

**From:** Buckberg, Perry  
**Sent:** Tuesday, August 2, 2022 8:51 AM  
**To:** Taylor, Andrew Charles  
**Subject:** Request for Additional Information Related to SQN Request for Fire and Seismic PRA Modification to 50.69 L-2022-LLA-0033  
**Attachments:** SQN 50.69 Mods - APLC Final RAI 8-2-22 L-2022-LLA-0033.pdf

By letter dated February 24, 2022 (ADAMS Accession No. ML22055A625), the Tennessee Valley Authority (TVA) submitted a license amendment request for the Sequoyah Nuclear Plant, Units 1 and 2, for fire and seismic probabilistic risk assessment modifications to the previously approved 10 CFR 50.69 categorization process.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittal and has identified areas where additional information is needed to complete its review. A draft request for additional information (RAI) was previously transmitted to you by email dated July 27, 2022. In response TVA provide that a response can be issued within 45 days of this e-mail.

The NRC staff considers that timely responses to RAIs helps ensure sufficient time is available for staff review and contributes toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact Perry Buckberg at (301) 415-1383 or via email at [Perry.Buckberg@nrc.gov](mailto:Perry.Buckberg@nrc.gov).

Thanks,

**Perry Buckberg**

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PRA Modification to 50.69 L-2022-LLA-0033  
**Sent Date:** 8/2/2022 8:50:44 AM  
**Received Date:** 8/2/2022 8:50:00 AM  
**From:** Buckberg, Perry

**Created By:** Perry.Buckberg@nrc.gov

**Recipients:**  
"Taylor, Andrew Charles" <actaylor@tva.gov>  
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REQUEST FOR ADDITIONAL INFORMATION (RAI)  
LICENSE AMENDMENT REQUEST TO MODIFY THE APPROVED  
10 CFR 50.69 CATEGORIZATION PROCESS  
TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2  
DOCKET NUMBERS 50-327 AND 50-328

By letter dated February 24, 2022 (ADAMS Accession No. ML22055A625), Tennessee Valley Authority (TVA, the licensee), submitted a license amendment request (LAR) regarding Sequoyah Nuclear Plant (SQN). The proposed license amendment would modify the SQN operation license to permit the use of the peer reviewed plant-specific seismic PRA and fire PRA models into the previously approved 10 CFR 50.69 categorization process.

**RAI APLC-01 – Seismic Probabilistic Risk Assessment (SPRA) Upgrades during SPRA Fact and Observation (F&O) Closure Review**

The American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) PRA Standard ASME/ANS RA-Sa-2009, “Addenda to ASME/ANS RA-S-2008, Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications,” dated February 2009, defines PRA upgrade as the incorporation into a PRA model of a new methodology or significant changes in scope or capability that impact the significant accident sequences or the significant accident progression sequences. Section 1–5 of Part 1 of the ASME/ANS RA-Sa-2009 PRA Standard states that upgrades of a PRA shall receive a peer review in accordance with the requirements specified in the peer review section of each respective part of this standard.

In Section 3.1.3 of the Enclosure to the LAR, the licensee stated that four seismic hazards analysis (SHA) findings were assessed to be upgrades and were resolved as part of a focused scope review. However, in the same section later, the licensee stated that “No upgrades were required as a part of the F&O closure.” This sentence appears to contradict the previous statement. Although these findings were resolved, they were assessed to be upgrades as part of the F&O closure review process. It is noted that Section 5 of Enclosure 2 to the SQN TSTF-505 LAR (ADAMS Accession No. ML21217A174) contains a similar sentence “No additional upgrades were required as a part of the F&O closure review.”

Explain the sentence “[n]o upgrades were required as a part of the F&O closure” in the February 24, 2022, LAR and confirm whether the sentence in TSTF-505 LAR would be more appropriate. If there were additional upgrades, please discuss these upgrades and the results of related focused-scope peer review(s).

**RAI APLC-02 – Integral Assessment**

Paragraph (c)(1)(ii) of 10 CFR 50.69 requires that the SSC functional importance be determined using an integrated, systematic process. The categorization of SSCs, including those categorized using the SPRA, is based on importance measures and corresponding numerical criteria, as described in Section 5.1 of NEI 00-04. Section 5.6 of NEI 00-04, “Integral Assessment,” discusses the need for an integrated computation using available importance measures. Section 5.6 further states that the “integrated importance measure essentially weights the importance from each risk contributor (e.g., internal events, fire, seismic PRAs) by the fraction of the total core damage frequency [or large early release frequency] contributed by

that contributor.” The guidance provides formulas to compute the integrated Fussell-Vesely (FV) and integrated Risk Achievement Worth (RAW).

In Section 3.7.1 of the Enclosure to the LAR, the licensee stated that the importance evaluations performed in accordance with the process in NEI 00-04 are determined on a component basis and that most of the seismic and fire basic event importance measures can be directly aligned with components in the internal events (IE) PRA. The licensee provided the two exceptions: subcomponents and SSCs not in other PRA models.

Those seismic and/or fire basic events that are not explicitly modeled in the IE PRA, but function as subcomponents of components modeled in the IE PRA, will have their hazard specific importance measures combined with the other PRA importance measures. For those seismic and fire basic events that are not explicitly modeled in the IE PRA, an integrated safety significant computation is not necessary.

- a) Describe how subcomponents modeled in the IE PRA are identified to link with a basic event in the SPRA or fire PRA (FPRA) and provide an example to illustrate the process.
- b) Confirm that those seismic and fire basic events not explicitly modeled in the IE PRA will be directly reported to IDP if their importance measures are above the threshold based on NEI 00-04 guidance.

### **RAI APLC-03 – PRA Model Uncertainty Dispositions**

Paragraphs 50.69(c)(1)(i) and (c)(1)(ii) of 10 CFR require that a licensee’s PRA be of sufficient quality and level of detail to support the SSC categorization process, and that all aspects of the integrated, systematic process used to characterize SSC importance must reasonably reflect the current plant configuration and operating practices, and applicable plant and industry operational experience. The guidance in NEI 00-04 specifies sensitivity studies to be conducted for each PRA model to address uncertainty. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common-cause failure, and maintenance unavailability) do not mask importance of components. The guidance in NEI 00-04 states that additional “applicable sensitivity studies” from characterization of PRA adequacy should be considered.

In Section 3.6 of the Enclosure to the LAR, the licensee stated that none of the PRA uncertainties or assumptions from Appendix A were identified as potential key assumptions and sources of uncertainty for the 10 CFR 50.69 application. It is unclear to the NRC staff which Appendix A is being referred to because the LAR does not include an Appendix A.

Provide the list of the seismic PRA assumptions and uncertainties and their dispositions with the conclusion if there are key assumptions and sources of uncertainty for the 10 CFR 50.69 application. For any key assumptions and sources of uncertainty for this application, discuss how they will be considered in categorization consistent with the guidance in NEI 00-04.