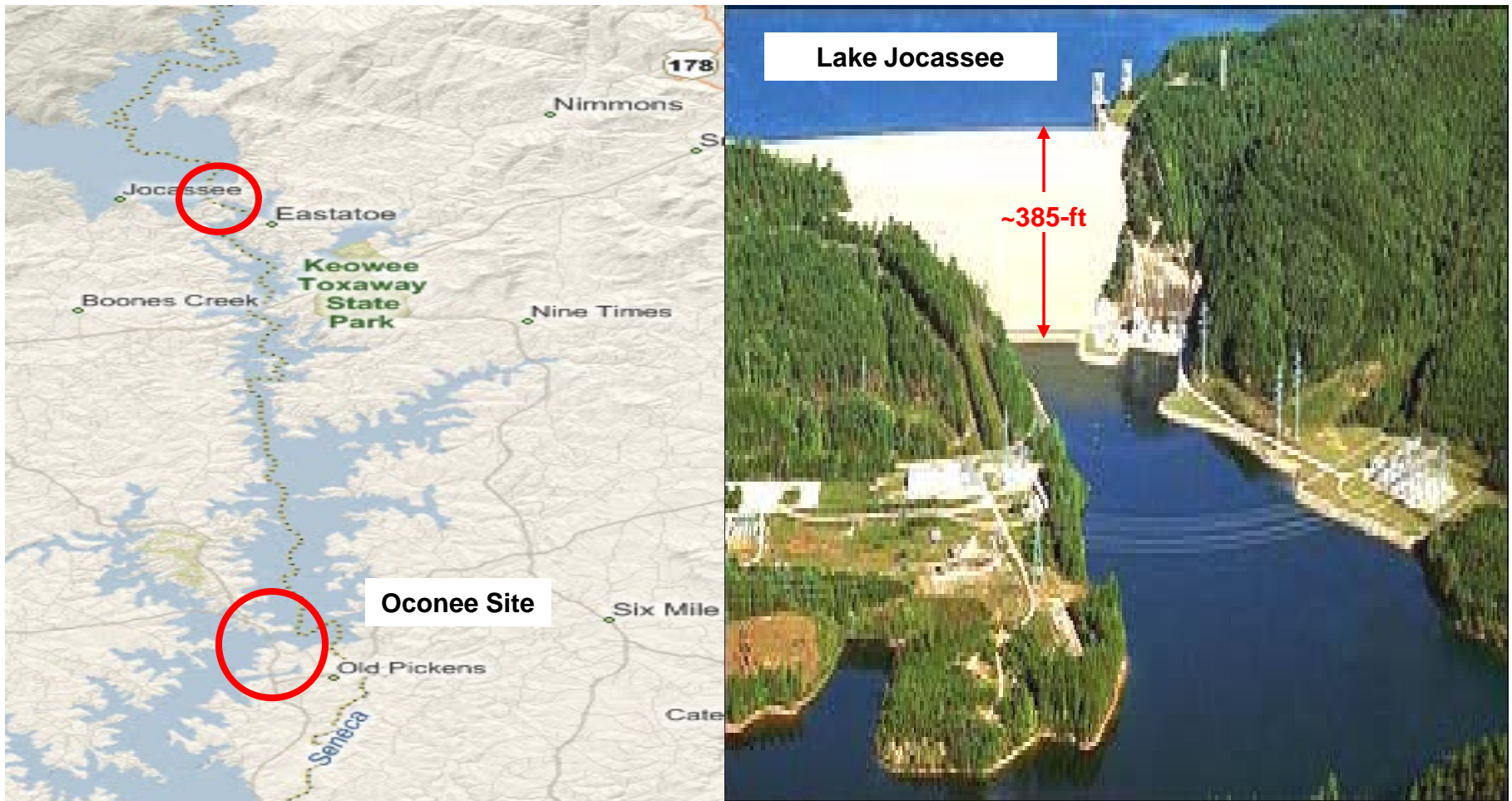


Oconee External Flooding Briefing for Commissioner Jaczko

David Skeen
Melanie Galloway
Anne Boland
April 9, 2009

Jocassee Dam Flood Scenario

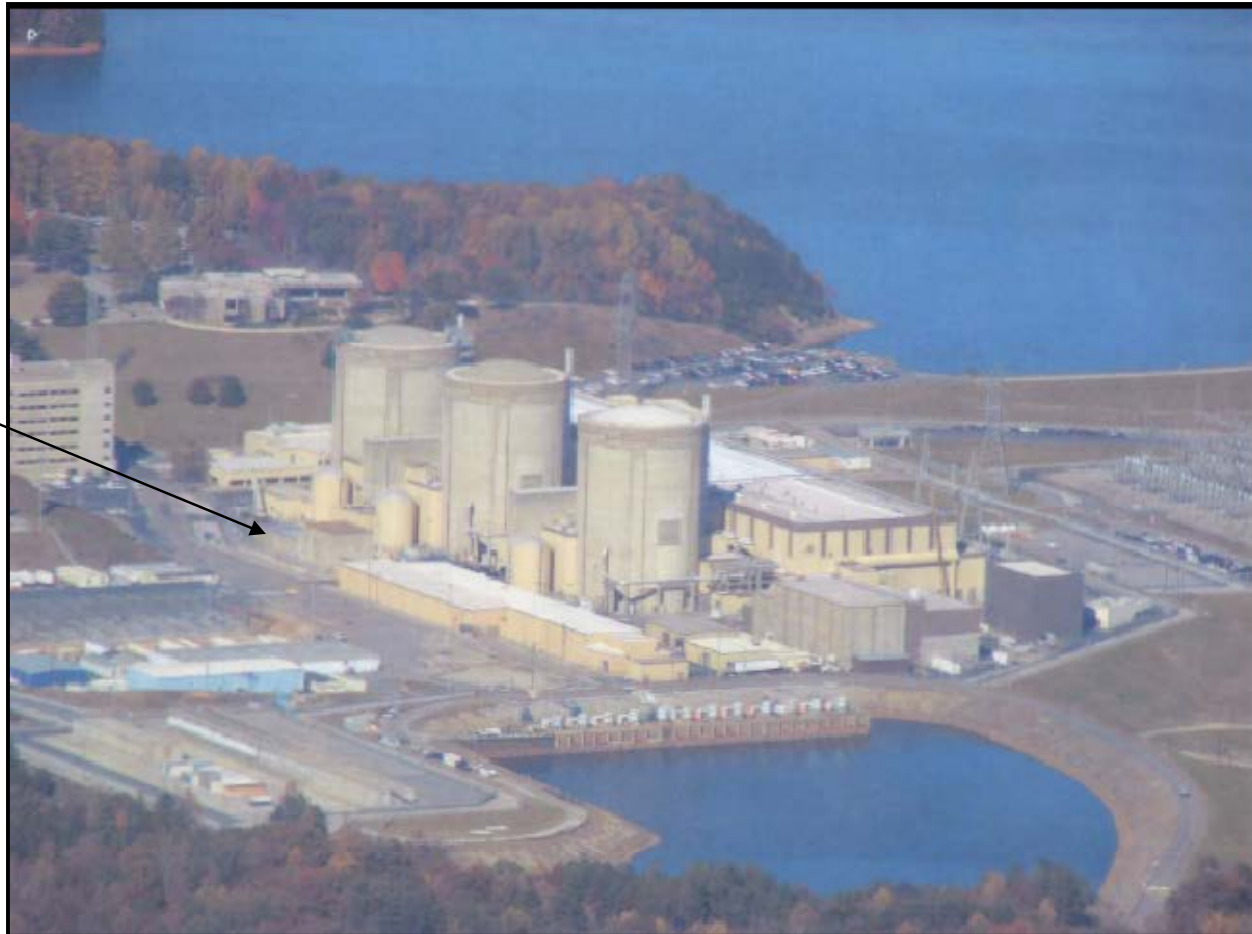


Jocassee Dam



Oconee Nuclear Station

Standby
Shutdown
Facility



Overview

- The staff issued a 50.54(f) letter to Duke on August 15, 2008, requesting information regarding external flooding hazards at the Oconee facility. The letter was issued because:
 - The Oconee Standby Shutdown Facility (SSF) contains the only equipment left to cool the core, containment and spent fuel pool, if all other safety-related and non-safety-related equipment are lost in the predicted worst-case external flood.
 - The SSF 5-ft high flood barrier protects against Duke's licensing basis flood of 4.7 feet. Duke's licensing basis calculations, performed in the early 1980s, have been lost and Duke has not reproduced them.
 - The only flooding analysis available was one conducted by Duke in the mid-1990s which predicted onsite flood heights from approximately 12 to 17 feet. The analysis was performed for FERC emergency planning purposes, using one dimensional inundation codes, and the conservatism of the modeling is uncertain.
 - In 2007, the staff was evaluating an inspection finding regarding an SSF flood barrier breach, and identified that Oconee's IPEEE frequency for sunny day, or random, failure of the Jocassee dam was non-conservative by an order of magnitude, and could increase the core damage frequency from external flooding to 2E-04/yr.

Duke's Response

- Duke committed to the following actions in its September 26, 2008 response
 - Short term
 - Increase the height of the SSF flood barriers from 5-ft to 7.5-ft (Completed - 03/09)
 - Create interim guidance to mitigate postulated floods that may render the SSF inoperable (Completed 03/09)
 - Update the 1992 inundation study using a more advanced computer model (HEC-RAS), developed by DoD and the Corp of Engineers (Completed 04/09). The updated study used the same parameters as the 1992 study, and varied some parameters to provide a sensitivity study
 - Long Term
 - Contract with Utah State to perform a study of the Jocassee dam to determine the probability of potential failure modes, and assess potential adverse effects to the SSF. Incorporate this information into a flooding evaluation using the HEC-RAS model to determine the appropriate flood height at the SSF (Expected completion date 02/10)

SSF South Wall Modification



The SSF walls were extended by 2.5 ft to provide added flood protection



Basis for Continued Operation

- Estimated frequency of dam failure is low.
 - No adverse trends in dam condition noted by FERC inspections.
 - Licensee performs regular inspections and monitoring of the dam, as well as periodic surveillance of the spillway gates.
 - Present level of the Jocassee Lake is very low.
- Timing of core damage scenarios allows time for mitigative measures.

Staff Concerns

- The staff has reviewed Duke’s proposed risk-informed approach to address flood height at the SSF.
- The staff has concluded risk analysis cannot be used to demonstrate compliance with deterministic flooding safety requirements, unless the risk analysis reveals that the failure is not “credible.”
- The staff and licensee agree that dam failure is a “credible” event.
- The staff has requested additional data in conjunction with the licensee’s inundation study to ensure adequate protection of the public health and safety. Key issues are:
 - Breach size
 - Lake level (Jocassee and Keowee)
 - Time to dam failure
 - Sensitivity analysis

Path Forward

- The staff is issuing a follow-up letter to Duke to let them know that NRC has found their risk analysis plan unacceptable to demonstrate compliance.
- The follow-up letter also establishes NRC's expectation that the licensee perform an adequate inundation study and technically defend the assumptions and parameters used in the study.
- The staff will meet again with Duke in May 2009 to allow the licensee to explain how the new inundation analysis code was benchmarked against the 1992 study and how the limited sensitivity analysis was performed.
- The staff will use in-house and independent expertise to provide insights on the study.
- If the staff determines that the study is inadequate, further regulatory action will be taken.
- An SES manager has filed a non-concurrence on the letter to Duke.