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

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February 12, 2003

TVA-BFN-TS-405S1

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
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 405 SUPPLEMENT 1 - DECAY TIME (TAC NOS. MB5733, MB5734, MB5735)**

Pursuant to 10 CFR 50.90, the Tennessee Valley Authority (TVA) is submitting a request for a TS change (TS-405S1) to licenses DPR-33, DPR-52, and DPR-68 for BFN Units 1, 2, and 3, respectively. This TS change is a supplemental change to TS-405, submitted on July 31, 2002, which requested a license amendment and TS changes for a full scope application of Alternate Source Term methodology for BFN Units 1, 2, and 3. This proposed supplemental change adds a new TS section 3.9.9, Decay Time.

TVA has reviewed the no significant hazards consideration for TS-405 submitted on July 31, 2002, and concluded it remains valid for the addition of this TS change. Similarly, the categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9) continues to be valid. In accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health.

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TVA is requesting that this supplemental TS change be approved and implemented in association with TS-405. Approval of TS-405 was requested by April 2003.

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 12, 2003.

Sincerely,

Ashok S. Bhatnagar

Enclosures:
1. TVA Evaluation of Proposed Change
2. Proposed Technical Specifications Changes
3. Changes to Technical Specifications Bases Pages

cc: (Enclosures)

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# Enclosure 1

# Technical Specifications (TS) Change 405 Supplement 1

# Decay Time

# TVA Evaluation of Proposed Change

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## 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. This change (TS-405S1) adds a new TS section 3.9.9, Decay Time, which establishes requirements to verify a minimum fuel decay period has passed prior to moving fuel after reactor shutdown. The minimum fuel decay period is an input used in the Refueling Accident analysis.

This TS change is a supplement to TS-405, submitted on July 31, 2002, which requested a license amendment and TS changes for a full scope application of Alternate Source Term (AST) methodology for BFN Units 1, 2, and 3.

## 2.0 PROPOSED CHANGE

A new TS section, 3.9.9, Decay Time, and an accompanying TS Bases section is proposed as shown in Enclosures 2 and 3, respectively. Identical changes are proposed for all three BFN units. The new TS section provides a Limiting Condition for Operation (LCO) and a Surveillance Requirement (SR) to verify that the reactor has been subcritical for at least 24 hours prior to in-vessel fuel movement.

## 3.0 BACKGROUND

TS-405 submitted an amendment request to licenses DPR-33, DPR-52, and DPR-68 to support a full scope application of AST methodology for BFN Units 1, 2, and 3. Specifically, in TS-405, TVA requested revisions to the BFN licensing and design basis to reflect the application of AST methodology and the approval of several TS changes, which were supported by the AST analyses.

As discussed in the TS-405 submittal, AST analyses were performed for the four Updated Final Safety Analysis Report

(UFSAR) Chapter 14.6 Design Basis Accidents (DBA) that could potentially result in control room and offsite doses. These include the Loss of Coolant Accident, the Main Steam Line Break Accident, the Refueling Accident, and the Control Rod Drop Accident. The subject AST analyses demonstrated that using AST methodology, post-accident control room and offsite doses remained within the regulatory limits of 10 CFR 50.67. The dose results of the four DBA reanalyses were provided in Enclosure 1 of TS-405.

Enclosure 4 of TS-405 provided the Safety Assessment for AST implementation and included a summary of scope, methodology, inputs, and assumptions for the AST analyses. The Refueling Accident analysis that is pertinent to this submittal is discussed in Section 2.3.1.3 of TS-405 Enclosure 4. The Refueling Accident analysis inputs are listed in Table 2-14 of Enclosure 4.

A key Refueling Accident analysis input is that 24 hours of fuel decay is used as an input in establishing the core isotopic inventory available for release in the dose analysis. In terms of plant operation, this means that 24 hours have elapsed since the reactor has been made subcritical during shutdown activities prior to in-vessel fuel handling. Currently, BFN does not have a TS or Technical Requirements Manual restriction on fuel decay time.

In a teleconference with NRC staff on November 4, 2002, on TS-405, NRC indicated TS provisions to prohibit in-vessel fuel movement at times less than 24 hours (the BFN AST Refueling Accident analysis input) following reactor shutdowns would be needed to provide assurance of the fulfillment of the AST Refueling Accident analysis input on minimum fuel decay time. With regard to this topic, NRC indicated that a number of utilities seeking approval of AST implementation had incorporated Technical Specifications Task Force (TSTF) item -51 into their AST TS submittals. TSTF-51 is an NRC-approved change to Standard TS and establishes restrictions on the handling of recently irradiated fuel for plants seeking relaxation of TS requirements based on Refueling Accident analyses which assume longer fuel decay periods.

In the teleconference, BFN Licensing staff indicated that TSTF-51 had been previously reviewed, but was not compatible with BFN's AST application, which analyzed the Refueling Accident at the same time point (24 hours after shutdown) as the existing non-AST Refueling Accident analysis. As an alternative, BFN offered a more direct approach to simply add a separate decay time TS into the Refueling Activities

section of TS as a new section 3.9.9, Decay Time. Accordingly, this submittal is providing the subject TS 3.9.9, Decay Time, for all three BFN Units as a supplement to TS-405.

As noted above, BFN does not currently have a decay time TS and also did not have a decay time TS in the BFN custom TS prior to the conversion to Standard TS (STS) in 1998. Many plants, however, did have a decay time TS prior to converting to STS. During STS conversion, this decay time TS was typically relocated out of TS to a Licensee Controlled Program. The proposed BFN TS 3.9.9 shown in Enclosure 2 is based on the typical fuel decay time TS for these plants (as modified for STS format).

Regarding NRC review schedule, TVA is requesting that this supplemental TS change be approved and implemented as a supplement to TS-405. Approval of TS-405 was requested by April 2003.

## 4.0 TECHNICAL ANALYSIS

Section 14.6.4 of the BFN UFSAR provides a description of the Refueling Accident analysis and includes a listing of major assumptions and inputs. For BFN, the Refueling Accident involves the drop of an irradiated fuel bundle onto the reactor core from the maximum height allowed by the refueling equipment. For this event, some fuel rods are postulated to fail with a resultant release of radioactivity into the refueling area and ultimately to the environment.

This same UFSAR accident was reanalyzed using AST methodology, and the methods used and results of the reanalysis were discussed in the July 31, 2002, transmittal of TS-405. The Refueling Accident AST dose results are shown in Enclosure 1 of TS-405 and considerable margin to regulatory limits is maintained. One of the AST Refueling Accident analysis inputs is that 24 hours of fuel decay time is assumed in establishing the core isotopic inventory. This reduces the inventory of radioactive products available for release since core and individual fuel assembly activity declines rapidly following reactor shutdown.

As noted in the Background section above, NRC indicated that, in support of TS-405, new TS provisions were needed to ensure that the 24-hour fuel decay period accident analysis constraint was enforced prior to moving fuel. This, in turn, provides an additional assurance that AST Refueling Accident dose analyses are bounding.

TVA proposes to provide this assurance by adding a new TS section, 3.9.9, Decay Time, which establishes an LCO and SR restricting fuel movement prior to 24 hours after the reactor is made subcritical during shutdown activities. Use of a TS LCO and an SR to verify that accident analysis inputs are maintained and verified is an appropriate means of providing such an assurance and is used for selected accident input parameters in other sections of TS. This approach constitutes a feasible and reliable means of ensuring the 24-hour decay time restriction is observed.

Furthermore, in practice, to move in-vessel fuel following a reactor shutdown, the drywell shield blocks, drywell head, reactor head, steam dryer, and steam separator must be removed to physically access the core and fuel. BFN's shortest time to move fuel after a reactor shutdown is about 40 hours. The best achievable, assuming optimal planning and scheduling, is still estimated to be about 40 hours. Therefore, it is unlikely, that even with refueling outage execution improvements, that the 24-hour criterion would ever be approached. Hence, addition of this TS is conservative since it is improbable that the 24-hour minimum decay time will be approached.

In summary, the proposed TS change is a suitable means of providing an additional assurance that the Refueling Accident analysis input on minimum fuel decay time is verified prior to in-vessel fuel movement.

## 5.0 REGULATORY SAFETY ANALYSIS

The Tennessee Valley Authority (TVA) is submitting a supplemental amendment request to licenses DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3 Technical Specifications (TS). The proposed amendment provides a Limiting Condition for Operation (LCO) and a Surveillance Requirement (SR) to verify that the reactor has been subcritical for at least 24 hours following reactor shutdown prior to in-vessel fuel movement.

### 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." It has been determined that the no significant hazards consideration for the TS-405 submittal dated July 31, 2002, remains valid for the addition of this supplemental TS change.

5.2 Applicable Regulatory Requirements/Criteria

10 CFR 50.36 prescribes criteria for consideration of items for inclusion in TS. Criterion 2 includes process variables, design features, or operating restrictions that are an initial condition of design basis accidents or transient analyses that either assume the failure of or present a challenge to the integrity of a fission product barrier.

The 24-hour decay time input assumption of the AST Refueling Accident analysis can be broadly determined to fit Criterion 2 and, thus be included in a TS as an LCO. Hence, the proposed addition of a new TS Section, 3.9.9, Decay Heat, is consistent with types of LCOs typically designated for inclusion in TS under 10 CFR 50.36.

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 Commission's 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 REFERENCE

TVA Letter to NRC dated July 31, 2002, "Browns Ferry Nuclear Plant - Units 1, 2, and 3 - License Amendment - Alternative Source Term (TS-405)"

Enclosure 2

Technical Specifications (TS) Change 405
Supplement 1

Decay Time

Proposed Technical Specifications Changes

## 3.9 REFUELING OPERATIONS

### 3.9.9 Decay Time

LCO 3.9.9 The reactor shall be subcritical for at least 24 hours.

APPLICABILITY: During in-vessel fuel movement.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. With the reactor subcritical for less than 24 hours. | A.1 Suspend in-vessel fuel movement. | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.9.9.1 | Verify the reactor has been subcritical for at least 24 hours. | Once prior to the movement of irradiated fuel in the reactor vessel. |

## 3.9 REFUELING OPERATIONS

### 3.9.9 Decay Time

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Enclosure 3

Technical Specifications (TS) Change 405
Supplement 1

Decay Time

Changes to Technical Specifications Bases

B 3.9 REFUELING OPERATIONS

B 3.9.9 DECAY TIME

BASES

BACKGROUND

This postulated refueling accident involves the drop of a fuel assembly on top of the reactor core during refueling operations (Ref. 1). The drop over the reactor core is more limiting than the drop over the spent fuel pool since the kinetic energy for the drop over the reactor core area (greater than 23 feet) produces a larger number of damaged fuel pins on impact than the shorter drops that could occur over the fuel pool. The refueling accident is analyzed using Alternate Source Term methodology governed by 10 CFR 50.67 and the guidelines of Regulatory Guide 1.183 (Ref. 2).

The refueling accident analysis assumes that the accident occurs at least 24 hours after plant shutdown. Specifically, a 24-hour radioactive decay time of the fission product inventory is assumed during the interval between shutdown and movement of assemblies in the reactor core.

APPLICABLE SAFETY ANALYSES

The minimum requirement of 24 hours of reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is an initial condition of the refueling accident analysis.

Decay time satisfies the requirements of Criterion 2 of the NRC Policy Statement (Ref. 3)

(continued)

BASES (continued)

LCO

The specified decay time limit requires the reactor to be subcritical for at least 24 hours. Implicit in this TS is the Applicability (during movement of irradiated fuel in the reactor vessel). This ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products, thus reducing the fission product inventory and reducing the effects of a refueling accident.

APPLICABILITY

This decay time restriction is applicable only during movement of irradiated fuel in the reactor vessel following reactor operation. Therefore, it effectively prohibits movement of irradiated fuel in the reactor vessel during the first 24 hours following reactor shutdown

ACTIONS

A.1

With the reactor subcritical less than 24 hours, all movement of irradiated fuel in the reactor vessel must be suspended. As stated above, movement of irradiated fuel in the reactor vessel is prohibited during the first 24 hours following reactor shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.9.9.1

Since movement of irradiated fuel in the reactor vessel is prohibited during the first 24 hours following reactor shutdown, a verification of time subcritical must be made prior to movement of irradiated fuel in the reactor vessel. This is done by confirming the time and date of subcriticality, and verifying that at least 24 hours have elapsed. The Frequency of "once prior to movement of irradiated fuel in the reactor vessel" ensures that the operation within the design basis assumption for decay time in the refueling accident analysis.

(continued)

BASES (continued)

REFERENCES

1. FSAR, Section 14.6.4.

2. Regulatory Guide 1.183, "Alternative Radiological Source Terms For Evaluating Design Basis Accidents at Nuclear Power Reactors", USNRC, July 2000

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

(continued)

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B 3.9.9 DECAY TIME

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BACKGROUND

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