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

CNL-14-050

March 31, 2014

10 CFR 50.54(f)

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

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

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Watts Bar Nuclear Plant, Unit 2
Construction Permit No. CPPR-92
NRC Docket No. 50-391

Subject: **Fourth Quarterly Status Report to the Flooding Hazard Reevaluation Report Extension Request**

References:

1. Letter from TVA to NRC, "Tennessee Valley Authority (TVA) - Extension Request Regarding the Flooding Hazard Reevaluation Report Required by NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1, Flooding, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2013 (ML13080A073)

2. Letter from TVA to NRC, "Revised Commitments for the Extension Request Regarding the Flooding Hazard Reevaluation Report Required by NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 2.1, Flooding, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated May 9, 2013 (ML13133A004)

3. Letter from NRC to TVA, "Sequoyah Nuclear Plant, Units 1 and 2, and Watts Bar Nuclear Plant, Units 1 and 2 - Relaxation of Response Due Dates Regarding Flooding Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of the Insights from the Fukushima Dai-ichi Accident," dated July 1, 2013 (ML13163A296)

4. Letter from TVA to NRC, "First Quarterly Status Report to the Flooding Hazard Reevaluation Report Extension Request Including Technical Pager Regarding Methodology for Multiple Dam Failures Due to Seismic Events," dated July 19, 2013 (ML13206A003)

5. Letter from TVA to NRC, "Second Quarterly Status Report to the Flooding Hazard Reevaluation Report Extension Request and Response to the Request for Additional Information Related to the Review of Potential Breaches of HESCO Flood Barriers and Earthen Embankments Affecting the Updated Hydro Analysis Results," dated September 30, 2013 (ML13276A048)

6. Letter from TVA to NRC, "Third Quarterly Status Report to the Flooding Hazard Reevaluation Report Extension Request," dated December 31, 2013 (ML14003A146)

By letter dated March 12, 2013, Tennessee Valley Authority (TVA) requested an extension to the schedule for submitting the Flooding Hazard Reevaluation Reports (HRRs) for the Sequoyah Nuclear Power Plant (SQN), Units 1 and 2, and the Watts Bar Nuclear Plant (WBN), Units 1 and 2 (Reference 1). After meeting with the Nuclear Regulatory Commission (NRC) on April 29, 2013, TVA committed in a follow-up letter dated May 9, 2013 (Reference 2) to provide the SQN and WBN Flooding HRRs to the NRC by March 12, 2015. The NRC approved the extension request in a July 1, 2013, letter to TVA (Reference 3).

TVA also committed in Reference 2 to provide periodic quarterly status reports of completed actions and progress to completing the HRRs to the SQN and WBN NRC Project Managers starting in June 2013. TVA provided the first quarterly update in a meeting with the NRC on June 27, 2013, and submitted the written update on July 19, 2013 (Reference 4). TVA provided the second quarterly update on September 30, 2013 (Reference 5) and the third quarterly update on December 31, 2013 (Reference 6).

The purpose of this letter is to submit the fourth quarterly status report regarding the status of completed actions and progress to completing the HRRs. Progress continues on track to complete the HRRs as scheduled to meet the requested March 12, 2015, completion date. Enclosure 1 of this letter provides details to the status of tasks required for completion of the HRRs.

TVA will provide the fifth quarterly update regarding the status of completed actions and progress to completing the SQN and WBN HRRs by June 30, 2014, consistent with Commitment 1 in the Enclosure of TVA's letter to NRC dated May 9, 2013 (Reference 2).

There are no new regulatory commitments contained in this letter.

If you have questions regarding this matter, please contact Kevin Casey at (423) 751-8523.

Respectfully,

for

J. W. Shea
Vice President, Nuclear Licensing

Enclosure:

4th Quarterly Update for NTTF Recommendation 2.1, Flooding Hazard Reevaluation Report (HRR) Extension Request, March 21, 2014

cc (w/Enclosure):

NRC Regional Administrator - Region II
NRR Director - NRC Headquarters
NRC Senior Resident Inspector - Sequoyah Nuclear Plant
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRR Project Manager - Sequoyah Nuclear Plant
NRR Project Manager - Watts Bar Nuclear Plant, Unit 1
NRR Project Manager - Watts Bar Nuclear Plant, Unit 2

**ENCLOSURE**

**4th QUARTERLY UPDATE FOR NTTF RECOMMENDATION 2.1,
FLOODING HAZARD REEVALUATION REPORT (HRR) EXTENSION REQUEST,
MARCH 21, 2014**

This update provides the status of the main tasks for completing the Flooding Hazard Reevaluation Reports (HRRs) outlined in the 1st quarterly update (Reference 3 of the cover letter). These main tasks are listed in Table 1 of this enclosure. As noted in the scheduled finish column, Tasks 4b, Sunny Day Dam Failure – Tributary Dams, is in progress and is currently scheduled to finish as indicated in Table 1. Tasks 6, Evaluate Stability of 18 dams under Probable Maximum Flood (PMF) conditions, and 9, Evaluate seismic stability of 18 dams, are complete as indicated in Table 1. Information from Tasks 6 and 9 will be used as input to Tasks 7, Perform PMF simulations using results of stability analysis, and 10, Perform simulations using results of seismic stability analysis.

As presented in the 1st quarterly update, sub-tasks to Task 6 and Task 9 were outlined in Flowcharts 1 and 2. As indicated in Table 2, laboratory testing was completed for the last 2 of 18 dams during this quarter. Tasks 6 and 9, PMF and Seismic Stability Analysis, for each of the 18 dams are also complete as shown in Table 2 and as previously discussed.

In the 1st quarterly update, TVA provided a technical paper regarding a methodology for evaluating multiple dam failures due to seismic events (Enclosure 2 of Reference 3 of the cover letter). TVA communicated it would utilize this methodology for evaluation of multiple dam failures due to a single seismic event in lieu of the methodology presented in Section 5.5 of the interim staff guidance, JLD-ISG-2013-01, “Guidance for Assessment of Flooding Hazards Due to Dam Failure.” However, due to scheduling concerns with meeting the March 12, 2015 HRR completion date, TVA will change methodologies and utilize the methodology presented in Section 5.5 of the interim staff guidance, JLD-ISG-2013-01, “Guidance for Assessment of Flooding Hazards Due to Dam Failure.” If an Integrated Assessment is required, TVA will continue to utilize the alternative methodology for evaluating site flooding from multiple dam failures due to seismic events as discussed in the 1st quarterly update.

Overall, progress continues to complete the HRRs as scheduled to meet the requested March 12, 2015, completion date.

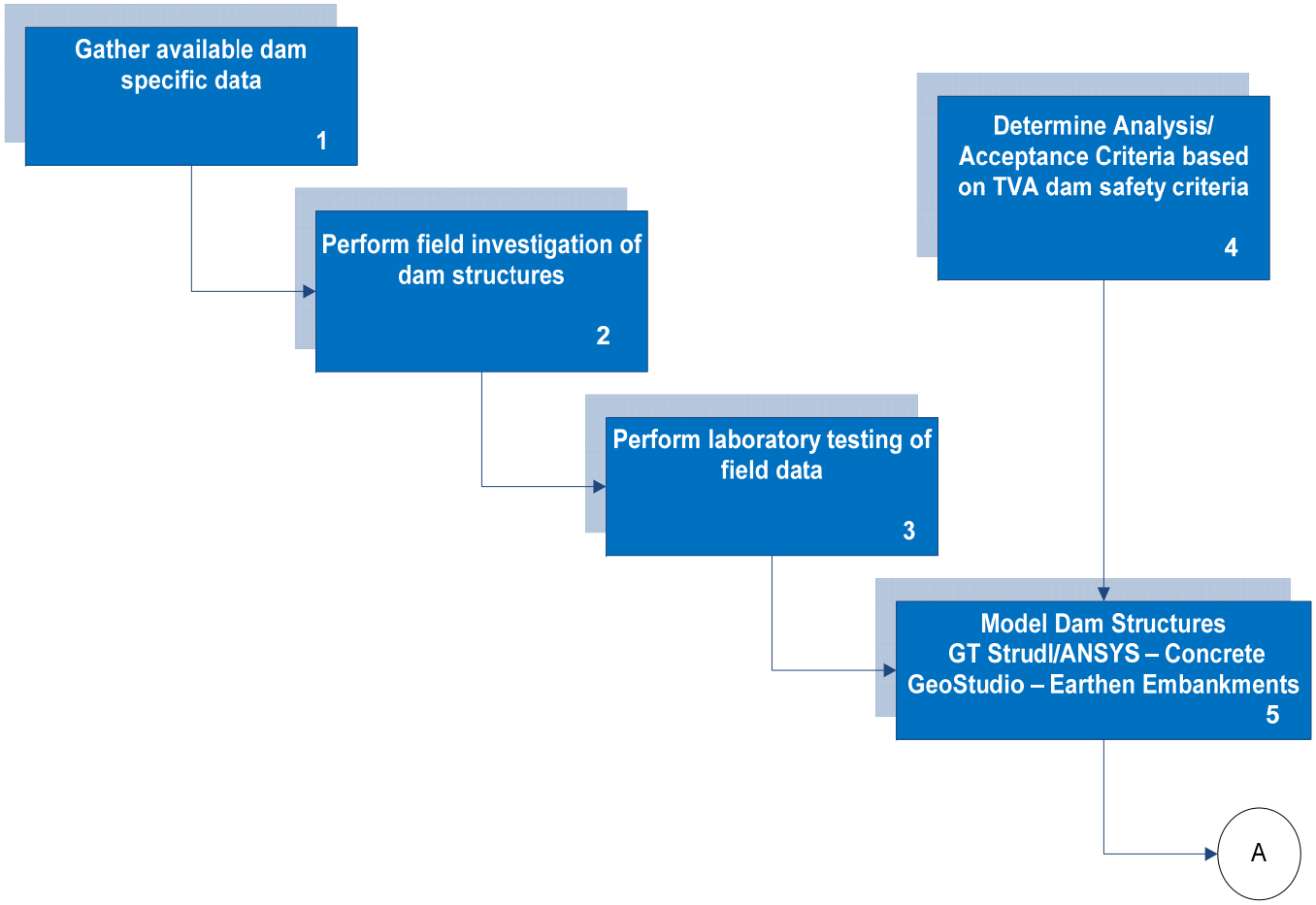
**TABLE 1**
**MAIN TASK STATUS UPDATE - MARCH 21, 2014 (updates shown in bold type)**

| | TASK | START | FINISH | STATUS |
|---|---|---|---|---|
| 1a | Main River Modeling Code Migration (SOCH to HEC-RAS) | | Nov 2012 | Complete |
| 1b | Tributary River Modeling Code Migration (SOCH to HEC-RAS) | | Nov 2013 | Complete |
| 2 | Confirm critical storm PMP selection | | Jan 2013 | Complete |
| 3 | Perform local intense precipitation analysis for SQN/WBN | | May 2013 | Complete |
| 4a | Sunny Day Dam Failure – WBH – east embankment failure | | Feb 2013 | Complete |
| 4b | Sunny Day Dam Failure - Tributary Dams | March 2013 | Nov 2014 | In-progress |
| 5 | Perform PMF simulations - 2 storms - all dams stable | Feb 2013 | March 2013* | In-progress* |
| 6 | Evaluate Stability of 18 dams under PMF conditions | | **March 2014** | **Complete** |
| 7 | Perform PMF simulations using results of stability analysis | April 2014 | Dec 2014 | **Started** |
| 8 | Develop dam specific seismic hazards | | April 2013 | Complete |
| 9 | Evaluate seismic stability of 18 dams | | **March 2014** | **Complete** |
| 10 | Perform simulations using results of seismic stability analysis | April 2014 | Dec 2014 | Not Started |
| 11 | Perform simulations to quantify uncertainties | June 2014 | Dec 2014 | Not Started |
| 12 | Prepare HRRs with results and interim actions, as required | Jan 2015 | March 2015 | Not Started |
| | * Task completed but indicated as in-progress to allow for revisiting the breach modeling techniques in light of the dam stability ISG. | | | |

**FLOWCHART 1**

**PMF AND SEISMIC STABILITY ANALYSIS FLOWCHART**

(Note - Blocks 1 - 5 are sub-tasks to Tasks 6 & 9 on next page)
(Note - See Table 2 for status of blocks 2 - 4 for each individual dam)



## FLOWCHART 2

## PMF AND SEISMIC STABILITY ANALYSIS FLOWCHART

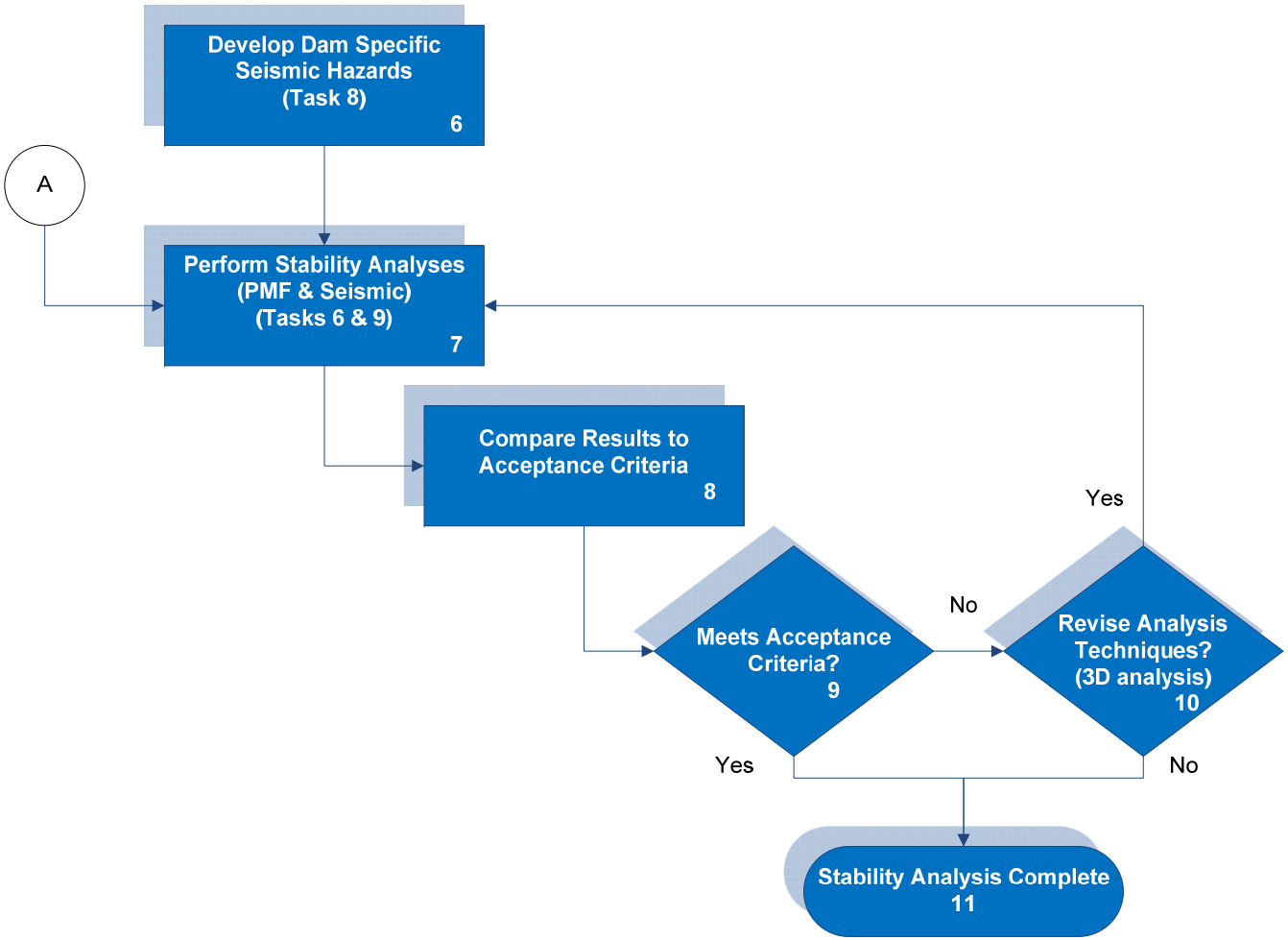


**TABLE 2**
**PMF AND SESIMIC STABILITY ANALYSIS STATUS BY DAM**
(updates as of 03/21/2014 noted in bold text)

| | Dam Project | Field Investigation (Borings) (# complete/total # borings) Block 2 | Laboratory Testing (ETC - estimate to completion) Block 3 | Develop Dam Specific Hazards Block 6 | PMF and Seismic Stability Analysis (scheduled completion) Block 7 |
|---|---|---|---|---|---|
| 1 | Apalachia | Complete 10/10 | Complete | Complete | **Complete** |
| 2 | Blue Ridge | Complete - 0/0 | N/A | Complete | **Complete** |
| 3 | Boone | Complete - 15/15 | Complete | Complete | **Complete** |
| 4 | Chatuge | Complete - 51/51 | Complete | Complete | **Complete** |
| 5 | Cherokee | Complete - 41/41 | Complete | Complete | **Complete** |
| 6 | Chickamauga | Complete 52/52 | Complete | Complete | **Complete** |
| 7 | Douglas | Complete - 75/75 | Complete | Complete | **Complete** |
| 8 | Fontana | Complete - 6/6 | Complete | Complete | **Complete** |
| 9 | Fort Loudoun | Complete - 57/57 | Complete | Complete | **Complete** |
| 10 | Fort Patrick Henry | Complete - 6/6 | **Complete** | Complete | **Complete** |
| 11 | Hiwassee | Complete - 4/4 | Complete | Complete | **Complete** |
| 12 | Melton Hill | Complete - 7/7 | **Complete** | Complete | **Complete** |
| 13 | Norris | Complete - 20/20 | Complete | Complete | **Complete** |
| 14 | Nottely | Complete - 48/48 | Complete | Complete | **Complete** |
| 15 | South Holston | Complete - 40/40 | Complete | Complete | **Complete** |
| 16 | Tellico | Complete - 53/53 | Complete | Complete | **Complete** |
| 17 | Watauga | Complete - 24/24 | Complete | Complete | **Complete** |
| 18 | Watts Bar | Complete - 60/60 | Complete | Complete | **Complete** |