



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

June 3, 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, as supplemented by letters dated November 13, December 15 (2 letters), and December 18, 2015, Tennessee Valley Authority (TVA) submitted a license amendment request for the Browns Ferry Nuclear Plant, 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 license amendment request 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.

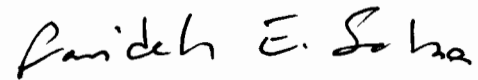
The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittals and determined that additional information is needed. On May 6, 2016, the NRC staff forwarded, by electronic mail, a draft request for additional information (RAI) to TVA. On May 12, 2016, Mr. Daniel Green of TVA informed the NRC staff that a clarification call is not requested and the draft RAI does not contain any sensitive or proprietary information. As agreed to by the NRC and TVA staff, TVA will respond to the enclosed RAI by June 24, 2016.

J. Shea

- 2 -

If you have any questions, please contact me at 301-415-1447 or 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 initial '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

cc w/enclosure: Distribution via Listserv

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 (2 letters), and December 18, 2015 (ADAMS Accession Nos. ML15317A361, ML15351A097, ML15351A113, and ML15355A413, respectively), Tennessee Valley Authority (TVA, the licensee) submitted a license amendment request (LAR) for 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 megawatt 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 NRC staff from the Balance of Plant Branch (SBPB), Division of Safety Systems, Office of Nuclear Reactor Regulation reviewed the information the licensee provided and determined that the following additional information is required in order to complete the evaluation.

SBPB-RAI [Request for Additional Information] 4

Regulatory Bases:

The following regulations and requirements are applicable to this RAI:

- Section 50.67, "Accident Source Term," of Title 10 of *Code of Federal Regulations* (10 CFR)
- Regulatory Guide 1.183 "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," Regulatory Position 1.5 "Submittal Requirements" as summarized below:

According to 10 CFR 50.90, an application for an amendment must fully describe the changes desired and should follow, as far as applicable, the form prescribed for original applications. Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR [Light-Water Reactor] Edition)" (Ref. 16), provides additional guidance. The NRC staff's finding that the amendment may be approved must be based on the licensee's analyses, since it is these analyses that will become part of the design basis of the facility. The amendment request should describe the licensee's analyses of the radiological and non-radiological impacts of the proposed modification in sufficient detail to support review by the NRC staff.

Enclosure

Plant Specific Technical Specification (TS) proposed change:

Current Surveillance Requirement (SR):

SR 3.6.3.1.1 "Verify \geq 2500 gal [gallons] of liquid nitrogen are contained in each nitrogen storage tank." (Frequency: 31 days).

Proposed SR:

SR 3.6.3.1.1 "Verify \geq 2615 gal of liquid nitrogen are contained in each nitrogen storage tank." (Frequency: 31 days).

The staff notes that the BFN Updated Final Safety Analysis Report (UFSAR) (BFN-26) Chapter 5, Section 5.2.6 "Combustible Gas Control in Primary Containment" and Chapter 14, Section 14.6.3.5 "Fission Product Release From Primary Containment" and Section 14.6.3.6 "Fission Product Release to Environs" provides two different values for containment exhaust flow rates for the containment atmosphere dilution (CAD) system. Chapter 5 provides a flow rate of 100 ft³/min (cubic feet per minute (cfm)), whereas Chapter 14 provides a flow rate of 139 cfm. In particular, Section 14.6.3.6d reads "The Containment Atmospheric Dilution (CAD) system operates for a period of 24 hours at a flow rate of 139 cfm at 10 days, 20 days, and 29 days post-accident. This flow is filtered via the SGTS [Standby Gas Treatment System] filters."

The staff reviewed Section 2.6.4 "Combustible Gas Control in Containment" and Figures 2.6-1 through 2.6-4 of LAR Attachments 8 (proprietary) and 9 (non-proprietary). Attachment 9 reads in part:

Technical Specification (TS) 3.6.3.1 "Containment Atmospheric Dilution (CAD) System," requires that 2500 gallons of liquid nitrogen (191,000 scf [standard cubic feet]) be stored in each of two tanks to meet the CAD system inerting requirements. As a result of increased production rate of radiolytic gas following EPU [extended power uprate], the required 7-day volume of nitrogen to satisfy TS 3.6.3.1 increases to 2615 gallons (200,000 scf) from 2108 gallons (161,200 scf) under CLTP [current licensed thermal power] conditions, which exceeds the available 2500 gallons (191,000 scf) supply required by TS 3.6.3.1. Analysis of the containment pressure buildup as a result of continuing CAD operation, under EPU conditions, shows that the containment repressurization limit of 30 psig [pounds per square inch gauge] is reached 15 days post-LOCA [loss-of-coolant accident], compared to 18 days under CLTP conditions.

The NRC staff could not determine from the information contained in the LAR submittal of September 21, 2015, the BFN Alternate Source Term LAR, or the subsequent license amendment, whether the increase in required liquid nitrogen volume (i.e., from 2500 to 2615 gal) per SR 3.6.3.1.1 factored into the Chapter 14 CAD system flowrate of 139 cfm to the SGTS and ultimately to the plant environs via the plant stack.

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

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/RA/

Farideh E. Saba, Senior Project Manager
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ADAMS Accession No. ML16145A158

*by memorandum

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