

US EPA ARCHIVE DOCUMENT



Comments on Draft Dam Assessment Report – Glen Lyn Plant

- June 3, 2011 -

AEP has reviewed the draft report provided by Dewberry & Davis, LLC as part of their assessment of the ash impoundment facilities at the Glen Lyn Plant and would like to offer the following comments. Each comment is denoted in italics that follows a quoted section of the report.

1.1 CONCLUSIONS

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

Fly Ash Pond

The stability analysis report for the Fly Ash Pond was prepared by GAI engineers but did not draw specific conclusions regarding the structural soundness of the perimeter dike though factors of safety were provided for static and seismic loading conditions assuming the facility serves as a landfill in the future. Under these conditions, the minimum factors of safety calculated for static and seismic loading are 1.29 and 1.01, respectively. The GAI report submitted was unsigned and unsealed.

An analysis should also be performed that assumes the facility acts as an impoundment with a permanent pool at the crest of the existing spillway.

The GAI stability analysis report for the fly ash pond was a part of the overall design report for the proposed landfill that was submitted and approved by the appropriate authorities in Virginia. The design report was sealed and signed.

As documented by AEP and discussed during the inspection, the fly ash pond is currently inactive. The pipelines that were used to convey and discharge ash-water mixture into the pond have been disconnected. The pool level has never been at the spillway invert elevation since dry ash placement began in the 1970's. A maximum pool level of 1525 ft was set by AEP in the 1990's for the temporary use of the pond. AEP concurs that an analysis modeling a true impoundment with a permanent pool at the crest of the principal spillway would be warranted if the pond is reactivated. AEP suggests that the

recommendation above be written based on a conditional statement that would require the analysis before the pond is placed back into operation.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

Perform a stability analysis of the Fly Ash Pond that assumes a proposed breaching of the perimeter dike of the Fly Ash Pond in accordance with appropriate regulations and requirements so that it does not impound water. Address the potential for liquefaction at the Fly Ash Pond and Bottom Ash Pond as it appears that this was not addressed in either stability analysis report.

Further clarification is requested by AEP. If the dike is breached in such a way that it can not hold any impounded water, then the stability analysis does not seem to be relevant.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

It is recommended that the Owner confirm with VA DCR, Division of Dam Safety whether or not a hydrologic and hydraulic analysis should be performed to evaluate the hydrologic/hydraulic safety of the Fly Ash Pond and Bottom Ash Pond. If so, perform the analysis in accordance with VA DCR requirements, and, if not, document the reasons why the analysis is not required by VA DCR.

No comments

1.2.3 Recommendations Regarding the Supporting Technical Documentation

It is recommended that technical documentation be prepared and submitted that addresses the potential for liquefaction at the Fly Ash Pond and Bottom Ash Pond.

AEP will perform a site-specific liquefaction potential evaluation for these facilities.

1.2.4 Recommendations Regarding the Maintenance and Methods of Operation

It is recommended that all underbrush and trees be removed from the Fly Ash Pond and Bottom Ash Pond in accordance with VA DCR Dam Safety requirements. This includes all woody vegetation at and beyond the toe of the Fly Ash Pond perimeter dike as well as the embankment and toe of the Bottom Ash Pond adjacent to East River.

It is recommended that any animal burrows located along the perimeter dike of the Fly Ash Pond and Bottom Ash Pond be backfilled in accordance with standard geotechnical engineering practices for dams, and monitored for future reoccurrence.

It is recommended that the Owner perform an interior inspection of the outlet pipe for the Bottom Ash Pond. Interior inspection should focus on the structural integrity of the pipe, seepage, and debris accumulation. The inspection report should summarize all findings and remedial action required, if any. An interior inspection of the outlet pipe for the Fly Ash Pond doesn't appear warranted at this time as the facility is currently inactive; however, if it becomes active then an interior pipe inspection should be performed as well.

The regular maintenance, monitoring and inspection of the facilities will be continued as appropriate. Regular maintenance activities include the control of vegetative growth and burrowing animal population.

2.4 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

Table 2.3: Approximate Maximum Capacity of Ash Ponds		
	Fly Ash Pond¹	Bottom Ash Pond (North & South Cells/ Clearwater Pond)
Maximum Pool Surface Area (acre)	10	5.8
Maximum Capacity (cubic yards)	303,845	145,200
Maximum Capacity (acre-feet)	185	90
Top of Dam (feet)	1540	1523
Normal Pool (feet)	1510	1505.5/1501.3

¹When pond was active.

Existing crest elevation of the bottom ash dike is 1515 ft.

APPENDIX A & APPENDIX B

We note that D&D has chosen to include a copy of all documents provided to them by AEP as appendices to the report. While we have not raised a claim of business confidentiality for these documents, we do not believe it is necessary to include the several hundred pages of supporting documents that we provided for D&D's review. In reviewing the final reports posted by EPA on their website for other facilities, most reports from the earlier rounds of site assessments contain none of these types of documents and question why it is now being done.

We strongly recommended that Appendices A and B be deleted and as an alternative that a list of the documents that were provided be given as a bibliography in an appendix, similar to what was done by Paul C. Rizzo Associates, Inc. for Duke Energy's Dan River Steam Station, (see Appendix E):

<http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/surveys2/dan-river-final.pdf>

NOTE

Subject: EPA Comments on AEP Appalachian Power Co - Glen Lyn Power Station,
Glen Lyn, VA
Round 9 Draft Assessment Report

To: File

Date: August 25, 2011

1. On p. p. ii, **INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS**, last paragraph, add a period at the end of the last sentence. Also, **PURPOSE AND SCOPE**, first paragraph, add a period at the end of the last sentence.
2. On p. 1-4, section 1.3 “Participants and Acknowledgement,” next to the names Jim Kohler and Patrick Kelly, United States Environmental Protections Agency should be altered to read “United States Environmental Protection Agency.” Additionally, “Public Health Services” should be removed from Patrick Kelly’s title.
3. On p. 2-2, Figure 2.1-2, please identify the impoundments for this site.
4. On, p. 2-3, Section 2.3 “Size and Hazard Classification”, paragraph 3, the description of the fly ash pond as being located “along the left bank” may need to be altered. please change the description to read “along the southwest bank.” All further descriptions of impoundments in relation to water bodies should likewise be altered (see Page 2-4, line 1).
5. On p. p. 2-5, Section 2.5.1 Earth Embankment, under Bottom Ash Pond, the report states “The aforementioned 1979 inspection report states that the perimeter embankment was constructed of a lean clay and shale mixture.” There is a 1978 report previously mentioned in Section 2.5.1 Earth Embankment, under Fly Ash Pond, else not quite sure to which report this statement refers – Please correct.
6. On p. 2-6, section 2.5.2 “Bottom Ash Pond”, it may be advantageous to include the elevation of the two splitter dikes referred to later in the report (Section 4.2.3), which effectively separate the north, south, and clearwater cells.

7. On p. 4-1, section 4.1.1 “Original Construction”, please include information concerning construction material used during original construction, if known, and the relevant sources the information was provided from.
8. On p. 4-3, section 4.2.3 “Current Operational Procedures”, it may be worth noting the procedure for dredging the bottom ash pond (I.e., frequency of dredging), if known.
9. On p. 5-14, section 5.4.2 “Outlet Conduit”, paragraph 1, line 2, replace “it’s” with “it is.”
10. On p. 7-2, section 7.1.4 “Factor of Safety and Base Stresses”, it would be advantageous to include a table with calculated factors of safety (as referred) along with corresponding USACE required factors of safety, for comparative ease.
11. On p. 8-1, section 8.2 “Maintenance of the Dam and Project Facilities”, it may be advantageous to include available information on the frequency of routine plant personnel inspections and the frequency of scheduled engineering inspections supervised by a professional engineer.
12. On p. 9-1, Section 9.2 INSTRUMENTATION MONITORING, add a period at the end of the last sentence.
13. On p. 5-2, the photo shows that. Route 649 sits to the right of the fly ash pond’s Southeast crest, does a structural failure of this pond have an impact on this road? If so, it should be discussed on the hazard potential ranking sheet in Appendix B.
14. On p. 7 of Appendix B, “Has there ever been a failure at this site?” and p. 8 of Appendix B, “Has there ever been significant seepages at this site?” for the fly ash pond, the response box is marked “no” for both. This appears to be inconsistent with the discussion in Section 3.2 SUMMARY OF SPILL/RELEASE INCIDENTS for the fly ash pond where it states: “Documents supplied by the Owner indicated that a slope failure of the northern dike occurred upon first filling of the pond as well as a 10 ft deep sink hole along the south-west corner of the dike. The slope failure and sinkhole incidents appear to have occurred at separate times prior to 1978; however, no documentation could be found that confirmed a spill and/or release of CCRs due to these incidents.” Please correct.

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-1712

December 29, 2011

Dewberry
Attn: Jerome Strauss P.E.
8401 Arlington Boulevard
Fairfax, Virginia 22031

Re: Comments for Coal Combustion Residue Impoundment Round 9 – Dam Assessment
Report, Glen Lyn Power Plant, Glen Lyn Bottom Ash Dam #07102

Dear Jerry,

Thank you for providing Virginia Department of Conservation and Recreation Dam Safety Region 4 the opportunity of including some comments on the Glen Lyn Power Plan Ash Pond Management Units for possible inclusion in the above referenced report. The following are my comments:

Summary

Under the provisions of 4VAC50-20-220 Unsafe Conditions, C. Nonimminent danger..." the of the Virginia Department of Conservation and Recreation Impounding Structure Regulations, Thomas I. Roberts, P.E., C.F.M. Regional Dam Safety Engineer intends to provide American Electric Power (AEP), a draft report in January 2012 indicating known deficiencies in the dam, and in February 2012 recommend that the current Regular Certificate to Operate the dam be replaced with a Conditional Certificate to Operate the dam. The Conditional Certificate to Operate the dam will contain a listing of requirements and completion dates that must be met by AEP. Once AEP has satisfactorily met the minimum safety requirements for their dam, AEP may apply for a new Regular Certificate to Operate and Maintain the dam.

Current Conditions

The Glen Lyn Bottom Ash Dam, NID #VA07102, currently has a Regular Certificate to Operate and Maintain issued March 20, 2008 and expires March 31, 2014. Our records indicate that it is 28 feet high and has a potential storage capacity of 90 acre-feet. The dam had functioned by pumping bottom ash/water slurry into the impoundment. Some storm water from U.S. 460 flows into the facility. Based on information mentioned by AEP personnel onsite and conditions observed it appears that the bulk of the embankment is made of coal combustion residue materials. Woody vegetation control on the dam does not comply with the minimum

standards in the regulations. There is no Auxiliary Spillway (Emergency Spillway) and the safe reliable operation of the principal spillway is doubtful. No calculations are available for the safe spillway capacity for this structure. Copper fine mesh screen used over the outlet structure was observed onsite in the grass adjacent to the only outlet structure.

Hazard Classification

The facility has been listed for many years as a Low Hazard Dam due to the proximity of the New River. The Hazard Classifications for dams in Virginia is based on the Virginia Impounding Structure Regulations (Dam Safety) 4VAC50-20-40 "**Hazard potential classifications of impounding structures.**"

A. Impounding structures shall be classified in one of three hazard classifications as defined in subsection B of this section and Table 1.

B. For the purpose of this chapter, hazards pertain to potential loss of human life or damage to the property of others downstream from the impounding structure in event of failure or faulty operation of the impounding structure or appurtenant facilities. Hazard potential classifications of impounding structures are as follows:

1. High Hazard Potential is defined where an impounding structure failure will cause probable loss of life or serious economic damage. "Probable loss of life" means that impacts will occur that are likely to cause a loss of human life, including but not limited to impacts to residences, businesses, other occupied structures, or major roadways. Economic damage may occur to, but not be limited to, building(s), industrial or commercial facilities, public utilities, major roadways, railroads, personal property, and agricultural interests. "Major roadways" include, but are not limited to, interstates, primary highways, high-volume urban streets, or other high-volume roadways.
2. Significant Hazard Potential is defined where an impounding structure failure may cause the loss of life or appreciable economic damage. "May cause loss of life" means that impacts will occur that could cause a loss of human life, including but not limited to impacts to facilities that are frequently utilized by humans other than residences, businesses, or other occupied structures, or to secondary roadways. Economic damage may occur to, but not be limited to, building(s), industrial or commercial facilities, public utilities, secondary roadways, railroads, personal property, and agricultural interests. "Secondary roadways" include, but are not limited to, secondary highways, low-volume urban streets, service roads, or other low-volume roadways.
3. Low Hazard Potential is defined where an impounding structure failure would result in no expected loss of life and would cause no more than minimal economic damage. "No expected loss of life" means no loss of human life is anticipated

C. The hazard potential classification shall be proposed by the owner and shall be subject to approval by the board. To support the appropriate hazard classification, dam break analysis shall be conducted by the owner's engineer. Present and planned land-use for which a development plan has been officially approved by the locality in the dam break inundation zones downstream from the impounding structure shall be considered in determining the classification.

D. Impounding structures shall be subject to reclassification by the board as necessary."

With the knowledge of economic costs and environmental damage caused by failures of other Coal Combustion Residue Impoundments, the currently listed "Low Hazard" classification might not be the correct current hazard classification based on the Virginia regulatory definitions. One important issue that arises from the Hazard Classification is the minimum required safe spillway capacity.

Minimum Required Safe Spillway Capacity

Once the actual hazard classification has been determined, Table 1 of 4VAC50-20-50 "Performance Standards Required for Impounding Structures" is used to determine the minimum safe spillway capacity.

Hazard Potential Class of Dam	Spillway Design Flood (SDF) ^B For New Structures ^F	Spillway Design Flood (SDF) ^B for Existing Impounding Structures ^{F,G}	Minimum Threshold for Incremental Damage Analysis
High	PMF ^C	0.9 PMP ^H	100-YR ^D
Significant	.50 PMF	.50 PMF	100-YR ^D
Low	100-YR ^D	100-YR ^D	50-YR ^E

Since the main hazard in this dam is the material impounded and the material in the dam, an Incremental Damage Analysis under the provisions of 4VAC50-20-52 would not be applicable for this dam.

An analysis of the inflow and safe outflow for this structure is required that includes flow runoff from U.S. 460. Past claims that the facility has the capacity to impound the Probable Maximum Flood (PMF) have not been substantiated with adequate calculations based on present conditions.

Structural Stability

AEP staff mentioned that the stability calculations provided only were for a additional pool depth of 3' rather than the additional depth of 14' to top of the embankment. With unaccounted for drainage entering the impoundment from U.S. 460, unreliable outlet structures due to the installation of screens that can clog, and the embankment made from Coal Combustion Residue materials the structural stability of the embankment is in doubt. The files indicate that structural stability calculations have not been provided based on full pond.

Conclusion

With the better understanding of the inherent environmental and economic dangers posed by a the failure of a Coal Combustion Residue Impoundments, especially one that is at least partially constructed of Coal Combustion Residue materials, AEP as owner, should immediately take action to bring this dam at least in compliance with the minimum safety standards in the Virginia Impounding Structure Regulations.

Please contact me if there are questions on my comments above at: Thomas I. Roberts, P.E., C.F.M., Region 4 Dam Safety Engineer, VA DCR Dam Safety & Floodplain Management, 8 Radford Street, Christiansburg, Virginia, 24073. Phone 540-394-2550, and e-mail Thomas.Roberts@dcr.virginia.gov.

Sincerely



Thomas I. Roberts P.E., C.F.M.

cc Robert Bennett, P.E, R.A., C.F.M., Div. Director VA DCR Dam Safety & Floodplain Management



COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

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December 29, 2011

Dewberry
Attn: Jerome Strauss P.E.
8401 Arlington Boulevard
Fairfax, Virginia 22031

Re: Comments for Coal Combustion Residue Impoundment Round 9 – Dam Assessment
Report, Glen Lyn Power Plant, Glen Lyn Flyash Dam #07101

Dear Jerry,

Thank you for providing Virginia Department of Conservation and Recreation Dam Safety Region 4 the opportunity of including some comments on the Glen Lyn Power Plant Ash Pond Management Units for possible inclusion in the above referenced report. The following are my comments:

Summary

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Current Conditions

The Glen Lyn Flyash Dam, NID #VA07101, currently has a Regular Certificate to Operate and Maintain issued March 20, 2008 and expires March 31, 2014. Our records indicate that it is 43 feet high and has a potential storage capacity of 300 acre-feet. The dam had functioned by pumping flyash/water slurry into the impoundment in the past but the piping is currently disconnected. A potentially limited amount of storm water can flow into the facility. Based on information mentioned by AEP personnel onsite and conditions observed (rodent hole expelled material) it appears that the bulk of the embankment is made of coal combustion residue

materials. Several rodent holes were observed onsite and file data indicates there is a long history of rodents residing in the embankment. Woody vegetation control on the dam does not comply with the minimum standards in the regulations. There is no Auxiliary Spillway (Emergency Spillway) and the safe reliable operation of the principal spillway is doubtful. No calculations are available for the safe spillway capacity for this structure. Though AEP staff have indicated in recent years that there is an intent to decommission the dam and make it no longer a regulated impounding structure, nothing has been provided to VA DCR Dam Safety & FM to date on this.

Hazard Classification

The facility has been listed for many years as a Low Hazard Dam due to the proximity of the New River. The Hazard Classifications for dams in Virginia is based on the Virginia Impounding Structure Regulations (Dam Safety) 4VAC50-20-40 "**Hazard potential classifications of impounding structures.**"

A. Impounding structures shall be classified in one of three hazard classifications as defined in subsection B of this section and Table 1.

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2. Significant Hazard Potential is defined where an impounding structure failure may cause the loss of life or appreciable economic damage. "May cause loss of life" means that impacts will occur that could cause a loss of human life, including but not limited to impacts to facilities that are frequently utilized by humans other than residences, businesses, or other occupied structures, or to secondary roadways. Economic damage may occur to, but not be limited to, building(s), industrial or commercial facilities, public utilities, secondary roadways, railroads, personal property, and agricultural interests. "Secondary roadways" include, but are not limited to, secondary highways, low-volume urban streets, service roads, or other low-volume roadways.

3. Low Hazard Potential is defined where an impounding structure failure would result in no expected loss of life and would cause no more than minimal economic damage. "No expected loss of life" means no loss of human life is anticipated

C. The hazard potential classification shall be proposed by the owner and shall be subject to approval by the board. To support the appropriate hazard classification, dam break analysis shall be conducted by the owner's engineer. Present and planned land-use for which a development plan has been officially approved by the locality in the dam break inundation zones downstream from the impounding structure shall be considered in determining the classification.

D. Impounding structures shall be subject to reclassification by the board as necessary."

With the knowledge of economic costs and environmental damage caused by failures of other Coal Combustion Residue Impoundments, the currently listed "Low Hazard" classification might not be the correct current hazard classification based on the Virginia regulatory definitions. One important issues that arises from the Hazard Classification is the minimum required safe spillway capacity.

Minimum Required Safe Spillway Capacity

Once the actual hazard classification has been determined, Table 1 of 4VAC50-20-50 "Performance Standards Required for Impounding Structures" is used to determine the minimum safe spillway capacity.

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Significant	.50 PMF	.50 PMF	100-YR ^D
Low	100-YR ^D	100-YR ^D	50-YR ^E

Since the main hazard in this dam is the material impounded and the material in the dam, an Incremental Damage Analysis under the provisions of 4VAC50-20-52 would not be applicable for this dam.

An analysis of the inflow and safe outflow for this structure is required. Past claims that the facility has the capacity impound the Probable Maximum Flood (PMF) have not been substantiated with adequate calculations based on present conditions.

Structural Stability

With the history of rodent burrows on the dam, the unknowns on how much of the impoundment will fill under extreme conditions and the poor conditions of outlet structures, the adequate structural stability of the embankment is in doubt. Even ignoring the potential for piping failure due to the rodent burrows, the files indicate that structural stability calculations have not been provided based on full pond.

Conclusion

With the better understanding of the inherent environmental and economic dangers posed by a the failure of a Coal Combustion Residue Impoundments, especially one that is at least partially constructed of Coal Combustion Residue materials, AEP as owner, should immediately take action to bring this dam at least in compliance with the minimum safety standards in the Virginia Impounding Structure Regulations.

Please contact me if there are questions on my comments above at: Thomas I. Roberts, P.E., C.F.M., Region 4 Dam Safety Engineer, VA DCR Dam Safety & Floodplain Management, 8 Radford Street, Christiansburg, Virginia, 24073. Phone 540-394-2550, and e-mail Thomas.Roberts@dcv.virginia.gov.

Sincerely



Thomas I. Roberts P.E., C.F.M.

cc Robert Bennett, P.E, R.A., C.F.M., Div. Director VA DCR Dam Safety & Floodplain Management

MEMORANDUM

TO: Jana Englander

FROM: Jerry Strauss

CC:

Date: December 30, 2011

SUBJECT: AEP/AP, Glen Lyn, Response to Comments

EPA Comments:

- made editorial changes;
- corrected identification of EPA personnel in 1.3.1
- added names of ponds on Figure 2.1-2
- Embankment composition – referenced each Appendix A document
- Don't have the elevation of the splitter dikes
- Construction material referenced in Section 2.5.1
- Dredging operations – periodic. Owner not more specific
- Stability tables provided
- Rte 649 – very lightly traveled road; was considered in the hazard rating. Impacts on the rivers more of an issue.
- Appendix B – p.7 revised to describe the pre-1978 release. Minimal information is available.

Utility Comments:

- AEP indicated that the request to perform a structural stability analysis be conditional – the Report reflects that.
- Report states that the GAI report was signed and sealed upon delivery to the state.
- The report clarifies Section 1.2.1 to differentiate the structural analysis vs. breaching the dam.
- Table 2.3 (crest elevation Bottom Ash Pond) presents discrepancy in State records and AEP data
- Appendix A modified somewhat to delete extraneous documents