



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

April 8, 2014

OFFICE OF  
SOLID WASTE AND  
EMERGENCY RESPONSE

VIA E-MAIL

Mr. Tad Johnsen  
Director  
City of Columbia, Water & Light Department  
P.O. Box 6015  
Columbia, Mo 65205

Re: Request for Action Plan regarding City of Columbia, Water & Light Department -  
Columbia Municipal Power Plant

Dear Mr. Rentfrow,

On August 22 and 23, 2012 the United States Environmental Protection Agency ("EPA") and its engineering contractors conducted a coal combustion residual (CCR) site assessment at the City of Columbia, Water & Light Department - Columbia Municipal Power 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 unit at the City of Columbia, Water & Light Department - Columbia Municipal Power 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 City of Columbia, Water & Light Department - Columbia Municipal Power Plant facility is attached.

This report includes a specific condition rating for the CCR management unit and recommendations and actions that our engineering contractors believe should be undertaken to ensure the stability of the CCR impoundment located at the City of Columbia, Water & Light Department - Columbia Municipal Power 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 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 **May 9, 2014**. 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  
5<sup>th</sup> Floor, N-5838  
Arlington, VA 22202-2733

You may also provide a response by e-mail to [hoffman.stephen@epa.gov](mailto:hoffman.stephen@epa.gov),  
[dufficy.craig@epa.gov](mailto:dufficy.craig@epa.gov), [kelly.patrickm@epa.gov](mailto:kelly.patrickm@epa.gov) and [englander.jana@epa.gov](mailto: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 unit, 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,  
/Barnes Johnson /, Director  
Office of Resource Conservation and Recovery

Enclosures

**City of Columbia, Water & Light Department - Columbia Municipal Power Plant  
Recommendations (from the final assessment report)**

**CONCLUSIONS**

**Conclusions Regarding the Structural Soundness of the CCW Impoundment**

A geotechnical investigation was performed by Terracon of Columbia, Missouri near the southeast corner of the impoundment. A report was issued by Terracon, dated March 2, 2004 with information on subsurface conditions and laboratory test results for soils encountered in borings drilled in the area (**Appendix C of the final report**). The report did not contain analysis of stability, seepage and/or settlement of the embankments of the existing impoundment. Information provided by CMPP did not include engineering analysis of the structural soundness of the impoundment (i.e. stability analyses). In general, engineering analyses for design of private facilities (the pond was originally constructed on private property for recreational purposes in the late 1800's) was much less common than it is today, and makes it unlikely that engineering analysis was performed for the dam forming the pond.

CDM Smith is unable to make an assessment of the structural soundness of the CCW impoundment, due to the lack of documentation. No apparent structural damage or evidence of previous repairs was observed in the impoundment during CDM Smith's site visit. From visual observations, the embankments appeared structurally sound, with no current evidence of erosion.

**Conclusions Regarding the Hydrologic/Hydraulic Safety of the CCW Impoundment**

A CMPP plant representative (Christian Johannmeier, the Power Production Superintendent), indicated the CCW impoundment has not been overtopped since its first use as a CCW pond beginning in the 1950's. The CMPP representative also stated there has been no seepage failure of the CCW impoundment embankments. Visual examination of the impoundment earth structures did not show evidence of previous overtopping or seepage on the slopes of the embankment or in the area of the toe.

A United States Army of Corps of Engineers (USACE) Phase I inspection of the CCW impoundment was performed in 1980 and a follow-up report was prepared. A copy of this report was provided to CDM Smith during the site visit. The report found the CCW impoundment could only pass 50 percent of the Probable Maximum Precipitation (PMP) event without overtopping. According to the report, the impoundment outlet structure and drain line have the capacity to discharge water at a rate of about half of what is necessary to accommodate a PMP event. Currently, the Missouri Department of Natural Resources (MDNR) requires that the impoundment pass 75 percent of a PMP event. Therefore, a 75 percent PMP event would potentially result in overtopping (discharge of ash slurry) of the CCW impoundment embankment crest. The USACE report also mentioned three discharge pipes for the dam: a 4-inch diameter pipe, an 8-inch diameter pipe, and a 10 inch diameter pipe. CDM Smith observed only the 8-inch diameter pipe during the site visit; this pipe is also shown on the topographic survey drawing CMPP provided to CDM Smith. The other two pipes were not shown on the survey drawings, and CDM Smith did not observe them during the site visit. The absence of these two additional pipes could further reduce the capacity of the impoundment to pass the 75 percent PMP event.

Measurements of the embankment crest show a drop in crest elevation. Based on elevations provided in the USACE report and elevations provided in a recent topographic survey by CMPP, the crest of the dam portion of the impoundment confining embankment dropped from El. 773.0 in 1980, to El. 770.0 in 2012.

This drop in elevation could be the result of consolidation of the embankment and underlying foundation soils, or the result of differences in measurement of the crest elevation resulting from use of different datum during the USACE and recent topographic survey. Elevations in the USACE report referred to Mean Sea Level (no clear definition of the datum for this is given), while the recent CMPP topographic survey used the NAVD 1988 as a reference datum.

The drop in crest elevation reduces the freeboard above the normal pond level and decreases the excess capacity for storage of water in the case of heavy rainfall or a 75 percent PMP event. Regardless of some uncertainty in the crest elevations, the CMPP representative indicated that there has not been an overtopping of the impoundment since the USACE report was issued in 1980. Although the impoundment has reportedly not been overtopped since 1980, there is no hydrologic/hydraulic analysis to confirm the impoundment can pass a 75 percent PMP event without overtopping. CDM Smith also understands that modifications have not been made to the embankment since the USACE report was issued. As the pond fills further with ash, the volume available for flood storage will diminish, and could eventually be less than used in the analysis, unless ash is excavated or other measures taken to restore available flood storage. It is, therefore, CDM Smith's opinion that the hydrologic/hydraulic safety of the CCW impoundment is inadequate at the present time.

#### **Conclusions Regarding the Adequacy of Supporting Technical Documentation**

Technical documentation provided by the USACE inspection report of the impoundment and a recent survey of the impoundment and surrounding areas provided by the plant representative provided some of the documentation necessary to evaluate the various safety aspects of the impoundment. This information lacked detail on subsurface conditions, engineering analysis and historical records on performance of the facility. Therefore, supporting documentation was not sufficient with regard to a complete analysis of impoundment safety.

#### **Conclusions Regarding the Description of the CCW Impoundment**

The description of the CCW impoundment provided by CMPP for CDM Smith's review appears to be consistent with the visual observations made by CDM Smith during the site assessment. However, the information provided by CMPP did not include record drawings for the CCW impoundment to assess discrepancies with the description provided in the 1980 USACE report.

#### **Conclusions Regarding the Field Observations**

CDM Smith staff was provided access to all areas of the CCW impoundment for observation and inspection by plant personnel. In addition, a plant representative accompanied CDM Smith staff during visual inspection of the impoundment. No visual evidence of prior ash slurry releases, embankment failures, or repairs were observed during CDM Smith's site visit. In general, the embankments appeared to be in fair condition, with most of the vegetation on embankment outside slopes of the impoundment mowed allowing visual examination. Some inside slopes of the impoundment embankments (primarily forming the northeast and east perimeter of the impoundment) contained overgrown vegetation and trees with diameters as large as 36 inches. Shrinkage cracks were observed on the crest of the west embankment, and also erosion features on the inside slopes of the west and south embankments. The collection basin for the outfall drain of the impoundment appeared to be in good condition, with water flowing freely through the top of the basin at the time our visit.

#### **Conclusions Regarding the Adequacy of Maintenance and Methods of Operation**

Documentation was not available to confirm these inspections. Observations of the embankment slopes showed evidence of recent mowing, and the plant representative indicated mowing occurs on a periodic basis (as needed). The plant representative also indicated the occasional need for removal of burrowing rodents and repair of the embankment associated with these animals. Documentation on the frequency of maintaining these mowed areas and removal of rodents was not included in information provided to CDM Smith by CMPP.

The limited amount of data available documenting the maintenance and operation procedures for the CCW impoundment is not sufficient to allow CDM Smith to make an evaluation of the adequacy of the maintenance and operations for the impoundment. The lack of regular documentation for current maintenance and methods of operation of this CCW impoundment makes these practices inadequate.

#### **Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program**

According to the plant representative, the impoundment is inspected twice a year. The CMPP surveillance, recording, and monitoring program appears to comply with MDNR National

Pollutant Discharge and Elimination System (NPDES) permit requirements. The NPDES permit does not require groundwater monitoring for the CMPP CCW impoundment since ash is dredged from the pond on a routine demand.

### **Classification Regarding Suitability for Continued Safe and Reliable Operation**

Based on visual observations of the CCW impoundment, review of available documentation (i.e. USACE evaluation and Terracon report) and conversations with the plant representative, the impoundment will generally perform in a safe manner with regard to structural stability during a 50 percent PMP event.

Information provided by CMPP did not include engineering design information for the impoundment. Due to the lack of design information, CDM Smith believes the CCW impoundment's performance is vulnerable to potential problems during a variety of conditions beyond a 50 percent PMP. The CMPP did not have a formal inspection, maintenance and operation programs. It is the opinion of CDM Smith that the condition of the CCW impoundment at the Columbia Municipal Power Plant for continued safe operation is **POOR** for continued safe and reliable operation.

## **RECOMMENDATIONS**

### **Recommendations Regarding the Hydrologic/Hydraulic Safety**

The previous hydrologic safety evaluation performed by the USACE found the impoundment did not meet requirements for drainage capacity for a design storm (75 percent of a PMP event.) Based on the previous hydrologic deficiencies and lack of documented improvements to the embankments associated with items, CDM Smith recommends that new hydrologic/hydraulic analysis be performed for the ash pond. This evaluation should include required actions to achieve safe and reliable operation of the facility, taking into consideration current operations and conditions.

### **Recommendations Regarding the Description of the CCW impoundment**

A current topographic survey, dated March 2012, was provided to CDM Smith by CMPP during the site visit. The elevations included on the drawings reference the North American Vertical Datum of 1988 (NAVD 88), while elevations referenced in the USACE Phase I report references the mean sea level (MSL) datum. The USACE Phase I report indicates the crest of the dam was at El. 773.0 MSL. The March 2012 survey shows the crest at El. 770.0 (NAVD 88). CDM Smith recommends a revision to the March 2012 survey drawings to include the conversion between NAVD88 and MSL to facilitate comparison of the dam's physical attributes over time.

### **Recommendations Regarding the Field Observations**

The following are CDM Smith's recommendations:

- a. The state of Missouri requires coal plants to have an emergency action plan (EAP) in case of a CCW impoundment release. CDM Smith was not provided with an EAP when requested. An EAP should be prepared for the impoundment.
- b. Shrinkage cracks on the crest of the west embankment (dam) should be documented; backfilled and grass cover should be established to protect the surface from shallow erosion and slope failures. Irrigation and periodic inspections should be conducted to maintain these grass covered slopes.
- c. Erosion was observed on the inside slopes of the west and south embankments. To restore areas of erosion, it is recommended to place and compact structural fill or riprap in eroded areas and grade to adjacent contours.
- d. Animal burrows were observed and have reportedly been an ongoing problem. Areas disturbed by animal activity should be documented, the animals removed, and the burrows backfilled with compacted structural fill to protect the integrity of the embankments.
- e. The removal of trees, shrubs and bushes on or near the embankment is recommended. The greatest density of this vegetation was observed along the east and north-east portions of the embankment. Vegetation removal should include the majority of roots

within the footprint of the embankment. Compacted structural fill should be used to backfill excavations and holes made in the embankment areas before restoring final grades with compacted native materials free of debris and organic materials.

### **Recommendations Regarding the Surveillance and Monitoring Program**

The CMPP surveillance, recording, and monitoring program appears to comply with MDNR NPDES permit requirements. The NPDES permit does not require groundwater monitoring for the CMPP CCW impoundment. Although there is no MDNR requirement for groundwater monitoring, CDM Smith recommends a system of groundwater monitoring wells be installed and regular measurements of water levels be recorded.

Although some potential inconsistencies exist in regard to the datum used to measure the crest elevation, there has been a drop in crest elevation of the dam. CDM Smith recommends CMPP establish a settlement monitoring program for the embankment crest. Records of settlements should be kept regularly in order to monitor and address any unusual embankment movements. The settlement monitoring program could be part of a formal inspection program developed for the facility.

### **Recommendations Regarding the Technical Documentation for Structural Stability**

It is recommended that a qualified professional engineer evaluate the static and seismic stability on representative embankment cross sections and perform liquefaction analyses for the ash pond. Also, because there is a lack of adequate information regarding foundation construction materials of the embankment, CDM recommends that boring and geotechnical analyses, including liquefaction analyses, be performed. If geotechnical analysis shows that foundation soils in the embankment are not susceptible to liquefaction, informal liquefaction analyses could be adequate.

### **Recommendations Regarding Continued Safe and Reliable Operation**

CDM Smith recommends the hydrologic/hydraulic analysis for drainage of the impoundment during a PMP event be completed within the next year. The analysis should necessarily ensure the impoundment can pass 75 percent of a PMP event without overtopping. Other recommendations, made above, should also be addressed within the next year if possible to ensure continued safe and reliable operation.