Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-16-010

August 12, 2016

10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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: **Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Application to Modify Technical Specification 4.3.1.2, Fuel Storage Criticality (TS-508)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for amendments to the Technical Specifications (TS) for Browns Ferry Nuclear Plant (BFN), Units 1, 2 and 3. The proposed amendment modifies TS 4.3.1.2 to address an identified non-conservatism regarding the storage of fuel in the new fuel storage vaults.

The enclosure to this letter provides a description of the proposed changes, technical evaluation of the proposed changes, regulatory evaluation, and a discussion of environmental considerations. Attachment 1 provides the existing BFN Units 1, 2, and 3 TS pages marked-up to show the proposed changes. Attachment 2 contains the Units 1, 2, and 3 TS pages retyped to show the proposed changes. There are no TS Bases changes associated with this change.

TVA has determined that there are no significant hazards considerations associated with the proposed changes and that the TS changes qualify for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and the enclosure to the Alabama State Department of Public Health.

TVA requests approval of these proposed TS changes by August 12, 2017 with implementation within 60 days of issuance.

There are no new regulatory commitments associated with this submittal. Please direct any questions concerning this matter to Edward Schrull at (423) 751-3850.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 12th day of August 2016.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosure: Technical Specification Change TS-508 – Changes to Technical Specification 4.3.1.2 for Browns Ferry Nuclear Plant, Units 1, 2, and 3

cc (Enclosure):

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

ENCLOSURE

TENNESSEE VALLEY AUTHORITY
Browns Ferry Nuclear Plant (BFN)
Units 1, 2, 3

EVALUATION OF PROPOSED CHANGE

Subject: **Technical Specification Change TS-508 – Changes to Technical Specification 4.3.1.2 for Browns Ferry Nuclear Plant, Units 1, 2, and 3**

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1. Proposed Technical Specifications Changes (Mark-up)
2. Retyped Proposed Technical Specifications Pages

1.0 SUMMARY DESCRIPTION

Tennessee Valley Authority (TVA) is requesting a license amendment to amend the Operating Licenses for Browns Ferry Nuclear Plant (BFN) Unit 1 (DPR-33), Unit 2 (DPR-52), and Unit 3 (DPR-68). The proposed changes would revise Technical Specification (TS) 4.3.1.2, "Fuel Storage Criticality," for all three units, to preclude the placement of fuel in the new fuel storage vaults.

2.0 DETAILED DESCRIPTION

2.1 PROPOSED CHANGES

A change to TS Design Feature 4.3.1.2 is being requested for all three BFN units. This TS change removes the existing TS 4.3.1.2 criticality criteria wording in its entirety, and replaces it with language that specifically restricts the placement of fuel in the new fuel storage vaults.

The proposed change replaces TS 4.3.1.2 with the following:

"The new fuel storage vault shall not be used for fuel storage. New fuel shall be stored in the spent fuel storage racks."

Attachments 1 and 2 provide the marked up and retyped TS pages, respectively, for the proposed TS 4.3.1.2 wording. There are no required changes to the TS Bases, because Section 4 of the TSs does not contain an associated set of TS Bases.

2.2 REASON FOR CHANGE

On November 10, 2015, a public meeting was held between TVA and the Nuclear Regulatory Commission (NRC) staff on the subject of the BFN Extended Power Uprate (EPU) (Reference 1). During the discussion of EPU impacts to the fuel storage criticality analysis, the NRC raised a concern over the adequacy of the current BFN Technical Specification (TS) 4.3.1.2, which pertains to the requirements for storage of fuel in the new fuel storage vaults. The current criticality analysis supporting TS 4.3.1.2 does not address potential optimum moderation conditions in the BFN new fuel storage vaults.

BFN relies on the use of administrative controls to address the optimum moderation concern by excluding the new fuel storage vaults as an approved new fuel storage area. However, TS 4.3.1.2, as written, would allow fuel to be placed in the vaults without an adequate criticality analysis that addresses optimum moderation conditions. 10 CFR 50.68(b)(3) states that an analysis of optimum moderation conditions is not required if administrative controls preclude storage in the new storage fuel vaults, and TVA has elected to not pursue increasing fuel storage flexibility by pursuing such an analysis. Despite these administrative controls, TS 4.3.1.2 is considered non-conservative, in that the TS, as currently written, would not adequately restrict placement of fuel in the new fuel storage vaults. A condition report (CR) has been entered in the TVA corrective action program to address this issue.

3.0 TECHNICAL EVALUATION

Each BFN unit contains a new fuel storage vault located adjacent to the spent fuel pool. However, the criticality analyses supporting the BFN new fuel storage vaults do not consider a potential optimum moderation condition.

The issue of storage of fuel in the new fuel storage vaults without having a criticality analysis that addresses optimum moderation conditions was previously addressed in Reference 2. In response to request for additional information (RAI) Item 3 in the Reference 2 letter, TVA stated that the new fuel storage vault would not be used to store fuel until an appropriate criticality analysis was performed. The response also noted that TVA has no plans for obtaining such an analysis, and would rely on administrative controls (including additions to UFSAR Section 10.2) that would prevent placing fuel in the new fuel storage vaults. In Reference 3, TVA withdrew the request to obtain an exemption to the 10 CFR 70.24 criticality monitoring requirements (the subject of the Reference 2 letter), noting that the recently issued 10 CFR 50.68 regulation does not require an analysis of optimum moderation conditions in the new fuel storage vault, provided that fuel is not placed in this location.

BFN has chosen to comply with the criticality requirements specified in 10 CFR 50.68(b)(3) by not allowing fuel to be stored in the new fuel storage vaults. Placing new fuel directly in the spent fuel pool is more efficient than placing it temporarily in the new fuel storage vaults, and later having to relocate it to the spent fuel pool prior to a refueling outage. For this reason, BFN has chosen not to pursue a criticality analysis of optimum moderation conditions that would allow use of the vaults, and has no intention of doing so in the future.

BFN procedures direct that new fuel, once inspected and channeled, be placed directly in the spent fuel pool racks. Placement of fuel in the new fuel storage vaults is explicitly forbidden by the new fuel receipt and handling procedure. In addition to this procedural control, the existence of the steel and concrete covers over the new fuel storage vaults provides a physical barrier to placement of fuel in the vaults. These controls provide a high level of assurance that fuel will not be inappropriately placed in the new fuel storage vaults.

Although BFN has administrative controls in place that preclude storing fuel in the new fuel storage vaults, the associated TS 4.3.1.2 would still allow BFN to place fuel in the vaults. Therefore, the TS is considered non-conservative, in that following it as written would allow BFN to store fuel in the vaults without having an analysis of the optimum moderator condition.

In accordance with NRC Administrative Letter 98-10, Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety, the discovery of an improper or inadequate TS is considered a degraded or nonconforming condition as defined in NRC Inspection Manual Chapter Part 9900: Technical Guidance, Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety. As stated in the NRC Inspection Manual Chapter Part 9900 Technical Guidance, whenever degraded or nonconforming conditions are discovered, 10 CFR Part 50, Appendix B, requires prompt corrective action to correct or resolve the condition. In the case of a

deficient TS, this includes the evaluation of compensatory measures, such as administrative controls, and prompt actions to correct the TS.

As noted above, adequate compensatory measures exist in the form of procedure controls and physical barriers to ensure new fuel is not placed in the new fuel storage vaults. In order to remedy the TS non-conservatism, a change to TS 4.3.1.2 is being requested for all three BFN units. This TS change removes the existing TS 4.3.1.2 wording in its entirety, and replaces it with language that specifically restricts the placement of new fuel in the new fuel storage vaults.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

10 CFR 50.68 provides criteria related to criticality accident requirements. Section (b)(3) of the regulation discusses the requirements for criticality analyses for new fuel storage in the vaults under optimum moderation conditions. BFN complies with the requirements of 10 CFR 50.68(b)(3) by precluding storage of fuel in the new fuel storage vaults. Modifying Technical Specification (TS) 4.3.1.2 to require that fuel not be placed in the vaults ensures that compliance with the regulation is enforced by the Technical Specifications, rather than by an administrative control approach.

4.2 PRECEDENT

The NRC has previously reviewed and approved a similar change to the TS associated with the new fuel storage vaults. The relevant portion of the license amendment listed below provides a precedent.

> Letter from NRC to Xcel Energy, "Monticello Nuclear Generating Plant, Issuance of Amendment to Revise the Technical Specifications to Support Fuel System Changes (TAC NO. ME9893)," dated October 24, 2014 (ML14197A020)

4.3 SIGNIFICANT HAZARDS CONSIDERATION

This analysis addresses the proposed change to amend Operating Licenses DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3 (respectively) to modify Technical Specification (TS) 4.3.1.2, Fuel Storage Criticality, to require that fuel not be placed in the new fuel storage vaults. The amendment will require that new fuel only be placed in the spent fuel storage racks.

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed amendment does not change the fuel handling processes, the fuel handling equipment, or require alteration of the plant fuel storage systems. The amendment places a restriction on use of the new fuel storage vaults, requiring that

new fuel be placed only in the spent fuel pool racks. Because no changes to fuel handling equipment, fuel storage systems, or fuel handling processes are involved, the proposed amendment does not increase the probability or consequences of a fuel handling accident. Therefore, the proposed change does not increase the probability or consequences of a previously evaluated accident.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed modification to the Technical Specifications does not require changes to the plant hardware or alter the operating characteristics of any plant system. As a result, no new failure modes are being introduced. Therefore, the change does not introduce a new or different kind of accident from those previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The proposed change to TS 4.3.1.2 ensures that the criticality margins of safety for fuel storage are maintained, by excluding the new fuel storage vault as an approved fuel storage location. The change restricts the storage of new fuel to the spent fuel pool racks, which are fully analyzed from a criticality standpoint. The change does not physically alter the fuel storage systems, or modify fuel storage requirements in such a way as to degrade the margins of criticality safety. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

4.4 CONCLUSIONS

The proposed modification of TS 4.3.1.2 is acceptable based on the following:

- The change corrects a non-conservatism in the Technical Specifications, and places stricter controls over the receipt and storage of new fuel.

- The resolution of the technical specification non-conservatism via the proposed change does not require any plant modification that could affect the criticality margin of safety.

- The proposed change cannot affect the initiators of any accident or transient, and cannot introduce any new failure mode.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Presentation from TVA to NRC, "Browns Ferry Nuclear Plant Extended Power Uprate License Amendment Request: NRC Public Meeting," dated November 10, 2015 (ML15308A100)

2. Letter from TVA to NRC, "Browns Ferry Nuclear Plant (BFN) - Units 1, 2, and 3 - Request for Additional Information Regarding Exemption Request from the Requirements of 10 CFR 70.24 (TAC Nos. M97301, M97302, and M97303)," dated July 21,1997 (ML9707290157)

3. Letter from TVA to NRC, "Browns Ferry Nuclear Plant (BFN) - Units 1, 2, and 3 - Withdrawal of Request for Exemption from 10 CFR 70.24 Criticality Monitoring Requirements (TAC Nos. M97301, M97302, and M97303)," dated December 15, 1998 (ML9812230205)

ENCLOSURE

ATTACHMENT 1

Proposed Technical Specifications Changes (Mark-up)

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 10.3 of the FSAR; and

b. A nominal 6.563 inch center to center distance between fuel assemblies placed in the storage racks.

4.3.1.2 ~~The new fuel storage racks are designed and shall be maintained with:~~

~~a. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 10.2 of the FSAR;~~

~~b. $k_{eff} \leq 0.90$ if in a dry condition, or in the absence of moderator, as described in Section 10.2 of the FSAR; and~~

~~c. A nominal 6.625 inch center to center distance between fuel assemblies placed in storage racks.~~

The new fuel storage vault shall not be used for fuel storage. New fuel shall be stored in the spent fuel storage racks.

(continued)

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ENCLOSURE

ATTACHMENT 2

Retyped Proposed Technical Specifications Pages

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