

**From:** Green, Kimberly  
**Sent:** Wednesday, February 16, 2022 10:36 AM  
**To:** Orf, Tracy J  
**Subject:** Request for Additional Information Regarding TVA's Request to Expand the SFP Criticality Safety Analysis for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (EPID L-2021-LLA-0097)  
**Attachments:** Final RAI.pdf

Dear Mr. Orf,

By letter dated May 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21150A022), Tennessee Valley Authority (TVA) submitted license amendment requests for Browns Ferry Nuclear Plant (Browns Ferry), Units 1, 2, and 3. The proposed requests seek approval to expand the spent fuel pool criticality safety analysis of record for all three Browns Ferry units to include the ATRIUM 11™ fuel design.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittal and has identified areas where additional information is needed to complete its review. A draft request for additional information (RAI) was previously transmitted to you by email dated January 27, 2022. Based on TVA's review of the draft RAI, you stated that a clarification call was unnecessary.

A response to the attached RAI is requested within 30 days from the date of this email.

The NRC staff considers that timely responses to RAIs will help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If you have any questions or if circumstances result in the need to revise the requested response date, please contact me at (301) 415-1627 or via email at [Kimberly.Green@nrc.gov](mailto:Kimberly.Green@nrc.gov).

Sincerely,  
Kimberly J. Green, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

**Hearing Identifier:** NRR\_DRMA  
**Email Number:** 1525

**Mail Envelope Properties** (SA9PR09MB54714BAE38AE21BEA2ED0F6B8F359)

**Subject:** Request for Additional Information Regarding TVA's Request to Expand the SFP  
Criticality Safety Analysis for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (EPID L-2021-LLA-0097)  
**Sent Date:** 2/16/2022 10:35:46 AM  
**Received Date:** 2/16/2022 10:35:00 AM  
**From:** Green, Kimberly

**Created By:** Kimberly.Green@nrc.gov

**Recipients:**  
"Orf, Tracy J" <tjorf@tva.gov>  
Tracking Status: None

**Post Office:** SA9PR09MB5471.namprd09.prod.outlook.com

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	1513	2/16/2022 10:35:00 AM
Final RAI.pdf	86647	

**Options**  
**Priority:** Normal  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**

REQUEST FOR ADDITIONAL INFORMATION  
TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3  
DOCKET NOS. 50-259, 50-260, AND 50-296  
REVISED CRITICALITY SAFETY ANALYSIS OF SPENT FUEL POOL STORAGE FOR  
ATRIUM 11 FUEL

## **Introduction**

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated May 29, 2021, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21150A022), the Tennessee Valley Authority (TVA) submitted a license amendment request (LAR) that proposed a revision to the criticality safety analysis for the spent fuel pools (SFPs) at Browns Ferry Nuclear Plant (Browns Ferry) Units 1, 2, and 3. The LAR proposes to expand the applicability of the spent fuel pool criticality safety analysis of record for all three Browns Ferry units to include the ATRIUM 11™ fuel design. Attachments 1 and 2 to LAR contain the proprietary and non-proprietary Framatome, Inc. (Framatome) Report, ANP-3910P and NP, Revision 2, "Browns Ferry Nuclear Plant Units 1, 2 and 3 Spent Fuel Storage Pool Criticality Safety Analysis for ATRIUM 11 Fuel," respectively.

## **Regulatory Requirements**

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.68(b)(1) requires that, "[p]lant procedures shall prohibit the handling and storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."

Paragraph 50.68(b)(4) of 10 CFR requires, in part, "If no credit for soluble boron is taken, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95-percent probability, 95-percent confidence level, if flooded with unborated water."

The Browns Ferry criticality analysis in ANP-3910, Revision 2, does not take credit for soluble boron for normal operating conditions.

## **Request**

By letter dated September 21, 2015, (ADAMS Accession No. ML15282A152), TVA submitted a LAR for an extended power uprate (EPU) that would allow the Browns Ferry Units 1, 2, and 3 reactors to operate at 120 percent of the original licensed thermal power level. In Attachment 7 of the September 21, 2015, letter, TVA addressed the impact of EPU on the SFP nuclear criticality safety (NCS) analyses. During the acceptance review, the NRC staff determined that a review of the NCS analysis of record would be necessary. TVA provided AREVA Report ANP-3160, Revision 1, by letter dated December 15, 2015 (ADAMS Accession No. ML15351A097). AREVA Report ANP-3160, Revision 1, addressed the TVA's use of

blended low enriched uranium (BLEU) fuel with the ATRIUM 10XM™ fuel. However, the more recent Framatome Report, ANP-3910P, Revision 2, does not address TVA's use of BLEU fuel.

The use of BLEU fuel could impact TVA's calculation of its SFP k-effective at a 95-percent probability, 95-percent confidence level, if flooded with unborated water. Therefore, in order to complete its review of the current LAR, the NRC staff requests the following information:

**RAI 1**

State whether the Browns Ferry Units 1, 2, and 3, reactors currently use BLEU fuel, and if the use of BLEU fuel is planned with the proposed ATRIUM 11™ fuel.

**RAI 2**

If TVA plans to continue to use BLEU fuel in the Browns Ferry Units 1, 2, and 3, reactors, describe how its use has been considered in the current criticality safety analysis, including whether the BLEU fuel would have the same power density during reactor operations as the limiting commercial grade uranium fuel evaluated in Framatome Report, ANP-3910P, Revision 2.