April 12, 1985

Docket No. 50-296

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

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Dear Mr. Parris:

The Commission has issued the enclosed Amendment No. 87 to Facility Operating License No. DPR-68 for the Browns Ferry Nuclear Plant, Unit 3. This amendment is in partial response to your application dated September 22, 1983 (TVA BFNP TS 191), as supplemented March 20, 1985.

This amendment revises the present pressure-temperature limit curves (Figure 3.6-1) in the Technical Specifications to provide more conservative limiting temperatures for pressure test, heatup, cooldown and core operations for the duration of the present Cycle 6 operations for Unit 3. Unit 3 is scheduled to shut down November 30, 1985 for environmental qualification modifications.

Your application had requested that we approve a pressure-temperature curve for at least the next decade of plant operation (i.e., valid for 12 equivalent full power years) for all three Browns Ferry units. While we have determined that the proposed curve is conservative for the balance of the current fuel cycle for Unit 3, the applicability to upcoming fuel cycles will be the subject of future correspondence.

A copy of the Safety Evaluation is also enclosed.

Sincerely,

Richard J. Clark

Richard J. Clark, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 87 to License No. DPR-68
2. Safety Evaluation

cc w/enclosures:
See next page

MTEB:DE
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Mr. Hugh G. Parris
Tennessee Valley Authority
Browns Ferry Nuclear Plant, Units 1, 2 and 3

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 87
License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated September 22, 1983, as supplemented March 20, 1985, 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-68 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 87, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 12, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 87

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise Appendix A as follows:

1. Remove the following pages and replace with identically numbered page.

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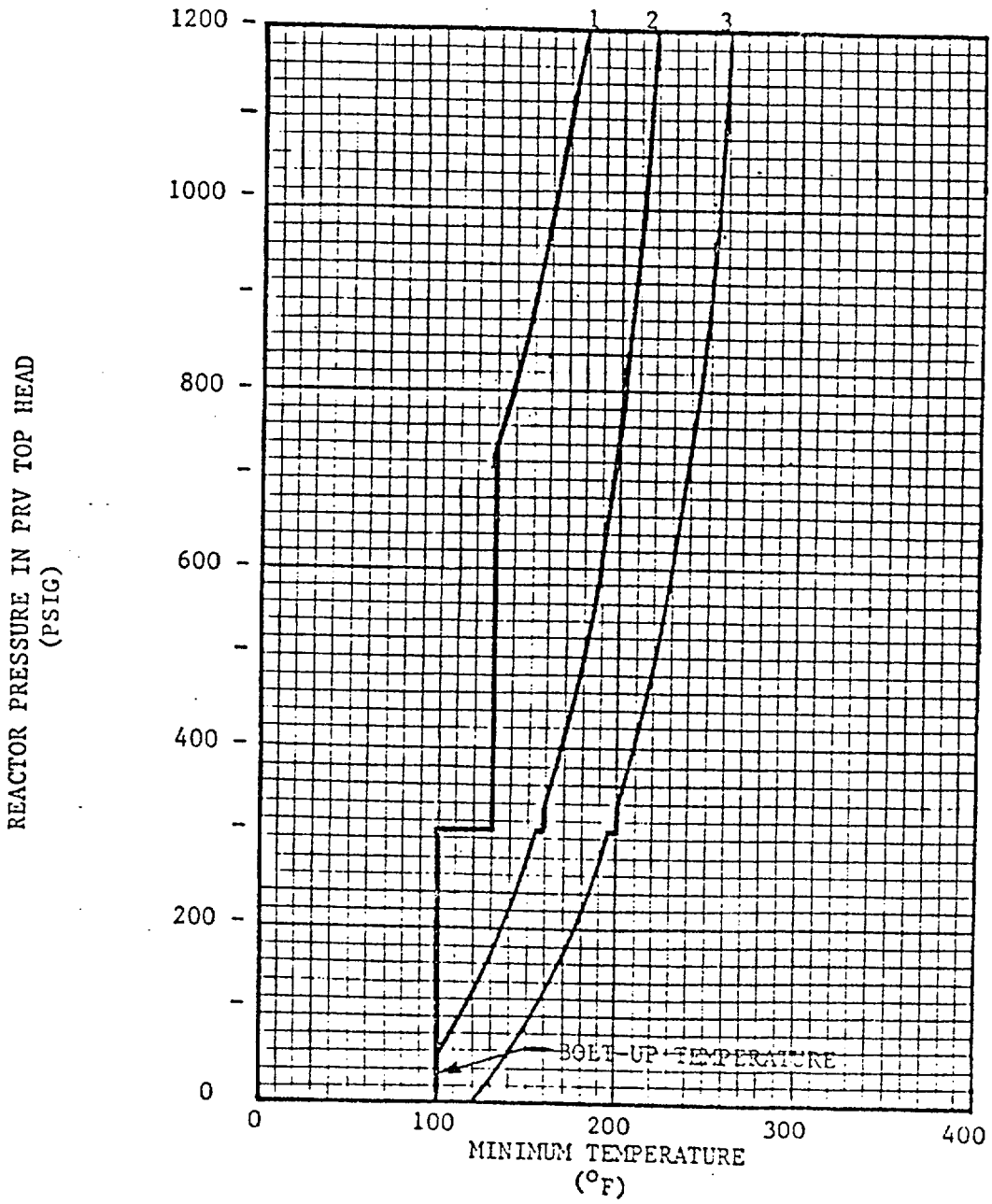
2. The marginal line on this page denotes the area being changed.

Figure 3.6-1



Curve #1
Minimum temperature for pressure tests such as required by Section XI. Minimum temperature of 170°F is required for test pressure of 1,100 psig.

Curve #2
Minimum temperature for mechanical heatup or cooldown following nuclear shutdown.

Curve #3
Minimum temperature for core operation (criticality) includes additional margin required by 10CFR50, Appendix G, Par. IV.A.3 which became effective July 26, 1983.

Notes
These curves include sufficient margin to provide protection against feedwater nozzle degradation. The curves allow for shifts in RT_{NDT} of the reactor vessel beltline materials to compensate for radiation embrittlement until the end of Cycle 6.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 87 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 3

DOCKET NO. 50-296

1.0 Introduction

By letter dated September 22, 1983 (TVA BFNP TS 191), as supplemented March 20, 1985, the Tennessee Valley Authority (the licensee/TVA) requested amendments to Facility Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3. The licensee requested amendments to the Technical Specifications (TS) to revise the present pressure-temperature limit curves (Figure 3.6-1). Periodic revision of these curves is required to account for the loss of reactor vessel material toughness resulting from the accumulated radiation exposure to the vessel with time.

2.0 Evaluation

Appendix G, "Fracture Toughness Requirements," and Appendix H, "Reactor Vessel Material Surveillance Program Requirements," 10 CFR Part 50, describe the conditions that require pressure-temperature limits for the reactor coolant pressure boundary and provide the general bases for these limits. These appendices specifically require that pressure-temperature limits must provide safety margins for the reactor coolant pressure boundary at least as great as the safety margins recommended in the ASME Boiler and Pressure Vessel Code, Section III, Appendix G, "Protection Against Nonductile Failure." Appendix G, 10 CFR Part 50, requires additional safety margins whenever the reactor core is critical, except for low-level physics tests.

Operating limits on the reactor vessel pressure and temperature are established to provide adequate safety margins against nonductile behavior during inservice leak and hydrostatic tests, during normal heatup and cooldown operations and during normal core operation. These are the three curves for the minimum temperature that must be maintained shown in Figure 3.6-1 in the Browns Ferry TS. Once in service, the pressure-temperature limits must be revised to reflect the actual neutron radiation damage as determined from the results of the reactor vessel materials surveillance program. Predictions of radiation damage must be based on the actual measured shifts in the nil-ductility reference temperature, RT_{NDT}, as determined by the materials surveillance program.

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Appendices G and H, 10 CFR Part 50, require the licensee to predict the shift for reference temperature due to neutron irradiation. The shift in RT_{NDT} due to neutron irradiation is then added to the initial RT_{NDT} to establish the adjusted reference temperature. The base plate or weld seam having the highest adjusted reference temperature is considered the most limiting material for which the pressure-temperature operating limits are based.

Browns Ferry Unit 1 achieved initial criticality on August 17, 1973. Initial criticality for Units 2 and 3 were July 20, 1974 and August 8, 1976, respectively. Due to the extended outages of the Browns Ferry units, the reactor vessels have not received much fast neutron fluence considering the length of time the facilities have been licensed. If Unit 3 operated continuously in the present Cycle 6 from now until the scheduled shutdown on November 30, 1985, the vessel exposure would only be 5.45 equivalent full power years (EFPYs).

The fracture toughness of all ferritic steels gradually decreases with exposure to fast neutrons above a threshold value. To adjust for this, the minimum operating temperature vs. pressure curves need to be revised. The present curves in Figure 3.6-1, which were based on a shift in RT_{NDT} of 30°F, were approved for use thru 4.0 EFPY. The Browns Ferry reactor vessels have exceeded this exposure. By application dated September 22, 1983, the licensee proposed revised curves. Our review of this submittal determined that additional information (as described in our letter of January 23, 1984) was needed on the chemical composition and test results on the weld and plate material used to fabricate the reactor vessels. The information requested was provided by TVA's letter of March 20, 1985. The March 20, 1985 submittal provided clarifying information to support the licensee's materials evaluation and did not significantly change the initial application. Based on the irradiation data, TVA concludes that a 45°F shift in RT_{NDT} will not occur for at least 12 EFPY of operation. This would cover about the next decade of operation for each Browns Ferry unit. Until the staff completes additional evaluations, we are not in a position to conclude that the data provided is adequately conservative and fully supports operation thru 12 EFPY vs., for example, 11.5 EFPY. The staff has concluded that the curves are conservative thru at least 7.0 EFPY, which is more than sufficient to cover operation of Browns Ferry Unit 3 for the remainder of Cycle 6. Both Browns Ferry Units 1 and 2 are shutdown to complete environmental qualification modifications; the projected startup dates are February 1986 and September 1985, respectively. Browns Ferry Unit 3 is required to shut down on November 30, 1985 to complete environmental qualification modifications. Accordingly, we are approving use of the revised Figure 3.6-1 by Browns Ferry Unit 3 during Cycle 6 operation. Operation beyond Cycle 6 for Unit 3, as well as future operation of Units 1 and 2 will be the subject of subsequent correspondence.

3.0 Environmental Considerations

The amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20.

The 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. 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.

4.0 Conclusion

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: B. Elliot and R. Clark

Dated: April 12, 1985