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

February 25, 2016

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
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 REGARDING EXTENDED POWER UPRATE (CAC NOS. MF6741, MF6742, AND MF6743)

Dear Mr. Shea:

By letter dated September 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15282A152), as supplemented by letters dated November 13, December 15, and December 18, 2015 (ADAMS Accession Nos. ML15317A361, ML15351A113, and ML15355A413, respectively), Tennessee Valley Authority (TVA or the licensee) submitted a license amendment request (LAR) for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The proposed amendment would increase the authorized maximum steady-state reactor core power level for each unit from 3,458 megawatts thermal (MWt) to 3,952 MWt. This LAR represents an increase of approximately 20 percent above the original licensed thermal power level of 3,293 MWt, and an increase of approximately 14.3 percent above the current licensed thermal power level of 3,458 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittals and determined that additional information is needed. On January 26, 2016, the NRC staff forwarded, by electronic mail, a draft of the staff's request for additional information (RAI) to TVA. On February 1, 2015, TVA informed the NRC staff that no clarification call is needed. The official questions are found in the enclosed RAI. This request was discussed with Mr. Daniel Green of your staff, and it was agreed that TVA would respond by March 18, 2016.

If you have any questions, please contact me at 301-415-1447 or Farideh.Saba@nrc.gov.

Sincerely,

Farideh E Saba

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 REGARDING EXTENDED POWER UPRATE

TENNESSEE VALLEY AUTHORITY

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

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

By letter dated September 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15282A152), as supplemented by letters dated November 13, December 15, and December 18, 2015 (ADAMS Accession Nos. ML15317A361, ML15351A113, and ML15355A413, respectively), Tennessee Valley Authority (TVA) submitted a license amendment request (LAR) for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The proposed amendment would increase the authorized maximum steady-state reactor core power level for each unit from 3,458 megawatts thermal (MWt) to 3,952 MWt. This LAR represents an increase of approximately 20 percent above the original licensed thermal power level of 3,293 MWt, and an increase of approximately 14.3 percent above the current licensed thermal power level of 3,458 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff from the Radiation Protection and Consequence Branch (ARCB), Division of Risk Assessment, Office of Nuclear Reactor Regulation, reviewed the impact of implementing the proposed power increase on the design-basis accidents (DBAs) currently analyzed in the BFN updated final safety analysis report. The NRC staff used Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000 (ADAMS Accession No. ML003716792) to perform the NRC staff's review. The NRC staff from ARCB determined that the following information is needed to complete the review of TVA's dose analysis (DA).

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In an effort to ensure a complete and accurate review of the dose consequence analyses, please provide additional information (preferably in tabular form) describing, for each DBA affected by the proposed extended power uprate (EPU), all the basic parameters and assumptions used in the dose consequence analyses (See Issue 1 of NRC Regulatory Issue Summary (RIS) 2006-04, "Experience with Implementation of Alternative Source Terms" (ADAMS Accession No. ML053460347). Please provide the current licensing basis (CLB) and the revised EPU input values, assumptions, and methods, as well as a justification for any changes to the CLB. Please identify which of these parameters were not previously reviewed and approved by the NRC and provide a justification for the change from the previously reviewed values to the CLB.

The NRC staff notes that some of the requested information has been provided in textual form in Section 2.9.2, "Radiation Sources in Reactor Coolant," of NEDC-33860P, Revision 0, "Safety Analysis Report for Browns Ferry Nuclear Power Plant, Units 1, 2, and 3, Extended Power

Uprate," dated September 21, 2015, provided in Attachment 6 of the LAR (hereafter "Section 2.9.2"). The NRC staff requests that the information in Section 2.9.2 be expanded to include all of the basic parameters, whether or not the individual parameter is being changed for the EPU amendment. The staff also finds it helpful if the information is presented in separate tables for each affected accident (loss-of-coolant accident (LOCA), control rod drop accident (CRDA), main steamline break accident (MSLBA), and fuel handling accident (FHA)). Please state if each accident's methods, inputs, assumptions, and results have not changed from those reviewed and approved by the NRC in "Reference 72" ["Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Issuance of Amendments Regarding Full-Scope Implementation of Alternative Source Term (TAC Nos. MB5733, MB5734, MB5735, MC0156, MC0157 and MC0158) (TS-405)," September 27, 2004 (ADAMS Accession No. ML042730028)].

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The LAR stated that analysis methods were not changed from those used in "Reference 72" for the CRDA. The LAR also stated that the analysis was performed based on plant operation at the EPU power level of 3,952 MWt, and the updated design inputs were confirmed to remain applicable or bounding for the EPU conditions. Confirm that the revised analyses are performed at 102 percent of the proposed EPU power level. If the revised analyses are performed at the EPU power level (3,952 MWt), explain how Regulatory Position 3.1 (footnote 8) of RG 1.183 is met, or justify why an uncertainty factor is not used in the CRDA analysis.

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Section 2.9.2 states that the LOCA analysis methods were not changed from those used in "Reference 72" and that all significant design-basis inputs and assumptions are the same as those in "Reference 72." The LOCA dose results provided by TVA in the application, and the supplements reviewed by the staff for "Reference 72," do not appear to match the LOCA consequences provided for the LOCA in the EPU LAR, Table 2.9-6, "LOCA Radiological Consequences." Therefore, it appears that the LOCA consequences have been updated since the NRC approval in "Reference 72." If the analysis methods, and all significant design-basis inputs and assumptions in the EPU LOCA analysis are the same as those in "Reference 72," explain why the EPU LOCA analysis consequences do not match the "Reference 72" LOCA analysis consequences.

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Section 2.9.2 states that the post-LOCA doses for the technical support center (TSC) were analyzed for the EPU, and the analyses methods were not changed from "Reference 72." Section 2.9.2 also states that the TSC is at the same location as the control room within the control room habitability zone. Thus, the same atmospheric dispersion factors were used to calculate the dose at the TSC receptor, but no other details on how the TSC doses were calculated are provided.

Please provide sufficient information regarding the methodology, inputs, and assumptions used to calculate the TSC doses so that the NRC staff can independently calculate the TSC doses for the CRDA, MSLBA, and FHA. Also, please provide a simplified diagram of the TSC ventilation system and explain in further detail the operation of the TSC, including the specific flow rates through the components during normal and accident conditions.

If you have any questions, please contact me at 301-415-1447 or Farideh.Saba@nrc.gov.

Sincerely,

/RA/

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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ADAMS Accession No.: ML16040A232 *** By an email**

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