Ferrante, Fernando

From: James Vail
Sent: Tuesday, January 06, 2009 7:16 AM
To: Fernando J Ferrante
Subject: FW: Oconee vs. Jocassee Licensing Basis
Attachments: Use of FERC Inundation Calculation Parameters.doc

Fernando

Here is an electronic copy of the Oconee GDC.

Jim

From: Jeff Circle
Sent: Monday, January 05, 2009 10:39 AM
To: Melanie Galloway; Robert Schaaf; James Vail
Cc: Goutam Bagchi; John Stang; Kenneth See; Raman Pichumani; Richard Raione
Subject: Oconee vs. Jocassee Licensing Basis

Lady and Gentlemen,

Happy New Year. Here is a rough draft of a write up based on what I noticed after going over all the FERC and Army Corps of Engineering regulations and guidance for dams as compared with our nuclear site requirements. I took a little time to boil it down to 1.5 pages. This may be used for the SES visit to Oconee later on this week so, please take a look at it and let me know if it's on the right track. Also, I'd appreciate it if Goutam and Raman can add any applicable seismic information to it.

Jeff.

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Use of FERC Inundation Calculation Parameters

Issue:
Are the inundation study parameters that Duke presented in their 50.54(f) letter response appropriate for the further inundation study?

Concern:
The parameters were developed for the licensing of Jocassee Dam with FERC as required by 18 CFR 12D. Although these parameters are appropriate for licensing the dam, they might lack the necessary margins required to satisfy the licensing criteria for external flood protection for the Oconee Nuclear Site.

Oconee Nuclear Site Requirements:
The licensing basis for external flooding for Oconee follow a draft version of GDC-2 presented in the Federal Register Notice of July 11, 1967:

"*Those systems and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be designed, fabricated, and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice, and other local site effects. The design bases so established shall reflect: (a) appropriate consideration for the most severe of these natural phenomena that have been recorded for the site and the surrounding areas and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design.*"

Regulatory Guide 1.59 states that, "In addition to floods produced by severe hydrometerological conditions, the most severe seismically induced floods reasonably possible should be considered for each site. Along streams and estuaries, seismically induced floods may be produced by dam failures or landslides. " .. "Flood conditions that could be caused by dam failures from earthquakes should also be considered in establishing the design basis flood." The most severe impact must be considered for dam failure with an appropriate margin to withstand higher forces.

FERC Guidance on Dams:
In conducting dam break studies, FERC suggests for rockfill dams that an average breach width of between one and five times the height of the dam should be used. The time-to-failure should be within 0.1 hrs (6-minutes) to 1 hour. The guidance goes on to state, "For a worst-case scenario, the average breach width should be in the upper portion of the recommended range, the time to failure should be in the lower portion of the range, and the Manning's "n" value should be in the upper portion of the recommended range. In order to fully evaluate the impacts of a failure on downstream areas, a sensitivity analysis is required to estimate the confidence and relative differences resulting from varying assumptions." To account for high degree of uncertainty, FERC recommends that the upper breach width along with shorter times be adopted assuming that the dam fails catastrophically.

Conclusion:

In their response to the 10 CFR 50.54(f) letter, Duke argued that the parameters that were used in the FERC inundation study were conservative. However, after review of the FERC regulations and guidance, it is concluded that the parameters are not at all conservative. Although the parameters (e.g., breach width and time-to-failure) might satisfy Jocassee's 18 CFR 12D requirements, they are in-fact median values and lack the necessary conservatism to comply with the requirements for appropriate margin in Oconee's licensing basis. In FERC's engineering guidance, it is recommended to use higher breach width and lower time-to-failure to account for the high degree of uncertainty. This is in spirit with NRC's licensing basis and regulatory position regarding floods and dam failure.