September 19, 2006

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

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 1 — ISSUANCE OF AMENDMENT REGARDING THE SCRAM DISCHARGE VOLUME (TAC NO. MC1427) (TS-437)

Dear Mr. Singer:

The Commission has issued the enclosed Amendment No. 259 to Renewed Facility Operating License No. DPR-33 for the Browns Ferry Nuclear Plant, Unit 1. This amendment is in response to your application dated November 3, 2003, as supplemented by a letter dated May 6, 2004, and August 1, 2006.

The amendment lowers the allowable value of the scram discharge volume from less than or equal to 50 gallons to less than or equal to 46 gallons in Technical Specification Table 3.3.1.1-1, Reactor Protection System Instrumentation, Function 7.b.

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 by MChernoff for/

Brian J. Benney, Project Manager
Plant Licensing Branch 4
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-259

Enclosures: 1. Amendment No. 259 to License No. DPR-33
2. Safety Evaluation

cc w/enclosures: See next page

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Dated: September 19, 2006

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 259
License No. DPR-33

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

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated November 3, 2003, as supplemented May 6, 2004, and August 1, 2006, 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 Renewed Facility Operating License No. DPR-33 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 259, 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 prior to the restart of Unit 1.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

L. Raghavan, Chief,
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 19, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 259

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Replace Page 3 of Renewed Operating License DPR-33 with the attached Page 3.

Revise the Appendix A Technical Specifications by removing the page identified below and inserting the attached page. The revised page is identified by the captioned amendment number and contains marginal lines indicating the area of change.

REMOVE	INSERT
3.3-7	3.3-7

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 259

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-33

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-259

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated November 3, 2003, as supplemented by letters dated May 6, 2004, and August 1, 2006, the Tennessee Valley Authority (TVA, the licensee) submitted a request for changes to the Browns Ferry Nuclear Plant (BFN), Unit 1, Technical Specifications (TSs). The proposed TS changes would (1) lower the Allowable Value (AV) of the Scram Discharge Volume (SDV) Water Level - High Float Switches from less than or equal to 50 gallons to less than or equal to 46 gallons in TS Table 3.3.1.1-1, Reactor Protection System Instrumentation, Function 7.b, and (2) remove the low scram pilot air header pressure switches from service. The supplements dated May 6, 2004, and August 1, 2006, provided additional information that clarified the application, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 3, 2004 (69 FR 5207).

2.0 BACKGROUND/REGULATORY EVALUATION

The SDV system receives the water displaced by the motion of the control rod drives during a reactor scram. The system contains two separate SDVs serving the east and west rod banks, each of which drains to its own scram discharge instrument volume (SDIV). The primary design objective of the SDV system is to ensure that sufficient free volume is maintained available to receive water displaced by the control rods during a full scram. Should the SDV fill to a point where there is insufficient free volume to accept the displaced water, control rod insertion would be impeded. SDIV water level is measured by two diverse methods: (1) two thermal probes (resistance-temperature detectors (RTDs)), and (2) two Magnetrol float switches. The trip logic is one-out-of-two taken twice for a scram, so actuation of either the float switches or the RTDs will initiate a high water level scram, and a trip in one of the SDIVs will initiate a reactor scram. For BFN Unit 1, the SDV high water level trip TS AV is currently 50 gallons measured in the SDIVs, as shown for Function 7 in TS Table 3.3.1.1-1, Reactor Protection System Instrumentation.

In addition, the licensee stated, in response to NRC, Inspection and Enforcement (IE) Bulletin 80-17, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR [Boiling-Water Reactor]," dated July 1980, and its supplements, that BFN implemented several short-term and long-term modifications to improve the performance of the SDV system and the

SDIVs. One of the short-term modifications installed on BFN Units 2 and 3 was the scram pilot air header pressure switches, which scrams the reactor on sensing low pressure in the control air system that serves the control rod drive system. The licensee intended to remove these switches following the completion of the long-term modifications associated with the subject bulletin as discussed in Section 3.2 of this Safety Evaluation.

Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," describes a method acceptable to the NRC staff for complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are initiated within, and remain within, the TS limits. RG 1.105, Revision 3, endorses Instrumentation Society of America (ISA) Standard ISA-S67.04-1994, Part 1, "Setpoints for Nuclear Safety-Related Instrumentation." The NRC staff utilized the RG and the above ISA standard in performing this review.

3.0 TECHNICAL EVALUATION

3.1 Lower AV of the SDV

The licensee proposed to revise the SDV Water Level - High Float Switches from less than or equal to 50 gallons to less than or equal to 46 gallons in TS Table 3.3.1.1-1, Reactor Protection System Instrumentation. The staff reviewed the application as supplemented by the licensee's letter of August 1, 2006, and determined the following:

- The licensee's setpoint methodology and its calculations utilize the Analytical Limits to establish the nominal Trip Setpoint, Acceptable As Left (AAL) band, Acceptable As Found (AAF) band and the AV.

- The licensee's setpoint methodology accounts for all known uncertainties associated with the instrument loop when calculating the trip setpoint.

- The licensee's procedures incorporate the AAL and AAF calibration tolerance values. For setpoint values found inside the AAL value, the setpoint does not require adjustment. For setpoint values found outside the AAL value and inside the AAF value, the setpoint will be adjusted and left within the AAL valve per surveillance requirements. For setpoint values found outside the AAF value, the appropriate supervisors will be notified, a review will be performed to determine operability, and the corrective action will be documented in the test log. For setpoint values found outside the AV the channel will be declared inoperable and appropriate action for the Limiting Condition for Operation will be entered.

- The licensee in its August 1, 2006, letter has stated that since credit is not taken in the BFN transient and accident analyses for TS instrument Table 3.3.1.1-1, Function 7.b, SDV Water Level - High Float Switches, in ensuring a Safety Limit is met or that the temperature acceptance criterion of 10 CFR 50.46 is met, this TS instrument function is not safety-limit related. Therefore, the operability of this TS function is controlled by licensee procedures.

The staff has reviewed the licensee's submissions and has determined that the licensee, in order to determine the trip setpoint for the SDV Water Level - High Float Switches, uses a method that conforms to the recommendations of RG 1.105 with respect to establishment of

analytical limits and the treatment of uncertainties. The licensee, therefore, has determined these trip setpoints and the associated AVs, together with AAL and AAF values, used to determine instrument operability, in an appropriately conservative manner. Accordingly, the proposed change to lower the AV in TS Table 3.3.1.1-1, Function 7.b, from less than or equal to 50 gallons to less than or equal to 46 gallons is acceptable.

3.2 Removal of the Scram Pilot Air Header Pressure Switches from Service

As stated above, TVA responded to the modification outlined in IE Bulletin 80-17 by installing the scram pilot air header pressure switches in BFN Units 2 and 3 with the intention of removing them upon the completion of the long-term modifications associated with the bulletin. The long-term modifications included the installation of separate SDIVs for each of the two control rod banks and the addition of diverse instruments in the SDIVs for the high-water level trip function. Field performance of the RTDs was satisfactory, however, a review of system data following reactor scrams showed that the actuation of the float switches typically lagged the RTDs by approximately 20 seconds. Pending remedy of the float switches slow response time, TVA maintained the scram pilot air pressure switches in service.

TVA's system analysis determined that the slow response time of the float switches was due to an undersized piping connection between the SDIVs and the float switch assemblies, which limits the fill rate of the float switch assemblies and delays switch actuation. By this license amendment request, the licensee stated that prior to restart of BFN Unit 1, the connecting piping between the SDIVs and the float switches will be replaced with a larger pipe (from the existing 3/4-inch diameter, Schedule 160 piping, to 2-inch diameter, Schedule 80 piping). This piping change increases the cross-sectional flow area by a factor of 10. To further offset the float switch response time, the float switch assemblies will be physically lowered by approximately 10 inches, which translates to a decrease of the AV of 50 gallons to 46 gallons. These modifications will remedy the slow response time of the float switches, which eliminates the need to retain the low scram pilot air header pressure trip function. These modifications and the lowering of the SDV water level setpoints have previously been approved on BFN Units 2 and 3 (ADAMS Accession No. ML020990743).

The staff accepted the resolution of the long-term fixes of the SDV system problem. On April 8, 2002, the NRC issued Amendment Nos. 276 and 235 to Facility Operating License Nos. DPR-52 and DPR-68 for the BFN Units 2 and 3, respectively. The amendments removed the requirements for the low-scram pilot air header pressure switches at the BFN Units 2 and 3.

Since the low scram pilot air header pressure switches were never added to the Unit 1 TSs, there is no change for this item. The staff finds this acceptable for BFN Unit 1.

4.0 CONCLUSION

Based on its review of the November 3, 2003, May 6, 2004, and August 1, 2006, submittals, the staff finds that the proposed TS changes for lowering the AV of SDV water level from less than or equal to 50 gallons to less than or equal to 46 gallons is acceptable.

5.0 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.

6.0 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 (69 FR 5207). 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.

7.0 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.

8.0 REFERENCES

1. Letter from TVA to NRC dated November 3, 2003, "Browns Ferry Nuclear Plant (BFN) Unit 1 TS Change 43 7- Scram Discharge Volume Water Level Set point."

2. Letter from TVA to NRC dated May 6, 2004, "Browns Ferry Nuclear Plant (BFN) Unit 1 TS Change 437 - Response to Request for Additional Information Regarding Scram Discharge Volume Water Level Set point (TAC No MC 1427)."

3. IE Bulletin No. 80-17, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR," July 3, 1980.

4. NUREG/CR-5191, "Close-out of IE Bulletin 80-17: Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR," December 1988.

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