



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

August 18, 2017

Mr. Joseph W. Shea, Vice President  
Nuclear Regulatory Affairs  
and Support Services  
Tennessee Valley Authority  
1101 Market Street, LP 3R-C  
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 – REQUEST FOR  
ADDITIONAL INFORMATION RELATED TO LICENSE AMENDMENT  
REQUEST TO REVISE MODIFICATIONS AND IMPLEMENTATIONS RELATED  
TO NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805  
PERFORMANCE-BASED STANDARD FOR FIRE PROTECTION FOR LIGHT  
WATER REACTOR GENERATING PLANTS (CAC NOS. MF9814, MF9815,  
AND MF9816)

Dear Mr. Shea:

By letter dated June 7, 2017, Tennessee Valley Authority (TVA or the licensee) submitted a license amendment request to revise certain modifications and an implementation item related to its risk-informed, performance-based fire protection program (RI/PB FPP) at the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (Browns Ferry). The modifications and the implementation item are required to be completed as part of Browns Ferry's transition to a RI/PB FPP in accordance with Title 10 of the *Code of Federal Regulations*, Section 50.48(c), National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants."

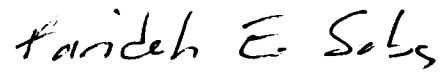
The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittal and determined that additional information is needed. On July 26, 2017, the NRC staff forwarded, by electronic mail, a draft request for additional information (RAI) to TVA. On August 3, 2017, the NRC staff held a conference call to provide the licensee with an opportunity to clarify any portion of the draft RAI and discuss the timeframe for which TVA may provide the requested information. As agreed to by NRC and TVA staff during the conference call, TVA will respond to the enclosed RAI by September 18, 2017. In addition, TVA staff confirmed that the enclosed RAI does not contain any sensitive information.

J. Shea

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If you have any questions, please contact me at 301-415-1447 or [Farideh.Saba@nrc.gov](mailto:Farideh.Saba@nrc.gov).

Sincerely,

A handwritten signature in black ink that reads "Farideh E. Saba". The signature is written in a cursive style with a large, stylized 'F' and 'S'.

Farideh E. Saba, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260, and 50-296

Enclosure:  
Request for Additional Information

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REQUEST FOR ADDITIONAL INFORMATION  
LICENSE AMENDMENT REQUEST TO REVISE MODIFICATIONS AND  
IMPLEMENTATIONS RELATED TO  
NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805  
PERFORMANCE-BASED STANDARD FOR FIRE PROTECTION  
FOR LIGHT WATER REACTOR GENERATING PLANTS  
TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3  
DOCKET NOS. 50-259, 50-260, AND 50-296

By letter dated June 7, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17158B285), Tennessee Valley Authority (TVA or the licensee) submitted a license amendment request (LAR) to revise certain modifications and an implementation item related to its risk-informed, performance-based fire protection program (RI/PB FPP) at the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (Browns Ferry). The modifications and the implementation item are required to be completed as part of Browns Ferry transition to a RI/PB FPP in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.48(c), National Fire Protection Association (NFPA) 805 Standard, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants."

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the information provided by TVA and determined that additional information as discussed below is needed to complete the review.

Probabilistic Risk Assessment (PRA)-Request for Addition Information (RAI) 01

In Enclosure 1 of the licensee's letter dated June 7, 2017, the licensee provided its basis for the proposed changes.

In Change Request 1, the licensee proposed to revise Table S-2 Plant Modifications 52a and 52b (PM-52a and b) to clarify the modification descriptions.

The licensee proposed to change PM-52a from: "For Drywell wide range pressure instruments P-64-160A and B, provide isolation of associated circuits and make appropriate power supply available such that both division instruments are not lost in the same fire scenario," to "Modify power supplies and associated circuits for drywell pressure indication instruments such that indication is available in the MCR [main control room] for all fire scenarios except those in Fire Area (FA) 16."

The licensee proposed to change PM-52b from: "Provide containment pressure indication on the Backup Control Panel," to "Provide isolation from circuits in FA 16 for containment pressure indication on the Backup Control Panel."

In Change Request 2, the licensee proposed to delete Plant Modification 84 (PM-84) from Table S-2. Modification 84 reduced the time overcurrent setting (TOC) for breakers 1126, 1132, 1226, and 1232 in the offsite power circuits so that the breakers would trip prior to incurring any thermal damage. Thus, the modification would enable subsequent recovery actions to clear the spurious loads and reclose the off-site power breakers. Competing design elements were identified during the design process that limit the amount that the TOC settings could be reduced.

NFPA 805, Section 4.2.4.2, requires that the “use of fire risk evaluation for the PB [performance-based] approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins.”

In the risk impact discussion for the proposed Change Request 1, the licensee stated that “the final modification is expected to be equal to or better than the modification originally described in Table S-2 of the NFPA 805 LAR with respect to fire risk.”

In the risk impact discussion for the proposed Change Request 2, the licensee calculated the change in risk and total risk for Units 1, 2, and 3. However, the licensee did not evaluate the change in risk from the compliant NFPA 805 PRA model, and thus did not establish that Regulatory Guide (RG) 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” Revision 2, (ADAMS Accession No. ML100910006), guidelines would have been met if the proposed configurations had been part of the NFPA 805 LAR upon which the NRC staff safety evaluation (SE) was based.

- A. Provide the change in core damage frequency (CDF) and large early release frequency (LERF), and total CDF and LERF for Units 1, 2, and 3 with both Change Requests 1 and 2 integrated simultaneously into the PRA results for the transition plant.
  - (1) Calculate the change in risk using the compliant PRA model supporting the NFPA 805 SE, adjusted for Change Requests 1 and 2 as appropriate. Summarize any changes made to the compliant PRA model due to proposed Change Requests 1 and 2. Alternately, provide a justification for the choice of another compliant PRA model.
  - (2) Indicate how the risk from these plant changes compares with the guidelines in RG 1.174, Revision 2.
- B. Confirm that Option A of the NRC letter to Nuclear Energy Institute (NEI), “Recommended Content for License Amendment Requests that Seek Changes to License Conditions that were Established in Amendments to Adopt National Fire Protection Association Standard 805, but Have Yet to be Fully Implemented,” dated March 2, 2016 (ADAMS Accession No. ML16015A416), is still appropriate for this proposed LAR, given the new risk analysis to be performed. If not, provide the necessary information for Option B or C, whichever is appropriate.

### PRA RAI 02

In the Defense-in-Depth/Safety Margin Discussion for the proposed change 1, the licensee stated that “the changes to drywell pressure instrumentation made available through PM-52 (a, b, and c) do not affect any defense-in-depth (DID) or Safety Margin.”

NFPA 805, Section 4.2.4.2, requires that the “use of fire risk evaluation for the PB approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins.”

NEI 04-02, “Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c),” Revision 2 (ADAMS Accession No. ML081130188), Section 5.3.5.3, “Safety Margins,” lists two specific criteria that should be addressed when considering the impact of plant changes on safety margins:

- Codes and standards or their alternatives accepted for use by the NRC are met; and,
- Safety analysis acceptance criteria in the licensing basis (e.g., FSAR [Final Safety Analysis Report], supporting analyses, etc.) are met, or provides sufficient margin to account for analysis and data uncertainty.

Based on the information provided by the licensee, the NRC is unable to complete its review because the application did not provide sufficient information regarding the acceptability of DID and safety margins for this proposed change. Provide the following:

- A. A discussion regarding DID that includes the basis for why the proposed changes do not impact each echelon of DID.
- B. A discussion of safety margins that includes the basis for why the proposed changes do not impact the safety margin criteria discussed in NEI 04-02.

### PRA RAI 03

In the DID/Safety Margin Discussion for the proposed Change Request 2, the licensee stated that “non-implementation of PM-84 does not affect DID Echelons 2 or 3.” No basis is cited for its conclusion with respect to Echelon 3, “Provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed,” even though the removal of the PM-84 no longer prevents the failure of the offsite power supply to inventory makeup and decay heat removal systems for the fire-induced spurious operation cited in the discussion on this modification.

NFPA 805, Section 4.2.4.2, requires that the “use of fire risk evaluation for the PB approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins.”

Provide a justification that Echelon 3 of DID is still sufficiently robust after removal of modification, PM-84.

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