



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 247 TO FACILITY OPERATING LICENSE NO. DPR-52
AMENDMENT NO. 207 TO FACILITY OPERATING LICENSE NO. DPR-68
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3
DOCKET NOS. 50-260 AND 50-296

1.0 INTRODUCTION

By letter dated June 21, 1996, the Tennessee Valley Authority (the licensee) requested amendments of the Technical Specifications (TS) for the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3. The proposed amendments revise the safety limit minimum critical power ratio (SLMCPR) to correct a non-conservative value. On May 24, 1996, in accordance with 10 CFR Part 21, the General Electric Company informed the Nuclear Regulatory Commission that the generic calculated SLMCPR may be nonconservative for some reactor core and fuel designs. The licensee has determined that for BFN Unit 2 Cycle 9, the SLMCPR given in TS 1.1.A.1 (SLMCPR = 1.07) is nonconservative. The licensee has requested that the SLMCPR calculated to bound BFN Unit 2 Cycle 9 operation (SLMCPR = 1.10) be used for all three BFN reactors pending long-term resolution of the issue. The licensee provided supplemental information on February 7, 1997, which did not affect the staff's proposed finding of no significant hazards consideration.

The licensee also provided revised TS Bases to resolve a discrepancy between the Bases and the Final Safety Analysis Report description of the supplemental spent fuel pool cooling mode of the residual heat removal system.

2.0 DESCRIPTION OF PROPOSED TECHNICAL SPECIFICATIONS CHANGES

The changes consist of a revision to Safety Limit 1.1.A.1, as follows:

When the reactor pressure is greater than 800 psia, the existence of a minimum critical power ratio (MCPR) less than 1.10 shall constitute violation of the fuel cladding integrity safety limit.

Changes to the TS Bases, which refer to this safety limit, delete references to a specific MCPR value.

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An unrelated change to the TS Bases regarding the capability of the residual heat removal (RHR) system to provide supplemental spent fuel pool cooling changes the word "will" to "can."

3.0 EVALUATION

The change to the SLMCPR restores margin lost when it was determined a generic SLMCPR value was nonconservative for some fuel and core designs. The BFN reactors are designed such that for transients caused by a single operator error or equipment malfunction are limited so that, considering uncertainties in monitoring core operations, more than 99.9% of the fuel rods are expected to avoid boiling transition.

A cycle-specific calculation has been performed for the current BFN Unit 2 Cycle 9 which resulted in an SLMCPR of 1.09. A similar calculation for the current BFN Unit 3 Cycle 8 yields an SLMCPR of 1.10. BFN Unit 1 is defueled, and is not expected to operate for at least several years, so analytical results have not been documented for that unit. The licensee proposes an SLMCPR of 1.10 for all three units.

The SLMCPR in TS 1.1.A.1 is proposed to change from 1.07 to 1.10 when the reactor pressure is greater than 800 psia and its associated Bases 1.1, 2.1.A.1, 2.1.A.3, 2.1.C, and 3.3/4.3.C are proposed to change from numerical number of 1.07 to the wording of the SLMCPR based on the cycle-specific analysis performed by General Electric (GE) for BFN Unit 2 Cycle 9 mixed core of GE11/GE9 fuel, which is also applicable to BFN Unit 1 and Unit 3 Cycle 8. The cycle-specific parameters were used including the actual core loading, the most limiting permissible control blade patterns, actual exposure-dependent rod power for R-factor distributions, and calculation made for several points in the cycle.

The staff has reviewed the proposed TS and its associated Bases changes which are based on the analyses performed using BFN Unit 2 Cycle 9 cycle-specific inputs and approved methodologies including GESTAR II (NEDE-24011-P-A-11, Sections 1.1.5 and 1.2.5) and NEDO-10985-A, January 1977, and found them acceptable. Because the R-factor methodology referenced in NEDE-24011-P-A-11 is not applicable to the part-length GE11 fuel, a revised R-factor methodology described in NEDC-32505P, "R-Factor Calculation Method for GE11, GE12 and GE13 Fuel," November 1995 was used. The revised R-factor calculation method uses the same NRC-approved equation stated in GESTAR (NEDE-24011-P-A) with the correction factors to account for the peaking factor effects due to the part-length-rod design. The staff has reviewed the R-factor calculation method for the GE11, the relevant information provided in the proposed Amendment 25 to GESTAR II, NEDE-24011 (which is under staff review) and the supplemental information dated February 7, 1997, on the Browns Ferry Unit 2 Cycle 9 (BFN2C9) and Unit 3 Cycle 8 SLMCPR calculation. The staff has found that the methodologies discussed above apply to the BFN design, and the justification for analyzing and determining the SLMCPR of 1.10 for all three Browns Ferry units based on the result of the analysis for the BFN Unit 3 Cycle 8 (BFN3C8) is acceptable, since (1) all three units are not an equilibrium core; (2) the fresh GE11 bundles for BFN3C8 have the flattest R-factor distribution compared



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with that in the BFN2C9; and (3) BFN3C8 is loaded with a higher batch fraction.

Based on its review, the staff concludes that the changes to the TS and its associated Bases for the SLMCPR are acceptable for BFN Units 2 and 3, since the changes are analyzed based on the NRC-approved method and a conservative cycle-specific SLMCPR is used for these units. The new values will ensure that greater than 99 percent of the fuel rods will avoid transition boiling.

Staff approval of similar changes for BFN Unit 1 is dependent on the licensee providing appropriate documentation of similar calculations for that unit. Therefore, an amendment to implement the revised SLMCPR for Unit 1 is not approved at this time.

In addition, a correction of the discrepancy in the description of the RHR supplemental fuel pool cooling mode in Bases 3.10.C by changing the wording from "will" to "can" is proposed to denote that the RHR system is a means of providing additional fuel pool decay heat removal. This revision is an appropriate clarification of the Bases for all three units.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements 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 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 the amendments involve no significant hazards consideration, and there has been no public comment on such finding (61 FR 42285). 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 or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based upon the considerations discussed above, that: (1) the amendments do not (a) significantly increase the probability or consequences of an accident previously evaluated, (b) create the possibility of a new or different kind of accident from any previously evaluated, or (c) significantly reduce a margin of safety, and therefore, the amendments do not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (3) such activities will be conducted in

compliance with the Commission's regulations; and (4) issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

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