US EPA ARCHIVE DOCUMENT

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

July 28, 2011

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

VIA E-MAIL

Mr. Daniel Siegfried, Managing Attorney
Alliant Energy Corporate Services
Legal Department
200 First Street SE
PO Box 351
Cedar Rapids, IA 52406-0351

Dear Mr. Siegfried,

On October 27, 2010 the United States Environmental Protection Agency ("EPA") and its engineering contractors conducted a coal combustion residual (CCR) site assessment at the M.L. Kapp Power Station 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 M.L. Kapp Power Station 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 M.L. Kapp Power Station facility is enclosed. 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 M.L. Kapp Power Station 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 provide a rationale. Please provide a response to this request by August 29, 2011. Please send your response to:

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

US EPA ARCHIVE DOCUMENT

If you are using overnight of 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

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

Enclosures

US EPA ARCHIVE DOCUMENT

Enclosure 2

M.L. Kapp Power Station Recommendations (from the final assessment report)

In the Draft Report, the management units were rated poor due to lack of documentation; specifically,

1) Completion of the hydrologic and hydraulic study for the Main Ash Ponds,
2) Hydrologic and hydraulic information for the Emergency Ash Ponds, and
3) More complete stability analyses.

Review of comments and studies provided by Alliant Energy and IPL in response to the Draft Report, resulted in sufficient information to evaluate the conditions of the ponds. The Poor ratings in the Final Report reflect the fact that, although additional information was provided, dam safety deficiencies are recognized for hydrologic and hydraulic loading conditions which may realistically occur. Remedial action is necessary.

4.2.1 **Hydrologic and Hydraulic**

Draft Report

Main Ash Settling Ponds

Although hydrologic and hydraulic documentation was provided for the Main Settling Ash Ponds, the conclusions presented in the documentation indicated the Main Ash Secondary Pond could not provide sufficient freeboard for the 100-year. 24-hour storm event. The Main Ash Primary Settling Pond, although contributing runoff volume, did not appear to have been taken into account with respect to runoff volume detention. In Section 3.2.2, AMEC provided a recommendation regarding the completion of a hydraulic study utilizing the entire two pond system, before evaluating available freeboard. Whatever the outcome, the Main Ponds must be operated in such a way that an acceptable freeboard depth is available during the 100-year, 24·hour storm event.

Emergency Ash Settling Ponds

AMEC recommends that an appropriate design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to each impoundment's watershed to assess whether the dam and decant system can safely store, control, and discharge the design flow. Based on the size and rating for the Emergency Ponds, the MSHA recommended design storm would be the 100-year 24-hour event. Hydraulic calculations should also be completed to determine the rate at which the discharge system could pass the design storm, if necessary, or draw down elevated water surfaces following such an event. The analysis should consider all critical stages over the life of the pond including full pond conditions.

Final Report

As the Main and Emergency Ash settling Ponds were just able to contain design storm runoff volumes with little to no freeboard, AMEC recommends that Alliant Energy, IPL, and their consultants determine the most appropriate method to increase freeboard above the design storm water surface elevations for all facility CCW ponds and to perform the necessary steps to complete the improvements. MSHA suggests a minimum freeboard of 3 feet as described in Section 3.2.1 of the Assessment Report. However, in AMEC's opinion, a freeboard increase to at least 18 inches above the design storm water surface elevation, would merit improved condition ratings to the level of Fair for all ponds.

4.2.2 **Geotechnical and Stability Recommendations**

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Draft Report

In the opinion of the assessing professional engineer, the criteria for minimum safety factors should be in accordance with USACE EM 1110-2-1902 with a minimum seismic safety factor of 1.2 as recommended by 2007 *MSHA Coal Mine Impoundment Inspection and Plan Review Handbook,* page 88. Likewise, if the dam does not meet the above seismic factor of safety, then the stability of the embankment should be analyzed and the amount of embankment deformation or settlement that may occur should be evaluated to assure that sufficient section of the crest will remain intact to prevent a release from the impoundment.

A November 2010 report by Sargent & Lundy, titled *Slope Stability Analyses - Ash Settling Pond Dikes,* for the M.L. Kapp Generating Station presents stability analyses for Main Ash Pond and the Emergency Ash Pond. Two cross sections were analyzed for static, seismic (pseudo –static condition, and rapid drawdown (for Emergency Ash Pond only). The locations of the cross sections were selected to represent the "most critical" areas within the perimeter berms. Sargent & Lundy's report references two borings located "adjacent" to the existing dikes; however, laboratory data was not provided at the time of this report.

In the opinion of the assessing professional engineer, the analysis should consider all critical stages over the life of the pond including pond full conditions. These conditions would need to be determined in conjunction with the hydraulic recommendations above. The hydrologic and hydraulic analysis will provide maximum water levels in the pond and a phreatic surface through the embankment. A rapid-drawdown should be performed for downstream embankment in relation to flooding of the Mississippi River. Since Sargent & Lundy's borings did not penetrate the CCW material, and documentation pertaining to the CCW's degree of compaction is not known, the friction angle value used for the CCW in the analysis appears to be slightly high for ash material (friction angle of 25 was utilized). Typical ash friction values are 28 degrees for compacted, 24 degrees for loosely compacted, and 11 degrees for uncompacted material. Consideration should be given for lowering strength values to account for inconsistencies within the fill or foundation materials. The analyses presented appear limited to a circular surface; different types of failure surfaces should be analyzed and optimized.

Final Report

After the publication of the Draft Report, an additional study was prepared by Sargent and Lundy (M.L. Kapp Generating Station *Pond Examination Report,* dated January 2011) along with comments in regard to items in the Draft Report. Specifically, the following responses to comment items were presented:

Comment Letter ITEM 1: The use of 1.2 as the minimum factor of safety for seismic load condition.

Response: *The factor of safety varies from 1.0 to 1.3 as referenced in many text books on the subject. There is only a minor difference between the factor used (1. 15) and the recommended value of 1.2. All of the stability analyses results have factors of safety greater than 1.2.*

Comment Letter ITEM 2: Perform slope stability analyses for the Maximum Water Levels in the Emergency Pond.

Response: *The water level selected (585' is the steady state level for the pond that is maintained by the plant. A higher level at 590', the top of dike, could be performed. However, if this higher level is due to the 100 year storm event and represents a short duration rise in the water level, there would only be an insignificant change in the phreatic line through the clay dike section due to the low permeability of the dike materials. Thus, the stability of the downstream slope of the*

dike would not be affected and the factor of safety would not change since the minimum factor of safety is located within the downstream slope of the dike (Figures 5 and 6 of calculation KAPP-SS-00 1).

Comment Letter ITEM 3: Rapid drawdown event due to flooding from the Mississippi River.

Response: *A rapid rise and fall of the water against the downstream slope of the Emergency Pond due to a flood condition from the Mississippi River would have minimal effect on the dike stability. Since the dike material is composed of clay material, a short duration of water against the dike would result in minimal saturation of the downstream slope. This would be approximately 2" to 10" of saturation based on typical permeability values for compacted clay soils. Thus the result s of the slope stability analyses would basically be unchanged from those shown on Figure 6 of calculation KAPP-SS-001. If saturation could occur, the results of this rapid drawdown case would be similar to that evaluated in Figure 9 of calculation KAPP-SS-001 since the dike slope is symmetrical.*

Comment Letter ITEM 4: Degree of compaction of the CCW material for the Main ash Pond.

Response: *S&L is not aware of any compaction reports for the ash material used to construct the dikes for the Main Ash Pond. However pictures taken during the walkdown of the ponds indicate that the loose material in the pond is standing on a near vertical face. See photographs P-23, P-24, and P-25 in the pond walkdown report. Considering a 2H:1V slope, the friction angle would be at least 26.50. These slopes are definitely steeper than 2H:1V. Published data is also available that states that flyash may also have a cohesion component, which increases with time after deposition in ponds or after fill compaction. This component is ignored in the calculation. Based on this, a friction angle of 250 seems appropriate and conservative .*

Comment Letter ITEM 5: Circular failure versus wedge analysis.

Response: *The circular failure surface is the most widely used approach because computer programs have been created to perform multiple analyses to determine the most critical failure surface with the lowest factor of safety. This is accomplished utilizing a general grid approach. Most engineers are satisfied with this approach when the geometry and geologic profile is relatively uniform. Wedge analyses are established based on the engineer's best guess for the potential critical surface utilizing the slope geometry and the subsurface profile data.*

Wedge analyses would be appropriate if one or more of the soil layers beneath the berm structure possessed exceptionally low strength (typically soft to very soft clays) and caused concern for potential instability along a plane through these materials. This is not the case with the in situ soil layers that support the dikes at the Kapp station. In the absence of such weak materials in the ground beneath the dikes, it is more appropriate to use the circular failure plane configuration in the slope stability analyses.

Based on the response to comments and the additional Sargent and Lundy report, dated January 2011, AMEC considers the geotechnical stability issues to have been satisfactorily addressed.

4.2.3 **Inspection Recommendations**

Annual visual inspections of each management unit should be performed by a Professional Engineer. Inspection reports should be maintained by the facility. Additionally, routine inspections (daily or weekly) performed by facility O&M personnel should be supported by an inspection checklist that could also serve as documentation of the inspection.

US EPA ARCHIVE DOCUMENT

Vegetation on the impoundments should continue to be aggressively managed. We further recommend that vegetation be managed based on guidance in (a) Corps of Engineers EM 111 0·2·301, *Guidelines for Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams* and (b) FEMA 534, *Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams.* Additionally, animal impact should be mitigated based on guidance in FEMA 473. *Technical Manual for Dam Owners: Impacts of Animals on Earthen Dams.*

US EPA ARCHIVE DOCUMENT