

NRR-DRMAPEm Resource

From: Wentzel, Michael
Sent: Friday, September 13, 2019 6:12 AM
To: 'Wells, Russell Douglas'
Cc: Hulvey, Kimberly Dawn; 'cedmondson@tva.gov'; Shoop, Undine; Saba, Farideh
Subject: Watts Bar Nuclear Plant - Request for Additional Information Related to the Application to Adopt 10 CFR 50.69 (EPID L-2018-LLA-0493)
Attachments: Watts Bar 50.69 Final Second Round Requests for Additional Information (L-2018-LLA-0493).pdf

Mr. Wells:

By letter dated November 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18334A363), as supplemented by letters dated July 15 and July 29, 2019 (ADAMS Accession Nos. ML19196A362 and ML19210D430, respectively), Tennessee Valley Authority (the licensee) submitted a license amendment request for Watts Bar Nuclear Plant, Units 1 and 2. The proposed amendments would modify the Watts Bar Nuclear Plant, Units 1 and 2 Facility Operating Licenses to implement the provisions 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) Probabilistic Risk Assessment Licensing Branch A and Risk-Informed Licensing Initiatives Team staff are reviewing the application, as supplemented, and have identified areas where additional information is necessary for the staff to complete its review. The NRC staff's request for additional information is provided in the attached. As discussed with you in a call on September 12, 2019, the NRC staff requests your response to the RAI within 45 days of the date of this email.

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

Sincerely,

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

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From: Wentzel, Michael

Created By: Michael.Wentzel@nrc.gov

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SECOND REQUEST FOR ADDITIONAL INFORMATION

REQUEST TO ADOPT

TITLE 10 OF CODE OF FEDERAL REGULATIONS 50.69

RISK INFORMED CATEGORIZATION OF STRUCTURES, SYSTEMS

AND COMPONENTS

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-390 AND 50-391

By application dated November 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18334A363), as supplemented by letters dated July 15 and July 29, 2019 (ADAMS Accession Nos. ML19196A362 and ML19210D430, respectively), Tennessee Valley Authority (the licensee), submitted a license amendment request (LAR) to adopt Title 10 of the *Code of Federal Regulations* (10 CFR) 50.69, "Risk-informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors," for the Watts Bar Nuclear Plant (WBN), Units 1 & 2.

The U.S. Nuclear Regulatory Commission (NRC) staff previously transmitted requests for additional information (RAIs) to the licensee via electronic mail on June 18, 2019 (ADAMS Accession No. ML19169A359). The licensee submitted responses to the RAIs in the supplemental letters dated July 15, 2019 and July 29, 2019.

The NRC Probabilistic Risk Assessment (PRA) Licensing Branch A (APLA) and Risk-Informed Licensing Initiatives Team (RILIT) staff have reviewed the application, as supplemented, and have identified areas where additional information is necessary for the staff to complete its technical review.

DRA RAI 01-01 – Appendix X, Close-out of Facts and Observations (APLA)

The process to close finding-level facts and observations (F&Os) is documented in Appendix X to Nuclear Energy Institute (NEI) 05-04, 07-12, and 12-13 "Close-out of Facts and Observations (F&Os)¹," as accepted, with conditions by the NRC in letter dated May 3, 2017². Section 3.3 of the LAR states that a finding closure review was conducted on the internal events (including internal floods) PRA (IEPRA) model in June 2017 and for the seismic PRA (SPRA) in April 2017. In the LAR, the licensee further confirms that the closed findings were reviewed and closed using the process documented in Appendix X to NEI 05-04, NEI 0-12, and NEI 12-13, as accepted by the NRC.

¹ Errata in title: Anderson, V. K., Nuclear Energy Institute, letter to Stacey Rosenberg, U.S. Nuclear Regulatory Commission, "Final Revision of Appendix X to NEI 05-04/07-12/12-16, 'Close-Out of Facts and Observations,'" dated February 21, 2017 (ADAMS Package Accession No. ML17086A431).

² Giitter, J., and Ross-Lee, M. J., U.S. Nuclear Regulatory Commission, letter to Mr. Greg Krueger, Nuclear Energy Institute, "U.S. Nuclear Regulatory Commission Acceptance on Nuclear Energy Institute Appendix X to Guidance 05-04, 07-12, and 12-13, Close-Out of Facts and Observations (F&Os)," dated May 3, 2017 (ADAMS Accession No. ML17079A427).

In DRA RAI 01, the NRC staff requested the licensee to either confirm that the Independent Assessment team was provided with and performed an independent written assessment that included justification of whether the resolution for each F&O constituted a PRA upgrade or maintenance update, as defined in the American Society for Mechanical Engineers/American Nuclear Society (ASME/ANS) RA-Sa-2009 PRA Standard and endorsed by Regulatory Guide (RG) 1.200, Revision 2 or perform a subsequent Independent Assessment for F&O closure or addendum to the report to address the inconsistency with Appendix X, as accepted, with conditions, by the NRC staff.

In response to DRA RAI-01.a, the licensee stated, in part:

[T]he information provided did not include a written assessment and justification of whether the resolution of each F&O, within the scope of the IA, constitutes a PRA upgrade or maintenance update as required by NEI 05-04 Appendix X Section X.1.3. The absence of this update/upgrade self-assessment did not negatively impact the ability of the IA team in performance of their review because the team based their conclusions on the merits for each F&O resolution. The team's assessment of whether the resolution constituted a PRA upgrade or maintenance update is based on consensus of the Independent Assessment team.

Without a written assessment and proper justification of whether the resolution of each F&O constitutes a PRA upgrade or maintenance update, the process performed for closure of the F&Os is not consistent with the Appendix X process as accepted, with conditions by the NRC staff. Material that is provided to a reviewer that is not complete in its entirety can lead to decisions made prematurely, in error, and are not transparent or traceable. To address the discrepancy identified, provide either of the following:

- i. Perform a subsequent Independent Assessment for F&O(s) closure to the Independent Assessment report to address the inconsistency with Appendix X, as accepted, with conditions, by the NRC staff via letter dated May 3, 2017.

OR

- ii. Provide all F&Os (i.e., intended to be closed out by the Independent Assessment) along with a disposition for each F&O that describes the impact on the 10 CFR 50.69 categorization process and justification for why it is appropriate.

DRA RAI 05-01 – Dispositions of Key Assumptions and Sources of Uncertainties (APLA/RILIT)

The regulations at 10 CFR 50.69(e) require periodic updates and, if necessary, changes to the categorization process and treatment of structures, systems, and components (SSCs). Section 3.3.2 of RG 1.200, Revision 2, states that “[f]or each application that calls upon this regulatory guide, the applicant identifies the key assumptions and approximations relevant to that application. This will be used to identify sensitivity studies as input to the decision-making associated with the application.” Section 5 of NEI 00-04 identifies sensitivity studies related to the technical adequacy of the PRA as part of the categorization process.

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., internal events, including internal floods, and the SPRA) could affect the significance of those assumptions or create new key assumptions or sources of uncertainties for this application. DRA RAI 05.b requested

the licensee to describe how the evaluation for key assumptions and sources of uncertainty is updated and modified for the PRAs supporting this application.

In response to DRA RAI 05.b, the licensee stated that a key assumption or source of uncertainty would be updated if the estimated cumulative impact exceeds the threshold of a 25 percent change to the baseline core damage frequency (CDF) or large early release frequency (LERF). The risk-informed categorization of SSCs in accordance with 10 CFR 50.69 is based on importance measures, not changes in CDF or LERF (i.e., delta CDF and delta LERF). Changes to importance measures, and consequently SSC categorization, as well as treatment of SSCs, can be impacted before reaching the threshold of a 25 percent change to the baseline CDF or LERF. To address the discrepancy identified, provide either of the following:

- i. Justify how a threshold of a 25 percent change to the baseline CDF or LERF is appropriate and bounding for determining changes to the importance measures for SSCs arising from changes to key assumptions and sources of uncertainty, and therefore, not adversely impacting the categorization and treatment of SSCs.

OR

- ii. Alternatively, describe an approach that will continue to evaluate assumptions and sources of uncertainty for categorization of SSCs, including the identification of those key to the application, when WBN PRA models are updated in the future for the PRAs supporting this application (i.e., IEPRAs (includes internal floods), and the SPRA) consistent with the guidance in NEI 00-04.

DRA RAI 07-01 - Integrated PRA Hazards Model (APLA/RILIT)

The categorization of SSCs, including those categorized using the SPRA, is based on importance measures and corresponding numerical criteria, as described in Sections 5.1 and 5.3 of NEI 00-04. Further, Section 5.6 of NEI 00-04 discusses the "integral assessment" wherein the hazard specific importance measures are weighted by the hazards contribution to the plant risk. DRA RAI 07.c requested information on how the importance measures are determined for the SPRA, considering that the seismic hazard is discretized into "bins". DRA RAI 07c further requested the licensee to describe and justify how the same basic events, which were discretized by binning during the development of the SPRA, are then combined to develop representative importance measures, as well as to discuss and justify how the importance measures are compared to the numerical criteria consistent with the guidance in NEI 00-04.

The licensee's response to DRA RAI 07.c stated that the licensee will not assess any importance measures based on a PRA one-top all hazards model. However, DRA RAI 07.c included a request for information on how importance measures are derived from the SPRA considering that the seismic hazard is discretized into "bins," including discussion of how the same basic events, which were discretized by binning during the development of the SPRA, are then combined (i.e., combined across 'bins' as well as across failure modes such as seismic and random failures) to develop representative importance measures. The licensee's response to DRA RAI-07.c did not provide any relevant information and the approach is not discussed in the LAR. Therefore, the NRC staff remains unclear on the approach that will be followed by the licensee and its alignment with the guidance in NEI 00-04.

- a. Describe how the importance measures (i.e., Fussell-Vesely [FV] and Risk Achievement Worth [RAW]) are derived from the SPRA considering that the seismic

hazard is discretized into 'bins.' The discussion should include how the same basic events, which were discretized by binning during the development of the SPRA, are then combined (i.e., combined across 'bins' as well as across failure modes such as seismic and random failures) to develop representative importance measures. Further, discuss how they are compared to the importance measure thresholds in NEI 00-04. Provide justification to support the determined impact on the categorization results and describe how the approach is consistent with the guidance in NEI 00-04.

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. The licensee's response to DRA RAI 07d stated that the importance evaluations are performed in accordance with NEI 00-04 and that some components in the Internal Events PRA may not be explicitly modeled in the SPRA. However, DRA RAI 07d included a request for information on how the integrated importance measures are calculated for certain components where corresponding basic events, which represent different failure modes for a component, in the SPRA may not align with basic events in other PRA modeled hazards. The licensee's response to DRA RAI-07.d did not provide any information relevant to that request and the approach is not apparent from the LAR. Therefore, the NRC staff remains unclear on the approach that will be followed by the licensee.

- b. Provide details and justification to support how the integrated importance measures will be calculated for the SPRA modeled basic events that may not align directly with basic events modeled in other PRA hazards. Include discussion for any 'mapping' that will be performed across the SPRA basic events and those in other PRA modeled hazards where additional modelling is determined to be necessary.

DRA RAI 12-01 – Propagation of Closed and Open/Partially Open Findings from DRA RAI 08 (RILIT)

The regulations at 10 CFR 50.69(e) require periodic updates and, if necessary, changes to the categorization process and treatment of SSCs. According to Sections 7-1.2 and 8-1.2 of the 2009 ASME/ANS PRA Standard, it is assumed that a 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.

DRA RAI 12.b requested the licensee to describe how changes to the IEPRA (which 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 IEPRA (includes internal floods) will be propagated to the SPRA used to support this application.

In its response to DRA RAI 12b, the licensee stated that changes to the PRAs supporting this application would be performed if the estimated cumulative impact exceed the threshold of a 25 percent change to the baseline CDF or LERF. The risk-informed categorization of SSCs in accordance with 10 CFR 50.69 is based on importance measures, not changes in CDF or LERF (i.e., delta CDF and delta LERF). Changes to importance measures, and, consequently, SSC categorization, as well as treatment of SSCs, can be impacted before reaching the threshold of a 25 percent change to the baseline CDF or LERF. To address the discrepancy identified, provide either of the following:

- i. Justify how a threshold of a 25 percent change to the baseline CDF or LERF is appropriate and bounding for determining the impact of changes to PRAs supporting this application on the importance measures and therefore, the categorization and treatment of SSCs consistent with the requirements in

10 CFR 50.69(e) and the guidance in NEI 00-04.

OR

- ii. Alternately, describe an approach that will propagate changes in the internal events, including internal flooding, PRA to the SPRA that is consistent with the requirements in 10 CFR 50.69(e) and the guidance in NEI 00-04 for appropriate categorization of SSCs.