



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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 122 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3

DOCKETS NOS. 50-259, 50-260 AND 50-296

1.0 INTRODUCTION

By letter dated June 1, 1988, the Tennessee Valley Authority (TVA or the licensee) requested amendments to Appendix A of the Technical Specifications (TS) for Facility Operating Licenses Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN), Units 1, 2 and 3. The proposed temporary changes to the TS are to provide system operability requirements for the Standby Gas Treatment System (SGTS) and the Control Room Emergency Ventilation System (CREVS) to support the BFN fuel inspection and reconstitution program and plant activities before Unit 2 fuel load.

The current BFN TS provide operability requirements for the handling of spent fuel and operations over the spent fuel pools. Specification 3.7.C.3 requires refueling zone secondary containment integrity to be maintained. For handling of spent fuel and all operations over spent fuel pools, BFN Technical Specification 3.7.B.1 requires all three trains of SGTS to be operable whenever secondary containment integrity is required. TS 3.7.B.3 will allow fuel handling for a maximum of seven days with one train of SGTS inoperable. However, the remaining two trains must be demonstrated operable within two hours and daily thereafter.

A conservative reading of TS 3.7.E.1 would also require both trains of CREVS to be operable. The staff understands that TVA is currently evaluating the CREVS due to leakage into the control room from the same ventilation ducts providing the CREVS suction. The current specification requires operability at all times when any reactor vessel contains irradiated fuel. All three units at BFN are currently defueled. TS 3.7.E.3 and 3.7.E.4 limit "refueling operations" if one or both CREVS is inoperable. A conservative definition of refueling operations would encompass any movement of fuel in and around the fuel pools.

Fuel inspection and reconstitution will improve the reliability of the fuel by identifying and replacing fuel rods which fail to meet acceptable corrosion criteria for continued operation. This will reduce the number of fuel pins leaking in future cycles, which will reduce plant radiation levels and thus increase plant safety.

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TVA has requested a temporary change to the TS which will relax these system requirements to allow the system modifications and maintenance needed for restart to proceed in parallel with the fuel inspection and reconstitution program.

## 2.0 EVALUATION

### 2.1 Standby Gas Treatment (SGTS)

The SGTS has three trains that automatically start upon receipt of a high radiation signal. The SGTS minimizes the release of radioactive material from the secondary containment to the environs. The SGTS performs two safety functions: (1) filtering iodine particulate and exhaust from the Reactor Building atmosphere to the plant stack during secondary containment isolation conditions, and (2) when isolated, maintaining the secondary containment at one-quarter inch of water negative pressure relative to the building exterior, thus assuring only inleakage into the secondary containment.

The fuel for all three units has decayed for approximately three years. The only significant radioisotope remaining is Kr-85. Based on the current fuel fission inventory, there is essentially no iodine present. Should a fuel handling accident occur, SGTS filtering of iodine would therefore not be required. Filtering has no effect on Kr-85 since it is an inert gas. The most severe accident applicable before fuel load is the fuel handling accident previously evaluated in the Final Safety Analysis Report, Section 14.6.4. The only safety function that would be performed by the SGTS in the event of a fuel handling accident would be to maintain the required one-quarter inch of water negative pressure when secondary containment integrity is required. It has been verified through periodic surveillance testing that only two SGTS trains are required to maintain the one-quarter inch of water negative pressure. The average measured inleakage is approximately 10,100 CFM with the secondary containment at one-quarter inch negative pressure. This is less than the TS limit of 12,000 CFM. Each train of SGTS is rated at 9,000 CFM. The total design flow for two trains is 15,000 CFM. Thus, two trains will provide adequate flow to maintain the necessary vacuum.

The proposed temporary amendment will require only two of the three trains of SGTS to be operable when secondary containment integrity is required. With less than two operable trains of SGTS, handling of irradiated fuel will be suspended until two trains are operable. If fuel handling is suspended, the fuel assemblies being moved, inspected, or reconstituted will be placed in a secure position until fuel handling activities resume. As fuel handling will be suspended if less than two trains are operable, limiting condition for operation (LCO) 3.7.B.3 and its associated required surveillance requirement (SR) 4.7.B.3.c will not be entered. To prevent ambiguity, this LCO and SR will be marked to clarify that they are not applicable without fuel in any of the three reactor vessels. Based on the above, the staff concludes that the proposed temporary changes to the TS regarding system operability requirements for the SGTS are acceptable.

## 2.2 Control Room Emergency Ventilation System (CREVS)

The CREVS is designed to protect the control room operators by pressurizing the main control room with filtered air during a fuel handling accident condition. The CREVS uses charcoal adsorbers to assure the removal of radioactive iodine from the air and high efficiency particulate absolute (HEPA) filters for removing particulate matter. These filters and adsorbers will keep the resulting doses, in the event of a design basis fuel handling accident, less than the allowable levels stated in Criterion 19 of General Design Criteria (GDC 19) for Nuclear Power Plants Appendix A to 10 CFR Part 50.

TVA is proposing to delete the operability requirements of the CREVS until just before the fuel load of BFN Unit 2. Unit 2 is scheduled to load fuel in the fall of 1988. Units 1 and 3 fuel load dates have not been established. This change will enable work to be performed on the CREVS and the associated control room HVAC ducting, as necessary. This consists of a one time change to the technical specifications. LCO's 3.7.E.3 and 3.7.E.4 will be returned to applicability before commencing fuel load.

The filtration function that the CREVS provides would not be needed in the event of a fuel handling accident. 10 CFR Part 50, Appendix A, GDC 19, requires that in the event of an accident the radiation dosage to the occupants of the control room not exceed 5 rem whole body or its equivalent to any part of the body for the duration of the accident. This same radiation dose limit is endorsed in Section 6.2.4 of NUREG 0800. TVA has evaluated the potential consequences to the control room operators in the event of a fuel handling accident before fuel load. Currently all three units are defueled with the irradiated fuel stored in the spent fuel pool. The irradiated fuel has decayed for approximately three years and the only remaining volatile fission product of any significance is Kr-85. Essentially no iodine is present in the decayed fuel. Due to the "scrubbing" effect of the fuel pool water and since Kr-85 is the only radioisotope of any significance, virtually no radioactive particulates would enter the CREVS intake ductwork. Since essentially no iodine is present in the fuel, the inhalation dose is negligible, and therefore, assuming the failure of two assemblies (i.e., 124 fuel pins), the main control room doses would be 0.001 rem whole body gamma, 0.200 rem beta, and 0.0 rem inhalation. These calculated doses are far below the level acceptable in the event of an accident. In order to reach the dose limit of 10 CFR Part 50 Appendix A, approximately 300 assemblies currently stored in the BFN fuel pool would have to fail. Based on the above, the staff concludes that the proposed temporary changes to the TS regarding system operability requirements for the CREVS are acceptable.

## 3.0 ENVIRONMENTAL CONSIDERATION

The amendments involve a change to a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and/or changes to the surveillance requirements. The staff has determined that the amendments involve 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding.

Accordingly, the amendments meet 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 nor environmental assessment need be prepared in connection with the issuance of these amendments.

#### 4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (53 FR 22407) on June 15, 1988 and consulted with the State of Alabama. No public comments were received and the State of Alabama did not have any comments.

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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Dated: July 20, 1988