



1101 Market Street, Chattanooga, Tennessee 37402

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

Browns Ferry Nuclear Plant, Units 1, 2, and 3  
Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68  
NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: **Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Probabilistic Risk Assessment Follow Up (60-Day Responses)**

- References:
1. Letter from TVA to NRC, "License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 Edition) (Technical Specification Change TS-480)," dated March 27, 2013 (ADAMS Accession No. ML13092A393)
  2. Letter from TVA to NRC, "Response to NRC Request to Supplement License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187)," dated May 16, 2013 (ADAMS Accession No. ML13141A291)
  3. Letter from NRC to TVA, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (TAC Nos. MF1185, MF1186, and MF1187)," dated November 19, 2013 (ADAMS Accession No. ML13298A702)
  4. Letter from TVA to NRC, "Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Set 1," dated December 20, 2013 (ADAMS Accession No. ML13361A093)

5. Letter from TVA to NRC, "Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Set 2," dated January 10, 2014 (ADAMS Accession No. ML1401A088)
6. Letter from TVA to NRC, "Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Set 3," dated January 14, 2014 (ADAMS Accession No. ML14077A201)
7. Letter from TVA to NRC, "Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Set 4," dated February 13, 2014 (ADAMS Accession No. ML14055A305)
8. Letter from TVA to NRC, "Response to NRC Request for Additional Information Regarding the License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants for the Browns Ferry Nuclear Plant, Units 1, 2, and 3 (TAC Nos. MF1185, MF1186, and MF1187) - Set 5," dated March 14, 2014 (ADAMS Accession No. ML14079A159)
9. Letter from NRC to TVA, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805, Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (TAC Nos. MF1185, MF1186, and MF1187)," dated July 31, 2014 (ADAMS Accession No. ML14203A125)

By letter dated March 27, 2013 (Reference 1), Tennessee Valley Authority (TVA) submitted a license amendment request (LAR) for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, to transition to National Fire Protection Association Standard (NFPA) 805. In addition, by letter dated May 16, 2013 (Reference 2), TVA provided information to supplement the Reference 1 letter.

By letter dated November 19, 2013 (Reference 3), the NRC staff requested additional information to support the review of the License Amendment Request (LAR). By letters dated December 20, 2013, January 10, 2014, January 14, 2014, February 13, and March 14, 2014

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(References 4, 5, 6, 7, and 8, respectively), TVA responded to the NRC staff's request for additional information (RAI).

By letter dated July 31, 2014 (Reference 9), the NRC provided a follow-up RAI specific to the probabilistic risk assessment. The required due dates for responding to the RAI varied from 60 days to 162 days.

Enclosure 1 provides the first set of TVA responses to some of the RAIs identified in the Reference 9 letter. As stated in the Reference 9 letter, these responses are nominal 60 day responses and are due by September 9, 2014. In addition, Enclosure 2 provides a listing of all RAIs listed in the Reference 9 letter and the actual date of the TVA response to each of the RAIs.

Consistent with the standards set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.92(c), TVA has determined that the additional information, as provided in this letter, does not affect the no significant hazards consideration associated with the proposed application previously provided in Reference 1.

There are no new regulatory commitments contained in this submittal. Please address any questions regarding this submittal to Mr. Edward D. Schrull at (423) 751-3850.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 29th day of August 2014.

Respectfully,



J. W. Shea  
Vice President, Nuclear Licensing

Enclosure:

1. TVA Response to NRC Request for Additional Information: PRA Follow-Up RAIs (60-day)
2. Summary of BFN NFPA 805 PRA Follow-Up RAI Response Dates

cc (Enclosure):

NRC Regional Administrator – Region II  
NRC Senior Resident Inspector – Browns Ferry Nuclear Plant  
NRC Project Manager - Browns Ferry Nuclear Plant  
State Health Officer, Alabama State Department of Health

## ENCLOSURE 1

**Tennessee Valley Authority  
Browns Ferry Nuclear Plant, Units 1, 2, and 3  
TVA Response to NRC Request for Additional Information: PRA Follow-Up RAIs (60-day)**

### **Probabilistic Risk Assessment (PRA) Request for Additional Information (RAI) 14.01**

In a letter dated January 10, 2014, (ADAMS Accession No. ML14014A088) the licensee submitted revisions to Implementation Items 32 and 33 proposed in the response to PRA RAI 14. The revisions do not provide a plan of action should the change in risk exceed risk acceptance guidelines. Include information in the response to explain the path forward should risk acceptance guidelines be exceeded subsequent to completion of PRA-credited modifications and implementation items.

#### **RESPONSE:**

License Amendment Request (LAR) Attachment S, Table S-3, Implementation Items 32 and 33 are the Tennessee Valley Authority (TVA) commitments to update the Fire PRA model to reflect design modifications and fire response human actions. These two implementation items were revised in the response to PRA RAI 14 in the letter dated January 10, 2014 (ADAMS Accession No. ML14014A088). TVA further revises Implementation Items 32 and 33, as follows, to provide a plan of action should the change in risk exceed risk acceptance guidelines.

Implementation Item 32 is revised to read: "Update the Fire PRA HRA [Human Reliability Analysis] model after all modifications are complete (returned to operation) and in their as-built configuration. The update will include a verification of the validity of the reported change in risk on as-built conditions after the modifications are completed. If this verification determines that the risk metrics have changed such that the RG 1.174 acceptance guidelines are not met, the Nuclear Regulatory Commission (NRC) will be notified and additional analytical efforts, and/or procedure changes, and/or plant modifications will be made to assure the RG 1.174 risk acceptance criteria are met."

Implementation Item 33 is revised to read: "Update the Fire HRA calculation upon completion of all procedure updates, all modifications and all training. The update will include a verification of the validity of the reported change in risk on as-built conditions after the procedures updates, modifications, and training are completed. If this verification determines that the risk metrics have changed such that the RG 1.174 acceptance guidelines are not met, the NRC will be notified and additional analytical efforts, and/or procedure changes, and/or plant modifications will be made to assure the RG 1.174 risk acceptance criteria are met."

The revised implementation items will ensure that the Fire PRA model and Fire HRA are reviewed when a modification or procedure change is finalized to ascertain deltas from the as-modeled configuration to the as-built, as-operated configuration and to make appropriate updates and that appropriate actions will be taken in the event risk acceptance guidelines are not met. Verification of the validity of the reported risk results will be performed as the Fire PRA model and Fire HRA are updated.

**PRA RAI 20.01**

In the letter dated March 14, 2014, the licensee responded to PRA RAI 20 stating that the Fire PRA models for the post-transition and compliant plants will be revised to credit those existing, non-fire-specific operator actions that occur outside the control room; however, the response does not address those taken internal to the control room. Clarify the treatment of existing, non-fire-specific operator actions taken internal to the control room consistent with PRA RAI 20.

**RESPONSE:**

Existing, non-fire-specific operator actions taken internal to the control room are credited in both the post-transition and compliant plants. TVA will continue to credit non-fire-specific operator actions taken internal to the control room in the post-transition and compliant plants when the models are revised to include the non-fire specific operator actions that occur outside the control room.

## **PRA RAI 22.01**

In a letter dated December 20, 2013, the licensee's response to PRA RAI 22 indicates that the Option No. 2 "formula" method of Task 10 in NUREG/CR-6850 was used to estimate the circuit failure probabilities (CFPs) in the Fire PRA. Provide updated risk results as part of the integrated analysis requested in PRA RAI 24, estimating CFPs using the interim technical guidance.

### **Response**

In the response to PRA RAI 22 submitted in the letter dated December 20, 2013 (ADAMS Accession Number ML13361A093), TVA stated that NUREG/CR-6850, Option 2, was used to estimate circuit failure probabilities in the Fire PRA. Subsequent to submitting the response to PRA RAI 22, TVA determined that NUREG/CR-7150, Volume 2, should be used to estimate circuit failure probabilities in the Fire PRA instead of NUREG/CR-6850, Option 2. Therefore, the updated risk results provided as part of the integrated analysis requested in PRA RAI 24 will estimate the CFPs using NUREG/CR-7150 Volume 2. Option 2 of Task 10 in NUREG/CR-6850 will no longer be utilized in the Fire PRA model.

## ENCLOSURE 2

### Tennessee Valley Authority Browns Ferry Nuclear Plant, Units 1, 2, and 3

#### Summary of BFN NFPA 805 PRA Follow-Up RAI Response Dates

RAI Question Number	Date and Type of Response	Actual Date of Response
Probabilistic Risk Assessment (PRA) Follow-up RAIs		
PRA 01.r.01	10/7/2014 (90)	Future Letter
PRA 04.01	10/7/2014 (90)	Future Letter
PRA 04.c.01	10/7/2014 (90)	Future Letter
PRA 04.k.01	10/7/2014 (90)	Future Letter
PRA 04.l.01	10/7/2014 (90)	Future Letter
PRA 10.c.01	10/7/2014 (90)	Future Letter
PRA 14.01	9/9/2014 (60)	CNL-14-147 September 9, 2014
PRA 19.a.01	12/17/2014 (162)	Future Letter
PRA 19.b.01.i	10/7/2014 (90)	Future Letter
PRA 19.b.01.ii	10/7/2014 (90)	Future Letter
PRA 19.b.01.iii	12/17/2014 (162)	Future Letter
PRA 20.01	9/9/2014 (60)	CNL-14-147 September 9, 2014
PRA 22.01 - Discussion of method	9/9/2014 (60)	CNL-14-147 September 9, 2014
- Updated risk results	12/17/2014 (162)	Future Letter
PRA 24.a	12/17/2014 (162)	Future Letter
PRA 24.b	10/7/2014 (90)	Future Letter
PRA 24.c	12/17/2014 (162)	Future Letter
PRA 24.d	10/7/2014 (90)	Future Letter