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Timeline of Interactions with the Licensee on the External Flooding Issue at the Oconee Nuclear Station (ONS)

Note: Key events are underlined.

- **January 1983** - Licensee memo to file, documents that a Jocassee Dam failure would (b)(7)(F) . The flood study was completed as part of the ONS probabilistic risk assessment (PRA) study, NSAC-60 by Duke Power and the Electric Power Research Institute (EPRI) Nuclear Safety Analysis Center.

- **April 1983** - Based on Request for Additional Information (RAI) responses, Nuclear Regulatory Commission (NRC) issues Standby Shutdown Facility (SSF) SER, which recognized turbine building flood as only credible SSF flooding concern....not Jocassee Dam failure.

- **June 1984** - NSAC-60 was completed. (This addressed both random failures of Jocassee Dam....no split fractions and no credit for SSF.)

- **June 1984 to June 1986** – Licensee design and construction of (b)(7)(F) (b)(7)(F) .

- **December 1992** - Jocassee Dam Failure Inundation Study (Federal Energy Regulatory Commission (FERC) Project No. 2503) was completed and predicted a flood range of (b)(7)(F) compared to site grade level.

- **December 1992** - Licensee implemented a final safety analysis report FSAR) update which added the Jocassee Dam failure, (b)(7)(F) and watertight door references to the licensing basis.

- **December 1993** – In an internal memo, licensee attempted to reconcile differences between the FERC study and their internal one due to updated software and analysis conservatism. Licensee states that they can not replicate the studies showing a (b)(7)(F) Proposed corrective action to re-analyze as part of the Individual Plant Examination of External Events (IPEEE) for December 1995.

- **February 1994** - NRC issued a Notice of Violation and Notice of Deviation (Report number 50-269,270,287 / 93-25) which included the identification of the (b)(7)(F) (b)(7)(F) per the recently completed FERC study; and the inaccurate IPEEE submittal, which stated that the (b)(7)(F) (b)(7)(F) .

Attachment 2

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- **March 1994** – Service Water inspection and violations. Licensee discussed a commitment to the NRC "...to complete a reanalysis of a postulated Jocassee flood with the available information on flood frequency, (b)(7)(F) (b)(7)(F) as part of the IPEEE effort."

- **June 1994** – Licensee removed all references to Jocassee Dam failure and the (b)(7)(F) (b)(7)(F) in the FSAR. The 10 CFR 50.59 evaluation stated that these references were originally added based on results of a PRA study which was not part of design basis.

- **September 1994** – (Internal NRC meeting between Region II and the Office of Nuclear Reactor Regulation (NRR) as documented in memo dated October 6, 1994)...The status of NRC review of a hypothetical Jocassee Dam failure was discussed. NRR indicated that the external events review would not be done for months, and research had not been contacted about the error in the licensee's IPE submittal. The ramifications of a high E-5 event was discussed, NRR considered it of minimal importance, and a revision submittal of 1995 was acceptable.

- **December 1995** – Licensee issued the IPEEE. However, the IPEEE did not explicitly reference the Jocassee Dam Failure Inundation Study. In addition, the IPEEE review team was not aware of the 1994 Notice of Violation and Notice of Deviation and the associated licensee commitments when completing their review. (b)(7)(F) Subsequent supplements issued in December 1996 and December 1997 also carried over these split fractions. In response to the January 1999 RAI, the licensee reconfirms that a flooding event (resulting from the seismically-induced failure of the Jocassee Dam) which exceeds the (b)(7)(F) is the dominant cut set. Subsequently in March 2000, the NRC closes the IPEE generic letter.

- **July 1998** – Licensee applied for renewal of operating license for all three units. In the value impact results for potentially cost-beneficial Severe Accident Mitigation Alternatives, the licensee considered increasing the height of the (b)(7)(F) However, it was not deemed cost-effective based on the underestimated IPEEE results. The NRC staff conducting this review were not aware of errors in the dam failure frequency which were to come to light in follow-up to the November 2006 final significance determination.

- **August 2003** - Licensee removed an access cover on the south side of the SSF outer wall exposing it to floods below the 5-ft level. Licensee failed to perform any 10 CFR 50.65(a)(4) or 10 CFR 50.59 evaluation (ref. RIS-2001-009) for a breached barrier.

- **September 2004** – During SSF sump modifications, the licensee's SSF Risk Reduction Team identified the need to consider increasing the height of the flood

walls. This recommendation was identified in PIP O-04-6365, corrective action #8. However, the actual corrective action #8 stated that, "Based on discussions with the Severe Accident Analysis Group, modifications to increase the height of the flood wall around the SSF will not be pursued at this time. Therefore, the proposed replacement SSF Sump pump should be based on operating with flood levels up to the height of the existing flood wall surrounding the SSF."

- **June 2005** – NRC inspectors notified licensee of the wall breach in the SSF. The licensee entered the deficiency into their corrective action program.
- **August 2005** – After a second corrective action, the licensee corrected the condition by sealing the breach in the SSF wall.
- **April 2006** – NRC inspectors, in documenting SSF breach as a performance deficiency, also note the Jocassee Dam Inundation Study.
- **August 2006** – Senior Executive Review Panel (SERP) meeting on the performance deficiency assessed as preliminary WHITE with the choice letter sent to the licensee.
- **October 2006** – Licensee provided written response to the NRC choice letter to waive a regulatory conference.
- **November 2006** - Final significance determination of WHITE was issued.
- **December 2006** - Licensee appeals the determination. Requested NRC to accept an incomplete, un-docketed, Jocassee seismic fragility study.
- **January 2007** - Appeal panel was convened with Region II, Region IV and Headquarters personnel.
- **February 2007** – Licensee sent completed seismic fragility analysis of Jocassee to NRC one month late.
- **March 2007** – Appeal panel upheld the WHITE finding based on random dam failure alone.
- **May 2007** – Licensee requested reassessment of the final determination of the appeal panel.
- **June 2007** - Team assembled to evaluate seismic analysis. Flooding expert reviewed the random failure frequency for Jocassee Dam. Follow-up telecom with licensee after seismic fragility analysis was evaluated. Discrepancy in dam failure frequency was communicated to the licensee.
- **July 2007** - Licensee response to analysis questions by email.

- **September 2007** – Final SERP concluded a WHITE finding.
- **October 2007** – Associated IP95002 Supplemental Inspection (conducted in late August 2007) report issued.
- **November 2007** – November 20 letter to licensee regarding the Final Significance Determination of the SSF barrier white finding and communication of the Jocassee Dam failure frequency error.
- **December 2007** – NRC Region II communicated the NRC Jocassee Dam failure frequency computation to the licensee.
- **December 2007 - August 2008** – The NRC staff developed/implemented an internal backfit assessment/flood action plan. This included pursuance of concern as an "inadequate protection" issue.
- **August 2008** – NRC Deputy Executive Director telecon to licensee Chief Nuclear Officer on concerns over Jocassee Dam failure and Oconee site flood height. Request for information pursuant to 10 CFR 50.54(f) issued to the licensee August 15, 2008.