

February 28, 2003

Mr. J. A. Scalice  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: BROWN FERRY NUCLEAR PLANT, UNIT 2 - ISSUANCE OF AN AMENDMENT  
REGARDING THE SAFETY LIMIT MINIMUM CRITICAL POWER RATIO  
(TAC NO. MB6811)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 280 to Facility Operating License No. DPR-52 for the Browns Ferry Nuclear Plant, Unit 2. This amendment is in response to your application dated October 25, 2002, as supplemented December 20, 2002, and February 11 and 21, 2003. The amendment would update the values of the Safety Limit Minimum Critical Power Ratio in Technical Specification 2.1.1.2 for Unit 2, Cycle 13 operation.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

**/RA/**

Kahtan N. Jabbour, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management

Docket No. 50-260

Enclosures: 1. Amendment No. 280 to  
License No. DPR-52  
2. Safety Evaluation

cc w/enclosures: See next page

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S. Cahill, RII

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\*No major changes to SE

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 280  
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 25, 2002, as supplemented December 20, 2002, and February 11 and 21, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 280, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Allen G. Howe, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: February 28, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 280

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by an amendment number and contains a marginal line indicating the area of change.

REMOVE

2.0-1

INSERT

2.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 280 TO FACILITY OPERATING LICENSE NO. DPR-52  
TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT, UNIT 2  
DOCKET NO. 50-260

## 1.0 INTRODUCTION

By letter dated October 25, 2002 (Reference 1), as supplemented by letters dated December 20, 2002 (Reference 2), February 11, 2003 (Reference 3), and February 21, 2003 (Reference 4), the Tennessee Valley Authority (TVA or the licensee) proposed a revision to the Browns Ferry Nuclear Plant (BFN), Unit 2, Technical Specifications (TSs). The revision would update the Safety Limit Minimum Critical Power Ratio (SLMCPR) values in TS 2.1.1.2 for Unit 2, Cycle 13 operation. The BFN Unit 2 Cycle 13 core has 764 fuel assemblies, consisting of 372 fresh General Electric (GE)-14 bundles, 256 once burned GE-13 fuel bundles, 24 twice burned GE-13 fuel bundles, and 112 thrice burned GE-11 fuel bundles. TVA's supplemental letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination or expand the scope of the original request.

## 2.0 EVALUATION

The proposed revision of the Technical Specification is described below.

### 2.1 TS 2.1.1 Reactor Core SLs [Safety Limits]

The licensee proposed to change the SLMCPR value for BFN Unit 2, Cycle 13 operation, from 1.07 to 1.08 for two recirculation loop operation, and to use the same value of 1.10 for single recirculation loop operation with the reactor vessel steam dome pressure greater than or equal to 785 psig and core flow greater than or equal to 10 percent of rated core flow.

The licensee described, in the above submittals, the approved methodologies used to calculate the SLMCPR values for the proposed TS revision. The Cycle 13 SLMCPR analysis was performed by Global Nuclear Fuel using plant- and cycle-specific fuel and core parameters, and U. S. Nuclear Regulatory Commission (NRC) approved methodologies, including NEDE-32505P-A, Revision 1, "R-Factor Calculation Method for GE-11, GE-12, and GE-13 Fuel," dated July 1999; NEDC-32601P, "Methodology and Uncertainties for Safety Limit MCPR Evaluations;" NEDC-32694P, "Power Distribution Uncertainties for Safety Limit MCPR Evaluation;" and Amendment 25 to NEDE-24011-P-A on Cycle Specific Safety Limit MCPR, (Reference 5).

The staff has reviewed the analysis supporting the change to the SLMCPR from 1.07 to 1.08 for two recirculation loop operation, and the use of the same value of 1.10 for single recirculation

ENCLOSURE

loop operation, using the approach stated in Amendment 25 to NEDE-24011-P-A including the loop operation. In addition, the staff has reviewed the impact on the BFN Unit 2, Cycle 13 operation, due to the bundle and core design changes. The licensee has provided the results of analyses in References 2 and 3 and indicated that there is sufficient conservatism in the SLMCPR values to accommodate the penalty caused by expected top-peaked power shape at the end of BFN Unit 2, Cycle 13 operation, because the most conservative values at the beginning of Cycle 13 were selected. The licensee also explained in References 2 and 4 that the increase of the SLMCPR value for BNF Unit 2, Cycle 13 operation, compared to Cycle 12 operation was due to the skewing of the rod critical power ratio (CPR) distribution in the histogram of all rod CPRs for the Cycle 13 core relative to a presumed normal probability density function in the approved Monte Carlo calculation. The staff finds that the justification for the proposed Cycle 13 SLMCPR values is acceptable because the most conservative results were chosen.

The licensee stated in Reference 3 that the bundle and core design changes for Unit 2, Cycle 13 operation, were prompted by a predicted shortfall in reaching the assumed minimum cycle exposure for the previous Cycle 12 operation. The reasons for the reduction in the projected Cycle 12 fuel burn-up included: (1) a mid-cycle outage that was performed to remove leaking fuel bundles from Cycle 12 core after original Cycle 13 design was completed; and (2) the potential that TVA may start the Unit 2 refueling outage earlier than originally planned. The staff has reviewed the licensee's response in Reference 3 with respect to the bundle and core design changes for Unit 2, Cycle 13. Based on this review, the staff finds that the changes are acceptable because with the Cycle 12 shortfall, the once-burned fuel (inserted in Cycle 12) will be more reactive than assumed in the original core design and additional shutdown margin (SDM) is required at the beginning of Cycle 13. To provide the additional SDM, 24 of the high-enrichment bundles have been modified with two additional gadolinium containing fuel rods. The staff finds that this bundle/core design change is acceptable because it provides the necessary beginning-of-Cycle 13 SDM.

Based on the results of the review, the staff finds that the SLMCPR analysis for Cycle 13 operation of BFN Unit 2 using the plant- and cycle-specific parameters in conjunction with the approved methodologies is acceptable. The proposed Cycle 13 SLMCPR values will ensure that 99.9 percent of the fuel rods in the core will not experience boiling transition, which satisfies the requirements of General Design Criterion 10 of Appendix A to Title 10, Code of Federal Regulation, Part 50, regarding acceptable fuel design limits. Also, the staff has concluded that the justification for analyzing and determining the SLMCPR values of 1.08 for two recirculation loop operation and 1.10 for single recirculation loop operation is acceptable for BFN Unit 2, Cycle 13 operation, because approved methodologies were used, and the analysis shows that SLMCPR values have sufficient conservatism to accommodate penalty due to top-peaked power shape at the end of cycle.

Based on its review of TVA's proposed revision to the TSs for Cycle 13 operation of BFN Unit 2, the staff finds it acceptable.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (67 FR 75885). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

#### 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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 to the health and safety of the public.

#### 6.0 REFERENCES

1. Letter (TVA-BFN-TS-420) from T. E. Abney to NRC, "Browns Ferry Nuclear Plant (BFN) - Unit 2 - Technical Specifications (TS) Change 420 - Safety Limit Minimum Critical Power Ratio (SLMCPR) - Cycle 13 Operation," October 25, 2002.
2. Letter (TVA-BFN-TS-420) from T. E. Abney to NRC, "Browns Ferry Nuclear Plant (BFN) - Unit 2 - Technical Specifications (TS) Change 420 - Safety Limit Minimum Critical Power Ratio (SLMCPR) - Cycle 13 Operation - Supplemental Information," December 20, 2002.
3. Letter (TVA-BFN-TS-420) from R. G. Jones to NRC, "Browns Ferry Nuclear Plant (BFN) - Unit 2 - Technical Specifications (TS) Change 420 - Safety Limit Minimum Critical Power Ratio (SLMCPR) - Cycle 13 Operation - Response to NRC Request for Additional Information (TAC No. MB6811)," February 11, 2003.
4. Letter (TVA-BFN-TS-420) from T. E. Abney to NRC, "Browns Ferry Nuclear Plant (BFN) - Technical Specifications (TS) Change 420 - Safety Limit Minimum Critical Power Ratio (SLMCPR) - Cycle 13 Operation - Response to NRC Request for Additional Information (RAI) (TAC No. MB6811)."
5. Letter from F. Akstulewicz (NRC) to G. A. Watford (GE) dated March 11, 1999, Acceptance for Referencing of Licensing Topical Reports, NEDC-32601P, Methodology and Uncertainties for Safety Limit MCPR Evaluations; NEDC-32694P, Power Distribution Uncertainties for Safety Limit MCPR Evaluation; and Amendment 25 to NEDE-24011-P-A on Cycle Specific Safety Limit MCPR.

Principal Contributor: Tai Huang, NRR

Date: February 28, 2003



Mr. J. A. Scalice  
Tennessee Valley Authority

**BROWNS FERRY NUCLEAR PLANT**

cc:

Mr. Karl W. Singer, Senior Vice President  
Nuclear Operations  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Mark J. Burzynski, Manager  
Nuclear Licensing  
Tennessee Valley Authority  
4X Blue Ridge  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. James E. Maddox, Acting Vice President  
Engineering & Technical Services  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Timothy E. Abney, Manager  
Licensing and Industry Affairs  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Mr. Ashok S. Bhatnagar, Site Vice President  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
Browns Ferry Nuclear Plant  
P.O. Box 149  
Athens, AL 35611

General Counsel  
Tennessee Valley Authority  
ET 11A  
400 West Summit Hill Drive  
Knoxville, TN 37902

State Health Officer  
Alabama Dept. of Public Health  
RSA Tower - Administration  
Suite 1552  
P.O. Box 303017  
Montgomery, AL 36130-3017

Mr. Robert J. Adney, General Manager  
Nuclear Assurance  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Chairman  
Limestone County Commission  
310 West Washington Street  
Athens, AL 35611

Mr. Robert G. Jones, Plant Manager  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609