TVA

Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

February 13, 2003

TVA-BFN-TS-421

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - TECHNICAL SPECIFICATIONS (TS) CHANGE 421 - FRAMATOME FUEL DESIGN AND STORAGE

Pursuant to 10 CFR 50.90, the Tennessee Valley Authority (TVA) is submitting a request for a TS change (TS-421) to licenses DPR-33, DPR-52, and DPR-68 for BFN Units 1, 2, and 3, respectively. The proposed amendment revises TS 4.2.1, Fuel Assemblies, to modify the fuel design description to encompass Framatome Advanced Nuclear Power (FANP) fuel assemblies and also modifies TS 4.3, Fuel Storage, to remove nomenclature specific to Global Nuclear Fuels analysis methods. The proposed TS changes are needed to allow the receipt and storage of Framatome fuel assemblies.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of

DO30

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 attachments to the Alabama State Department of Public Health.

TVA is planning to first use FANP fuel for Unit 3 Cycle 12 operation, which begins in Spring 2004. Fuel receipt and storage is scheduled for November 2003. Therefore, TVA is asking that this TS change be approved by October 1, 2003, and that the implementation of the revised TS be made within 60 days of NRC approval.

There are no regulatory commitments associated with this submittal. This letter is being sent in accordance with NRC Regulatory Issue Summary 2001-05, Guidance on Submitting Documents to the NRC by Electronic Information Exchange or on CD-ROM. If you have any questions about this TS change, please contact Tim Abney at (256)729-2636.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 13, 2003.

Sincerely,

R. G. Jones
Plant Manager

Enclosures:
1. TVA Evaluation of Proposed Change
2. Proposed Technical Specifications Changes (mark-up)

cc: (Enclosures)
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Enclosure 1

Technical Specifications (TS) Change 421
Framatome Fuel Design And Storage

Units 1, 2, and 3

TVA Evaluation of Proposed Change

1.0 DESCRIPTION

This letter is a request to amend Operating Licenses DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3, respectively. The proposed amendment revises TS 4.2.1, Fuel Assemblies, to modify the fuel design description to encompass Framatome-Advanced Nuclear Power (FANP) fuel assemblies and also modifies TS 4.3, Fuel Storage, to remove nomenclature specific to Global Nuclear Fuels (GNF) fuel storage criticality analysis methods. The proposed change is needed for the receipt and storage of FANP fuel in November 2003.

2.0 PROPOSED CHANGE

The proposed TS change revises TS 4.2.1, Fuel Assemblies, to add water channels to the fuel assembly description. FANP fuel assembly design includes an interior water channel. Also, existing TS 4.3.1.1.a and TS 4.3.1.2.a both contain fuel storage criticality design criteria specific to GNF analysis methods. It is proposed these two TS clauses be deleted, which removes the GNF-specific nomenclature and renders TS 4.3.1.1 and TS 4.3.1.2 compatible with GNF and FANP fuel storage analysis methods.

Marked-up BFN Units 1, 2, and 3 TS pages are provided in Enclosure 2, which show the specific revisions. The identical changes are being requested for all three units. The fuel design features TS sections have no corresponding TS Bases sections, therefore, no changes to the TS Bases are involved with this requested amendment.

3.0 BACKGROUND

A description of BFN fuel assembly design is provided in Section 3.2, Fuel Mechanical Design, of the BFN Updated Final Safety Analysis Report (UFSAR) and in TS 4.2.1, Fuel Assemblies. Storage of fuel is described in UFSAR Sections

3.6.6, Reactivity of Fuel in Storage, 10.2, New Fuel Storage, 10.3, Spent Fuel Storage, and in TS 4.3, Fuel Storage. Currently, BFN uses only GNF fuel assemblies, and portions of the current UFSAR and TS descriptions are specific to the use of GNF fuel types. This TS change proposes to make the subject TS sections compatible with GNF and FANP fuel descriptions and fuel storage analysis methods.

In a meeting with the NRC staff on October 16, 2002 (Reference 1), TVA discussed the transition plan and schedule for the use of FANP ATRIUM-10 fuel at BFN. As part of the transition plan, core design analysis and transient analysis services, including fuel storage criticality analyses, will be performed by FANP rather than GNF, as is currently the case.

TS Section 4.2.1, Fuel Assemblies, contains a general description of the fuel assembly designs currently used at BFN. At present, BFN uses only GNF fuel and the text description in TS 4.2.1 is consistent with the physical characteristics of GNF fuel. A minor change is needed to TS 4.2.1 to modify the text description of the fuel assemblies to be compatible with FANP ATRIUM-10 fuel. Specifically, ATRIUM-10 fuel design uses a water channel to increase neutron moderation rather than the water rods used in GNF designs. Therefore, the TS text description is being modified to reference water channels as well as water rods so that the TS description is applicable to both GNF and FANP fuel.

Current TS 4.3.1.1.a and 4.3.1.2.a, which address fuel storage criticality design criteria for spent fuel pool and new fuel storage, prescribe the use of a in-core k-infinity criteria. GNF criticality analysis methodology for fuel storage uses an in-core k-infinity criteria, however, the FANP criticality analysis methodology does not. To make the BFN fuel storage TS compatible with both GNF fuel and Framatome fuel, a distinction would need to be made between GNF and FANP analysis methods, or the GNF-specific criteria is required to be eliminated. A review of several Boiling Water Reactor (BWR) plants TS that have both GNF and FANP fuel showed that it is not typical to have vendor-specific fuel storage criteria in the subject fuel storage TS section, 4.3.1. Therefore, for consistency with other plants in this section of TS, it is proposed that TS 4.3.1.1.a and 4.3.1.2.a be deleted, which would make TS 4.3.1 compatible with the storage of both GNF and FANP fuel.

As discussed in the October 16, 2002, meeting with NRC (Reference 1), TVA is planning to use a reload batch of FANP fuel for the Unit 3 Cycle 12 core, which is scheduled to begin operation in Spring 2004. Unit 2 use of FANP fuel will follow in 2005 and possibly Unit 1 at a later date. In support of the Unit 3 schedule, receipt of FANP fuel assemblies is scheduled for November 2003. Therefore, TVA is asking that this TS change be approved by October 1, 2003, and that the implementation of the revised TS be made within 60 days of NRC approval for all three units. Approval of the TS change is being requested for all three BFN units to allow the future receipt of FANP fuel without further amendment requests.

Prior to the actual use of FANP fuel on a given BFN unit, additional TS changes to TS 5.6.5, Core Operating Limits Report (COLR), will be required to reference the FANP analytic methods used for the determination of core operating limits. The Unit 3 COLR changes are expected to be submitted in Spring 2003 to support Cycle 12 operation in 2004.

4.0 TECHNICAL ANALYSIS

FANP ATRIUM-10 fuel is the newest of the line of FANP BWR fuel designs and is currently approved for use in a number of foreign and domestic nuclear plants including LaSalle, Susquehanna, River Bend, and Grand Gulf. ATRIUM-10 fuel design includes a interior water channel rather than water rods used in GNF designs to increase neutron moderation. Therefore, the TS 4.2.1, Fuel Assemblies, text description is being modified to reference water channels as well as water rods so that the TS description is applicable to GNF and FANP fuel. TS 4.2.1, additionally requires that fuel assemblies be limited to fuel designs that have been designed that have been analyzed with NRC approved codes and methods. Hence, this proposed TS change is simply a description update to accommodate the features of an approved FANP BWR fuel type.

The second requested TS change involves the proposed deletion of TS 4.3.1.1.a and 4.3.1.2.a, which currently include a cold in-core k-infinity fuel storage criticality design criteria for spent fuel pool and new fuel storage. This in-core k-infinity analysis methodology is used by GNF for fuel storage criticality analysis and retention of the criteria would introduce an incongruity with FANP analysis methods, which use different criteria.

As noted, FANP fuel storage criticality analyses do not use an in-core k-infinity approach, but rather criticality is assured by demonstrating (using KENO) that the array k-eff is less than or equal to 0.95 under the worst credible conditions with storage limits on fuel enrichment and gadolinia loadings for a given fuel type. Alternatively, a cold in-rack k-infinity comparison method (using CASMO) may be used if these fuel parameter limits are not met. The referenced analysis methods and computer codes are commonly used by FANP for fuel storage criticality analyses for BWRs that use FANP fuel.

With the proposed deletion of TS 4.3.1.1.a and 4.3.1.2.a, the remaining TS 4.3.1 provisions specified in TS 4.3.1.1.b and 4.3.1.1.c for spent fuel storage and 4.3.1.2.b, 4.3.1.2.c, and 4.3.1.2.d for new fuel will continue to provide adequate requirements for the purposes of specifying fuel storage criticality requirements. These remaining TS provisions repeat the base fuel storage subcriticality criteria in BFN UFSAR Section 3.6.6, Reactivity of Fuel in Storage, UFSAR Section 10.2, New Fuel Storage, and UFSAR Section 10.3, Spent Fuel Storage, and are independent of the fuel vendor methodology.

TS 4.3.1.1.a and 4.3.1.2.a were added to BFN TS in 1998 during the conversion to improved Standard TS (STS). The two TS clauses were added to promote consistency with the model TS provided in Revision 1 of NUREG-1433, Standard Technical Specifications for General Electric Plants, BWR/4s. However, the structure of NUREG-1433 model TS for this STS section is predicated on the use of General Electric (now GNF) fuel and methods, and does not accommodate the use of other fuel vendor analysis methods. At the time of STS conversion and as is currently the case, BFN was using only GNF fuel. A survey of several BWRs' TS showed that plants using GNF and FANP fuel do not have the equivalent of BFN 4.3.1.1.a and 4.3.1.2.a in their STS. Therefore, the BFN proposed change is consistent with other plants' TS and the pre-STS version of TS at BFN, which did not contain vendor-specific fuel storage analysis criteria.

In summary, the proposed change is considered acceptable because the change simply makes the fuel design description and fuel storage TS compatible with approved fuel designs and analysis methods for GNF and FANP. Both companies are recognized providers of nuclear fuel and fuel analysis services.

5.0 REGULATORY SAFETY ANALYSIS

The Tennessee Valley Authority (TVA) is submitting an amendment request to licenses DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3 Technical Specifications (TS). The proposed amendment revises TS 4.2.1, Fuel Assemblies, to modify the fuel design description for compatibility with Framatome-Advanced Nuclear Power (FANP) fuel and also modifies TS 4.3, Fuel Storage, to remove nomenclature specific to Global Nuclear Fuels (GNF) analysis methods.

5.1 No Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 revises TS 4.2.1, Fuel Assemblies, to modify the fuel design description to accommodate FANP fuel designs. The change to TS 4.2.1 is administrative and simply adds descriptive text to reflect that FANP fuel assemblies have a water channel.

To make the fuel storage TS compatible with the storage of GNF and FANP fuel, the proposed amendment also modifies TS 4.3, Fuel Storage, to delete criteria specific to GNF fuel storage criticality analysis methods. BFN criticality analysis and storage requirements continue to be adequately described in the Updated Final Safety Analysis Report (UFSAR) and in existing TS 4.3.1.1.b, TS 4.3.1.1.c, TS 4.3.1.2.b, 4.3.1.2.c, and 4.3.1.2.d. Hence, the proposed elimination of the GNF-specific criteria in TS 4.3 does not affect BFN design basis requirements associated with ensuring adequate criticality margins are maintained for fuel storage.

The requested TS changes do not involve any plant modifications or operational changes that could affect system reliability, performance, or the possibility of operator error. The requested changes do not affect any postulated accident precursors, do not affect accident mitigation systems, and do not introduce any new accident initiation methods.

Therefore, the proposed TS change does not involve an increase in the probability or consequences of an accident previously evaluated.

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 changes to TS do not affect the performance of any BFN structure, system, or component credited with mitigating any accident previously evaluated. Fuel storage criticality analyses will continue to be performed in accordance with established UFSAR commitments that are independent are fuel vendor specific methods. The TS changes do not introduce new modes of operation or involve plant modifications.

Therefore, the proposed TS change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

Response: No

The proposed amendment modifies TS 4.3, Fuel Storage, to remove nomenclature specific to GNF criticality analysis methods. Fuel storage criticality analyses will continue to be performed in accordance with UFSAR commitments and the remaining TS commitments in accordance with FANP accepted methods, which specify appropriate criteria and conservatisms. Therefore, the proposed TS change does not involve a reduction in the margin of safety.

Based on the above, TVA concludes that the proposed amendment presents no 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.

5.2 Applicable Regulatory Requirements/Criteria

10 CFR 50.36 provides that important design features be described in TS and a TS section on fuel design has historically been included in custom TS and in STS. Currently, only GNF fuel is being used at BFN and the TS 4.2.1 fuel description has provisions specific to GNF fuel types. To accommodate the planned use of FANP fuel, a TS change that revises the fuel design description to reflect that FANP fuel assemblies have a water channel is required. This change is administrative and simply adds descriptive text to reflect that FANP fuel assemblies have a water channel. Maintaining the TS fuels design description up-to-date is consistent with 10 CFR 50.36 design features objectives.

The second TS change modifies TS 4.3, Fuel Storage, to remove nomenclature specific to GNF criticality analysis methods. 10 CFR 50, Appendix A, Criterion 62, Prevention of Criticality in Fuel Storage and Handling, prescribes that criticality in the fuel storage system be prevented by geometrically safe configurations. To ensure this, criticality analyses are performed to demonstrate that the subcriticality criteria specified in the UFSAR are satisfied for the storage of fuel.

The deletion of TS 4.3.1.1.a and 4.3.1.2.a, which are specific to GNF methodology for criticality analyses, does not diminish TVA's obligation to satisfy the UFSAR and remaining TS 4.3.1 criteria for the analysis and storage of both FANP and GNF fuel. With the transition to FANP fuel, FANP will provide the fuel storage criticality analysis services in accordance with FANP standard methodology. Hence, conformance to applicable regulatory requirements is not reduced by this proposed TS change.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that 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 Commissions regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that 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 effluent 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.

7.0 REFERENCES

October 22, 2002, NRC Summary of October 16, 2002, Meeting Regarding the Extended Power Uprate and Fuel Transition Activities For Browns Ferry Units 2 and 3 (TAC NOS. MB6381 and MB6382).

Enclosure 2

Technical Specifications (TS) Change 421
Framatome Fuel Design And Storage

Units 1, 2, and 3

Proposed Technical Specifications Changes (mark-up)

4.0 DESIGN FEATURES

4.1 Site Location

The BFN site contains approximately 840 acres and is located on the north shore of Wheeler Lake at Tennessee River Mile 294 in Limestone County, Alabama. The minimum distance from the outside of the secondary containment building to the boundary of the exclusion area as defined in 10 CFR 100.3 is ≥ 4000 feet.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 764 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material, and water rods. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with NRC staff approved codes and methods and have been shown by tests or analyses to comply with all safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

or channels

4.2.2 Control Rod Assemblies

The reactor core shall contain 185 cruciform shaped control rod assemblies. The control material shall be boron carbide, hafnium metal, or both, as approved by the NRC.

(continued)

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. Fuel assemblies having a maximum k-infinity of 1.33 in the normal reactor core configuration at cold conditions;

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

c. 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. Fuel assemblies having a maximum k-infinity of 1.31 in the normal reactor core configuration at cold conditions;

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

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

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

(continued)

4.0 DESIGN FEATURES

4.1 Site Location

The BFN site contains approximately 840 acres and is located on the north shore of Wheeler Lake at Tennessee River Mile 294 in Limestone County, Alabama. The minimum distance from the outside of the secondary containment building to the boundary of the exclusion area as defined in 10 CFR 100.3 is ≥ 4000 feet.

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or channels

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The reactor core shall contain 185 cruciform shaped control rod assemblies. The control material shall be boron carbide, hafnium metal, or both, as approved by the NRC.

(continued)

4.0 DESIGN FEATURES (continued)

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

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a. Fuel assemblies having a maximum k-infinity of 1.31 in the normal reactor core configuration at cold conditions;

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or channels

(continued)

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. Fuel assemblies having a maximum k-infinity of 1.33 in the normal reactor core configuration at cold conditions;

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

b c. 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. Fuel assemblies having a maximum k-infinity of 1.31 in the normal reactor core configuration at cold conditions;

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

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

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

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