

US EPA ARCHIVE DOCUMENT

COMMENTS

Comments received for CHA Draft Report (*December 7, 2009*, CHA Project No. 20085.1060.1510) for the Assessment of Dam Safety of Coal Combustion Surface Impoundments Duke Energy – W.C. Beckjord Station, New Richmond, OH. Comments include;

- EPA comments - None;
- OH DNR comments received on January 5, 2010 and January 28, 2010; and
- Duke Energy comments received on January 28, 2010.

Final Report
Assessment of Dam Safety of Coal Combustion Surface Impoundments
Duke Energy – W.C. Beckjord Station
New Richmond, OH

**Comments Received from the EPA
In Response to CHA Draft Report dated December 7, 2009**
None Received

CHA Project No. 20085.1060.1510

Comments

EPA HQ - None. Notes: Contractor rated facility (all four units) as POOR- contractor recommends a detailed stability analysis for all four units. The stability analysis for each pond should include a subsurface investigation to determine existing soil parameters in the embankments and foundation soils. Also install piezometers to determine the current phreatic surface. Contractor also states this facility does not have adequate inspection practices and should develop a more detailed inspection procedure to insure an adequate inspection. The contractor was not provided with sufficient information to determine if all four units were constructed on wet ash, slag or other unsuitable materials.

EPA Region – None.

State -

From: "Brian Queen" <brian.queen@epa.state.oh.us>
To: James Kohler/DC/USEPA/US@EPA
Cc: "Craig Butler" <Craig.Butler@epa.state.oh.us>, "Dan Harris" <dan.harris@epa.state.oh.us>, "Dave Chenault" <dave.chenault@epa.state.oh.us>, "Dave Schuetz" <dave.schuetz@epa.state.oh.us>, "George Elmaraghy" <George.Elmaraghy@epa.state.oh.us>, "Jeff Hines" <Jeff.Hines@epa.state.oh.us>, "Jim Sferra" <jim.sferra@epa.state.oh.us>, "Jim Simpson" <Jim.Simpson@epa.state.oh.us>, "Jon Bernstein" <Jon.Bernstein@epa.state.oh.us>, "Pam Allen" <pam.allen@epa.state.oh.us>, "Paul Novak" <Paul.Novak@epa.state.oh.us>, "Rich Fox" <rich.fox@epa.state.oh.us>
Date: 01/05/2010 10:41 AM
Subject: Draft Coal Ash Impoundment Assessment Reports

Dear Mr. Kohler

Thank you for providing Ohio EPA the opportunity to review the Draft Coal Ash Impoundment Assessment Reports. We appreciate you keeping us involved in this process. If US EPA decides to issue press releases for these facilities we would appreciate seeing them before they're released as you did for AEP Philip Sporn.

The reports' descriptions of the facilities field evaluations and the assessments of the loading conditions appear to be accurate for all six facilities and we have no comments at this time.

Thanks

Brian Queen
(740) 380-5420
brian.queen@epa.state.oh.us

Also: See letter dated January 28, 2010 (comments from Ohio State Dam Safety Engineering Program).

Company – See letter dated January 28, 2010.

Final Report
Assessment of Dam Safety of Coal Combustion Surface Impoundments
Duke Energy – W.C. Beckjord Station
New Richmond, OH

**Comments Received from OH DNR
In Response to CHA Draft Report dated December 7, 2009**
*Email dated January 5, 2010 and
Letter dated January 28, 2010*

CHA Project No. 20085.1060.1510

Comments

EPA HQ - None. Notes: Contractor rated facility (all four units) as POOR- contractor recommends a detailed stability analysis for all four units. The stability analysis for each pond should include a subsurface investigation to determine existing soil parameters in the embankments and foundation soils. Also install piezometers to determine the current phreatic surface. Contractor also states this facility does not have adequate inspection practices and should develop a more detailed inspection procedure to insure an adequate inspection. The contractor was not provided with sufficient information to determine if all four units were constructed on wet ash, slag or other unsuitable materials.

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Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

David Hanselmann • Chief

Division of Soil & Water Resources

January 28, 2010

Jim Kohler, P.E.
Environmental Engineer
LT, U.S. Public Health Service
U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery
(Letter provided by email)

RE: Assessment of Dam Safety Coal Combustion Surface Impoundments Draft Reports for Conesville Generation Station, Muskingum River Power Plant, JM Stuart Station, W.C. Beckjord Station, Miami Fort Generating Station, and Kyger Creek Power Station

Dear Mr. Kohler:

Thank you for the opportunity to join Clough, Harbour, & Associates (CHA) on their inspections of the dams at the power stations referenced above and to provide comments on the draft report. The reports were very thorough in the areas of dam safety that were reviewed. Although some typographical errors were noted, they have not been listed in this letter and it is expected that they will be recognized and corrected during CHA's final revisions to the reports. The comments provided below are in reference to more general concepts for the evaluations.

Hydrologic and Hydraulic Design – General

Section 3.2 of each report provides an evaluation of hydrologic and hydraulic design of each impoundment. The reports refer to Ohio Administrative Code (OAC) Rules for design flood and freeboard. The Dam Safety Engineering Program interprets these rules as follows. For a Class II upground reservoir with at least half of its impoundment as open water, the structure can inherently store the 50% probable maximum flood, and the appropriate evaluation considers overfilling prevention (OAC Rule 1501:21-13-03) and available freeboard (OAC Rule 1501:21-13-07). Also, the required freeboard is not added to pool elevation during the design flood – it is based on the maximum operating level.

1501:21-13-03 (D) Every upground reservoir shall have an overflow or other device to preclude overfilling the reservoir during normal filling operations. Local watershed drainage into the reservoir must also be included in the design of the overflow device if applicable.

1501:21-13-07 Sufficient freeboard shall be provided to prevent overtopping of the top of the dam due to passage of the design flood and other factors including, but not limited to, ice and wave action. The chief may approve a lower freeboard requirement if the dam is armored against overtopping erosion.

(A) For class I and class II dams that are upground reservoirs, the minimum elevation of the top of the dam shall be at least five feet higher than the elevation of the designed maximum operating pool level unless otherwise approved by the chief.

Structural Stability and Adequacy - General

Section 3.3 of each report provides an evaluation of structural stability and adequacy. The reports refer to Table 3-1 of the US Army Corps of Engineer's Engineering Manual 1110-2-1902. A copy of a portion of this section from the Miami Fort Generating Station report has been included for reference as well as a copy of Table 3-1 from the manual.

In performing a review of the structural adequacy and stability of Ash Pond A and Ash Pond B, CHA has compared the computed factor of safety provided in the original design documents for the ash ponds with minimum required factors of safety as outlined by the U.S. Army Corps of Engineers in EM 1110-2-1902, Table 3-1. The guidance values for minimum factor of safety are provided in Table 3.

Table 4 - Minimum Safety Factors Required

Load Case	Required Minimum Factor of Safety
Steady State Conditions at Present Pool or Maximum Storage Pool Elevation	1.5
Rapid Draw-Down Conditions from Present Pool Elevation	1.3
Maximum Surcharge Pool (Flood) Condition	1.4
Seismic Conditions from Present Pool Elevation	1.0
Liquefaction	1.3

From the Miami Fort Generating Station report

EM 1110-2-1902
 31 Oct 03

**Table 3-1
 Minimum Required Factors of Safety: New Earth and Rock-Fill Dams**

Analysis Condition ¹	Required Minimum Factor of Safety	Slope
End-of-Construction (including staged construction) ²	1.3	Upstream and Downstream
Long-term (Steady seepage, maximum storage pool, spillway crest or top of gates)	1.5	Downstream
Maximum surcharge pool ³	1.4	Downstream
Rapid drawdown	1.1-1.3 ^{4,5}	Upstream

¹ For earthquake loading, see ER 1110-2-1806 for guidance. An Engineer Circular, "Dynamic Analysis of Embankment Dams," is still in preparation.

² For embankments over 50 feet high on soft foundations and for embankments that will be subjected to pool loading during construction, a higher minimum end-of-construction factor of safety may be appropriate.

³ Pool thrust from maximum surcharge level. Pore pressures are usually taken as those developed under steady-state seepage at maximum storage pool. However, for pervious foundations with no positive cutoff steady-state seepage may develop under maximum surcharge pool.

⁴ Factor of safety (FS) to be used with improved method of analysis described in Appendix G.

⁵ FS = 1.1 applies to drawdown from maximum surcharge pool; FS = 1.3 applies to drawdown from maximum storage pool.

For dams used in pump storage schemes or similar applications where rapid drawdown is a routine operating condition, higher factors of safety, e.g., 1.4-1.5, are appropriate. If consequences of an upstream failure are great, such as blockage of the outlet works resulting in a potential catastrophic failure, higher factors of safety should be considered.

From the Engineering Manual

The analysis condition for end-of-construction has been eliminated from the tables in CHA reports, which is appropriate considering the age of these structures. However, CHA has included analysis conditions for seismic and liquefaction, which are not specifically addressed in Table 3-1. Table 3-1 does refer to ER 1110-2-1806; this document provides guidance but does not note specific factors of safety. The appropriate references for these factors of safety should

be noted. In addition, it is important to note that the table is intended for new construction, and the manual provides allowances for reducing the factors of safety for dams that have been in operation for long periods of time.

c. Factors of safety. Acceptable values of factors of safety for existing dams may be less than those for design of new dams, considering the benefits of being able to observe the actual performance of the embankment over a period of time. In selecting appropriate factors of safety for existing dam slopes, the considerations discussed in Section 3-1 should be taken into account. The factor of safety required will have an effect on determining whether or not remediation of the dam slope is necessary. Reliability analysis techniques can be used to provide additional insight into appropriate factors of safety and the necessity for remediation.

In particular, the slope stability analysis for the Muskingum River Units 1-4 Bottom Ash Pond included four scenarios that have factors of safety below 1.5 but above 1.42. Considering the age of the structure, the current and historic operation of the impoundment as a pumped-storage facility with a static pool, and the location of the failure planes with respect to releasing the impoundment, further discussion for considering these factors of safety acceptable should be provided.

Muskingum River Power Plant Report

Section 4.2 should include monitoring the seeps at the downstream toe of Muskingum River Lower Fly Ash Dam.

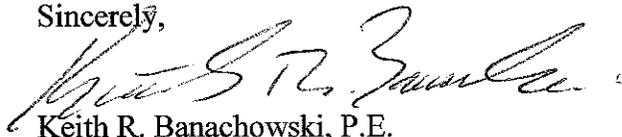
W.C. Beckjord Station

According to the as-built plans for Beckjord Ash Pond C Extension Dam and field investigation, the 30-inch-diameter concrete pipe that connects to Ash Pond C has not been plugged. However, the overflow pipe in the southwest corner that consists of a 54-inch-diameter CMP riser and 36-inch-diameter Corban reinforced fiberglass pressure pipe has been plugged with concrete.

Table 2 should be corrected to include a normal pool elevation of 518.0 for Beckjord Ash Pond C Extension Dam.

The Division of Soil & Water Resources looks forward to continuing cooperation with US Environmental Protection Agency in investigating and improving the conditions of coal ash impoundments. Please contact me at 614/265-6738 if you have any questions.

Sincerely,



Keith R. Banachowski, P.E.

Program Manager

Dam Safety Engineering Program

Division of Soil & Water Resources

Final Report
Assessment of Dam Safety of Coal Combustion Surface Impoundments
Duke Energy – W.C. Beckjord Station
New Richmond, OH

Comments Received from Duke Energy
In Response to CHA Draft Report dated December 7, 2009
Comments Received January 28, 2010

CHA Project No. 20085.1060.1510



Duke Energy Corporation
526 South Church St.
Charlotte, NC 28202

Mailing Address:
EC13K / PO Box 1006
Charlotte, NC 28201-1006

Via E-Mail and Overnight Courier

January 28, 2010

Mr. Stephen Hoffman
US Environmental Protection Agency
Two Potomac Yard
2733 S. Crystal Drive
5th Floor, N-237
Arlington, VA 22202-2733

RE: US EPA Request/ICR # 2350.01
W.C. Beckjord Station
747 US Route 52
New Richmond, Ohio 45157

Dear Mr. Hoffman:

Duke Energy Ohio, Inc. (DEO) received and has reviewed the draft report for W.C. Beckjord Station that resulted from the site assessment of Ash Basins A, B, C, and C Extension conducted by the United States Environmental Protection Agency (EPA) and its engineering contractors on October 8-9, 2009. Duke Energy supports the EPA's objective to ensure ash basin dam safety. We remain committed to operating and maintaining all of our coal ash basin dams safely.

The impoundment facilities at Beckjord are currently under the regulatory authority of the Ohio Department of Natural Resources, Division of Water (ODNR). The ODNR conducts an assessment/inspection of the impoundments at a minimum of once every five years. Duke Energy also plans to continue an internal inspection program.

Duke Energy remains committed to meeting all state and federal requirements and to managing its coal combustion byproducts impoundments in a very safe and responsible manner. We are confident, based on our ongoing monitoring, maintenance and inspections, that each of our ash basin dams has the structural integrity necessary to protect the public and the environment.

Duke Energy submits the following comments regarding the draft report:

1. General Comments

- All of the ash ponds were rated as having a “Significant Hazard Potential”. Because Ash Pond A and Ash Pond C Extension are no longer operated and do not impound water, any potential failure of these impoundments is unlikely to have widespread impact and any risk of significant environmental losses would be low. Accordingly, Duke believes that Ash Pond A and Ash Pond C Extension should be rated as having a “Low Hazard Potential”.
- In several locations within the draft report, it was stated that CHA was not provided with a copy of certain documents (see, e.g. Section 2.6, page 26, Section 3.4.1, page 121, and Section 3.5.1, page 124). Many of these documents were readily available but were never requested by CHA. Had they been requested, Duke Energy would have provided them. Duke Energy will provide this information now upon request.

2. Section 1.1, Page 1

At the bottom of page 1, there is a list of individuals who accompanied the CHA Engineers. Under Name, it lists “Tammy Jeff”. This should be “Tammy Jett”.

3. Section 1.3.1, Page 4

Ash Pond A, Paragraph 1, first sentence

Take out “D’Appolonia and”. Add “& Lundy” after the word “Sargent”.

4. Section 1.3.2, Page 4

Ash Pond B, Paragraph 1, second sentence

Replace the phrase “and other waste ash” with “and other waste water”.

Eliminate the items below from the example of “other waste ash”. These items are not present in Ash Pond B:

- Cooling tower blow-down
- Boiler chemical cleaning waste
- Boiler blow-down
- Laboratory drains

Add a comma between the words “stormwater run-off” and “mill rejects”.

Paragraph 2, first sentence

Replace “7,200” with “3,500”.

5. Section 1.3.3, Page 5

Ash Pond C, Paragraph 1

Replace the phrase “and other waste ash” with “and other waste water”.

Eliminate the items below from the example of “other waste ash”. These items are not present in Ash Pond C:

- Landfill leachate
- Boiler blow-down
- Cooling tower blow-down
- Boiler chemical cleaning waste
- Coal pile runoff
- Laboratory drains

Add a comma between the words “stormwater run-off” and “mill rejects”.

Paragraph 2, first sentence

Replace “6,800” with “7,500”.

6. Section 1.3.4, Page 6

Paragraph 2, first sentence

Replace “6,620” with “7,500”.

Paragraph 3, first sentence

Replace the word “spillway” with the word “outfall”, so the sentence would read “The Ash Pond C Extension outfall...”

7. Section 1.3.5, Page 7

Remove this paragraph/section. This is not a separate impoundment. It is within the existing Ash Pond C Basin. The wastewater/acid neutralization tank is within this basin as stated in this paragraph, but the tank is used for the treatment of the wastewater not the basin.

8. Section 1.4, Page 7

Paragraph 1, third sentence

Change “Little Indian Creek” to “Pond Run Creek”

9. Section 1.6, Page 8

The first sentence says “CHA reviewed the following documents provided by AEP”. It should say “Duke Energy” in place of AEP.

10. Section 2.5.2, Page 26

The Title of this section should be “Ash Pond C Extension Outlet Structures” not “Ash Pond C”

11. Section 3.3, Page 117

The “Minimum Safety factors Required” for slope stability as presented in Table 3 of the report is taken from Table 3-1 of the U.S. Army Corps of Engineers publication EM-1110-2-1902, dated October 31, 2003. This manual expressly states that the values in Table 3-1 apply to the design of new earth and rock-fill dams. With regard to existing dams, Section 3-3c of this manual states:

Acceptable values of factors of safety for existing dams may be less than those for design of new dams, considering the benefits of being able to observe the actual performance of the embankment over a period of time.

Ash ponds A, B, C, and C Extension have all been in service for 20 years or more. Based on the U.S. Corps of Engineer requirements cited above and the observed performance history of the ponds, Duke Energy believes that lower factors of safety would be applicable.

12. Sections 3.3.3, 3.3.4 & 4.8, Pages 118, 119 &131

In CHA’s evaluation of information from other consultants with respect to slope stability, CHA stated that analysis was not performed for the rapid drawdown loading condition, implying that this analysis should be performed. Duke Energy understands the ODNR does not require rapid drawdown analysis for up-ground reservoirs because they are not subject to rapid fluctuations in pool level as are some run-of-river dams. The ash ponds are the equivalent of up-ground reservoirs.

13. Section 3.4, Page 120

CHA indicates that portions of Ash Pond C Extension were constructed above soft clay soils, implying that this presents a greater concern than had this not been the case. However, the presence of soft clay is principally a concern with respect to the end of construction case. As the Ash Pond C Extension embankments have been in place in excess of 20 years without incident, this case is no longer an issue, consistent with ACOE guidance for existing dams.

14. Section 3.5.1, Page 124

Fourth sentence
Change “DOE” to “DEO”.

15. Section 4.1, pg. 128

Duke Energy is fully committed to taking all necessary and appropriate actions to ensure the safe and reliable operation of all of its impoundments. Duke Energy believes, however, that the poor designation contained in the report is inappropriately low and mischaracterizes the current condition of the embankments, particularly with respect to Pond C Extension. In its most recent inspection report, ODNR did not require any “engineering repairs and investigations.” And, with respect to the old surface slides, ODNR stated that they appeared

stable but recommended that they be monitored. (Item 7, pg 123). Additionally, slope stability analyses performed by ATEC at the time of construction of Pond C Extension indicate a safety factor of 1.66 with respect to deep seated failure, which exceeds the current minimum standard for new construction.

16. Section 4.7, Page 130

In Ash Pond B, the maximum operating pool as defined by ODNR is Elevation 515, which is at the level of the highest stop log in the spillway. Based on the elevation of the dam crest which is at Elevation 520, the minimum freeboard is 5 feet, which meets the ODNR, Dam Safety Section requirements. ODNR does not consider a rise in water level due to an extreme storm event, such as the PMP, as an operating condition.

If you have any questions regarding these comments or need additional information, please contact me at 980-373-3719.

Sincerely,

D. Edwin M. Sullivan

D. Edwin M. Sullivan, PE
Environmental Health & Safety