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January 14, 2011

10 CFR 50.4

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

Browns Ferry Nuclear Plant, Units 1, 2, and 3
NRC Docket Nos. 50-259, 50-260, and 50-296
Facility License Nos. DPR-33, DPR-52, and DPR-68

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

Watts Bar Nuclear Plant, Units 1 and 2
NRC Docket Nos. 50-390 and 50-391
Facility License No. NPF-90
Construction Permit No. CPPR-92

Bellefonte Nuclear Plant, Unit 1
NRC Docket No. 50-438
Construction Permit No. CPPR-122

Subject: **Responses to Hydrology Action Items**

Reference: NRC Meeting Summary, "Summary of July 7, 2010, Public Meeting with TVA Regarding Status of Hydrology Issues Including the Flooding Effects on the TVA Operating Nuclear Plants," dated August 26, 2010

The purpose of this letter is to respond to the action items resulting from the Tennessee Valley Authority (TVA)/NRC meeting on July 7, 2010 as documented in the referenced meeting summary regarding recently identified hydrology issues related to the Tennessee River and the effects on the TVA nuclear plants. The responses to the action items provide the latest information that TVA has regarding the respective issues.

Received at DCD on 5/15/12

D030
NRR

There are no new regulatory commitments included in this submittal. If you have any questions, please contact Rod Cook at (423) 751-2834.

Respectfully,

R. M. Krich

Enclosure:
Responses to Hydrology Action Items

cc: (Enclosure)

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant
NRC Senior Resident Inspector - Sequoyah Nuclear Plant
NRC Senior Resident Inspector - Watts Bar Nuclear Plant, Unit 1
NRC Senior Resident Inspector - Watts Bar Nuclear Plant, Unit 2

ENCLOSURE

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2
BELLEFONTE NUCLEAR PLANT, UNIT 1

RESPONSES TO HYDROLOGY ACTION ITEMS

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1. *Provide information regarding the ability of the temporary dam modifications to withstand debris and impact loading.*

   Response:

   HESCO Concertainers were used to temporarily modify the dams. Information regarding the ability of the HESCO Concertainer to withstand debris and impact loading is provided on the attached CD (Attachment 1).

2. *Determine if the Finite Element Analysis (FEA) schedule of 18 months can be improved.*

   Response:

   The schedule for performing the FEAs has been evaluated and, due to available resources and complexities of tasks, has been determined not to be able to be improved beyond the schedule as discussed below.

   Each of the four modified TVA dams (i.e., Cherokee, Fort Loudon, Tellico, and Watts Bar Dams) have been evaluated for structural adequacy. The only dams which require a more rigorous evaluation (in the form of an FEA) are the Cherokee and Douglas Dams. (It should be noted that Douglas Dam is a sister dam to Cherokee Dam, thus the rationale for its further evaluation.)

   The current TVA River Operations (RO) schedule shows that the Cherokee Dam FEA started in October 2010 and has an expected completion within 12-14 months. The Douglas Dam FEA is scheduled to start during the second half of Fiscal Year 2011 with an expected completion of 13-17 months. As noted above, the Douglas Dam is similar to Cherokee Dam and portions of the FEA model used for Cherokee Dam may be used for Douglas Dam, and could reduce the time required to complete the FEA for Douglas Dam.

3. *Provide the schedule for completing the analyses and modifications at the operating nuclear plants, and also include Bellefonte Nuclear Plant.*

   Response:

   A Schedule for Current and Long Term Hydrology Related Tasks and Projects (schedule subject to change) is provided in Attachment 2 attached.

4. *Provide the fall back plans if the FEA produces unfavorable results such as higher probable maximum flood elevation.*

   Response:

   If the FEA produces unfavorable results, then TVA will take the necessary steps to strengthen the dams to eliminate the potential for failure.

RO's corrective action plan includes design of modifications and planning for implementation as needed for any FEA results which require such action.

5. *What is the impact on the operating plants during final dam embankment modifications (i.e., for the period when the temporary modifications are being replaced by permanent modifications)?*

   Response:

   Permanent modifications are in the conceptual design phase; therefore, the transition from temporary modifications to permanent modifications has not yet been formally planned. Transition plans will be written and the impacts to the operating plants' design bases will be considered to ensure the design bases are maintained as part of the modification process. In some cases, the "temporary modifications" may be the final corrective action and no further impact would be realized.

6. *What is the effect of any reasonable delay in River Operations' notifications to the sites on the margins for actions at the plant sites? This includes Watts Bar Nuclear Plant, Unit 2 [WBN, Unit 2].*

   Response:

   There is no reasonable time delay that would exceed the notification time postulated in our analysis.

   The impact for WBN, Unit 2 would be the same as WBN, Unit 1. The minimum notification time from the original analysis has been shown to be 27 hours. This time is based on the combined effects of dam failure plus flood (load cases are: Operating Basis Earthquake + 1/2 Probable Maximum Flood; for WBN, this considers the failure of the Fontana Dam; for Sequoyah Nuclear Plant (SQN), this considers the failure of Fontana, Hiwassee, Blue Ridge, and Appalachia Dams). The remaining dam failure plus flood combinations have a longer time for the flood wave to reach the WBN and SQN plant grades and, therefore, give additional margin to the notification time. Due to the large distance between the tributary dams and the Browns Ferry Nuclear Plant (BFN) site, the seismic failures of the multiple tributary dams combined with flood do not exceed site grade at BFN. For the Probable Maximum Flood event, the notification time for all TVA plants is greater giving even more margin.

   It is further important to note that River Operations/River Scheduling is manned 24 hours a day, 7 days a week and that during periods of heavy rainfall, TVA RO staffs the Emergency Center.

   The updated analysis has validated the warning times of 27 hours originally determined for WBN and will validate the warning times for SQN per the schedule shown in Attachment 2. As cited above, the BFN site grade is not exceeded by the seismic failures of the upstream dams combined with flood; therefore, further validation of the warning times for BFN is not needed.

7. *What is the schedule for returning the operating plants to conformance with their respective Updated Final Safety Analysis Reports. This includes any effects from changes to the Chickamauga locks.*

   Response:

   TVA has preliminarily concluded that the methodology used to evaluate the effects of certain seismic dam failures represents a change to methodologies described in the WBN, SQN and (as required) BFN respective UFSARs. If the preliminary conclusion is sustained, NRC approval would be required. TVA will seek this approval by submitting a license amendment request for WBN, SQN, and BFN (as necessary). TVA plans to submit license amendment requests for each of the sites consistent with the schedule provided in Attachment 2. With regard to plan modifications required to respond to the results of the new analyses, Attachment 2 depicts a high level schedule for modifications at both sites.

   With respect to modifications to the Chickamauga Dam Lock, those modifications presently have no Federal funding and, therefore, schedule delays are expected to extend beyond the current schedule. However, the modifications needed at the nuclear sites will be incorporated into the business plan and will be implemented prior to the loss of the existing Chickamauga Dam spillways.

8. *Check the Sequoyah Nuclear Plant, Units 1 and 2 (SQN) licensee event report (LER) to confirm that a supplement was committed to; submit an updated SQN LER as appropriate.*

   Response:

   The Supplement specified in the original LER was submitted on April 14, 2010. No further supplements are planned.

Attachments:

1. HESCO Concertainer Info CD
2. Current and Long Term Hydrology Related Tasks and Projects

ATTACHMENT 2
SCHEDULE FOR CURRENT AND LONG TERM HYDROLOGY RELATED TASKS AND PROJECTS

Item	Start Date	Finish Date[1]	Comments
BLN 3/4 RAIs	01/03/2011	07/01/2011	See Note 2
WBN U2 Seismic + Flood Analysis	06/30/2010	01/18/2011	
WBN PMF Equipment Study	01/31/2011	03/18/2011	
WBN License Amendment Request (if necessary)	04/01/2011	04/11/2011	
WBN Short Term Mods	10/03/2011	09/28/2012	
WBN RAIs	01/18/2011	03/25/2011	
SQN Seismic + Flood Analysis	01/30/2011	09/30/2011	
SQN PMF Equipment Study	Complete	Complete	
SQN Short Term Mods	10/03/2011	09/28/2012	
SQN LODD Analysis (warning time validation)	01/14/2011	09/14/2011	
SQN License Amendment Request (if necessary)	11/04/2011	11/15/2011	
BFN PMF Analysis	01/30/2011	01/30/2012	
BFN License Amendment Request/FSAR Change Request (if necessary)	03/05/2012	03/16/2012	
All Degraded/Nonconforming Issues Closed	09/28/2012	09/28/2012	
Future Chick. Dam Lock Configuration: Planning and Estimating	10/03/2011	06/01/2012	Lock Project not funded for completion
FY12 Budget Input	05/02/2011	05/02/2011	
Future Chick. Dam Lock Analysis	10/03/2011	06/01/2012	Lock Project not funded for completion
Future Chick. Dam Lock Driven Site Mods	10/01/2012	9/27/2013	Lock Project not funded for completion
Loss of Chick. Dam Spillways	10/17/2014	10/17/2014	Lock Project not funded for completion

Note 1 - All dates are subject to change
Note 2 - These dates are shown because answering RAIs may cause schedule slip on other line items due to limited resources.

LODD = Loss of Decision Date