound. There are no visible indications of unsafe conditions or conditions needing immediate remedial action.

Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for the CCR management units. There was no evidence of significant unexplained embankment repairs or prior releases observed during the field assessment.

Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appears to be adequate. The management unit dikes are instrumented with piezometers and slope inclinometers. Additional piezometers are to be installed and monitored as recommended by Stantec.

Classification Regarding Suitability for Continued Safe and Reliable Operation

The Ash Pond, Gypsum Disposal Area and Dry Fly Ash Stack are rated SATISFACTORY for continued safe and reliable operation. No other existing or potential management unit safety deficiencies are recognized in the field assessment and review of furnished operations, maintenance, surveillance, and monitoring information. Acceptable performance is expected under applicable static loading conditions and hydrologic conditions in accordance with the applicable criteria.

RECOMMENDATIONS

Recommendations Regarding the Structural Stability

- 1) Install the planned lined ponds in the Gypsum Disposal Area as soon as possible for receiving and settling the gypsum slurry that must be sluiced to the Gypsum Disposal Area whenever the dewatering facility has an outage. Re-evaluate the piping potential factor of safety after the lined ponds have been in place for about a year, to check whether or not the elimination of sluice water in the gypsum stack reduces the seepage exit gradients sufficiently to result in acceptable factors of safety against piping. Closely monitor the seepage conditions at the critical section in the interim. If the seepage exit gradients have not sufficiently abated, develop and implement a remedial measure to lower the exit gradients and achieve an acceptable factor of safety against piping failure.
- 2) Install the additional piezometers around and in the Dry Ash Stack as recommended by Stantec and monitor pore-water pressures periodically as the Dry Ash Stack is filled. If or when the piezometer measurements indicate a significant increase in pore-water pressures in the underlying materials, immediately perform a slope stability analysis to verify that an acceptable factor of safety exists. If the calculated minimum factor of safety is marginal or below, cease filling operations and allow time for the pore-water pressures to dissipate to normal levels. Do not begin filling again until pore-water pressures have stabilized and an acceptable factor of safety exists.

Recommendations Regarding the Hydrologic/Hydraulic Safety

No recommendations for physical or operational modifications to enhance hydrologic/hydraulic capacity appear warranted at this time.

Recommendations Regarding the Supporting Technical Documentation

Since Dewberry issuance of the Draft Report TVA submitted additional documentation. See Docs 22, 23, 24 and 25 in Appendix C. The supporting technical documentation is adequate.

Recommendations Regarding the Field Observations

No significant problems were observed in the field assessment that would require special attention outside of routine maintenance. The minor issues observed, mostly small eroded areas or areas of seepage and poor drainage, should be addressed by TVA's routine maintenance activities.

These include:

- 1) Repair minor erosion at various locations.
- 2) Continue to mow/ maintain vegetation along slopes.
- 3) Continue to monitor and document known seepage per seepage action plan.
- 4) Provide positive slope to promote drainage into perimeter ditch.

Recommendations Regarding Continued Safe and Reliable Operation

No additional recommendations are warranted at this time, other than the recommendations given to control rate of filling of the Dry Ash Stack. (See "Recommendations" Subsection "Recommendations Regarding the Structural Stability," Paragraph 2).

¹The pseudostatic method is a simplified method for determining seismic slope stability that is based on the same approach (i.e., limit equilibrium) used in analyzing static slope stability. In current practice, the pseudostatic method of analysis is used primarily as a screening tool to help assess whether an embankment dam or slope requires a more detailed seismic slope analysis. The pseudostatic method ignores cyclic loading of the earthquake, but accounts for the seismic force by applying an equivalent static force on the slope. In the limit equilibrium approach the stress strain relationship of the soil is not considered, so the method should not be used for sensitive clays and other materials that lose shear strength during an earthquake or loose soils located below the groundwater table subject to liquefaction.