From:	Wentzel, Michael
Sent:	Thursday, January 7, 2021 8:48 AM
To:	Orf, Tracy J
Subject:	Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Revision 1 of Audit Plan and Setup of Online Reference Portal (EPID L-2020-LLA-0162)
Attachments:	Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Revision 1 of Plan for Audit of Information in Support of LAR to Adopt 10 CFR 50.69 (L-2020-LLA-0162).pdf

Dear Mr. Orf:

By application dated July 17, 2020 (Agencywide Documents Access and Management System Accession No. ML20199M373); the Tennessee Valley Authority (TVA), submitted a license amendment request to allow for the voluntary adoption of the requirements of Title 10 of the *Code of Federal Regulations*, Section 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors," at Browns Ferry Nuclear Plant, Units 1, 2, and 3.

By email dated December 2, 2020 (Agencywide Documents Access and Management System Accession No. ML20337A439) the U.S. Nuclear Regulatory Commission (NRC) staff transmitted its plan for a regulatory audit using an online reference portal that allows the NRC staff limited, read-only access to review information provided by TVA to support its request. As discussed in the December 2, 2020, email, the regulatory audit could include interactions (e.g. teleconferences or webinars) to help understand the information made available on the online reference portal. Based on its review of the information provided on the portal, the NRC staff is issuing the attached Revision 1 of the audit plan to describe the interactions being requested by the staff.

If you have any questions, please contact me at (301) 415-6459 or michael.wentzel@nrc.gov.

Sincerely,

Michael J. Wentzel, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Hearing Identifier: NRR_DRMA
Email Number: 958

Mail Envelope Properties (MN2PR09MB586714224169AA5858485C49E7AF0)

Subject: Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Revision 1 of Audit Plan and Setup of Online Reference Portal (EPID L-2020-LLA-0162)
Sent Date: 1/7/2021 8:48:15 AM
Received Date: 1/7/2021 8:48:15 AM
From: Wentzel, Michael

Created By: Michael.Wentzel@nrc.gov

Recipients:
"Orf, Tracy J" <tjorf@tva.gov>
Tracking Status: None

Post Office: MN2PR09MB5867.namprd09.prod.outlook.com

Files	**Size**	**Date & Time**
MESSAGE	1537	1/7/2021 8:48:15 AM
Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Revision 1 of Plan for Audit of Information in Support of LAR to Adopt 10 CFR 50.69 (L-2020-LLA-0162).pdf	157282	

Options
Priority: Normal
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:

REVISION 1 OF AUDIT PLAN

REGARDING LICENSE AMENDMENT REQUEST TO

ADOPT THE REQUIREMENTS OF 10 CFR 50.69

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

DOCKET NOS. 50-259, 50-260, AND 50-296

EPID L-2020-LLA-0162

1.0 BACKGROUND

By application dated July 17, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20199M373), the Tennessee Valley Authority (TVA; the licensee) submitted a license amendment request (LAR) for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (Browns Ferry). The proposed amendments would allow for the voluntary adoption of the requirements of Title 10 of the *Code of Federal Regulations*, Section 50.69, ‘‘Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors.’’

The U.S. Nuclear Regulatory commission (NRC) staff has reviewed the licensee’s submittal and determined that a regulatory audit of the information identified in the Information Request section below would assist in the timely completion of the subject LAR review process. The NRC staff is continuing to review other aspects of the licensee’s submittal and may identify the need for additional audit subjects by separate correspondence.

2.0. REGULATORY AUDIT BASES

An audit was determined to be the most efficient approach toward a timely resolution of questions associated with this LAR review, because the NRC staff will have an opportunity to minimize the potential for RAIs and ensure no unnecessary burden will be imposed by requiring the licensee to address issues that are no longer necessary to make a safety determination. The NRC staff is requesting an initial set of internal licensee information to be audited by the staff using an online reference portal. Upon completion of this audit, the NRC staff is expected to achieve the following.

1. Confirm internal licensee information that supports statements made in the LAR.

2. Determine whether the information included in the documents is necessary to be submitted to support a safety conclusion.

The audit information the NRC staff determines to be necessary to support the development of the NRC staff’s safety evaluation will be requested to be submitted on the docket.

3.0 REGULATORY AUDIT SCOPE AND METHODOLOGY

The purpose of the remote audit is to gain a more detailed understanding of the licensee's process to implement risk-informed categorization and treatment of structures, systems and components as proposed in the LAR. The NRC staff will audit internal events and fire probabilistic risk assessment (PRA) and the risk informed approach implementing 10 CFR 50.69.

The areas of focus for the regulatory audit are the information contained in the licensee's submittal, the enclosed audit information needs, and all associated and relevant supporting documentation (e.g., methodology, process information, calculations, etc.) identified below. The audit will be performed consistent with NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, Revision 1, "Regulatory Audits," dated October 31, 2019 (ADAMS Accession No. ML19226A274).

4.0 INFORMATION REQUESTS

Please provide the following information for the NRC staff to audit:

1. Applicable peer review reports and closure reports for internal events, internal flooding, fire and seismic PRAs.

2. Available 10 CFR 50.69 structures, systems, and components categorization program procedures (i.e., Categorization review and adjustment process, decision criteria for Independent Decision-Making Panel (IDP), etc.).

3. Uncertainty notebooks for internal events, internal flooding, and fire PRAs related to PRA model assumptions and sources of uncertainty.

4. Documentation of review of PRA model assumptions and sources of uncertainty and identification of key assumptions and sources of uncertainty for the application identified in the LAR.

5. PRA notebooks for the modeling of FLEX equipment and FLEX human error probabilities, if credited in the PRA

To support the NRC staff's understanding of the LAR and to help identify any additional information needed to support its review, the staff requests that the licensee be prepared to discuss the following:

- The LAR and 50.69 analysis
- PRA technical acceptability
- PRA model assumptions and sources of uncertainty and the process for identification and disposition of the key assumptions and sources of uncertainty
- External events treatment for 50.69

The specific questions that the audit team would like to discuss with TVA are identified in the attachment.

5.0 AUDIT TEAM

Key licensee personnel involved in the development of the LAR should be made available for interactions on a mutually agreeable schedule to respond to any questions from the NRC staff.

Team Member	Division	Area of Responsibility
Michael Wentzel	NRR/DORL/LPLII-2	Project Management
Mihaela Biro	NRR/DRA/APLA	Technical Review
Jigar Patel	NRR/DRA/APLA	Technical Review
Shilp Vasavada	NRR/DRA/APLC	Technical Review
De Wu	NRR/DRA/APLC	Technical Review
Garill Coles	Pacific Northwest National Laboratory	Technical Review

6.0 LOGISTICS

The audit will be conducted from December 7, 2020 to January 20, 2021 through an online portal established by the licensee. The NRC staff and contractor's access to the online portal should be terminated on February 19, 2021.

The NRC staff requests to conduct remote meetings with TVA staff to discuss the attached audit questions on January 12 and 13, 2021.

The suggested schedule for the meetings is as follows:

January 12

Morning

- Kick-off. Opening comments - NRC and TVA. Introductions and logistics.
- Open PRA F&Os (Audit Question 1)
- Internal Events Peer Review (Audit Question 2)
- Discuss the scope for the internal, fire and seismic event full-scope, focused-scope, and F&O closure reviews listed in the LAR.
- Risk categorization of interfacing Systems

Afternoon

- PRA Uncertainties and Key Assumptions (Audit Questions 3 & 4)
- Total Risk Consideration (Audit Question 5)
- Summary of the day.
- NRC staff meeting.

January 13

Morning

- Integrated PRA Hazards Model (Audit Question 6)
- NEI 00-04 Figure 5-6 and Use of External Floods and High Winds (Audit Question 7)
- Impact of Internal Events Findings to SPRA (Audit Question 8)

- Discussion of credit for the nitrogen bottle held by a “permanently installed cart” in the SPRA, including the fragility determined for the cart.

Afternoon

- Summary of audit.

7.0 SPECIAL REQUESTS

The NRC staff would like access to the documents listed above in Section 4.0 through an online portal that allows the NRC staff and contractors to access documents via the internet. The following conditions associated with the online portal must be maintained throughout the duration that the NRC staff and contractors have access to the online portal:

- The online portal will be password-protected, and separate passwords will be assigned to the NRC staff and contractors who are participating in the audit.

- The online portal will be sufficiently secure to prevent the NRC staff and contractors from printing, saving, downloading, or collecting any information on the online portal.

- Conditions of use of the online portal will be displayed on the login screen and will require acknowledgement by each user.

Username and password information should be provided directly to the NRC staff and contractors. The NRC project manager will provide TVA the names and contact information of the NRC staff and contractors who will be participating in the audit. All other communications should be coordinated through the NRC project manager.

7.0 DELIVERABLES

The NRC team will develop an audit summary report to convey the results. The report will be placed in ADAMS within 90 days of the completion of the final audit session. The audit information the NRC staff determines to be necessary to support the development of the NRC staff’s safety evaluation will be requested to be submitted on the docket.

AUDIT QUESTIONS

AUDIT QUESTION 01 – Open PRA Facts and Observations (F&O)

Regulatory Guide 1.200, Revision 2 (ADAMS Accession No. ML090410014) provides guidance for addressing PRA acceptability. RG 1.200, Revision 2, describes a peer-review process using the 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," as one acceptable approach for determining the technical acceptability of the PRA. The primary results of peer review are the facts and observations (F&Os) recorded by the peer review team and the subsequent resolution of these F&Os. Appendix X to the Nuclear Energy Institute (NEI) guidance documents NEI 05-04, NEI 07-12, and NEI 12- 13, titled "NEI 05-04/07-12/12-06 Appendix X: Close-out of Facts and Observations (F&Os)" (ADAMS Package Accession No. ML17086A431), which was accepted by the NRC in a letter dated May 3, 2017 (ADAMS Accession No. ML 17079A427), describes process to close finding-level F&Os.

LAR Attachment 3 presents all findings not closed by the F&O closure review for both internal events and fire PRA (IEPRA and FPRA). The NRC staff reviewed the open findings and associated dispositions and finds that the disposition for each F&O is to resolve the finding "and have it closed in accordance with an Independent Assessment." The NRC staff notes that the proposed license condition presented in LAR Enclosure 2 states that "numbered items" listed in LAR Attachment 1, "List of Categorization Prerequisites" will be completed prior to implementation of the 10 CFR 50.69 program. The last item in the Categorization Prerequisite List regards a commitment to "close all open F&Os listed in [LAR] Attachment 3 and incorporate changes into the MOR [model of record] prior to system categorization." Thus, the license condition does not appear to commit to resolve the open findings and have them closed out using an Independent Assessment, as stated in the dispositions provided in LAR Attachment 3. In addition, the NRC staff notes that the resolutions to many of the internal events F&Os appear to have the potential to impact the FPRA. However, the LAR does not indicate that the FPRA will be updated to incorporate the resolutions to the internal events findings.

In light of these observations, address the following:

a) Confirm that the license condition is meant to commit to resolving the open IEPRA and FPRA F&Os and to closing them with an Independent Assessment and propose an adjustment to the wording in the license condition or in LAR Attachment 1, accordingly.

b) Alternatively, if it is not your intention to commit to resolving the open IEPRA and FPRA F&Os and closing them with an Independent Assessment, then justify how it will be ensured that the resolutions will be adequate for this application.

c) Confirm that the resolutions to the internal events findings with the potential to impact the FPRA modeling will be incorporated into the FPRA.

d) If it is confirmed in the response to part (c), above, that the resolutions to the internal events findings with the potential to impact the FPRA modeling will be incorporated into the FPRA, then propose a mechanism that ensures that the internal events

findings with the potential to impact the FPRA modeling will be incorporated into the FPRA prior to the implementation of the risk categorization program.

e) If it is not confirmed in the response to part (c), above, that the resolutions to the internal events findings with the potential to impact the FPRA modeling will be incorporated into the FPRA, then justify that incorporation of the IEPRA finding resolutions into the FPRA would have no impact on the risk categorization program.

f) The NRC staff notes that during its observation of TVA's F&O Closure Review conducted December 7-10, 2020, several F&Os were unable to be closed during the review. As such, the NRC staff requests resolution to the following F&Os to help validate that the licensee's PRA meets the minimum quality threshold required for the application:

    i. IFEV-B1-01: Aging factors more accurately captures the increased likelihood of pipe rupture due to aging mechanisms associated with certain water sources. Provide a justification or resolution to address the lack of aging factors in establishing internal flood frequencies for service and fire sources in excess of 40 years.

    ii. Fire 2-50: Temperature indication instrumentation is not modeled as cue for operators to initiate suppression pool cooling. Without temperature indication, the operators would have to rely upon other cues to initiate suppression pool cooling. Provide verification that no fire in any particular fire area would disable all the PRA modeled cues that the operators rely upon to initiate suppression pool cooling.

AUDIT QUESTION 02 – Peer Review History for the Internal Events

The ASME/ANS RA-Sa-2009 PRA standard 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 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. Criteria presented to identify PRA upgrades are: (1) use of new methodology, (2) change in scope that impacts the significant accident sequences or the significant accident progression sequences, and (3) change in capability that impacts the significant accident sequences or the significant accident progression sequences.

LAR Section 3.2 indicates that the last full scope peer review for the IEPRA was conducted in August 2009 and that the F&O closure review to close out F&Os from the 2009 peer review and remaining F&Os from the intervening focused-scope peer review was conducted in November 2018. The LAR does not discuss the internal events and internal flood PRA model changes made between August 2009 and when the F&O closure review was performed in 2018 to improve the model or to incorporate changes to reflect the as-built, as-operated plant. Given the significant length of time between the last full-scope peer review and the F&O closure reviews, address the following:

a. Summarize the major model changes performed for the internal events (including internal flood) PRA since August 2009 and for each change justify why or why not the change meets the definition of a PRA upgrade as defined in the

ASME/ANS RA-Sa-2009 PRA Standard (e.g., changing to different PRA software or a different human reliability analysis methods are examples of possible PRA upgrades).

b. Confirm that focused-scope peer reviews have been conducted for any model changes performed for the internal events (including internal flood) PRA model since July 2009 that meets the definition of a PRA upgrade as defined in the ASME/ANS RA-Sa-2009 PRA Standard. Describe the peer reviews and status of the resulting F&Os. Provide any remaining open F&Os, along with their dispositions for this application.

AUDIT QUESTION 03 – Identification of Key Assumptions and Sources of Uncertainties

Paragraphs (c)(1)(i) and (ii) of 10 CFR 50.69 require that a licensee's PRA be of sufficient quality and level of detail to support the structure, system, and component (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.

Section 5 of NEI 00-04, Revision 0, "10 CFR 50.69 SSC Categorization Guideline" (ADAMS Accession No. ML052900163), provides guidance for performing sensitivity studies for each PRA model to address the uncertainty associated with those models. Specifically, Sections 5.1, 5.2, and 5.3 provide guidance for such sensitivities for the internal events, fire and seismic PRA, respectively. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common cause failure, and maintenance probabilities) do not mask importance of components.

LAR Section 3.1.10 explains that TVA used the detailed process of identifying, characterizing and qualitative screening of model uncertainties found in Section 5.3 of NUREG-1855, Revision 1, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making" (ADAMS Accession No. ML17062A466), and Section 3.1.1 of Electric Power Research Institute (EPRI) Technical Report (TR) 1016737, "Treatment of Parameter and Modeling Uncertainty for Probabilistic Risk Assessments." LAR Attachment 6 presents a total of six FPRA key assumptions and sources of uncertainty and LAR Section 3.1.10 explains that no internal events or seismic PRA modeling uncertainties key to this application were identified. The LAR states that a "list of assumptions and sources of uncertainty" were reviewed to identify those which would be significant to this application and that if a "non-conservative treatment" or a method "not commonly accepted" were used then it was reviewed for its impact in application. The LAR does not explain how the initial "list of assumptions and sources of uncertainty" was developed nor does it indicate whether plant-specific issues, generic industry concerns, and modeling choice concerns (e.g., level of detail) were all reviewed to compile this list. It is also not clear to the NRC staff whether other screening criteria beyond identification of non-conservative treatments and uncommon practices were used to screen sources of uncertainty.

Section 3.2.3 of RG 1.200, Revision 2, as well as NUREG-1855, Revision 1, provide guidance on how to identify, characterize, and treat key sources of uncertainty relevant to a risk-informed application. Revision 1 of NUREG-1855 additionally cites EPRI TR 1026511, "Practical Guidance on the Use of Probabilistic Risk Assessment in Risk-Informed Applications with a Focus on the Treatment of Uncertainty." Furthermore, Section 1.3 of NUREG-1855, Revision 1, states, in part, that "[a]lthough assumptions and approximations made on the level of detail in a

PRA can influence the decision-making process, they are generally not considered to be model uncertainties because the level of detail in the PRA model could be enhanced, if necessary. Therefore, methods for identifying and characterizing issues associated with level of detail are not explicitly included in NUREG-1855; they are, however, addressed in EPRI TRs 1016737 and 1026511." Additionally, Section 3.3.2 of RG 1.200, Revision 2, defines key assumptions and sources of uncertainty. Therefore, the NRC staff requests the following information to confirm that the key assumptions and sources of uncertainty provided in Attachment 6 of the LAR were properly assessed from the base PRAs that have received peer reviews:

a) Provide a description of the process used to determine the key sources of uncertainty and assumptions for each PRA model used to support this application. The discussion should be provided separately for the IEPRA, FPRA, and seismic PRA (SPRA) and include:

    i. A description of how the key assumptions and sources of uncertainties provided in Attachment 6 were identified from the initial comprehensive list of PRA model(s) (i.e., base model) source of uncertainties and assumptions, including those associated with plant-specific features, modeling choices, and generic industry concerns. This can include an identification of the sources of plant-specific and applicable generic modeling uncertainties identified in the uncertainty analyses for the base internal events and internal flooding PRA.

    ii. Discussion and justification that the evaluation criteria used to identify an assumption or source of uncertainty as “key” is consistent with RG 1.200, and/or NUREG-1855, Revision 1, Revision 2, or other NRC-accepted method.

b) If the process of identifying “key” assumptions or sources of uncertainty for the PRA models used to support this application cannot be justified for use in the 10 CFR 50.69 categorization process, provide the results of an updated assessment that includes a description of each key assumption or source of uncertainty identified.

AUDIT QUESTION 04 – Dispositions of Key Assumptions and Sources of Uncertainties

Paragraph (c)(1)(i) of 10 CFR 50.69 requires the licensee to consider the results and insights from the PRA during categorization. The guidance in NEI 00-04 specifies sensitivity studies to be conducted for each PRA model. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common cause failure, and maintenance probabilities) do not mask importance of components. NEI 00-04 guidance states that additional “applicable sensitivity studies” from characterization of PRA adequacy should be considered.

The NRC staff notes that modeling conservatisms (i.e., assumptions and sources of uncertainty) can mask the importance measures of other SSCs. Sections 5.1 and 5.3 of NEI 00-04 provide guidance on performing individual sensitivity studies for key assumptions and sources of uncertainties as part of the categorization process. Section 3.1.10 of the LAR states that “[t]he conclusion of this review is that no additional sensitivity analyses are required to address Browns Ferry PRA model specific assumptions or sources of uncertainty.” It is unclear to the NRC staff if any sensitivity studies will be performed for each of the key assumptions and

sources of uncertainties provided in Attachment 6 of the LAR and how the determination to either perform or not perform sensitivities was made. Considering these observations, address the following:

a) For any additional key assumptions/sources of uncertainty identified as a result of the response to Audit Question 03, discuss how each identified key assumption and uncertainty will be dispositioned in the categorization process. The discussion should clarify whether TVA is following the guidance in Section 5 of NEI 00-04 by performing sensitivity analysis or other accepted guidance such as NUREG-1855. The summaries and descriptions should be provided separately for the identified key assumptions and uncertainties related to the IEPRA (includes internal floods), internal FPRA, and SPRA.

LAR Attachment 6 identifies the key assumptions and sources of PRA modeling uncertainty for this application. The NRC staff notes that the LAR presents six key sources of uncertainty for the FPRA and no key sources of uncertainty for the internal events or seismic PRAs. As part of the audit, a comprehensive uncertainty analysis was provided for internal, fire and seismic events that consisted of (1) identification of plant specific assumptions from the PRA notebooks and identification of applicable generic sources of modeling uncertainty from EPRI TRs 1016737 and 1026511, and (2) evaluation and screening of these assumptions and sources of uncertainty to identify key sources of uncertainty. This comprehensive uncertainty analysis was specifically performed for the Browns Ferry TSTF-425 LAR (ADAMS Accession No. ML20087P262). It not clear to the NRC staff whether the conclusions of this analysis are meant to (or do) apply to the 10 CFR 50.69 LAR. The NRC staff notes that the sensitivity of an application to sources of uncertainty can be different for different applications. Therefore, address the following:

a) Clarify whether the uncertainty analysis performed for the TSTF-425 LAR is also the basis for the uncertainty analysis performed for the 10 CFR 50.69. If so, provide justification that disposition of the identified sources uncertainties (especially those identified as “potential key sources of uncertainty”) are also applicable to the 10 CFR 50.69 LAR.

b) If the uncertainty analysis performed for the TSTF-425 LAR is not the basis for the 10 CFR 50.69 uncertainty analysis, then describe the uncertainty analysis that was performed for the 10 CFR 50.69 LAR and justify why no key sources of uncertainty were identified for the IEPRA or SPRA.

AUDIT QUESTION 05 – Total Risk Consideration

Regulatory Guide (RG) 1.174, Revision 3 , "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML17317A2560, provides the risk acceptance guidance in terms of change-in-risk in combination with total core damage frequency defined by regions. These regions are shown in Table 4 and 5 as Region I (No changes allowed), II (Small changes), and III (Very Small Changes and More Flexibility with Respect to Baseline core damage frequency (CDF)/large early release frequency (LERF). NEI 00-04 includes an overall risk sensitivity study for all the Low Safety Significant (LSS) components to assure that if the unreliability of the components was increased, the increase in risk would be small (i.e., meet the acceptance guidelines of RG 1.174, Revision 3).

RG 1.174 and Section 6.4 of NUREG-1855, Revision 1, for a Capability Category II risk evaluation, indicate that the mean values of the risk metrics (total and incremental values) need to be compared against the risk acceptance guidelines. The mean values referred to are the means of the probability distributions that result from the propagation of the uncertainties on the PRA input parameters and model uncertainties explicitly reelected in the PRA models. In general, the point estimate CDF and LERF obtained by quantification of the cutset probabilities using mean values for each basic event probability does not produce a true mean of the CDF/LERF. Under certain circumstances, a formal propagation of uncertainty may not be required if it can be demonstrated that the state of knowledge (SOKC) is unimportant (i.e., the risk results are well below the acceptance guidelines).

The NRC staff notes that the LAR does not stipulate whether the total CDF and LERF values presented in LAR Attachment 2 are mean values and notes there is a small margin between the LERF for Units 1 and 2 of 9.3E-06 and 9.4E-06 per year, respectively, and the RG 1.174, Revision 3 LERF threshold of 1E-05 per year. Accordingly, the risk increase due to consideration of the SOKC and the possible risk increase associated IEPRA and FPRA model updates committed to in the license condition to resolve open F&Os could impact the conclusions of the NEI 00-04 Section 8 overall sensitivity study results by increasing the Browns Ferry LERF values above 1E-05 per year.

In light of the observations above, address the following:

a) Demonstrate that, for the NEI 00-04 Section 8 overall sensitivity study results, Browns Ferry will be in conformance with the RG 1.174 risk acceptance guidance after the IEPRA and FPRA models are updated to include the increase associated with SOKC (if needed) and potential increases due to committed PRA updates to resolve F&Os.

b) Alternatively, propose a mechanism that ensures that, for NEI 00-04 Section 8 overall sensitivity study results, Browns Ferry will be in conformance with the RG 1.174 risk acceptance guidance after the IEPRA and FPRA models are updated to include the increase associated with SOKC (if needed) and potential increases due to updates to PRA models performed to resolve F&Os

AUDIT QUESTION 06 – Integrated PRA Hazards Model

Paragraph (c)(1)(ii) of 10 CFR 50.69 requires that the SSC functional importance be determined using an integrated, systematic process. NEI 00-04, Section 5.6, “Integral Assessment,” discusses the need for an integrated computation using available importance measures. Section 5.6 further states that the “integrated importance measure essentially weighs 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 Fussel-Vesely (FV) and integrated Risk Achievement Worth (RAW).

LAR Section 3.3 states that the weighted average importance method presented in NEI 00-04 Section 1.5 will be used to integrate seismic PRA results into the overall importance measures. The licensee cited the response to Watts Bar 50.69 RAI-07 (ADAMS Accession No. ML19196A362) for the integration of risk importance measures across all hazards. The NRC staff notes that SPRA basic events, such as structural failures, may often not align with basic events in other PRA models. The licensee did not mention whether the same approach

for Watts Bar 50.69 RAI 07-01 (ADAMS Accession No. ML19302D625) will be applicable to the Browns Ferry 50.69 LAR.

a) Confirm that the response to Watts Bar 50.69 RAI 07-01 is applicable to the Browns Ferry 50.69 LAR.

b) If question a) cannot be confirmed, provide responses for RAI 07-01 applicable to Browns Ferry.

AUDIT QUESTION 07 – Overall Use of NEI 00-04 Figure 5-6 and Use for External Floods and High Wind

The guidance in NEI 00-04 Figure 5-6 provides guidance to be used to determine SSC safety significance. The guidance in NEI 00-04 states, in part, that if it can be shown that the component either did not participate in any screened scenarios or, even if credit for the component was removed, the screened scenario would not become unscreened, then it is considered a candidate for the LSS category.

LAR Section 3.1.7, states that "[n]o SSCs were explicitly credited to allow a scenario to screen," and therefore, "[s]creened hazards are considered insignificant for every SSC and [ ] will not be considered during the categorization process." The NRC staff notes that LAR Attachment 4 screens all other external events (besides internal flood, internal fire and seismic events). It appears to NRC staff that, based on this description, at the time an SSC is categorized, it will not be evaluated using the guidance in NEI 00-04, Figure 5-6 to confirm that the SSC is not credited in screening an external hazard because that evaluation has already been made. The NRC staff notes that plant changes, plant or industry operational experience, and identified errors or limitations in the PRA models could potentially impact the conclusion that an SSC is not needed to screen an external hazard.

Also, concerning the external flooding, the NRC staff provided an assessment of the Browns Ferry flood hazard mitigating strategy assessment (MSA) dated September 5, 2017 (ADAMS Accession No. ML17222A328). That assessment discusses SSCs that would be relied upon to mitigate the impact of an extreme flooding event such as Local Intense Precipitation (LIP). The report discusses passive features such as external doors but also refers to credit for active components. Section 3.2 of the NRC staff's assessment discusses use of FLEX strategies against external flooding events such as a LIP. Section 3.2.1 of the NRC staff's assessment states that, regarding the Intake Pump Station, each compartment contains sump pumps to remove rainwater that accumulates from openings at the roof. These passive and active SSCs appear to be credited in screening of the external flooding hazard.

In light of these observations, address the following:

a) Clarify whether or not an SSC will be evaluated during categorization of the SSC using the guidance in NEI 00-04, Figure 5-6, to confirm that the SSC is not credited in screening an external hazard.

b) Identify any active and passive SSCs that are credited for screening the external flooding hazard and discuss how those SSCs will be included and considered in the proposed categorization process.

c) Identify any active and passive SSCs that are credited for screening the high winds and tornado, including tornado-generated missile, hazard and discuss how those SSCs will be included and considered in the proposed categorization process.

AUDIT QUESTION 08 – Propagation of Closed and Open/Partially Open Findings from Internal Events Open Finding Level F&O

According to Section 5-1.2 of the 2009 ASME/ANS PRA Standard, it is assumed that full-scope internal-events at-power Level 1 and Level 2 LERF PRAs exist and that those PRAs are used as the basis for the SPRA. Therefore, the acceptability of the IEPRA model used as the foundation for the SPRA is an important consideration. Section 3.2 of the LAR states that the internal events and seismic hazards findings were reviewed and closed using the process documented in Appendix X to NEI 05-04, NEI 07-12, and NEI 12-13. Further, Attachment 3 of the LAR provides an evaluation of internal events open finding level F&Os that impact the 10 CFR 50.69 application. However, the LAR does not provide information about the propagation of changes made to the IEPRA (includes internal floods) for (1) resolving the finding level-F&Os that are closed, and (2) addressing the open/partially open finding level-F&Os.

a) Clarify whether changes made to the internal events model to close finding-level F&Os or to disposition the open/partially open finding-level F&Os that are applicable to the SPRA have been implemented in the SPRA used to support this application or justify not implementing the changes in the context of impact on this application.

a)b) Describe an approach that that is consistent with the requirements in 10 CFR 50.69(e) and the guidance in NEI 00-04 for appropriate categorization of SSCs to propagate changes in the IEPRA (includes internal floods) to the SPRA arising from the review of this application, as part of any implementation item resulting from this application, or as part of routine maintenance and updating of the IEPRA (includes internal floods).