



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-16-115

July 15, 2016

10 CFR 50.4

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Sequoyah Nuclear Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-77 and DPR-79
NRC Docket Nos. 50-327 and 50-328

Watts Bar Nuclear Plant, Unit 1 and 2
Facility Operating License Nos. NPF-90 and NPF-96
NRC Docket Nos. 50-390 and 50-391

Subject: **Notification of Change in Completion Schedule Regarding the Improved Flood Mitigation System Project**

- References:
1. Letter from TVA to NRC, "Commitment to Install Improved Flood Mitigation Systems," dated April 16, 2013 (ML13108A107)
 2. Letter from TVA to NRC, "Progress Update on Improved Flood Mitigation System Project," dated July 1, 2013 (ML13189A135)
 3. Letter from NRC to TVA, "Tennessee Valley Authority Commitment to Install Flood Mitigation Systems at Sequoyah Nuclear Plant, Units 1 and 2, and Watts Bar Nuclear Plant, Units 1 and 2," dated July 1, 2013 (ML13182A615)
 4. Letter from TVA to NRC, "Sixth Progress update on Improved Flood Mitigation System Project and Commitment Change to Improved Flood Mitigation System Milestones," dated September 30, 2014 (ML14275A239)
 5. Letter from TVA to NRC, "Tennessee Valley Authority - Hydrologic Engineering Center River Analysis System (HEC-RAS) Project Milestones," dated June 22, 2016 (ML16175A518)
 6. Letter from TVA to NRC, "Thirteenth Progress Update on Improved Flood Mitigation System Project," dated June 30, 2016 (ML16182A531)

By letters dated April 16, 2013, and July 1, 2013, Tennessee Valley Authority (TVA) committed to install improved flood mode mitigation systems (FMMS) at the Sequoyah Nuclear Plant (SQN), Units 1 and 2, and the Watts Bar Nuclear Plant (WBN), Units 1 and 2 (Reference 1 and 2). By letter dated July 1, 2013, the Nuclear Regulatory Commission (NRC) acknowledged the commitment (Reference 3). In Reference 3, the NRC requested TVA to notify it in writing of a modified schedule in advance of the change if the actions cannot be completed within the specified schedule for any reason. By letter dated September 30, 2014, as the FMMS design alternatives were established, TVA notified the NRC of changes to the implementation milestones that did not impact the specified completion milestone (Reference 4). The purpose of this letter is to notify the NRC of a change in the specified completion schedule.

At the time of the commitment, significant activity was underway to examine anticipated flood levels at SQN and WBN under extreme conditions. Revisions to the current licensing basis (CLB) for probable maximum flood conditions had been submitted to the NRC for review for both SQN and WBN. The CLB revision under review at that time had relatively small margins for protection of key safety functions at the plants. Separately, beyond-design-basis (BDB) flood hazard reevaluations were underway for SQN and WBN in response to the March 12, 2013, NRC Request for Information 10 CFR 50.54(f) letter. At that time, the analytic outcome of these reevaluations was uncertain and some potential for significant increases in reevaluated flood hazard levels existed. At the same time, TVA was designing and preparing to implement changes to the plants in response to NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (FLEX) to provide protection against BDB events. With regard to flood hazards, consistent with the FLEX guidance, TVA designed the FLEX systems to provide protection against the revised CLB floods then under review with margin.

Since July 2013, TVA has proceeded with FMMS design and procurement to complete the FMMS projects by December 2016 as described in quarterly progress updates submitted to the NRC. As provided in the Thirteenth Progress Update submitted June 30, 2016 (Reference 6), the final design packages have been issued for SQN and WBN. Long lead items for both SQN and WBN projects have been procured. Field implementation is currently scheduled to begin in July, 2016 for both the SQN and WBN FMMS Projects.

Since the FMMS commitment in July 2013, TVA has completed the 50.54(f) Flood Hazard Reevaluation Reports (FHRRs) for SQN and WBN. The reevaluated flood hazard was bounded by the design basis elevation at SQN and increased by 0.6 feet at WBN. The FHRRs were submitted to the NRC in March 2015. The FHRR is a BDB analysis that uses industry standard tools and conservative assumptions consistent with industry guidance. In September 2015, the NRC described its review of the FHRR for SQN and WBN and concluded the FHRR results were acceptable for performing an Integrated Assessment or a focused evaluation, as appropriate, to address the reevaluated flood hazards that exceed the current design basis.

In addition, in parallel with TVA's evaluation and NRC's reviews of the CLB and FHRR flood analyses, since July, 2013, TVA has completed extensive upgrades to flood control features on the Tennessee River and its tributaries upstream of SQN and WBN. Specifically, TVA has:

- Completed modifications to increase height of embankments to replace HESCO Barriers at Cherokee, Fort Loudoun (except for 1900 feet pending the completion of the Tennessee Department of Transportation Highway 321 bridge project), Tellico and Watts Bar Dams;
- Completed post-tensioning at Cherokee and Douglas Dams;
- Completed neck reinforcement at Fort Loudoun, Tellico and Watts Bar Dams;
- Completed modifications to Douglas Saddle Dam 1 Floodwall;
- Stabilized Douglas Saddle Dams 1, 3, 9 and 10;
- Increased the height of Douglas Saddle Dam 3; and,
- Reanalyzed all critical dams (18 dams) to TVA's River Operations Dam Safety criteria with updated geotechnical data.

These modifications represent significant enhancements to flood protection for SQN and WBN. In addition, they represent significant safety enhancements against floods for the people of the Tennessee Valley for whom flood protection is part of TVA's founding mission.

TVA has also completed FLEX Order implementation at SQN and WBN. The FLEX systems design will be reviewed against the FHRR in accordance with Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 1, Appendix G, "Mitigating Strategies Assessment for New Flood Hazard Information," guidelines. The Mitigating Strategies Assessment will be submitted by the end of 2016.

In addition to the projects to improve dams upstream of SQN and WBN, TVA is performing further analyses of the precipitation models used as part of inputs to the hydraulic models that form the basis of CLB and BDB flood analyses. These precipitation models are updates to Hydrometeorological Reports 41, "Probable Maximum and TVA Precipitation over the Tennessee River Basin above Chattanooga," and 56, "Probable Maximum and TVA Precipitation Estimates With Areal Distribution for Tennessee River Drainages Less than 3,000 Mi² in Area," and represent an upgrade of this portion of the flood models. The precipitation inputs used in the CLB and the FHRR were taken from data sets compiled in the 1960s. The updated precipitation models will include updated data (storm and dew point), meteorological science, technology, weather radar, Geographic Information System (GIS) tools, and treatment of topography. The updated precipitation modeling is consistent with approaches used by numerous other licensees as part of their FHRR interactions with NRC (e.g., Quad Cities (ML13081A039)).

TVA's project to upgrade precipitation models and rerun hydraulic models is expected to conclude in late 2017. Very preliminary results indicate that precipitation volumes/inputs may decrease approximately 25 to 30 percent over CLB and FHRR values. While it is necessary to rerun hydraulic models to conclusively establish resulting changes in flood levels at the SQN and WBN sites, TVA currently has reason to expect potentially significant decreases in analyzed flood levels at both sites. Key milestones associated with this project were provided to NRC by letter dated June 22, 2016 (Reference 5).


Consequently, TVA has determined that it is prudent to reschedule the field implementation of the FMMS at SQN and WBN. As noted above, equipment has been procured and is currently available for installation. However, TVA has concluded it is prudent to defer the field implementation of FMMS until completion of the revised precipitation modeling. This will allow TVA to determine with finality what appropriate margin, if any, should be designed into additional flood mitigating systems at SQN and WBN. With the reevaluated flood levels at SQN and WBN using updated precipitation data expected to be determined by August 2017, TVA will use the updated precipitation data to rerun hydraulic models and determine flood levels with a completion expectation in late 2017. TVA will subsequently update its licensing basis for both SQN and WBN with the analyzed flood levels. Therefore, TVA is revising the Commitment 1 due date (Enclosure 2 of Reference 2, as updated in Reference 4) to implement an FMMS at SQN, Units 1 and 2, and WBN, Units 1 and 2, from December 31, 2016, to September 30, 2018.

TVA is superseding Commitment 2 (Enclosure 2 of Reference 1) that provided quarterly periodic written updates regarding the progress of the FMMS project with the commitment made in Enclosure 2 of Reference 5 to submit status updates on the HEC-RAS project deliverable submittal milestones on a six-month frequency. Additionally, TVA will provide a written update regarding the reevaluated SQN and WBN flood levels using updated precipitation data by October 1, 2017.

The enclosure to this letter provides the one revised commitment and one new regulatory commitment contained in this letter. If additional information is needed regarding this update, please contact Russell Thompson at (423) 751-2567.

Respectfully,
**Joseph W.
Shea**

J. W. Shea
Vice President, Nuclear Licensing

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Enclosure

cc: See page 5

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Enclosure:

List of Commitments

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Sequoyah Nuclear Plant
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRR Director - NRC Headquarters
NRR Project Manager - Sequoyah Nuclear Plant
NRR Project Manager - Watts Bar Nuclear Plant

ENCLOSURE

LIST OF COMMITMENTS

1. TVA will implement an improved flood mode mitigation system at SQN, Units 1 and 2, and WBN, Units 1 and 2, by September 30, 2018.
2. TVA will provide a written update regarding the reevaluated SQN and WBN flood levels using updated precipitation data by October 1, 2017.