



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

CNL-14-133

August 28, 2014

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

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

Subject: **Third Six-Month Status Report in Response to the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) for Sequoyah Nuclear Plant (TAC Nos. MF0864 and MF0865)**

- References:
1. Letter from TVA to NRC, "Tennessee Valley Authority (TVA) - Overall Integrated Plan in Response to the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) for Sequoyah Nuclear Plant," dated February 28, 2013 (ML13063A183)
 2. Letter from TVA to NRC, "First Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) for Sequoyah Nuclear Plant," dated August 28, 2013 (ML13247A286)
 3. Letter from NRC to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 - Interim Staff Evaluation Relating to Overall Intergraded Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF0864 and MF0865)," dated February 19, 2014 (ML14002A109)

4. Letter from TVA to NRC, "Second Six-Month Status Report and Revised Overall Integrated Plan in Response to the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order-EA-12-049) for Sequoyah Nuclear Plant," dated February 28, 2014

On February 28, 2013, the Tennessee Valley Authority (TVA) submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order modifying licenses with regards to requirements for mitigation strategies for beyond-design-basis external events, Order number EA-12-049, for the Sequoyah Nuclear Plant (SQN), Units 1 and 2 (Reference 1). On August 28, 2013, TVA provided the first six-month status report to the OIP (Reference 2).

The OIP submitted in Reference 1 employed a strategy using reactor coolant pump (RCP) low leakage seals. TVA revised its strategy to use the existing conventional RCP seals. This change in RCP seals required a revision to the OIP submitted by Reference 1. Based on a review of TVA's plan, including the first six-month update, and information obtained through the mitigation strategies audit process, the NRC concluded in its Interim Staff Evaluation that the plan, when properly implemented, will meet the requirements of Order EA-12-049 at SQN, Units 1 and 2 (Reference 3). The Interim Staff Evaluation included open item 3.2.1.6.A. This open item required revision to the Sequence of Events due to use of the conventional RCP seals for reanalysis by the NRC. On February 28, 2014, TVA provided the second six-month status report and revised OIP (Reference 4) which included the required revision to the Sequence of Events due to use of the conventional RCP seals.

In addition, Reference 4 noted that TVA was evaluating potential changes to the capacity and storage locations of the current 3 MW FLEX diesel generators (DGs) as well as use of the current auxiliary feedwater supply tank. It was also noted that any changes to the SQN mitigation strategies resulting from this review would be provided to the NRC in the third six-month status report.

The purpose of this letter is to provide the third six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1, including the resulting changes to storage locations of the current 3 MW FLEX DGs and use of the current auxiliary feedwater supply tank. Specifically, the Enclosure of this letter provides third six-month status report. This status report incorporates the following changes from the revised OIP:

- Storage locations for the current 3 MW FLEX DGs has changed from the FLEX Equipment Storage Building (FESB) to the existing Additional Diesel Generator Building (ADGB); and,
- The site location for the FESB has been changed.

There is no change to the capacity of the 3 MW DGs. Use of the auxiliary feedwater supply tank (AFWST) remains under evaluation. An option is being reevaluated to qualify the existing Condensate Storage Tank as a primary water source in lieu of the AFWST. Any changes to the SQN mitigation strategies resulting from this reevaluation will be provided to the NRC in the fourth six-month status update.

In addition to the changes described previously, the Open Items table in the Enclosure has been updated. Open Items 1 and 2 have been re-opened as indicated in the Enclosure. Open Items 4 and 11 are closed and the date for Open Item 7 has been revised. The milestone target completion dates have also been updated as shown in the Enclosure.

There are no new regulatory commitments in this letter. If you have any questions regarding this report, please contact Kevin Casey at (423) 751-8523.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of August 2014.

Respectfully,

J. W. Shea

Digitally signed by J. W. Shea
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J. W. Shea
Vice President, Nuclear Licensing

Enclosure:

Tennessee Valley Authority Sequoyah Nuclear Plant's Third Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigations strategies for Beyond-Design-Basis External Events

cc (Enclosure):

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

ENCLOSURE

**TENNESSEE VALLEY AUTHORITY SEQUOYAH NUCLEAR PLANT
THIRD SIX-MONTH STATUS REPORT FOR THE IMPLEMENTATION OF ORDER EA-12-049,
ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION
STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS**

ENCLOSURE

TENNESSEE VALLEY AUTHORITY SEQUOYAH NUCLEAR PLANT THIRDSIX MONTH STATUS REPORT FOR THE IMPLEMENTATION OF ORDER EA-12-049, ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS

Introduction

Tennessee Valley Authority (TVA) developed an Overall Integrated Plan (OIP) (Reference 1 in Reference section of this enclosure), for Sequoyah Nuclear Plant (SQN), Units 1 and 2, documenting the diverse and flexible strategies (FLEX), in response to Reference 2. TVA provided the first 6-month status report on August 28, 2013 (Reference 3) and a revised OIP on February 28, 2014 (Reference 4). This attachment provides an update of milestone accomplishments since submittal of the revised OIP (Reference 4), including any changes to the compliance method or schedule.

Milestone Accomplishments

The following milestone(s) have been completed since submittal of the revised OIP (Reference 4), and are current as of July 31, 2014.

None

Milestone Schedule

The following provides an update to Attachment 2 of the OIP. The activity status of each item is provided, as well as any change to the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Activity	Target Completion Date	Activity Status	Revised Target Completion Date
Submit Overall Integrated Plan	Feb 2013	Complete	
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete	
Update 2	Feb 2014	Complete	
Update 3	Aug 2014	Complete	
Update 4	Feb 2015	Not Started	
Update 5	Aug 2015	Not Started	
Update 6	Feb 2016	Not Started	
Update 7	Aug 2016	Not Started	
FLEX Strategy Evaluation	Jun 2013	Complete	
Walk-throughs or Demonstration	May 2015	Not Started	
Perform Staffing Analysis	Jun 2014	Not Started	Dec 2014
Modifications:			
Modifications Evaluation	Oct 2013	Complete	
Unit 1 N-1 Walkdown	Oct 2013	Complete	
Unit 1 Design Engineering	Nov 2014	Started	
Unit 1 Implementation Outage	May 2015	Not Started	
Unit 2 N-1 Walkdown	Apr 2014	Complete	
Unit 2 Design Engineering	Nov 2014	Started	
Unit 2 Implementation Outage	Dec 2015	Not Started	
Storage:			
Storage Design Engineering	Jul 2014	Started	Oct 2014
Storage Implementation	Jul 2015	Not Started	May 2015
FLEX Equipment:			
Procure On-Site Equipment	Jan 2015	Started	
Develop Strategies with RRC	Dec 2013	Complete	
Install Off-Site Delivery Station	Apr 2014	Started	Mar 2015
Procedures:			
PWROG issues FSG guidelines	Jun 2013	Complete	
Create Site Specific FSIs	Jun 2014	Started	Nov 2014
Create Maintenance Procedures	Jun 2014	Started	Nov 2014
Training:			
Develop Training Plan	Jun 2014	Started	Nov 2014
Implement Training	Dec 2015	Not Started	May 2015
Unit 1 FLEX Implementation	May 2015	Not Started	
Unit 2 FLEX Implementation	Dec 2015	Not Started	
Full Site FLEX Implementation	Dec 2015	Not Started	
Submit Completion Report	Jan 2016	Not Started	

Changes to Compliance Method

The following is a list of changes made to the information provided in the February 28, 2014, revised OIP (Reference 4). These changes meet the NEI 12-06 compliance method.

- The storage locations for the current 3 MW FLEX diesel generators (DGs) has changed from the FLEX Equipment Storage Building (FESB) to the existing Additional Diesel Generator Building (ADGB). The location of the ADGB is provided on Sketch 1, page 9. Relocation of the 3 MW DGs has no impact to the 3 MW DGs' electrical connections from the previous revised OIP; however, relocation will allow only one 3 MW DG to be in operation at a time due to ventilation restrictions of the ADGB.
- The site location for the FESB has been changed. The FESB will now be located on the west side of the SQN site. See Sketch 1, page 9. Sketch 1 also provides the revised FLEX equipment haul paths as noted.

Need for Relief/Relaxation and Basis for the Relief/Relaxation

TVA is evaluating the potential schedule changes to the first unit's implementing refueling outage resulting from the changes to the compliance methods as described above and the potential use of the existing Condensate Storage Tank as a primary water source to determine if relief/relaxation is needed. Currently, TVA expects to comply with the order implementation date and no relief/relaxation is required at this time.

Open Items from Overall Integrated Plan and NRC Evaluation

The following tables provide a summary of the open items documented in the OIP or the NRC Evaluation and the status of each item.

Open Item Number	Description	Status
1	The current Condensate Storage Tank (CST) is a non-seismic tank that is not missile protected. The site is currently pursuing two options; the qualification and hardening of the existing CST or the construction of a new seismically qualified and missile protected CST. One of these options must be completed before the volume of the CST can be credited.	Re-Opened An evaluation is underway to determine qualification and hardening of the existing CST is achievable.
2	Liquefaction of haul routes for FLEX will be analyzed.	Re-Opened Analysis required on new haul routes due to relocation of the FESB.

Open Item Number	Description	Status
3	No detailed analysis has been provided regarding initial FLEX fuel supplies to determine a need time for access to 7 day tank supplies or resupply of the 7 day tanks. It is assumed that each FLEX component is stored with a minimum supply of 8 hours of fuel at constant operation. This assumption will need to be assessed once all FLEX equipment has been purchased and equipment specifications are known.	Closed Fuel consumption spreadsheet completed to show that fuel supply of equipment will last seven days.
4	No need time has been identified for action to protect containment. This includes actions to mitigate pressurization of containment due to steaming when reactor coolant system (RCS) vent paths have been established or actions to mitigate temperature effects associated with equipment survivability. An evaluation will be provided to prove indefinite containment coping.	Closed Reference Westinghouse Calculation LTR-ISENG-14-2, Rev 0, for the MAAP Analysis
5	The Phase 3 equipment staging area has not been determined.	Closed Areas are identified and will be included with the Regional Response Center (RRC) playbook.
6	A strategy for clearing and removing debris will be determined.	Closed Debris removal equipment is identified and storage determined
7	A thorough analysis of the makeup flow rate requirements and other equipment characteristics will be finalized during the detailed design phase of FLEX.	Started Calculation to be complete by fall of 2014
8	The need time for spent fuel pool (SFP) cooling actions (deployment of hose, venting, and alignment of makeup) was determined using worst case heat loads. This item will continue to be assessed and later action times may be acceptable. Note that the timing for this step during an outage is different, but resources will be available to complete the required actions.	Closed CN-CDME-13-24 Westinghouse Calculation
9	Functional requirements for each of the Phase 3 strategies, equipment and components will be completed at a later time and will be provided in the six month updates to the February 28, 2013 submittal.	Started

Open Item Number	Description	Status
10	Containment temperature instrumentation is only available until flood waters enter the technical support center (TSC) inverter or station battery rooms. A method to monitor containment temperature, postflood, will be developed.	Started
11	The heating, ventilation and air conditioning (HVAC) analysis is preliminary, and has not been finalized.	Closed Reference HVAC ELAP Analysis SL-012415, Rev 0
12	Verify ability to deploy FLEX equipment to provide core cooling in Modes 5 and 6 with steam generators (SGs) unavailable.	Closed Demonstration prior to implementation of the order and included as part of the FLEX strategy (Reference CN-SEE-II-13-26, Rev 0)
13	An evaluation of the impact of FLEX response actions on design basis flood mode preparations will be performed. This evaluation will include the potential for extended preparation time for FLEX. Changes which affect the Integrated Plan will be included in the six month update.	Open
14	Perform an alternate cooling source evaluation. The purpose of this analysis is to examine options to utilize alternate water sources to provide continuous sources of water to maintain key safety functions.	Closed FLEX strategies have both primary and secondary cooling sources identified.
15	Perform conceptual hydraulic performance analyses. The purpose of this analysis is to conservatively evaluate hydraulic performance of FLEX systems.	Open
16	Develop a mechanical conceptual design report. The purpose of this report is to summarize the mechanical conceptual design of the FLEX strategies and identify any required modifications.	Open
17	Develop a electrical conceptual design report. The purpose of this report is to summarize the electrical conceptual design of the FLEX strategies and identify any required modifications.	Open
18	Perform an RCS makeup analysis. The purpose of this analysis is to define FLEX RCS inventory and shutdown margin for Sequoyah.	Open
19	Perform an SFP evaluation. The purpose of this analysis is to evaluate the impact of sloshing and time-to-boil in the SFP after an earthquake.	Open

Open Item Number	Description	Status
20	Perform a timing and deployment evaluation. The purpose of this analysis is to summarize the FLEX timeline for Sequoyah, identify time constraints and provide for the safety function needs.	Open
21	Develop a programmatic control report. The purpose of this report is to summarize the need to implement programmatic control of the FLEX program.	Open
22	Evaluate the existing extreme hazard analysis and planned Near-Term Task Force (NTTF) Tier 1 activities on FLEX strategies to summarize on-going industry activities and the potential to impact the developed FLEX strategies.	Open
23	The time at which the Forebay volume depletes needs to be evaluated to determine the time at which replenishment is required. Based on Reference 10 there is 1,640,000 gallons available in the Forebay. Based on the alternate cooling source evaluation, approximately 640,000 gallons are required at 72 hours post ELAP. Therefore, it is expected the Forebay volume will supply suction to the TDAFWP for greater than 72 hours following the ELAP event and replenishment will be required during Phase 3.	Open
24	Further analysis will be performed to determine the required timeline for implementing the 6.9 KV FLEX DGs as an alternate power source for the loads supplied by the 480v FLEX DGs.	Open
25	Complete battery calculations to document Vital Battery life of 8 hours after loss of all AC. A battery calculation has been completed for WBN which is of similar design.	Open
26	The CETs are only available until water enters the auxiliary instrument room. A method to monitor CET, post flood, will be evaluated and developed, if required.	Closed CETs will not be required for flood event.
27	Strategies to address extreme cold conditions on the refueling water storage tank (RWST) and/or boric acid tanks (BATs), including potential need to reenergize heaters have not been finalized.	Closed Initial RWST Technical Specifications temperature requirements ensure that five hours is not challenged.
28	Establish a contract with the SAFER team in accordance with the requirements of Section 12 of Reference 2.	Closed Agreement with Regional Response Center (RRC) is in place

Potential NRC Evaluation Impacts

Use of the auxiliary feedwater supply tank is still under evaluation. An option is being reevaluated to qualify the existing Condensate Storage Tank (CST). Use of the existing qualified CST as a primary water source in the FLEX strategy, has the potential to impact the NRC evaluation.

References

The following references support the updates to the OIP described in this enclosure.

1. Letter from TVA to NRC, "Tennessee Valley Authority (TVA) - Overall Integrated Plan in Response to the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) for Sequoyah Nuclear Plant," dated February 28, 2013 (ML13063A183)
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. Letter from TVA to NRC, "First Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) for Sequoyah Nuclear Plant," dated August 28, 2013 (ML13247A286)
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Sketch 1
FLEX Building Locations, Haul Paths, and Pump Locations

