EPA Comments

SUBJECT: Comments on "DRAFT REPORT - TVA Kingston Fossil Power Plant"

DATE: October 31, 2012

TO: Dewberry & Davis, LLC

FROM: U.S. Environmental Protection Agency/Office of Resource Conservation and Recovery

COMMENTS:

1. On page 1-2, section 1.1.6, add a period at the end of the last sentence in this section.
2. Improve picture quality of Figure 2.1-2.
3. Page 2-4, section 2.2.3: our understanding is that all coal fired boilers produce some slag; this is likely disposed in the same manner as the bottom ash.
4. Page 2-4, section 2.2.4: clarify that at the time of the site visit, the FGD scrubber system was still under construction. No scrubber sludge was being generated at the time of the site visit. When is the scrubber expected to be operational? If already operational at time of the visit, where is the sludge going if not the gypsum impoundment?
5. Page 2-8, section 2.5.2: also add in this section that at the time of the site visit, the FGD scrubber systems was still under construction. No scrubber sludge was being generated at the time of the site visit. When is the scrubber expected to be operational? If already operational at time of the visit, where is the sludge going if not the gypsum impoundment?
6. On page 3-2, correct date of embankment failure from December 8 to December 22, 2008.
7. Page 4-3 to 4-5, section 4.2: should mention 2008 failure (again) and what is currently being done (slurry wall construction, etc.). Briefly discuss how failure changed CCR management operations. Section 4.2.4 should not be left blank considering massive failure and rehab efforts.
8. Appendix A, Document 17 is missing its appendix D, Emergency Action Plan. Please add to report.
9. Appendix B, Document 24, Title Page should say "Gypsum Disposal Facility" not "Primary Bottom Ash Pond"

Memorandum

To: Mr. Stephen Hoffman
Office of Resource Conservation and Recovery
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch

From: Jerry Strauss. P.E., P.M.P. and Joseph P. Klein, III, P.E.

Date: April 5, 2013

Re: EPA Review Comments
CCR Dam Assessment Report
Kingston Fossil Plant
Harriman, TN

This memorandum provides additional information in response to EPA review comments provided to Dewberry on April 3, 2013 via e-mail from Ms. Jana Englander. Item numbers are used for convenience and tracking; there are no corresponding numbers in the original e-mail. Responses that result in changes to the FINAL Report are highlighted in Yellow.

1. Report makes no mention on Kingston failure analysis

   Dewberry's scope of work was to assess surface impoundments that receive liquid borne coal combustion residuals (CCR). At the time of our inspection, remediation of the failed dredge pond was in progress, no CCR were being deposited in the Dredge Pond and the closed Dredge Pond contained no water. TVA personnel indicated that upon completion of remedial construction, the Dredge Pond would remain out of service until formally closed as part of the TVA decision to transition to dry handling of CCR throughout the system by 2020.

   Therefore assessment of the failed Dredge Pond, including review of technical reports pertaining to the previous failure was not part of our scope of work.

2. Clarify why Ash Pond C rated "FAIR" based on lack of liquefaction analysis but seismic slope stability factors of safety are acceptable

   Slope stability factors of safety are a function of the internal shear strength of the embankment and underlying materials. A critical variable in determining internal shear strength is the fluid pressure in the inter-granular voids formed between individual soil particles. Short term increases in the internal fluid pressure reduce the soil's internal shear strength until the excess fluid can be drained. To account for this phenomenon, seismic slope stability analyses are conducted using "undrained" soil shear strength values. The technical data reviewed and included as appendices in Dewberry's report were based on undrained shear strength values and indicated acceptable factors of safety.

   However, in certain sandy and silty soils, seismic induced vibrations can result in increased pore pressure that equals or exceeds the internal shear strength. In that case the soil has zero shear strength, and liquefaction occurs.

Dewberry conducted a qualitative assessment of soil conditions for each of the plants we assessed. The results of the Kingston assessment indicated soils in the Ash Pond C embankment, and foundation materials were susceptible to potential liquefaction. Therefore Ash Pond C was assessed as being in FAIR condition, and a recommendation made to conduct quantitative analyses of the liquefaction potential under design earthquake conditions.

3. Clarify acceptance of State hydrologic/hydraulic design criteria in assessing Ash Pond C

   In conducting the CCR management unit assessments, Dewberry looked first at Federal guidelines for evaluation; for example, the Federal guidelines of minimum acceptable slope stability factors of safety. However, Dewberry is unaware of similar widely promulgated Federal guidance for design flood events as the basis for designing or evaluating hydrologic/hydraulic conditions. Dewberry has historically used State design requirements as promulgated in the State's applicable dam safety regulations.

   Typically State hydrologic/hydraulic design requirements are based on the size and hazard classification of the dam. Tennessee dam safety regulations classify Ash Pond C as an **Intermediate** size dam for which the design criteria is ½ the PMP. Further discussion is provided in Section 6.2 of the report.

4. Clarify acceptance of State hydrologic/hydraulic design criteria in assessing Gypsum Disposal Facility

   As indicated in response to comment #3, absent established Federal hydrologic and hydraulic design guidelines, Dewberry evaluated the dams relative to State dam safety regulatory criteria. Tennessee dam safety regulations classify the Gypsum Disposal Facility as a **Small** size dam for which the design criteria is 1/3 the PMP. Further discussion is provided in Section 6.2 of the report.

5. Report should include an attached/appended memo noting that Dewberry read through all sorts of reports

   Typically Dewberry receives a large volume of data, including technical reports for each plant during the assessment process. EPA direction has been to only reference reports or other data upon which our assessment is based. The direction includes providing references to specific documents throughout our report each time information or data was used. Documents provided to Dewberry but from which no information was used are neither referenced in the report, nor included in the Appendix.

   Each use of data from a report provided by the utility is identified and referenced in the Dewberry report by the notation: (See Appendix A – Doc XX).

6. Clarify reasoning for exclusion of several units or cells of the Main Ash Pond

The original “Main Ash Pond” was constructed in the late 1950s and impounded about 245 acres. The impoundment dike was designated “Dike C”. In 1983 an interior dike, designated Dike D was constructed to divide the impoundment into to nearly equal sections. The northern half of the new configuration was designated as the Dredge Pond, and the southern half designated as the Ash Pond.

As discussed in response #1, the scope of Dewberry’s assessment did not include the Dredge Pond as it currently exists following the failure of Dike D.

The Ash Pond is referred to in various documents provided to Dewberry as “Ash Pond”, “Main Collection Ash Pond”, and “Ash Pond C”. Ash Pond C is the name used for the impoundment in our report.

In the mid to late 1970s a stilling pond was created within Ash Pond C to allow fine size soil particles to precipitate out of suspension before the water reentered Watts Bar Lake.

Dewberry’s assessment includes both the ash collection and stilling basin cells of Ash Pond C.

An enhanced aerial photograph with pertinent facility components identified is provided as a new Appendix C to the report, and included with this memo for convenience.

7. Clarify units within Gypsum Disposal Facility and why “impoundment for dry stacking gypsum was not included in the assessment”

   The FGD Gypsum Disposal Facility Phase 1 consists of a 20-acre impoundment that stores dry stacked gypsum recovered from the flue gas desulfurization (FGD) process, and an adjoining storm water pond. At the time of Dewberry’s assessment the subgrade drainage system was being completed in the dry stack impoundment, and the storm water pond was in service. Both portions of the facility were assessed, and findings presented in the report.

   An enhanced aerial photograph, with pertinent facility components identified, is provided as a new Appendix C to the report, and included with this memo for convenience.

8. Section 1.1.1: Add sentence that qualitative liquefaction analysis was completed by Dewberry

   A sentence indicating that Dewberry conducted a qualitative liquefaction analysis has been added to the report.

9. Section 1.1.5” Correct typographical error by changing “filed” to “field”

   Typographical error has been corrected.

10. Section 1.2: Consider adopting recommendations included in report by Stantec (Appendix A – Doc. 7)

    The recommendations presented in the referenced Stantec report are related to improved mowing and general control of seepage and vegetative growth on the embankments.

    As discussed in Section 8.2 of the Dewberry report, TVA commissioned Stantec to prepare a maintenance plan addressing the seepage issue. Sections 1.1.6 and 8.3 of the report concluded that maintenance procedures appeared to be adequate and no additional recommendation were required. The intended inference was that the Stantec recommendations had been implemented.

11. Clarify why "impoundment for dry stack gypsum" was not included in the assessment as it appears to contain significant amount of fluid

    As discussed in response #7, both components of the FGD Gypsum Disposal Facility, including the impoundment for the dry gypsum stack were assessed by Dewberry. Surface water observed in the impoundment at the time of Dewberry's inspection was storm water runoff in an area where the subgrade drainage system had not been completed.

    Storm water in the dry gypsum stack impoundment that flowed to a completed section of the subgrade drainage system was directed to the storm water pond. The subgrade drainage system is now complete and all storm water is captured and conveyed to the storm water pond.

12. Figure 2.1-2 should be replaced and additional identification labels added

    Figure 2.1-2 has been supplemented with a new aerial photograph and enhanced identification of pertinent CCR storage and disposal components.

    Adding additional text to the photograph in the text of the report degraded the overall appearance of the exhibit.

13. Section 2.2: Add description of CCR conveyances

    Section 2.2 describes what CCRs are contained in the various impoundments. Operational procedures, including how CCRs are conveyed to the impoundment are discussed in Section 4.2 of the report.

    The organizational structure of the report was developed in earlier rounds of assessment, and Dewberry has been encouraged to maintain a level of discipline in organizing information in accordance with the standard structure.

14. Section 2.2.3: Clarify statement on boiler slag

    Report has been revised to reflect boiler slag as a CCR material at the Kingston Fossil Plant.

15. Section 2.2.4: Clarify scrubber was under construction at the time of the site visit

    New scrubbers were being installed at the time of Dewberry's site visit.

16. Section 2.5.2: Add that scrubber was under construction and expected operational date.

    Dewberry has contacted TVA to determine if the scrubbers have become operational, or an estimated start date. We have not had a response at this time.

17. Section 2.3: Include design data for Dike D or state not available

    A history of Dike D is provided in Section 4.1.2 of the report. Neither design nor construction data was provided to Dewberry for review.

18. Section 4.2: Elaborate on the remedial construction being done, and how failure changed CCR management operations

    Evaluation of the remedial construction underway at the failed Dredge Pond was beyond the scope of Dewberry's assessment since the failed management unit no longer holds liquids.

    As discussed in Section 4.1.3 of the report, the failure damaged a section of Dike C at Ash Pond C. Repairs to Dike C at the northwest corner of Ash Pond C were designed, and work had been completed at the time of Dewberry's site visit.

    Changes in CCR operations at the site included closing the Dredge Pond and directing sluiced ash to Ash Pond C.

19. Section 7.1.5: Stipulate Dewberry's assessment that formal liquefaction analysis is not warranted for embankments at the Gypsum Disposal Facility.

    For Section 7: Section 7.1 is intended to be data presentation, with assessment of adequacy of the data discussed on Section 7.2, and assessment of embankment stability in Section 7.3.

    The review comment correctly identifies an inconsistency in that Section 7.1.5 provides a recommendation pertaining to the Ash Pond C but not the Gypsum Disposal Facility. To maintain consistency with the EPA approved structure of the report, the recommendation has been removed from Section 7.1.5.

    The recommendations are presented in Section 1.2 of the report.

20. Improve clarity of Appendix documents

    As requested by EPA, Dewberry submits reports electronically. The EPA internet site established to receive the reports has a size limit of 50MB. The number and size of reference documents included in Appendix A resulted in the full report

being well over 50MB. Appendix A documents 1 and 4 together exceed 245MB. Dewberry used compression software to reduce the size of the report file, which resulted in the poor visual quality when the documents are opened.

To improve the quality of the documents, Dewberry will deliver to EPA a CD version of the report with the full, uncompressed reference documents.

21. Correct title shown on Appendix B cover sheet

Appendix B title sheet has been corrected.

Tennessee Valley Authority, 1101 Market Street, BR4A, Chattanooga, Tennessee 37402

October 19, 2012

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

TENNESSEE VALLEY AUTHORITY (TVA) – COMMENTS ON COAL ASH SITE ASSESSMENT ROUND 11 DRAFT REPORTS FOR ALLEN (ALF), BULL RUN, (BRF) COLBERT (COF), CUMBERLAND (CUF), GALLATIN (GAF), JOHN SEVIER (JSF), JOHNSONVILLE, (JOF) KINGSTON (KIF), PARADISE (PAF), SHAWNEE (SHF), WATTS BAR (WBF), AND WIDOWS CREEK (WOF) FOSSIL PLANTS

Dear Mr. Hoffman:

Tennessee Valley Authority (TVA) appreciates the opportunity to provide responses to the recommendations outlined in the Draft Coal Ash Site Assessment Round 11 Draft Reports for TVA's fossil plants. The Draft Reports were attached to EPA's September 5, 2012 email from Jana Englander to TVA's Susan Kelly. This EPA review process has provided TVA a public forum to confirm that our coal ash facilities meet current state requirements.

TVA has contracted with Stantec Consulting Services Inc., to assist in the technical review and responses to the EPA draft reports. The draft report responses are attached for your consideration in finalizing the Coal Ash Site Assessment Round 11 Reports. The following is a summary of our responses;

Allen: A seismic stability analysis and liquefaction analysis have been completed indicating acceptable performance under seismic loading. TVA recommends the Allen East Ash Pond be upgraded from Poor to Satisfactory.

Bull Run: TVA has no additional comments to EPA's analysis.

Colbert: TVA has no additional comments to EPA's analysis.

Cumberland: The operating pool level for the Ash Pond has been lowered 6.2 feet and the seepage analysis has been revised. Piping factors of safety are now satisfactory. TVA recommends the final rating for the Ash Pond be upgraded from Fair to Satisfactory.

A liquefaction potential assessment was performed for the Gypsum Disposal Area and showed the saturated ash materials are anticipated to undergo liquefaction for the 2,500-year earthquake. Therefore, a higher level of slope stability analysis was completed demonstrating that the factor of safety is satisfactory. TVA recommends the final rating for the Gypsum Disposal Area be upgraded from Poor to Satisfactory.

Additional seismic analysis and field investigation is underway for the Dry Fly Ash Stack. The results are indicating the possibility of a favorable response. However, the analysis is not complete. We anticipate its completion during EPA's review of these comments.

Gallatin: A seismic stability analysis for Ponds A and E has been completed with acceptable results. TVA recommends the final rating be upgraded from Fair to Satisfactory.

An additional stability and seepage analysis for the saddle dikes on the stilling ponds has been completed and a project to increase the hydrologic/hydraulic capacity of the ponds is underway. Based on the analysis and improvement plans underway, TVA recommends the Gallatin Stilling Ponds rating be upgraded from Poor to Fair and from Fair to Satisfactory once the project is completed.

John Sevier: The static and seismic slope stability analysis were reviewed and deemed to be appropriate for the soil materials present.

Johnsonville: A quantitative liquefaction analysis and a post-earthquake static slope stability analysis were performed. Results showed the slope to remain stable. As a result, TVA recommends that final rating for Ash Disposal Area 2 be upgraded from Fair to Satisfactory.

Kingston: TVA has no additional comments to EPA's analysis.

Paradise: A liquefaction analysis was performed and the hydrologic/hydraulic capacity was evaluated. The liquefaction analysis indicated that the materials would remain stable and not liquefy during a 2,500 year event. The H&H analysis confirmed that the ponds safely pass the 100-year 24-hour storm. However, they do not pass the Probable Maximum Flood. TVA has plans to design and construct features to correct this issue at the ponds. TVA recommends that the facilities at Paradise be upgraded from Fair to Satisfactory once the H&H issues have been addressed.

Shawnee: A liquefaction analysis and post-earthquake static stability analysis were performed with acceptable results. TVA recommends that the rating for Ash Pond No. 2 be upgraded from Poor to Satisfactory.

Watts Bar: A hydrologic/hydraulic analysis was performed for the design storm and the new spillway system currently under design and in construction. Based on the satisfactory outcome of the analysis; TVA recommends the final rating be upgraded from Fair to Satisfactory.

Widows Creek: TVA has no additional comments to EPA's analysis.

The following is a summary of the draft facility ratings and TVA's proposed final ratings.

EPA Draft Report Results				
Plant	Facility	Draft Rating	Driver for Rating	Stantec Proposed Final Rating
ALF	East Pond	Poor	Seismic	Sat
BRF	FA Pond	Sat		Sat
	BA Pond	Fair	Liquefaction	Fair
	Gyp Pond	Fair	Liquefaction	Fair
COF	Dry Stack	Sat		Sat
	BA Pond	Fair	Liquefaction	Fair
CUF	Ash Pond	Fair	Piping	Sat
	Dry Stack	Poor	Seismic	Poor
	Gyp	Poor	Seismic	Sat
GAF	Ash Ponds	Fair	Liquefaction	Sat
	Stilling Ponds	Poor	H&H and static	Fair
JSF	Dry Stack	Sat		Sat
	Ash pond	Sat		Sat
JOF	Island	Fair	Liquefaction	Sat
KIF	Ash/stilling	Fair	Liquefaction	Fair
	GDA	Sat		Sat
PAF	Scrubber sludge	Fair	H&H - overtopping	Fair
	Ash Pond	Fair	H&H - overtopping	Fair
	Slag Ponds	Fair	H&H - overtopping	Fair
SHF	Ash Pond	Poor	Seismic	Sat
WBF	Pond	Fair	H&H	Sat
WCF	Gyp stack	Sat		Sat
	Ash Pond	Fair	Liquefaction	Fair

TVA takes its environmental responsibilities very seriously and appreciates EPA's efforts to verify the quality of our impoundments. We would like to arrange a conference call once your staff has received this letter and briefly reviewed the attached reports so we can answer any immediate questions or concerns. Please contact Susan Kelly at (423)-751-2058 or sjkelly0@tva.gov to arrange this conference call.

Sincerely,

Cynthia M. Anderson
for

Brenda E. Brickhouse
Vice President
Compliance Interface and Permits

Enclosures

SJK:LMB
Enclosures
cc (electronic distribution with enclosures):
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