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Oconee Flood Protection and the 10 CFR 50.54(f) Response

NRR LT Meeting
October 21, 2008

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Objectives

- Purpose
 - Summarize the licensee's responses
 - Discuss the staff's evaluation and options
 - Discuss possible paths forward
 - To receive LT feedback on the merits of possible paths forward

Background

- Duke Hydro/FERC Inundation Study completed in early 1990s. Estimated flood heights up to 16.8 ft above SSF grade level
 - First identified by inspectors in 1994.
- Floods in excess of 5 ft lead to three-unit core damage event.
- Staff identified an under-estimate in licensee's random dam failure frequency for Jocassee.
- Staff discovery that the Jocassee dam failure issue had not been adequately resolved.
- Issued 10 CFR 50.54(f) letter for Duke to address flooding concerns.

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Principal 10 CFR 50.54(f) Questions Regarding Oconee Flood

1. Explain the bounding external flood hazard at Oconee and the basis for excluding consideration of other external flood hazards, such as those described in the Inundation Study, as the bounding case.
2. Provide your assessment of the Inundation Study and why it does or does not represent the expected flood height following a Jocassee Dam failure.
3. Describe in detail the nuclear safety implications of floods that render unavailable the SSF and associated support equipment with a concurrent loss of all Alternating Current power.

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50.54(f) Letter Review Team

- Scope
 - Review submittal as if NRC is reconstituting a design basis flood for Oconee
 - All modes/events causing external flooding will be assessed
 - All modes/events causing Jocassee dam failure will be assessed
- Topics considered in development of options:
 - Likelihood of dam failure
 - Flood analysis
 - Seismology
 - Basis for continued operation
 - Security

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Overall Summary of Licensee's Response

- Inundation levels based on current drought conditions
 - Supports continued operation
- Commitment to increase current flood walls to 7.5 feet by February 2009.
- Further analysis by February 2010.
- Heavy reliance on test and inspection of dam
- Seismic failure is “not credible”
- Other dam failure modes (i.e., overtopping) “not credible”

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Overall Summary of Staff's Review of Licensee's Response

- Interim continued operation appears feasible with additional licensee commitment of water management
- Licensee failed to fully address site flood height (e.g., adequate protection)
 - No analysis for random Jocassee Dam failure at full pond level
 - An inadequate seismic analysis
 - Did not perform a Probable Maximum Precipitation (PMP) analysis
- Future planned analysis for dam failure is not acceptable
 - Issues on time-to-failure, breach size, and choice of flood model
- Current and future reliance on probability arguments is not acceptable

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Options for Path Forward

- Options represent choice between engineered and analytical approaches
- An engineered solution
 - Installation of watertight doors to the SSF
 - Has not been committed to by licensee
- An analytical approach
 - Analysis was proposed by the licensee



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Summary of Option 1

Engineered Solution (Installation of watertight doors)

Pros

- Independent of all sources of flood and inundation level
- Fully addresses adequate protection
- Fewer NRC staff resources required for inspections and review
- Timely and defensible to internal and external stakeholders

Cons

- Licensee might delay acceptance of this solution

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Summary of Option 2

Further Analytical Solution

Pros

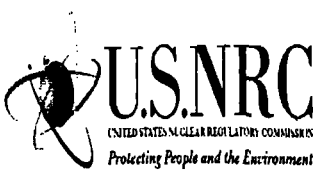
- Improved estimate of flood inundation level to define amount of protection to be applied
- Licensee-proposed solution

Cons

- A resolution timeframe may be prohibitive
- Licensee has inappropriately eliminated failure modes
- High degree of uncertainty in dam breach analysis
- Analysis plan for Feb. 2010 is not adequate
- Calculated inundation level may result in a further engineered solution
- Probability approach is not acceptable
- Requires very extensive staff review resources

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Outline of Presentation to Licensee on October 30, 2008 Management Meeting

- State basis for interim continued operation
- State NRC position on dam failure frequency (probability) argument
 - NRC will not expend staff resources on an approach which will not contribute to a solution
 - Licensee's proposed probability approach of eliminating failure modes with inappropriate bases is not acceptable to NRC staff
- State NRC position on preferred option
- State regulatory vehicle to pursue
 - An order
 - A Confirmatory Action Letter

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