

US EPA ARCHIVE DOCUMENT



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Via E-Mail and Overnight Courier

December 7, 2009



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
Buck Steam Station
1555 Dukeville Road
Spencer, North Carolina 28146

Dear Mr. Hoffman,

Duke Energy Carolinas, LLC (DEC) received and has reviewed the final draft report for Buck Steam Station that resulted from the site assessment of Ash Basins 1, 2, and 3 conducted by the US EPA and its engineering contractors on June 9-10, 2009. Duke Energy supports the EPA's objective to ensure ash basin dam safety. We have a comprehensive and robust monitoring, maintenance, and inspection program in place for all of our coal ash basin dams and remain committed to operating and maintaining these facilities safely.

The impoundment facilities at Buck are currently under the regulatory authority of the North Carolina Utilities Commission. The Commission requires Duke Energy to have an inspection performed every five years by an independent consultant using qualified licensed Professional Engineers. The consultants utilized by Duke Energy to meet this requirement are equally qualified as those used by the EPA for its assessment. Effective January 1, 2010, the facilities will be under the regulatory authority of the North Carolina Department of the Environment and Natural Resources (NCDENR), Division of Land Resources, Office of Dam Safety. The Office of Dam Safety will conduct an **assessment/inspection** of the impoundments at a minimum of once every two years and in practice, plans to do the inspections once a year. Duke Energy also plans to continue our rigorous internal inspection program.

EPA's engineering contractor has rated the Buck impoundments in accordance with the National Inventory of Dams rating criteria as "Significant Hazard Potential". As previously noted, this rating is not an indication of the structural integrity of the impoundment, but of the hazard potential if the impoundment were to fail. "Significant Hazard Potential" is used where failure results in no probable

loss of human life but can cause significant economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. In our response to the CERCLA 104(e) Request for Information Question #1 submitted last March for Buck, we stated that no National Inventory of Dams criteria rating had been assigned to the Buck structures by a State or Federal agency; however, the North Carolina Utilities Commission had classified the structures as "high hazard" under the North Carolina Dam Safety Rules due to the potential environmental damage of an ash release in the event of failure. This highlights the difference between the North Carolina rating criteria where high hazard potential is a classification also used if economic damage of greater than \$200,000 is expected; versus the National Inventory of Dams criteria where high hazard potential is reserved for those cases where there would be a probable loss of human life. The National criteria rating of "Significant Hazard Potential" from the contractor is an accurate reflection of the reasoning behind the North Carolina rating of "High Hazard Potential". The EPA's engineering contractor's rating is a reduction in rating from that previously released by the EPA of high hazard from the CERCLA 104(e) Request for Information.

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. EPA's report supports this conclusion and found that acceptable performance is expected in accordance with the applicable safety regulatory criteria. EPA's contractor did, however, make several recommendations to address minor deficiencies and secondary studies/investigations to provide further assurance of continued structural integrity. Duke Energy responds to each of these recommendations as follows:

4.2 Vegetation Control

While CHA observed appropriate grass cover that had been recently mowed, taller weeds were growing adjacent to the upstream ash and dike contact. We recommend these weeds be cut during the routine mowing and vegetation control maintenance to prevent undesirable wood brush and trees from establishing where their roots could penetrate the embankment.

Sparse vegetation was noted in localized areas on each of the dikes. In these areas of sparse vegetation, reseeding maintenance should be performed.

Duke Energy has removed the weeds and will address areas of sparse vegetation in accordance with our current practices and guidance from the North Carolina Department of Environment and Natural Resources, Land Quality Section, Dam Safety Office by May 1, 2010.

4.3 Drainage Swales

Sediment was evident in rip rap drainage swales. The sediment observed appeared to be related to surface runoff and tended to be accumulated at the toe of the swales. Duke Energy should monitor the condition of these drainage swales and if the sediment appears to be clogging the rip rap and impeding surface runoff from being adequately conveyed away from the earthen embankments, the rip rap should be cleaned of sediment.

Duke Energy will continue to monitor the condition of the drainage swales and will investigate the source of the erosion as necessary. If clogging occurs, the rip rap will be cleaned of sediment. Duke Energy considers this recommendation complete.

4.4 Main Dike Crest

A low area was observed on the downstream side of the main dike across from the outlet tower access path as noted in Section 2.3.1. We recommend this low spot to be re-graded to prevent surface runoff from the crest concentrating in this area, and marked in the field, so Duke Energy personnel can observe for further changes during routine inspections. Should any unusually large amount of sediment appear in the rip rap swales at any one time, particularly after rain events, plant personnel should inspect the dike slope and crest areas because this could be a sign of decreased grass cover and increase erosion activity.

Upon confirmation of a low area, Duke Energy will re-grade the low spot to prevent runoff from concentrating in the area by January 31, 2010. Sediment in rip rap swales, grass cover, and erosion activity are already included in the station's inspection program.

4.5 Animal Control

CHA observed several areas where disturbed soil was observed on the dam embankments because of animal activity. Disturbed areas that result in loose soil and vegetation removal should be monitored during routine inspections and re-graded and seeded as needed to keep these areas stable. Paths, such as the beaver or muskrat slide seen on the Basin 2 to 3 dam, should be observed for deepening and runoff erosion as these areas will concentrate storm water runoff.

CHA did not observe signs of burrowing animals, but Duke Energy personnel indicated they have had to trap woodchucks at their fuel tank containment berm, so Duke Energy should remain vigilant during inspections looking for signs of burrowing animals on the dikes as well.

Duke Energy will continue to monitor this situation, in accordance with our current animal control practices and the guidance issued by the North Carolina Department of Environment and Natural Resources, Land Quality Section, Dam Safety Office. Duke Energy considers this recommendation complete.

4.6 Seepage

CHA understands from conversations with Duke Energy personnel that they are currently discussing seepage control and measuring options with their consultant to help quantify the seepage conditions at the toe of the new dike. CHA recommends that a plan be developed and implemented that includes monitoring a weir. A monitoring weir allows for this quantitative measurement of seepage flow so that changes can be more easily identified, and it allows a sampling point to collect flow for observation of soil particles being carried by the flow.

Seepage was also observed around the headwall of the outlet pipe at the Basin 1 to Basin 2 dam. CHA recommends this seepage be monitored during Duke Energy's monthly inspections

of their ash pond facilities. Because of the discharge channel water level, this is not a location conducive to installation of a monitoring system.

Duke Energy will develop a plan to monitor seepage at the new dike by January 31, 2010, and continue monitoring seepage around the headwall of the outlet pipe at the Basin 1 to Basin 2 dam.

4.7 Wooded Area of Main Dike

CHA recommends that Duke Energy have an independent consultant evaluate the neglected portion of the main dike. This area of the dike does not impound water under the current normal operating pool. However, this area will impound water under flood conditions. Therefore, this portion of the dike should be evaluated for determination of its ability to hold back flood water volumes.

In consultation with an independent engineer, Duke Energy will evaluate and determine the adequacy of the described section of the dike for flood control by January 31, 2010.

4.8 Ash and Vegetation at Basin 2 to Basin 3 Outlet Control Structure

Ash is piled around the Basin to Basin 3 outlet control structure and significant vegetation has been established in this ash. The vegetation and ash should be removed so as not to impede flow into the outlet structure.

Duke Energy will remove vegetation and ash so as not to impede flow between Basins 2 and 3 by January 31, 2010.

4.9 Depressions on Diverter Dike

CHA recommends that depressions and erosion swales on the diverter dike be re-graded and re-seeded and then monitored for changes.

Duke Energy will re-grade areas of the diverter dike to address any depressions or swales by January 31, 2010. As a matter of factual reference, the *diverter* dike as referenced in this report should be "divider" dike.

4.10 Monitoring Instrumentation

There are conclusions and recommendations in the 2008 inspection report suggesting that some of the piezometers at the new and main dike are damaged and should be replaced with new piezometers with screens at the same elevations. CHA strongly recommends that these piezometers be reinstalled particularly at the new dike where there have been concerns about elevated phreatic surface in the past. Well operating monitoring points can show signs of change in the dike that need to be addressed before signs become visible at the ground surface.

Duke Energy has installed new piezometers to replace all damaged or malfunctioning piezometers in order to properly measure changes in the phreatic surface. The new piezometers were installed on September 18, 2009. Duke Energy considers this recommendation complete.

4.11 Hydrologic and Hydraulic Evaluation Update

Preliminary analyses suggest that the ash basins at Buck Steam Station will safely pass the $\frac{3}{4}$ PMF. However, these analyses suggest the water levels in Basin 2 will rise to within 0.6 feet of the dam crest. Because of the preliminary nature of these analyses, CHA recommends Duke Energy evaluate the basin system for safe passage of the $\frac{3}{4}$ PMF and make adjustment to operating procedures as needed to meet freeboard requirements satisfactory to the North Carolina Utilities Commission.

As documented in the Ash Basin Flood Routing report dated March 20, 1986, Duke Energy has previously completed hydrologic analyses for this pond and dam and has demonstrated that the design is adequate for the design storm. Duke Energy considers this recommendation complete.

4.12 Hazard Assessment

We recommend that a breach analysis be performed to determine whether development downstream from the main dike (e.g. residential development approximately 3 miles downstream) would suggest a high hazard classification is warranted for the impoundment.

We also recommend that a breach analysis be performed for the new dike to determine if the Buck Steam Station access road and parking areas would be impacted by a failure of the dike and if a high hazard classification is warranted.

Although not discussed during EPA's site assessment, a breach/dam break analysis was conducted for the Buck Steam Station dikes on or about 1992. A copy of this analysis was forwarded to CHA on November 24, 2009 and is currently being reviewed. Based on this analysis, the peak downstream flood is approximately 7 feet above normal stage, within the normal flood plain boundary.

4.13 Additional Stability Analyses – New Dike

We recommend that an investigation be performed in which the properties of the embankment and foundation soils be investigated. Based on the documentation we have reviewed it appears that it has been some time, over 15 years, since a detailed investigation has been performed for the new dike. Independent consultant reports have summarized changes over time in the new dike, including some piezometers readings above the design phreatic surface (Piezometers P15 and P16). Current piezometer data (May 2009) indicates that other piezometers readings are below the design phreatic surface (Piezometers P13 and P14). The 2008 Annual Inspection Report notes that piezometers 15 and P16 are damaged. The recommended investigation should include the installation of additional piezometers to determine the current phreatic surface and to replace any damaged piezometers. The

investigation should include a detailed stability analysis based on the updated soil and phreatic parameters determined.

It should be noted that if operations at the Buck Steam Station are modified and Basin 1 is dredged resulting in the new dike impounding liquid it is recommended that a rapid drawdown analyses be performed.

Duke Energy has replaced the damaged piezometers and has begun collecting data to evaluate the current phreatic surface. Duke Energy will evaluate the data and consult with a third party engineering consultant on the need for additional stability analyses. Data collection, evaluation, and additional stability analyses, including rapid drawdown analysis, will be completed by December 31, 2010.

4.14 Additional Stability Analyses – Main Dike

The steady state analysis in 1996 for the main dike (adjacent to Basin 2) indicated a factor of safety of 1.4 for the downstream slope, which is below the recommended criteria of 1.5. Additional piezometers were installed after the fourth independent inspection report to verify uplift conditions at depth in the main dike. An independent review of recent piezometers readings should be conducted to confirm that uplift conditions at depth are below hydrostatic.

Although the calculated factor of safety is below the recommended criteria, Duke Energy had an independent consultant conduct an evaluation in which they determined that the analysis and factor of safety were adequate (Sixth Independent Consultant Inspection Report dated February 28, 2006. page 3–2.) Duke Energy considers this recommendation complete.

4.15 Additional Stability Analyses – Diverter Dike

If operations at the Buck Steam Station are modified and Basin 2 is dredged resulting in the diverter dike impounding liquid it is recommended that a steady state and rapid drawdown analyses be performed.

Duke Energy has no plans to dredge Basin 2. If dredging is considered in the future, this recommendation will be re-visited. Duke Energy considers this recommendation complete. As a matter of factual reference, the *diverter* dike as referenced in this report should be "divider" dike.

4.16 Settlement Monitoring Points

The Buck Steam Station staff should continue to take settlement monitoring point readings on a regular annual basis. The readings should be plotted with previous readings to determine if the rate of settlement has changed.

Duke Energy will continue to observe, record, and analyze settlement data in accordance with our current practices. Duke Energy considers this recommendation complete.

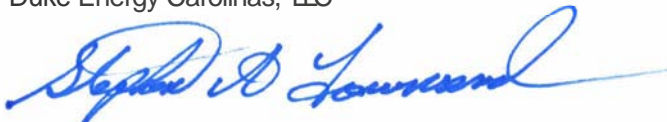
4.17 Basin 3 ~~Outlet~~ Spillway Channel

CHA observed undermining and joint separation in the concrete-lined spillway channel conveying water below the downstream Main Dike toe to the Yadkin River. This does not appear to be an imminent threat to dike stability at this time, and given the fact that this area has been noted in previous inspections as a point of concern, is likely to have been a fairly slow developing condition over a period of years. If left unchecked however, the rate of undermining can increase and can reach the point where the spillway no longer protects the downstream toe from continual erosion as more sections drop away from the channel. The presence of the Yadkin River backwater in this area of the dike exacerbates the problem by softening the soils, especially during periods of higher water levels. As a consequence, CHA recommends careful routine inspection, particularly after the area experiences periods of heavy rainfall and plant sump pumping, high river levels, or increased power generation that leads to higher CCW sluicing volumes. Should a marked increase in undermining and resulting spillway joint separation or lining displacement become evident, the outlet spillway channel should be repaired or replaced.

Duke Energy will continue to observe and record conditions in this area in accordance with our current inspection practices and make repairs as necessary. Duke Energy considers this recommendation complete.

If you have any questions regarding the above responses, please contact Ed Sullivan at our corporate offices at 980-373-3719 or via e-mail.

Sincerely,
Duke Energy Carolinas, LLC



Stephen A. Townsend
General Manager II, Buck Steam Station
Regulated Fossil Stations