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

January 28, 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. MF4851, MF4582, AND MF4853)

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, 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 U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittals and determined that additional information is needed. On January 15, 2016, the NRC staff forwarded, by electronic mail, a draft request for additional information (RAI) to TVA. On January 21, 2016, 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. The RAI is enclosed. As agreed by the NRC and TVA staff during the conference call, TVA will respond to this RAI by February 16, 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

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The U.S. Nuclear Regulatory Commission (NRC) staff from the Electrical Engineering Branch (EEEB) and Steam Generator Tube Integrity and Chemical Engineering Branch (ESGB), Division of Engineering reviewed the information the licensee provided and determined that the following additional information is required in order to complete the evaluation.

EEEB-Request for Additional Information (RAI) 1

In Section 3.0 of Attachment 43, the licensee states:

> The [TSS] study evaluated the performance of the 500 kV [kilovolt] and 161 kV offsite power systems during a DBE [design-basis event] under EPU [extended power uprate] conditions. Bus voltages observed during the simulation are compared to acceptance criteria to determine adequacy of the offsite power supply. The TSS considered a loss of the largest single supply to the grid, loss of the largest single load, loss of the nuclear unit, and loss of each bulk transmission line in the TVA transmission system, including all the lines coming into the BFN switchyard. The study used base cases from both 2015 (pre-EPU) and 2019 (post-EPU) to address the load flow analysis at EPU conditions.

A. Provide the acceptable voltage range of BFN 500 kV and 161 kV offsite power acceptance criteria. Also, clarify whether the voltage criteria corresponding to post-EPU conditions has been agreed upon by the transmission system operator.

B. Provide a summary of the cases studied, with diagrams to verify that the voltage criteria is met under the following post-EPU conditions:

i. loss of the largest load (identify the load),
ii. loss of the largest generator (identify the generator), and
iii. loss of the most critical transmission line (identify the line).

EEEB-RAI 2

In Section 2.3.3.1 of Attachment 7, "Safety Analysis Report for Browns Ferry Nuclear Plant Units 1, 2, and 3 Extended Power Uprate," the licensee states:

> The larger condensate pump motors (1,250 horsepower (hp)), CBP motors (3,000 hp) and reactor recirculation pump motors (8,657 hp) do not change the conclusions of the current Browns Ferry degraded voltage analysis. The analysis encompasses the safety-related 4.16 kV [kilovolts] buses and is independent of voltage profiles for the balance of plant buses [BOP].

Provide a summary of the degraded voltage analysis corresponding to post-EPU conditions. Also, provide single line diagram(s) showing the safety-related 4.16 kV buses with their connected loads and power sources and the BOP buses with their connected loads and power sources.

EEEB-RAI 3

In Section 2.3.3.2 of Attachment 7, the licensee states:

> The analytical electrical system computer model developed for Browns Ferry updated the main power transformer size to reflect the recent change of main power transformers and the proposed changes to the main generators and condensate pumps.

Provide a description of the proposed changes, including the ratings, to the main generators.

EEEB-RAI 4

In Section 2.3.2.2 of Attachment 7, the licensee states:

> The Unit 1, Unit 2 and Unit 3 isolated phase bus (IPB) duct work, cooling coils and fans have been modified to increase the continuous current rating to provide for operation at EPU output.

Provide the IPB duct current rating and the continuous current requirement for EPU conditions to show the adequacy of the IPB duct to support operation under EPU conditions. Also, provide a description of the modifications made to the IPB duct, cooling coils, and fans, to increase the continuous current rating for operating at EPU conditions.

ESGB-RAI 1

In Section 10.3.6 of the Updated Final Safety Analysis Report, and in information provided in the supplemental letter dated December 15, 2015, it is indicated that a Boral neutron absorber monitoring program is used at BFN, Units 1, 2, and 3. The intent of the monitoring program is to manage potential reduction of neutron-absorbing capacity and loss of material due to general corrosion. However, in the sources mentioned, there is minimal information describing the Boral monitoring program. For this reason, please provide a brief description of the monitoring program. The information provided should include the following discussion:

A. If test specimens (i.e., coupons) are used:

   i. Define the periodicity for evaluation.
   ii. Provide the number of coupons available.
   iii. Describe any adverse conditions identified from coupon evaluation thus far.
   iv. Discuss the ambient conditions for the coupons in the spent fuel pool (e.g., surrounded by freshly discharged spent fuel assemblies).
   v. Discuss whether coupons are returned to the spent fuel pool after inspection.

B. If coupons are not used, discuss the periodicity of surveillance.

C. Describe the types of tests performed during the periodic inspection.

   a. Describe the test procedure.
   b. Discuss whether neutron-attenuation testing is performed to determine the boron-10 (B-10) areal density of the absorber material during periodic testing.

D. Define the acceptance criteria for the surveillance program, including what constitutes an adverse condition.

E. Describe those measures taken to address a failure to meet the acceptance criteria for either the surveillance program and/or the B-10 areal density.

F. Address any adverse conditions, other than identified corrosion, which may be identified during testing, and whether different acceptance criteria apply to those other adverse 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
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ADAMS Accession No.: ML16020A111 *by memorandum **by e-mail

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NAME	GKulesa	BBeasley	FSaba
DATE	1/13/2016	1/28/2016	1/28/2016

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