



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

CNL-19-069

July 29, 2019

10 CFR 50.69

10 CFR 50.90

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

Watts Bar Nuclear Plant, Units 1 and 2
Facility Operating License Nos. NPF-90 and NPF-96
NRC Docket Nos. 50-390 and 50-391

SUBJECT: Final Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, "Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors" (WBN-TS-17-24) (EPID L-2018-LLA-0493)

- References:
1. TVA letter to NRC, CNL-18-068, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," dated November 29, 2018 (ML18334A363)
 2. NRC Electronic Mail to TVA, "Watts Bar Nuclear Plant - Final Request for Additional Information Related to Application to Adopt 10 CFR 50.69 (EPID L-2018-LLA-0493)," dated June 18, 2019 (ML19169A359)
 3. TVA letter to NRC, CNL-19-065, "Partial Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24) (EPID L-2018-LLA-0493)," dated July 15, 2019 (ML19196A362)

In Reference 1, Tennessee Valley Authority (TVA) submitted for Nuclear Regulatory Commission (NRC) approval, a request for an amendment to Facility Operating License Nos. NFP-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN) Units 1 and 2 to allow for the implementation of the provisions of 10 CFR, Part 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors." In Reference 2, the NRC provided a request for additional information (RAI) and requested that

U.S. Nuclear Regulatory Commission
CNL-19-069
Page 2
July 29, 2019

TVA respond by July 15, 2019, for those responses to questions not requiring uncertainty estimates and by July 29, 2019 for those responses to questions requiring uncertainty estimates. In Reference 3, TVA submitted responses to NRC DRA RAIs 01, 02, 06, 07, 09, and 11 of Reference 2.

The enclosure to this letter provides the responses to the remaining RAIs of Reference 2 (i.e., DRA RAIs 03, 04, 05, 08, 10, and 12). TVA would also like to correct the following errors in Reference 3:

- The date of the reference in the response to NRC DRA RAI 02 should have been May 7, 2019, vice March 21, 2019.
- For the responses to NRC DRA RAI 07a and 07b, the NRC accession number that was referenced should have been ML18334A363 vice ML1834A363.

There are no new regulatory commitments made in this letter. Please address any questions regarding this submittal to Kimberly D. Hulvey, TVA Fleet Licensing Manager, at (423) 751-3275.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 29th day of July 2019.

Respectfully,



James T. Polickoski
Interim Director, Nuclear Regulatory Affairs

Enclosure: Final Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, "Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors" (WBN-TS-17-24) (EPID L-2018-LLA-0493)

cc: NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager - Watts Bar Nuclear Plant
Division of Radiological Health - Tennessee State Department of Environment and Conservation

Final Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, "Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors" (WBN-TS-17-24) (EPID L-2018-LLA-0493)

NRC Introduction

Title 10 of the Code of Federal Regulations, Section 50.69 (10 CFR 50.69), "Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors", allows licensees to use a risk-informed process to categorize systems, structures, and components (SSCs) according to their safety significance in order to remove SSCs of low safety significance from the scope of certain identified special treatment requirements. Regulatory Guide (RG) 1.201, Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML061090627) endorses, with regulatory positions and clarifications, the Nuclear Energy Institute (NEI) guidance document NEI 00-04, Revision 0 "10 CFR 50.69 SSC Categorization Guideline", (ADAMS Accession No. ML052910035) as one acceptable method for use in complying with the requirements in 10 CFR 50.69. Both RG 1.201 and NEI 00-04 cite RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (ADAMS Accession No. ML040630078) which endorses industry consensus probabilistic risk assessment (PRA) standards, as the basis against which peer reviews evaluate the technical adequacy of a PRA. Revision 2 of RG 1.200 is available at ADAMS Accession No. ML090410014.

By letter dated November 29, 2018 (ADAMS Accession No. ML18334A363), Tennessee Valley Authority (TVA), submitted a license amendment request (LAR) to adopt 10 CFR 50.69, Riskinformed Categorization and Treatment of Structures, Systems, and Components for Watts Bar Nuclear Plant (WBN), Units 1 & 2. Section 3.1.1 of the LAR states that TVA will implement the risk categorization process in accordance with NEI 00-04, Revision 0, as endorsed by RG 1.201. However, TVA's LAR does not contain sufficient information for the Nuclear Regulatory Commission (NRC) staff to determine whether TVA has implemented the guidance in NEI 00-04, as endorsed by RG 1.201, appropriately to demonstrate compliance with all the requirements in 10 CFR 50.69. The following requests for additional information (RAIs) outline the specific issues and information needed to complete the NRC staff's review:

NRC DRA RAI 03 – SSCs Categorization Based on Other External Hazards (RILIT)

Paragraph (b)(2)(ii) of 10 CFR 50.69 requires that the quality and level of detail of the systematic processes that evaluate the plant for external events during operation is adequate for the categorization of SSCs.

Section 3.2.4 of the LAR Enclosure 1 states that, "[a]ll other external hazards were screened from applicability to WBN Units 1 and 2 per a plant-specific evaluation in accordance with Generic Letter (GL) 88-20 and updated to use the criteria in ASME PRA Standard RA-Sa-2009. Attachment 4 provides a summary of the other external hazards screening results."

- a. *Attachment 4, "External Hazards Screening," of the LAR screens external flooding based on the following criteria:*

PS1: Design Basis hazard cannot cause a core damage accident.

PS2: Design basis for the event meets the criteria in the NRC 1975 Standard Review Plan (SRP).

Therefore, TVA's basis for screening the external flooding hazard from consideration for this application seems to rely on compliance with the Current Design Basis (CDB) with respect to mitigation of the hazard. The attachment further states that flood protection plans, designed to minimize impact of floods above plant grade on safety related facilities are in place.

The NRC staff's assessments of TVA's response to 10 CFR 50.54(f) information request for the re-evaluated flood hazard at its site (ADAMS Accession Numbers ML15310A080 and ML15239B287) identifies three flooding hazards that were not bounded by the current design basis; namely local intense precipitation (LIP), flooding in streams and rivers, and the combined effects flood caused by probable maximum flood (PMF) and maximum wind-wave activity. The discussion for external flooding in Attachment 4 of the LAR does not discuss the above cited flooding hazards. It is unclear to the NRC staff if the hazard screening included recent information and if an updated assessment has been conducted. In light of these observations:

- i. Provide justification using the criteria in Section 6.2-3 of ASME/ANS RA-Sa-2009 for screening the external flooding hazard from this application including consideration of the hazards that were found to not be bounded by the current licensing basis. The justification should include consideration of uncertainties in the determination of demonstrably conservative mean values as discussed in Section 6.2-3 of ASME/ANS RA-Sa-2009.*
- ii. If the external flooding hazard cannot be screened out, provide justification using the criteria in Section 6.2-3 of ASME RA-Sa-2009 for screening the external flooding hazard from this application. The justification should include consideration of the following factors:*
 - Uncertainties in the determination of demonstrably conservative mean values.*
 - Reevaluated external flood hazard information,*
 - The frequency of external flooding mechanisms including local intense precipitation (LIP), flooding in streams and rivers, and combined event flooding hazards,*
 - The impact of external flooding hazards, such as LIP flooding in streams and rivers, and combined event river flooding hazards, on plant SSCs and plant operation including the ability to cope with upset conditions,*
 - The operating experience associated with reliability of flood protection measures, including operator action reliability, and*
 - Identify and justify what type of SSCs, if any, are credited in the screening of the external flooding hazard, including both passive and active features.*

- iii. *If the external flooding hazard is screened out, identify any active and passive SSCs that are credited for the screening (i.e. credited as flood protection features) and discuss how those SSCs will be included and considered in the proposed categorization process.*
- b. *Attachment 4, "External Hazards Screening," of the LAR screens extreme wind and tornado hazards. The discussion of the screening criteria is based on the design of Category I structures as well as the design and protection against tornado and tornado missile hazards. It is unclear if any SSCs are being credited as part of the screening (i.e. protection features) of the high winds and tornado, including tornado missile, hazard and how any such SSCs will be considered in the categorization process.*

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

TVA Response to NRC DRA RAI 03

TVA Response to RAI 03a.i

TVA has reassessed the screening criteria with respect to External Flooding hazards. Consistent with the screening criterion defined by ASME/ANS RA-Sa-2009, Screening Table 6-2-3(b), Supporting Requirement (SR) EXT-B1, the External Flooding hazard for WBN is based on Criterion C5, which states:

"The event is slow in developing, and it can be demonstrated that there is sufficient time to eliminate the source of the threat or to provide an adequate response."

With respect to the External Flooding hazard for WBN, the plant is designed such, that there is sufficient warning time given large rainfall or seismically induced upstream dam failure, to shut down the plant and implement emergency procedures. Plant shutdown is based on a flood warning scheme divided into two stages (i.e., Stage I and Stage II). Stage I is a minimum of ten hours and Stage II is a minimum of 17 hours. During Stage I preparation, steps are taken for flood mitigation. If conditions persist, Stage II is entered, whereby the operator moves to initiate plant shutdown. Therefore, the minimum warning time calculated that flooding could exceed plant grade is 27 hours. As noted in Section 2.4.10 of the WBN dual-unit Updated Final Safety Analysis Report (UFSAR):

"Any rainfall flood exceeding plant grade will be predicted at least 28 hours in advance by TVA's RO organization.

Notification of seismic failure of key upstream dams will be available at the plant approximately 27 hours before a resulting flood surge would reach plant grade. Hence, there is adequate time to prepare the plant for any flood."

Furthermore, LIP was evaluated and discussed in Section 2.4.2.3 of the WBN UFSAR where it states:

"Structures housing safety related facilities, systems, and equipment are protected from flooding during a local PMP by the slope of the plant yard."

Section 2.4.3.6 of the WBN UFSAR addresses coincident wind wave activity and states:

“All equipment required to maintain the plant safely during the flood is either designed to operate submerged, is located above the maximum flood level, or is otherwise protected.”

Therefore, for design basis External Flooding hazards the timing available to exceed plant grade represents a slow moving event, which meets the criteria for Criterion C5 from Table, 6-2-3(b), “Supporting Requirement EXT-B1,” in that there is sufficient time to provide an adequate response.

In Reference 1, TVA submitted a flood hazard re-evaluation report which noted that these External Flooding hazards were identified as being unbounded. TVA is providing NRC with six-month updates on the status of the resolution of this issue (e.g., Reference 2).

In accordance with Reference 1, TVA committed to provide the NRC with a revised WBN warning time analysis. Therefore, as noted in Attachment 1 to Reference 3, TVA will re-confirm that there is sufficient time to eliminate the source of the threat or to provide an adequate response in accordance with Criterion C5, prior to 50.69 categorization. Reference 3 also contains a proposed license condition related to completion of the implementation items listed in Attachment 1 to Reference 3.

Screening Criterion C5 is based on the timing to mitigate the hazard prior to it impacting plant safety. Therefore, there was no use of conservative mean values; and so, there are no uncertainties to consider.

TVA Response to RAI 03a.ii

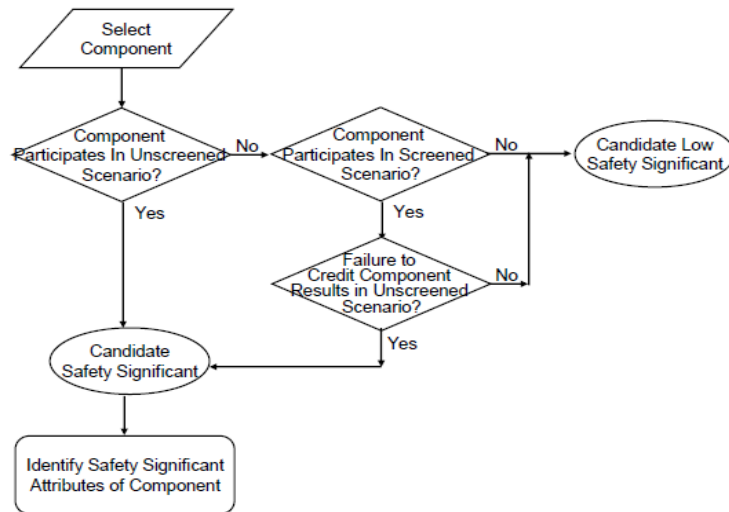
The design basis External Flooding hazard, as noted in the response to RAI 03.i meets the screening criteria as a slow moving event, and is expected to remain screened out from further consideration once the reevaluation of the warning time analysis is completed. Consistent with the proposed license condition contained in Reference 3, if a beyond design basis External Flooding hazard does not screen out as a slow moving event, the criteria of Section 6-2-3 of ASME/ANS RA-Sa-2009 will be applied.

TVA Response to RAI 03a.iii

Active and passive SSCs that are required to mitigate the consequence of external flooding consist of doors, manhole covers, sumps, walls, floors, and ceilings (hence, watertight seals for penetrations).

The process to follow for the above components credited for External Flood mitigation are described by Figure 5-6 “Other External Hazards” from NEI 00-04. As noted in Reference 4, TVA will follow the requirements of the endorsed guidance. Therefore, TVA is subjecting the external hazards (excluding internal fires and seismic hazards) to the process described by the following flow chart in NEI 00-04, Figure 5-6. As part of the categorization assessment of “other external hazard” risk, an evaluation is performed to determine if there are components being categorized that participate in screened scenarios and whose failure would result in an unscreened scenario. Those components would be classified as high safety significant (HSS).

Figure 5-6 (from NEI 00-04)
Other External Hazards



TVA Response to RAI 03b

Active and passive SSCs that are required to mitigate the consequence of external wind or tornado hazards consist of doors, missile shields, hatches, manhole covers, and sumps. The same process as described in the response to RAI 03a.iii will also be applied for screening for protection against external wind or tornado hazards.

References

1. TVA letter to NRC, CNL-15-043, "Flood Hazard Reevaluation Report for Watts Bar Nuclear Plant, Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2015 (ML15072A116)
2. TVA letter to NRC, CNL-19-046, "Tennessee Valley Authority - Hydrologic Engineering Center River Analysis System (HEC-RAS) Project Milestone Status Update And Commitment Changes," dated April 29, 2019 (ML19119A349)
3. TVA letter to NRC, CNL-19-065, "Partial Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24) (EPID L-2018-LLA-0493)," dated July 15, 2019 (ML19196A362)
4. TVA letter to NRC, CNL-18-068, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," dated November 29, 2018 (ML18334A363)

NRC DRA RAI 04 – Identification of Key Assumptions and Sources of Uncertainties (APLA/RILIT)

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 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 provides guidance for performing sensitivity studies for each PRA model to address the uncertainty associated with those models. Specifically, Sections 5.1 and 5.3 provide guidance for such sensitivities for the internal events PRA and SPRA, 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.

In Section 4.1 of the LAR, Watts Bar identifies RG 1.174, Revision 3 as an applicable regulatory guidance. Regulatory Guide 1.174, Revision 3, cites NUREG-1855, Revision 1, as related guidance. In Section B of RG 1.174, Revision 3, the guidance acknowledges specific revisions of NUREG-1855 to include changes associated with expanding the discussion of uncertainties.

Attachment 6 of the LAR contains a total of three key assumptions/sources of uncertainties identified within the IEpra (includes internal floods) and the SPRA. Section 3.2.7 of the LAR states in part, “[t]he detailed process of identifying, characterizing and qualitative screening of model uncertainties is found in Section 5.3 of NUREG-1855 (Revision 0) and Section 3.1.1 of [Electric Power Research Institute (EPRI) Technical Report (TR)] 1016737.” For identification of the three key assumptions and sources of uncertainty provided in Attachment 6 of the LAR, Section 3.2.7 of the LAR states, in part,

“[t]he list of assumptions and sources of uncertainty were reviewed to identify those which would be significant for the evaluation of this application. If the WBN PRA model used a non-conservative treatment, or methods that are not commonly accepted, the underlying assumption or source of uncertainty was reviewed to determine its impact on this application. Only those assumptions or sources of uncertainty that could significantly impact the configuration risk calculations were considered key for this application.”

NUREG-1855 has been updated to Revision 1 as of March 2017 (ADAMS Accession No. ML17062A466). 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.”

Additionally, Section 3.3.2 of RG 1.200, Revision 2, defines key assumptions and sources of uncertainty. 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 (includes internal floods) and 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. A discussion on how the process and the criteria used to identify an assumption or source of uncertainty as “key” is consistent with RG 1.200, and/or NUREG-1855, Revision 1, or Revision 2, or other NRC-accepted methods.*
- 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.*

TVA Response to NRC DRA RAI 04

TVA Response to RAI 04a.i

TVA used NUREG-1855, Revision 0 to determine the key assumptions and sources of uncertainty. This approach applies to both the Internal Events PRA (IEPRA) and the Seismic PRA (SPRA) models. This is the same process described in the response to RAI-04.a of Reference 1. All of the key assumptions and sources of uncertainty identified using this process are shown and dispositioned in Attachment 6 of Reference 2. The SPRA was built upon the IEPRA. There were no additional key assumptions or key sources of uncertainty identified for the SPRA model. As mentioned in the response to RAI APLB-03 of Reference 3, the SPRA identified assumptions and sources of uncertainty related to the seismic hazard development, fragility analyses, and plant response model; however, these assumptions and sources of uncertainty were not characterized as “key” in the SUNCERT Notebook.

TVA Response to RAI 04a.ii

As noted in the response to RAI-04.a of Reference 1, TVA followed NUREG-1855, Revision 0 to identify key assumptions and sources of uncertainty. As further noted in the response to RAI-04.a of Reference 1, following the guidance shown in NUREG-1855, Revision 0 is consistent with the guidance in NUREG-1855, Revision 1. This approach was applied to both the IEPRA and the SPRA models.

TVA Response to RAI 04b

As stated in the response to RAI 4a.ii, NUREG-1855, Revision 0 is consistent with the guidance shown in NUREG-1855, Revision 1. This approach was applied to both the IEPRA and the SPRA models.

References

1. TVA letter to NRC, CNL-19-002, “Response to Request for Additional Information Regarding Application to Modify Sequoyah Nuclear Plant Units 1 and 2, Application to Adopt 10 CFR 50.69, ‘Risk-informed Categorization and Treatment of Structures, Systems,

and Components for Nuclear Power Reactors,' (SQN-TS-17-06) (EPID: L-2018-LLA-0066)," dated March 21, 2019 (ML19081A065)

2. TVA letter to NRC, CNL-18-068, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," dated November 29, 2018 (ML18334A363)
3. TVA letter to NRC, CNL-19-035, "Response to Request for Additional Information Regarding Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (WBN-TS-18-14) (EPID L-2018-LLA-0279)" dated May 7, 2019 (ML19127A323)

NRC DRA RAI 05 – Dispositions of Key Assumptions and Sources of Uncertainties (APLA/RILIT)

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 notes that modelling 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 3.2.7 of the LAR states, "[t]he conclusion of this review is that no additional sensitivity analyses are required to address WBN 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 DRA RAI 04, 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 IEPRAs (includes internal floods) and SPRA.*
- b. *The key assumptions and sources of uncertainties identified as part of the LAR may change because updates to the PRAs supporting this application (i.e., IEPRAs (includes internal floods) and SPRA) could affect the significance of those assumptions for this application or create new key assumptions or sources of uncertainties for this application. Describe how TVA's 10 CFR 50.69 program assures that the evaluation of "key" assumptions and sources of uncertainty for the PRAs supporting this application (i.e., IEPRAs (includes internal floods) and SPRA) are modified to support the categorization process.*

TVA Response to NRC DRA RAI 05

TVA Response to NRC DRA RAI 05a

TVA did not identify any additional key assumptions/sources of uncertainty as a result of the response to RAI 04. The key assumptions/sources of uncertainty remain those listed in Attachment 6 of CNL-18-068 (Reference 1). As discussed in response to RAI 04, TVA used NUREG-1855, Revision 0 to determine the key assumptions/sources of uncertainty. In addition to those key assumptions/sources of uncertainties listed in Attachment 6 to Reference 1, TVA has a list of F&Os shown in Attachment 3 to Reference 1. While they are not considered key assumptions/sources of uncertainty, a gap assessment is performed against the Capability Category II criteria from the applicable supporting requirements each time categorization is performed.

For F&Os assessed by the Independent Assessment (IA) team as closed, TVA proposed a license condition to update the model of record (MOR) to include all changes initiated by the F&O resolutions that were confirmed by the IA Team as outlined in Attachment 1 of CNL-19-065 (Reference 2).

TVA Response to NRC DRA RAI 05b

TVA's categorization process follows the guidance specified in NEI 00-04. Table 5-2 of NEI 00-04 describes the sensitivity studies to be performed which exercise key areas of uncertainty in the PRA. In addition, Section 12.1 of NEI 00-04 describes the process to reassess the SSC categorization following a PRA model update. Furthermore, TVA procedure NEDP-26, "Probabilistic Risk Assessment" requires that all model modifications that have been evaluated, but not yet incorporated into the MOR, be included in a living model. Any plant specific key assumptions/sources of uncertainty that might change because of updates to the PRA would be governed by NEDP-26. Changes to the PRA model are required if the estimated cumulative impact of plant configuration changes exceed the threshold of plus/minus 25% of the baseline CDF or LERF. Therefore, if a change to a key assumption/source of uncertainty were identified that results in a significant change to the PRA model results, the model (in accordance with the TVA procedure) would be updated to address that assumption/source of uncertainty to support the categorization process.

References

1. TVA letter to NRC, CNL-18-068, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," dated November 29, 2018 (ML18334A363)
2. TVA letter to NRC, CNL-19-065, "Partial Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24) (EPID L-2018-LLA-0493)," dated July 15, 2019 (ML19196A362)

DRA RAI 08 – Open/Partially Open Findings from the Independent Assessment (APLA/RILIT)

Section 4.2 of RG 1.200 states that the LAR should include a discussion of the resolution of the peer review findings and observations (F&Os) that are applicable to the parts of the PRA required for the application. This discussion should take the following forms:

- a discussion of how the PRA model has been changed
- a justification in the form of a sensitivity study that demonstrates the accident sequences or contributors significant to the application decision were not adversely impacted (remained the same) by the issue.

Attachment 3 of the LAR, “Disposition and Resolution of Open Peer Review Findings and Self-Assessment Open Items,” provides finding-level F&Os that are still open or only partially resolved after the F&O closure review. Address the following:

- a. For F&Os 2-28 and 7-10, associated with Supporting Requirements (SR) QU-C1 and IFQU-A6, the disposition provided in Attachment 1 of the LAR states in part, “[t]he issues associated with these F&Os will be corrected.” However, the dispositions provided in Attachment 3 of the LAR for the F&Os (i.e., 2-28 and 7-10) states that, “TVA intends, to set joint human error probabilities (JHEP) values greater than or equal to 1.0×10^{-5} and re-evaluate and update human event probabilities (HEP) for actions that are less than one hour. It is unclear to the NRC staff based upon TVAs intentions how the final resolutions to these F&Os will be incorporated into the PRA models used for the categorization process.

Provide clarification that, for the dispositions (resolutions) of these F&Os, TVA’s intentions will include (1) addressing all the JHEPs in the recovery rule file(s) with a floor value of $1E-05$ and (2) updating all HEPs for operator actions that are less than one hour.

- b. For F&O 7-22, associated with LE-D5, for the disposition of this F&O provided in Attachment 3 of the LAR, TVA states in part, “[t]he result of not taking credit for secondary side isolation for a SGTR [Steam Generator Tube Rupture] results in an overconservatism that would potentially cause more SSCs to be categorized as HSS, RISC-1 and RISC-2 than LSS RISC-3 and RISC-4 if credit had been taken.” The NRC acknowledges that modelling conservatisms have the potential to mask the importance measures of other modeled SSCs. NUREG-1855 and NEI 00-04 provide guidance to address instances for which sensitivities should be performed to quantitatively assess the identification, characterization, and treatment of implicit modeling assumptions where the potential exists for the risk metrics to be used for the risk-informed application.

Section 4.3.2 of NUREG-1855, Revision 1, states in part, “[t]he analyst may screen out initiating events, component failure modes, and human failure events so that the model does not become encumbered with insignificant detail.” The guidance goes on to further state, “[t]he generally conservative bias that results, could be removed by developing a more detailed model.”

Section 7.4 of NUREG-1855, for Stage E states in part, “[a]ny such source of model uncertainty that could cause the risk metric results to challenge or further exceed the acceptance guidelines are considered to be key.” It is unclear to the NRC staff how TVA concluded that not crediting the operator actions in the PRA models, especially for SGTR, would not adversely impact the categorization of SSCs for future risk-analysis without performing a case sensitivity study or inclusion of the operator actions into the model. Considering these observations, provide the following:

- i. *Provide qualitative or quantitative justification that supports the determination that not modeling secondary side isolation for a SGTR in the base IEPRA (includes internal floods) will not adversely impact the categorization of SSCs in the 10 CFR 50.69 application and is not a key assumption/source of uncertainty. If determined to be a key assumption/source of uncertainty provide an updated Attachment 6 of the LAR. For any quantitative justification used, discuss how it is consistent with the recommended sensitivities prescribed in Tables 5-2, 5-3, 5-4, and 5-5 of NEI 00-04 and the guidance provided in NUREG-1855, Revision 1, to identify, characterize, and treat assumptions and sources of modeling uncertainty that are key to an application.*

OR

- ii. *Alternatively, incorporate the operator actions involving isolation of the secondary side into the PRA models used for the categorization process. If determined that the incorporation of the HEPs and any other logic changes into the PRA model constitutes an upgrade to the PRA model as defined in the ASME/ANS RA-Sa-2009 PRA Standard, propose a mechanism to perform a focused scope peer review and resolve any potential F&Os generated from the peer review prior to implementing the SSC categorization process.*
- c. *For F&O 7-21, the associated SR IFEV-B3 remains not met at CC-II for the Watts Bar IEPRA (includes internal floods). The SR IFEV-B3 in the ASME/ANS Ra-SA 2009 PRA standard states to [d]ocument sources of model uncertainty and related assumptions (as identified in QU-E1 and QU-E2) associated with the internal flood-induced initiating events. SRs QU-E1 and QU-E2 further states to identify sources of model uncertainty and assumptions made in the development of the PRA. For the disposition provided in Attachment 3 of the LAR, the Independent Assessment team discusses that [i]t is not clear from the documentation how the selected error factor was calculated in cases where different error factors are shown for various pipe sizes and further explains that Section 2-2.7 of the ASME/ANS Ra-SA 2009 PRA standard for SR QU-E3 prescribes how quantification is to be performed for internal events, which involves parametric uncertainty analysis be performed. For the disposition the licensee states in part, “[t]his finding will require sensitivity studies to be performed as needed to support evaluation in the 50.69 categorization process.”*

It is unclear to the NRC staff what the assumption(s)/sources of model uncertainty are for the internal flood-induced initiating events associated with F&O 7-21 or the applicable treatment (i.e., sensitivities to be performed). Considering these observations, provide the following:

- i. *Provide all the sources of uncertainty and assumptions associated with F&O 7-21 for the base IEPRA (includes internal floods) model. For each source of uncertainty and assumption, confirm if it is key to the 10 CFR 50.69 categorization process and provide an updated Attachment 6 of the LAR if necessary.*
- ii. *Describe the sensitivities to be performed and how they are applicable for addressing each of the sources of uncertainty and assumptions identified in RAI 08.c.(i). In the description, include how the application of the sensitivities is consistent with NUREG-1855, Revision 1 and NEI 00-04 as endorsed, to address the parametric model uncertainty in the IEPRA (includes internal floods) model that will be used for SSC categorization.*

- d. For F&O 5-8, associated with SRs LE-C2, LE-C7, LE-C9, and LE-E1, for the disposition provided in Attachment 3 of the LAR, the Independent Assessment team concluded that SR LE-C9 may be considered MET at CC II-III and SR LE-C2 remains MET at CC I because there are operator actions following the onset of core damage that were treated conservatively and not updated to address the F&O. The disposition does not address if the Independent Assessment team determined if the other SRs LE-C7 and LE-E1 were met or not met at CC-II. It is unclear to the NRC staff if those SRs (i.e., LE-C7 and LEE1) associated with the F&O are met at CC-II.
- i. Confirm that the Independent Assessment team determined if the SRs LE-C7 and LE-E1 were determined met at CC-II for F&O 5-8. If the SRs were determined met at CC II, provide a summary of the evaluation performed by the Independent Assessment team to support the conclusion.

Furthermore, in the disposition provided in Attachment 3 of the LAR for F&O 5-8, the licensee states, "[t]he absence of crediting operations is an over-conservatism that would potentially result in more HSS SSCs, RISC-1 and RICS-2 than LSS RISC-3 and RISC-4 if credit has been taken." The NRC acknowledges that modelling conservatisms have the potential to mask the importance measures of other modeled SSCs. Section 4.3.2 of NUREG-1855, Revision 1 states in part, "[t]he analyst may screen out initiating events, component failure modes, and human failure events so that the model does not become encumbered with insignificant detail." The guidance goes on to further state, "[t]he generally conservative bias that results, could be removed by developing a more detailed model." Section 7.4 of NUREG-1855, for Stage E states in part, "[a]ny such source of model uncertainty that could cause the risk metric results to challenge or further exceed the acceptance guidelines are considered to be key." It is unclear to the NRC staff how TVA concluded that not crediting the operator actions in the PRA models would not adversely impact the categorization of SSCs for future risk-analysis without performing a case sensitivity study or inclusion of the operator actions into the base model(s). Considering these observations, provide the following:

- i. Provide qualitative or quantitative justification that supports the determination that not including the operator actions into the base PRA models will not adversely impact the categorization of SSCs in the 10 CFR 50.69 application and is not a key assumption/source of uncertainty. If determined to be a key assumption/source of uncertainty provide an updated Attachment 6 of the LAR. For any quantitative justification used, discuss how it is consistent with the recommended sensitivities prescribed in Tables 5-2, 5-3, 5-4, and 5-5 of NEI 00-04 and the guidance provided in NUREG-1855, Revision 1 to identify, characterize, and treat assumptions and sources of modeling uncertainty that are key to an application.

OR

- ii. Alternatively, incorporate the operator actions involving isolation of the secondary side into the PRA models used for the categorization process. If determined that the incorporation of the HEPs into the PRA model constitutes an upgrade to the PRA model as defined in the ASME/ANS RA-Sa-2009 PRA Standard, propose a mechanism to perform a focused scope peer review and resolve any potential F&Os generated from the peer review prior to implementing the SSC categorization process.

- e. *For F&O 3-6 and 1-6 provided in Attachment 3 of the LAR, both dispositions state, [t]he NEI 00-04 categorization process, which TVA will follow, exercises key areas of uncertainty in the PRA (e.g., human reliability, CCF and no maintenance plant configurations). Attachment 6 of the LAR provides the PRA(s) identified key assumptions and sources of uncertainty along with the dispositions, however the assumptions and sources of uncertainty associated with F&O 3-6 and 1-6 are not provided as key in Attachment 6 of the LAR.*
- i. *Provide qualitative or quantitative justification to demonstrate that the F&Os (i.e., 3-6 and 1-6) will not adversely impact the categorization of SSCs in the 10 CFR 50.69 application and is not a key assumption/source of uncertainty. If determined to be a key assumption/source of uncertainty provide an updated Attachment 6 of the LAR. For any quantitative justification used, discuss how it is consistent with the recommended sensitivities prescribed in Tables 5-2, 5-3, 5-4, and 5-5 of NEI 00-04 and the guidance provided in NUREG- 1855, Revision 1 to identify, characterize, and treat assumptions and sources of modeling uncertainty that are key to an application.*

OR

- ii. *Alternatively, propose a mechanism to resolve the F&Os (i.e., 3-6 and 1-6) and include the specific actions (i.e., PRA changes) to be performed. If determined that the incorporation of the PRA changes into the PRA model constitutes an upgrade as defined in the ASME/ANS RA-Sa-2009 PRA Standard, include a mechanism to perform a focused scope peer review and resolve any potential F&Os generated from the peer review prior to implementing the SSC categorization process.*

TVA Response to NRC DRA RAI 08

TVA Response to NRC DRA RAI 08a

WBN F&O 2-28 in Attachment 3 to Reference 1 states:

“MDN-000-999-2008-0144 (Human Reliability Analysis) Appendix F addresses identification of dependencies. The criteria are met since the analysts followed common practice. However, the stated rule for application of a lower limit (1E-5) on the combined HEP was not applied in the Qrecover File.”

The intent of the F&O is to state that the JHEP floor value of 1E-5 was not taken into consideration during the quantification performed for the MOR. In order to correct the issue, the model will have to be updated to address all of the JHEPs in the recovery rule file with a JHEP floor value of 1E-5. The intent of the disposition shown in Attachment 1 of Reference 1 was stating that this correction will be made in the next model update. In addition, Attachment 1 of CNL-19-065 (Reference 3) states that this correction will be performed prior to system categorization.

WBN F&O 7-10 in Attachment 3 to Reference 1 states:

“The analysis in Section 5.4.1 [Internal Flooding Notebook] includes an assessment that evaluates existing human actions. From a cursory review, the main impact seems to be an exclusion of non-Main Control Room (MCR) actions given a flood event. There appears to be little if any adjustment to the other actions that are performed in the MCR.”

The intent of this F&O is to question whether the flooding impacts onto Human Reliability Analyses (HRAs) used in the PRA model were adequately performed, specifically those actions that have less than an hour available for the operator action. A review was conducted of flooding impacts on the operator actions identified that require less than an hour to perform. A consultant firm was contracted to evaluate the existing analysis. They determined that the existing analysis was appropriately performed and that there is no need to adjust the operator actions with regard to flooding impacts. In addition, a bounding sensitivity was performed for RAI APLA-04 in Reference 2, and adjustment of the HRAs performed in a timeframe of one hour or less did not result in a significant change to the model results. As a result, the model was not updated to include any new operator action impacts.

TVA Response to NRC DRA RAI 08b.i

WBN F&O 7-22 in Attachment 3 to Reference 1 states:

“The secondary side isolation of a ruptured Steam Generator (SG) was modeled in the Steam Generator Tube Rupture (SGTR) event tree (top event small LOCA (SL)). After core damage, there was no consideration of the secondary side isolation capability in the accident progression sequences.”

The intent of this F&O is to question why secondary side isolation was not credited in the LERF analysis. In order to address the potential for masking SSC rankings, a sensitivity study (consistent with the last bullet item shown on NEI 00-04, Table 5-2) was performed that applied a 0.1 recovery factor to the applicable SGTR sequences to evaluate the impact to LERF. TVA determined that this sensitivity study resulted in no change to the LERF cutsets, meaning the importance measures were not affected. Therefore, this would not be considered a key source of uncertainty, as the results from the base model have not changed. Therefore, no change to the list of key assumptions/sources of uncertainty identified in Attachment 6 of the LAR, as based on NUREG-1855 Revision 0, is required. A comparison of NUREG-1855, Revision 0 to NUREG-1855, Revision 1 is discussed in the RAI 4a response.

TVA Response to NRC DRA RAI 08c.i and 08c.ii

WBN F&O 7-21 pertains to how the error factors were applied to internal flooding initiating events. The only sources of uncertainty and assumptions associated with F&O 7-21 is that the error factors were not propagated through the PRA model appropriately for the flooding initiating events. Because some pipe breaks and break sizes were grouped together, it is not clear whether the appropriate error factor was used in the analysis.

In order to address this source of uncertainty, a sensitivity study was performed as described in the response to RAI APLA-05 of Reference 2. The sensitivity study (consistent with the last bullet item shown on NEI 00-04, Table 5-2) documents a review that applied error factors on the flooding initiators and were adjusted as applicable to ensure that the appropriate error factors were applied. The results of the sensitivity study demonstrated that modifying the error factors for the flooding initiators does not result in a significant change to the PRA model results. Therefore, this F&O would not be considered a key source of uncertainty as the results from the base model have not changed significantly. Therefore, no change to the list of key assumptions/sources of uncertainty identified in Attachment 6 of the LAR, as based on NUREG-1855 Revision 0, is required. A comparison of NUREG-1855, Revision 0 to NUREG-1855, Revision 1 is discussed in the RAI 4a response.

TVA Response to NRC DRA RAI 08d.i (first)

WBN F&O 5-8 in Attachment 3 to Reference 1 states:

“The operator action failure probabilities considered in the LERF analysis were not correctly estimated. After core damage, the operation steps in the Severe Accident Management Guidelines (SAMGs) would be much different from the steps in the Emergency Operating Procedures (EOPs) before core damage.”

F&O 5-8 addresses HRAs not being credited in the LERF analysis to recover equipment. SR LE-C7 and LE-E1 are not specifically called out in the F&O discussion written in the F&O closure report. However, the original peer review performed in 2009 shows that both of these SRs are met at Capability Category I-III. Because these F&Os were previously assessed as met during the original peer review, and the IA team did not document any additional issues regarding these SRs from this F&O, the SRs are still assessed as met at Capability Category I-III.

TVA Response to NRC DRA RAI 08d.i (second)

A review of each of the HEPs used in the LERF analysis was performed to determine which operator actions, if not credited, could result in over conservatism in the model. Of the HEPs that were reviewed, only manual operation of the nitrogen backup system was found to have an impact on the results. A sensitivity study (consistent with the last bullet item shown on NEI 00-04, Table 5-2) was performed for the IEPRA model to include credit of the manual operation of the nitrogen backup system using an appropriate screening value, and the associated change in the WBN Unit 1 LERF was reanalyzed to determine if any importance measures had changed. Crediting this HEP resulted in two additional components identified as risk significant based on Unit 1 LERF. These components were already identified as risk significant based on the WBN Unit 1 CDF; thus, there is no change to the number of risk important components. Therefore, this F&O would not be considered a key source of uncertainty, as the results from the base model have not changed significantly. Therefore, no change to the list of key assumptions/sources of uncertainty identified in Attachment 6 of the LAR, as based on NUREG-1855 Revision 0, is required. A comparison of NUREG-1855, Revision 0 to NUREG-1855, Revision 1 is discussed in the RAI 4a response.

TVA Response to NRC DRA RAI 08e.i

WBN F&O 3-6 pertains to crediting State of Knowledge Correlation (SOKC) in the PRA model for evaluation of Interfacing System Loss of Cooling Accident (ISLOCA). TVA does not currently apply SOKC to ISLOCA scenarios in the WBN PRA model. Therefore, TVA has proposed a license condition in Attachment 1 to Reference 3 to re-introduce SOKC into the MOR prior to using the PRA model for system categorization. By updating the model to re-introduce SOKC, the F&O would be addressed, and therefore would not be identified as a key source of model uncertainty.

WBN F&O 1-6 pertains to uncertainty data not being incorporated appropriately for some basic events within the model. The response to RAI APLA-01 in Reference 2 explains that the missing uncertainty information will not affect the point estimate CDF/LERF values. Therefore, the importance measures generated from the calculated cutsets for the CDF/LERF will not be impacted either. In addition, APLA-01 in Reference 2 performed a sensitivity study (consistent with the last bullet item shown on NEI 00-04, Table 5-2) that demonstrated that the impact of the missing uncertainty parameters is not significant. Therefore, this F&O is not a key source of

uncertainty, as the results from the base model have not changed significantly, and no change to the list of key assumptions/sources of uncertainty identified in Attachment 6 of the LAR (as based on NUREG-1855 Revision 0) is required. A comparison of NUREG-1855, Revision 0 to NUREG-1855, Revision 1 is discussed in the RAI 4a response.

References

1. TVA letter to NRC, CNL-18-068, "Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24)," dated November 29, 2018 (ML18334A363)
2. TVA letter to NRC, CNL-19-035, "Response to Request for Additional Information Regarding Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (WBN-TS-18-14) (EPID L-2018-LLA-0279)" dated May 7, 2019 (ML19127A323)
3. TVA letter to NRC, CNL-19-065, "Partial Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24) (EPID L-2018-LLA-0493)," dated July 15, 2019 (ML19196A362)

NRC DRA RAI 10 – Implementation Items (APLA/RILIT)

Paragraph (b)(2)(ii) of 10 CFR 50.69 requires that a licensee's application contain a description of the measures taken to assure that the quality and level of detail of the systematic processes that evaluate the plant for internal and external events during normal operation, low power, and shutdown are adequate for the categorization of SSCs. If the responses to RAIs 01 through 09 above require any follow-up actions prior to implementation of the 10 CFR 50.69 categorization process, provide a list of those actions and any PRA modeling changes, including any items that will not be completed prior to issuing the amendment but must be completed prior to implementing the 10 CFR 50.69 categorization process.

Propose a mechanism that ensures these activities and changes will be completed and appropriately reviewed and any issues resolved prior to implementing the 10 CFR 50.69 categorization process. An example would be a table of listed implementation items referenced in a license condition.

As an alternative to providing an implementation item for an F&O, demonstrate that the F&O(s) will have no adverse impact and/or insignificant impact on the 10 CFR 50.69 categorization process.

TVA Response to NRC DRA RAI 10

There were no follow-up actions identified that need to be performed prior to implementation of the 10 CFR 50.69 categorization process other than the ones described in Attachment 1 to the referenced letter. To ensure these activities and changes will be completed and appropriately reviewed and any issues resolved prior to implementing the 10 CFR 50.69 categorization process, the referenced letter (CNL-19-065) contains a revised proposed license condition to

the WBN Units 1 and 2 Facility Operating Licenses to implement the items contained in Attachment 1 of CNL-19-065.

Reference

TVA letter to NRC, CNL-19-065, "Partial Response to NRC Request for Additional Information Regarding Watts Bar Nuclear Plant, Units 1 and 2, Application to Adopt 10 CFR 50.69, 'Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors' (WBN-TS-17-24) (EPID L-2018-LLA-0493)," dated July 15, 2019 (ML19196A362)

NRC DRA RAI 12 – Propagation of Closed and Open/Partially Open Findings from DRA RAI 08 (RILIT)

According to Sections 7-1.2 and 8-1.2 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 internal events PRA model used as the foundation for the SPRAs is an important consideration. Section 3.3 of the Enclosure 1 to the LAR states that the internal events 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 finding-level F&Os that are still open or only partially resolved after the F&O closure review. However, the LAR does not provide information about the propagation of changes made to the IEPRAs (includes internal floods) and/or the SPRA 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.*
- b. *Discuss how changes to the IEPRAs (includes internal floods) 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 IEPRAs (includes internal floods) will be propagated to the SPRA used to support this application.*

TVA Response to NRC DRA RAI 12

TVA Response to NRC DRA RAI 12a

Many of the Internal Events F&Os have been closed through the closure review process. The closure review was performed in accordance with the process documented in Appendix X to NEI 05-04, as well as the guidance in ASME/ANS PRA Standard (RA-Sa-2009) and RG 1.200, Revision 2. The 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. The Internal Events F&Os (including those that were closed as part of the closure review and those that remain open) have been evaluated for their impact on the SPRA. There is no impact to the WBN SPRA for any of the Internal Events F&Os.

TVA Response to NRC DRA RAI 12b

TVA procedures require that changes in PRA inputs or discovery of new information be evaluated to determine whether such information warrants PRA update (including the cumulative effect of all previously evaluated model changes that are yet to be included in the MOR). Evaluation of changes in PRA inputs, or discovery of new information, are documented using the PRA evaluation process. Potential and implemented plant configuration changes that do not meet the threshold for immediate update are tracked in a PRA Model Open Items Database. A PRA update may be performed without incorporating all changes; however, unincorporated changes must not significantly impact the model.

10 CFR 50.69(e) requires licensees to review changes to the plant, operational practices, applicable plant and industry operational experience, and, as appropriate, update the PRA and SSC categorization and treatment processes. This regulation further specifies that this review be performed in a timely manner, but no longer than once every two refueling outages. TVA intends to implement this requirement using updates to the PRA MORs (including Internal Events, Internal Flooding, Fire, Seismic, High Winds, and other External Events) when the estimated cumulative impact of plant configuration changes exceed the threshold of +/-25% of CDF or LERF. Changes resulting from random fluctuations in plant equipment unavailability or unreliability data throughout the operating cycle are not considered "configuration changes," but are captured in the periodic PRA update process notwithstanding.

In summary, if the IEPRA (including internal flooding) model is updated or upgraded, TVA will ensure the changes are evaluated to determine the impact on the SPRA model. Following the evaluation, the SPRA model will be updated if the impact of model changes exceed the threshold of +/-25% of CDF or LERF.