

US EPA ARCHIVE DOCUMENT

July 26, 2011

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

Re: East Kentucky Power Cooperative
Geotechnical Investigation at the Dale Facility
Response to Final Report Recommendations

Dear Mr. Hoffman:

This letter and the attachment are submitted in response to the June 27, 2011 letter from Suzanne Rudzinski, Director, Office of Resource Conservation and Recovery, regarding the recommendations made in the final Report of Geotechnical Investigation, Dams Safety Assessment of Coal Combustion Surface Impoundments, East Kentucky Power Cooperative, William C. Dale Power Station (June 2011). The attachment is a version of Enclosure 2 to Ms. Rudzinski's letter. In the attachment, East Kentucky Power Cooperative, Inc. (EKPC) has restated the recommendations made in the Final Report as listed in Enclosure 2 and inserted its response to those recommendations.

By letter of January 12, 2011, EKPC previously submitted comments on the Report of Geotechnical Investigation, Dams Safety Assessment of Coal Combustion Surface Impoundments, East Kentucky Power Cooperative, William C. Dale Power Station (September 2010 Draft), which included the comments of EKPC's consulting engineering firm S&ME. EKPC does not restate those comments in the attachment. EKPC's responses in the attachment are limited to the recommendations made in the Final Report.

EKPC appreciates the opportunity to respond to the Final Report recommendations. EKPC takes its responsibilities very seriously, and understands the importance of ensuring the structural stability of the impoundments at the Dale facility. EKPC has taken a pro active response in assessing the stability of the impoundments at the Dale Station, as demonstrated by the documents and other information provided to EPA's contractor during the geotechnical investigation.

EKPC understands that EPA will be closely monitoring our progress in implementing the responses to the recommendations, and that EPA could decide to take additional action if the circumstances warrant. EKPC remains willing to engage in further discussions with EPA regarding the recommendations made in the Final Report and the appropriate response.

Sincerely,



Jerry Purvis

Responses of East Kentucky Power Cooperative to the
Dale Final Report Recommendations

4.2 Ash Pond 2

4.2.1 Hydrologic and Hydraulic Recommendations

EKPC Response:

No Final Report recommendations were listed in Enclosure 2 for this section.

EKPC has taken these actions regarding Ash Pond 2: 1) the embankment has been raised to an elevation of 595.2'; 2) the north embankment has been modified to achieve the S&ME recommended safety factor; and 3) the interior slope has been repaired and channel lining has been placed for protection. See the attached photographs.

4.2.2 Geotechnical and Stability Recommendations

Final Report

Comments included in the January 12, 2011 response to the draft report by EKPC take exception to the use of MSHA guidelines to evaluate CCW impoundments. AMEC followed the guidelines presented in our scope of work for assessment of CCW impoundments which was provided by EPA.

AMEC acknowledges the design stability studies performed for Ash Pond 2 indicate the impoundment meets KDOW minimum requirements for all cases on the west section and the seismic case on the north section, but falls short of these requirements on the north section for the static case/normal pool. The additional static case/100-year pool also does not meet the minimum requirements.

AMEC recommends EKPC evaluate the need to revise the stability analyses (and hydraulic analyses as stated above) considering worst case conditions (i.e. highest pond water level and pond full of ash).

EKPC Response:

EKPC has complied with requirements of the Kentucky Division of Water for the stability analysis, and will continue to comply with all KDOW dam safety standards. Based upon EKPC's review of the stability reports for other facilities, the MSHA guidelines are not being consistently used in all assessments of impoundments.

EKPC disagrees that the design stability studies for Ash Pond 2 do not meet the KDOW minimum requirements for all cases. S&ME recommended in the Dale Ash Pond No. 2 Stability Report to have a static factor of safety of 1.4, and recommended construction of a toe berm to achieve the higher static factor of safety. EKPC has constructed the toe berm (drawing attached) as recommended by S&ME to increase the static factor of safety on both cases for the north section. S&ME will perform a new stability analyses for the north section to confirm the as-built conditions meet the recommended safety factor.

EKPC maintains Ash Pond 2 at a minimum freeboard of 11.5" in accordance with KDOW Engineering Memorandum No. 5. This provides more than sufficient capacity to handle the 100-year 24-hour storm event (6.1"), should it occur.

The work performed by Bowser-Morner, Stantec and S&ME has produced a significant volume of information regarding the subsurface conditions for this impoundment, including laboratory data, borings, stability analyses, and the long term performance of the embankments. "There is danger in relying too heavily on slope stability analyses for existing dams. Appropriate emphasis must be placed on the often difficult task of establishing the true nature of the

behavior of the dam through field investigations and research into the historical design, construction records, and observed performance of the embankment. In many instances monitoring and evaluation of instrumentation are the keys to meaningful assessment of stability.” USACE EM 1110-2-1902 Chapter 3. EKPC has conferred with its consultant, S&ME, regarding the need to revise the stability analyses. Based upon the operation procedures for this impoundment and the analyses that have been performed, EKPC disagrees that the additional stability analyses recommended by AMEC are necessary. See also the response to Section 4.2.3.

4.2.3 Monitoring and Instrumentation Recommendations

Final Report

AMEC continues to recommend the monitoring and instrumentation approach described in the Draft report.

EKPC Response:

EKPC will install the instrumentation within 180 days. EKPC will continue its daily inspections and the Annual Professional Engineer’s Inspection described in the Draft report. On a monthly basis, EKPC will document potential problems, the areas inspected, monitoring of the instrumentation, and pond and river levels.

4.2.4 Inspection Recommendations

Final Report

AMEC continues to recommend the inspection regimen described in the Draft report.

EKPC Response:

See response to Section 4.2.3.

4.3 Ash Pond 3

4.3.1 Hydrologic and Hydraulic Recommendations

Final Report

No additional documentation was provided for Ash Pond 3 following submittal of the Draft Report.

EKPC Response:

EKPC did not submit documentation in response to the Draft Report because the area referred to as Ash Pond 3 is no longer in use as an ash impoundment. As noted in the Draft Report and in EKPC’s responses to the Draft Report, the area that was formerly used as Ash Pond 3 is used to stack ash dredged from Ash Pond 2 and for dry storage of compacted ash. The water from the stacked ash drains into Ash Pond 2.

EKPC will not use the area referred to as Ash Pond 3 as an ash impoundment. Since the area is not used as an ash impoundment, hydraulic analysis is not possible.

4.3.2 Geotechnical and Stability Recommendations

Final Report

No stability analyses documentation was provided for Ash Pond 3 following submittal of the Draft Report.

EKPC Response:

See response to Section 4.3.1.

4.3.3 Monitoring and Instrumentation Recommendations

Final Report

Comments included in the January 12, 2011 response to the draft report by EKPC state "Ash Pond 3 is used for dry storage of compacted ash. It is unclear what useful information such instrumentation would provide". In AMEC's opinion, the area contains ash and water and is therefore a coal combustion waste impoundment. AMEC revises the second sentence above to: AMEC recommends EKPC evaluate the need to install piezometer instrumentation to provide a means of internally monitoring conditions within the embankment(s) of the dam.

EKPC Response:

See response to Section 4.3.1.

4.4 Ash Pond 4

4.4.1 Hydrologic and Hydraulic Recommendations

Final Report

EKPC provided Draft Report comments for Ash Pond 4 that are identical to those provided for Ash Pond 2. The same design storm event (100-year 6-hour) and freeboard (12 inches) were applied to the impoundment. Additionally, due to the environmental impacts to the Kentucky River that would result from a failure of the impoundment, it is AMEC's opinion that sound engineering judgment would dictate that the minimum design storm hydrologic criteria used for these impoundments should be increased to a more critical minimum storm event, such as, at a minimum, the 100-year 24-hour storm. Increasing the minimum design storm event, as well as the freeboard to more than 12 inches above the design storm event, would provide a higher, more conservative level of protection against overtopping of the crest of the impoundment. The Fair rating maintains that no deficiencies exist for normal loading conditions (KDOW minimum design storm/freeboard requirements). In AMEC's opinion, assignment of a satisfactory rating to Ash Pond 4 is not possible due to the pond's limited level of hydrologic protection.

EKPC Response:

EKPC has complied with requirements of the Kentucky Division of Water for the hydraulic analysis, and will continue to comply with all KDOW dam safety standards. Based upon EKPC's review of the hydraulic reports for other facilities, the MSHA guidelines are not being consistently used in all assessments of impoundments.

EKPC maintains Ash Pond 4 at a minimum freeboard of 11.5: in accordance with KDOW Engineering Memorandum No. 5. This provides more than sufficient capacity to handle the 100-year 24-hour storm event (6.1"), should it occur.

The work performed by Bowser-Morner, Stantec and S&ME has produced a significant volume of information regarding the subsurface conditions for this impoundment, including laboratory data, borings, stability analyses, and the long term performance of the embankments. "There is danger in relying too heavily on slope stability analyses for existing dams. Appropriate emphasis must be placed on the often difficult task of establishing the true nature of the behavior of the dam through field investigations and research into the historical design, construction records, and observed performance of the embankment. In many instances monitoring and evaluation of instrumentation are the keys to meaningful assessment of stability." USACE EM 1110-2-1902 Chapter 3. EKPC has conferred with its consultant, S&ME, regarding the need to revise the stability analyses. Based upon the operation procedures for this impoundment and the analyses that have been performed, EKPC disagrees that the additional stability analyses recommended by AMEC are necessary.

EKPC has completed the repairs on Ash Pond 4. The scarp on the outside of the embankment next to the river was repaired, and a stability analysis of the repair was performed. The wet areas at the toe of the embankment were regraded to drain toward the river. The clay on the interior slopes of the embankment was regraded and compacted to repair erosion damage. A 2 acre area of the Northeast Interior Slope was repaired by: 1) excavating to a new subgrade; 2) compacting the new subgrade to 92% of Standard Proctor; 3) the subgrade was proof rolled; 4) density tests were performed on the subgrade; 5) an HDPE liner was installed; 6) 18" of #11 stone was installed on the liner; and 7) 18" of Class 2 channel lining was placed on the stone. See the attached photographs.

4.4.2 Geotechnical and Stability Recommendations

Final Report

Comments included in the January 12, 2011 response to the Draft report by EKPC take exception to the use of MSHA guidelines to evaluate CCW impoundments. AMEC followed the guidelines presented in our EPA provided scope of work for assessment of CCW impoundments.

AMEC acknowledges the 1975 Bowser-Morner design stability analyses performed for Ash Pond 4 was approved by KDOW for construction of the impoundment. The study meets current KDOW standards, except for the long term case for the river bank section.

AMEC recommends EKPC evaluate the need to perform a current stability analyses (and hydraulic analyses as stated above) considering present as-built embankment soil conditions, current (and/or repaired) embankment configurations. The analyses should include worst case conditions (i.e. highest pond water level and pond full of ash).

The Fair rating maintains that no deficiencies exist for normal loading conditions (KDOW minimum design requirements). In AMEC's opinion, assignment of a satisfactory rating to Ash Pond 4 is not possible due to the pond's limited level of stability protection represented by recent analyses, history of releases, and current interior and planned exterior (river bank) repairs.

EKPC Response:

EKPC has complied with requirements of the Kentucky Division of Water for the stability analysis, and will continue to comply with all KDOW Dam Safety Standards. Based upon EKPC's review of the stability reports for other facilities, the MSHA guidelines are not being consistently used in all assessments of impoundments

EKPC disagrees that the Bowser-Morner design stability analyses do not meet the long term case for the river bank section. AMEC is referring to the static factor of safety that was calculated for the steepest portion of the existing river bank that has been repaired, not the static factor of safety for the pond embankment. Bowser Morner recommended that EKPC construct the embankment 30' from the river bank to not adversely affect the embankment slopes, and the embankment was constructed in accordance with the recommendation. EKPC will repair any future scarp that should form in the river bank near the toe of the impoundment to keep it stabilized.

The Bowser-Morner report extensively modeled the embankments for Pond No. 4 under various loading conditions during the initial design. S&ME has confirmed the shear strength values used in the Bowser Morner modeling through laboratory testing and back-calculation. A stability analysis was performed on the repair made to the embankment this year (see photos of the repair), as discussed in the response to Section 4.4.1.

4.4.3 Monitoring and Instrumentation Recommendations

Final Report

AMEC continues to recommend the monitoring and instrumentation approach described in the Draft report.

EKPC Response:

EKPC will install the instrumentation within 180 days. EKPC will continue its daily inspections and the Annual Professional Engineer's Inspection described in the Draft report. On a monthly basis, EKPC will document potential problems, the areas inspected, monitoring of the instrumentation, and pond and river levels.

4.4.4 Inspection Recommendations

Final Report

AMEC continues to recommend the inspection regimen described in the Draft report.

EKPC Response:

See response to Section 4.4.3.



Raising Dam Height to 595.2' on Ash Pond No. 2



Placing Clay to Raise Dam Height on Ash Pond No. 2



Installing Toe Berm at Ash Pond No. 2



Channel Lining Placed on Interior Slope for Erosion Protection at Ash Pond No. 2



Recompaction of Interior Slopes to Repair
Erosion on Ash Pond No. 4



Preparing Subgrade for Liner at Ash Pond No. 4



Preparing Subgrade for Liner at Ash Pond No. 4



HDPE Liner On-Site for Ash Pond No. 4
Conformance Samples Taken While Stockpiled
and All Materials were Approved



Repair Where Destructive Sample was Taken
from Seam at Ash Pond No. 4



Cap Over Seam Where Destructive Sample
Failed Testing at Ash Pond No. 4
Cap Was Tested and Approved



Liner Installation at Ash Pond No. 4



Placing 18" of #11 Stone on Liner and Anchor
Trench at Ash Pond. No. 4



Placing 18" of Class 2 Channel Lining Ontop of #11 Stone at Ash Pond No. 4



Placing 18" of Class 2 Channel Lining Ontop of #11 Stone at Ash Pond No. 4



Placing 18" of Class 2 Channel Lining Ontop of #11 Stone at Ash Pond No. 4



Finished Interior Slope at Ash Pond No. 4



Re-grade to Achieve Positive Drainage Away
from Pond No. 4 Dam



Seed and Straw Re-graded Areas at Pond No. 4