

May 24, 2002

Mr. R. T. Ridenoure
Division Manager - Nuclear Operations
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
Post Office Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT
(TAC NO. MB3653)

Dear Mr. Ridenoure:

The Commission has issued the enclosed Amendment No. 209 to Facility Operating License No. DPR-40 for the Fort Calhoun Station, Unit No. 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 14, 2001, as supplemented by letters dated January 15 and April 15, 2002.

The amendment revises TS 2.10.4(5)(a)(iii), "DNBR Margin During Power Operation Above 15% Rated Power," to decrease the minimum required reactor coolant system flow rate from 206,000 gallons per minute (gpm) to 202,500 gpm. In addition, the Bases section for TS 2.10.4 has been revised to be consistent with the approved change to the TS.

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

Sincerely,

/RA/

Alan B. Wang, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-285

Enclosures: 1. Amendment No. 209 to DPR-40
2. Safety Evaluation

cc w/encls: See next page

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OMAHA PUBLIC POWER DISTRICT

DOCKET NO. 50-285

FORT CALHOUN STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 209
License No. DPR-40

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Omaha Public Power District (the licensee) dated December 14, 2001, as supplemented by letters dated January 15 and April 15, 2002, 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 license 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, Facility Operating License No. DPR-40 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B. of Facility Operating License No. DPR-40 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 209, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: May 24, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 209

FACILITY OPERATING LICENSE NO. DPR-40

DOCKET NO. 50-285

Replace the following pages of Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

REMOVE

2-57c
2-57e

INSERT

2-57c
2-57e

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 209 TO FACILITY OPERATING LICENSE NO. DPR-40

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION, UNIT NO. 1

DOCKET NO. 50-285

1.0 INTRODUCTION

By application dated December 14, 2001 (Reference 1), and supplemental letters dated January 15, 2002 (Reference 2), and April 15, 2002 (Reference 3), Omaha Public Power District (OPPD) requested changes to the Technical Specifications (Appendix A to Facility Operating License No. DPR-40). The requested changes would revise the minimum required reactor coolant system (RCS) flow rate in Technical Specification (TS) 2.10.4(5)(a)(iii) from 206,000 gpm to 202,500 gpm for power operation above 15% of rated power. OPPD also proposed to revise the Bases section of TS 2.10.4 to be consistent with the proposed change of TS 2.10.4. To support its proposed changes, OPPD submitted the results of its evaluation of all design bases transients and accidents that are affected by the proposed change of reactor coolant minimum flow to predict that with the proposed change, the consequences of these events will remain acceptable.

The supplemental letters dated January 15 and April 15, 2002, provided additional information that clarified the application. The additional information did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on January 22, 2002 (67 FR 2927).

By letter dated April 15, 2002, OPPD provided additional information in the following areas: (1) results of its reanalysis for all departure from nucleate boiling (DNB) limiting design basis transients and accidents using the reduced minimum RCS flow rate, (2) the required DNB ratio (DNBR) limits associated with Cycle 21 operation, (3) confirmation that the NRC has reviewed and approved the methodology used for the licensee's reanalyses and the use of the methodology is consistent with the current licensing analyses, (4) confirmation that the initial conditions and assumptions used in the reanalyses are consistent with the current licensing analyses, and (5) assurance that there is adequate natural circulation flow for plant safe shutdown given the higher flow-resistant FRA-ANP fuel assemblies in the core.

2.0 BACKGROUND

Prior to TS Amendment 193 (Reference 4), FCS was operated with a minimum RCS flow rate of 202,500 gpm. Amendment 193 changed the minimum RCS flow rate to 206,000 gpm to accommodate the need for an increase in RCS flow rate due to the removal of the steam generator orifice plate in 1998. The increased minimum RCS flow rate provided additional design margin to DNB. However, due to the loading of the higher flow-resistant fuel assemblies in the core, TS 2.10.4 (5)(a)(iii) needs to be revised to return to the previously specified minimum RCS flow rate of 202,500 gpm.

The minimum required reactor coolant flow rate specified in TS 2.10.4(5)(a) is one of the important DNB-related parameters along with the RCS cold leg temperature and pressurizer pressure. The limits of these RCS parameters are required to be maintained to assure that the calculated transient minimum DNBR (MDNBR) are above the allowable MDNBR for all design basis events initiated during power operations.

The proposed amendment for the change of minimum RCS flow rate complies with Criterion 10 of 10 CFR Part 50, Appendix A, General Design Criteria for Nuclear Power Plants. The licensee is required to demonstrate that the RCS with the reduced minimum RCS flow rate will provide appropriate margin to assure that the specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs).

The licensee stated that the proposed change is needed to accommodate the projected decrease in RCS flow rate due to: (1) the loading of higher flow-resistant FRA-ANP fuel assemblies into the core, which will result in a larger pressure drop than that experienced by the current Westinghouse fuel assemblies, and (2) the anticipated need to plug steam generator tubes during future refueling outages. In the current operating cycle, Cycle 20, there are 53 FRA-ANP fuel assemblies and 80 Westinghouse fuel assemblies in the core. The licensee is planning to replace the remaining Westinghouse fuel assemblies with FRA-ANP fuel assemblies in the next two refueling outages. The licensee also anticipates that additional steam generator tubes will need to be plugged during future outages as a result of steam generator tube testing.

To accommodate the new mixed fuel arrangement in the core for Cycle 21 operation, the proposed change of TS 2.10.4 with adequate supporting safety analyses is also needed to satisfy the requirement of Criterion 2 of 10 CFR 50.36(c)(2)(ii) relative to the required limiting conditions of operation (LCO) for initial plant conditions that are assumed in a design basis transient and accident analysis. The staff's acceptance criteria is that the TS specified limitation of the initial plant conditions is consistent with their assumed value in the licensee's safety analyses.

3.0 EVALUATION

In support of its proposed changes and in responses to the staff's requests for information, the licensee provided a discussion of the computer code and methodology used to perform its reanalyses for DNB limiting events affected by a reduced RCS flow rate. The licensee used the XCOBRA-IIIC computer code and the FRA-ANP HTP DNBR method for its reanalyses.

The staff confirmed during its review that the computer code and methodology had been reviewed and approved by NRC. The details of the staff review are documented in Topical Reports XN-75-21(P)(A), Revision 2, "XCOBRA-IIIC," and EMF-92-153(P)(A), Supplement 1, "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel." The computer code and methodology has been satisfactorily applied in the safety analyses for the current Cycle (Cycle 20) at FCS. The staff also confirmed that the initial conditions and assumptions used in the licensee's reanalyses remain consistent with the current licensing analyses of the plant.

The licensee has provided a list of calculated MDNBR for each event analyzed. The calculated MDNBR for Cycle 21 operation range between 1.199 to 1.778. Using the FRA-ANP correlation applicable to Cycle 21 operation (including a 2 percent mixed core penalty for 93 FRA-ANP fuel assemblies and the remaining 40 Westinghouse fuel assemblies), the licensee calculated that the MDNBR limit value was 1.164. The staff has reviewed the results of the licensee's analyses and concludes that the licensee's calculated MDNBRs for all analyzed events with reduced RCS flow rate are higher than the calculated Cycle 21 MDNBR limit of 1.164. Since the results of the licensee's reanalyses demonstrated that there is adequate DNB margin for the reduced RCS flow rate proposed by the licensee, the staff concludes that the proposed reduction of RCS flow is acceptable. The staff also concludes that: (1) the proposed change complies with Criterion 10 of 10 CFR Part 50, Appendix A since the RCS with the reduced minimum RCS flow rate will provide appropriate margin to assure that the SAFDLs are not exceeded during any condition of normal operation, including the effects of AOOs, and (2) this proposed change assures that the restrictions specified in TS 2.10.4 are consistent with the assumption used in the safety analyses and thus complies with the requirement of Criterion 2 of 10 CFR 50.36(c)(2)(ii).

The licensee has performed a large break loss-of-coolant accident (LBLOCA) analysis for Cycle 21 operation and calculated a peak clad temperature (PCT) of 1955°F. The licensee also performed another calculation that used the current higher RCS flow rate and the same methodology, and calculated a PCT of 1956°F. This indicates that the RCS flow rate reduction has very little effect on the expected PCT results. This LBLOCA analysis demonstrate that the proposed change of minimum RCS flow rate complies with the requirements of 10 CFR 50.46. The licensee did not perform a small break loss-of-coolant accident (SBLOCA) with the reduced RCS flow rate because the licensee judged the effect from the reduced RCS flow to an SBLOCA to be less than that for an LBLOCA. In addition, there is over 300°F of PCT margin in the analysis of record for an SBLOCA. We agree with the licensee's assessment as the reduction in the initial RCS flow rate has no significant effect on the transient responses and PCT due to the early tripping of reactor coolant pumps.

During the review the staff raised a concern regarding adequate natural circulation flow for plant safe shutdown relative to the higher flow-resistant FRA-ANP fuel assemblies in the core. In response, the licensee indicated that as part of the Cycle 20 analyses, FCS performed a thermal hydraulic compatibility analysis. This analysis concluded that the difference in the forced flow between a full core of Westinghouse fuel and a full core of FRA-ANP fuel is less than 1%. Based on the results of this calculation, the licensee projected that there will be a similar 1% flow reduction for natural circulation flow conditions. The staff agrees with the licensee's assessment because with the same flow path configuration, the degree of flow changes due to the increase of flow resistance will not have a significant effect.

The staff considers this small reduction in natural circulation flow rate following a reactor trip with loss of off-site power insignificant and the capability of natural circulation cooldown will remain adequate with higher flow-resistant fuel in the core. The staff has determined that the proposed change to TS 2.10.4 to reduce the required minimum RCS flow rate from 206,000 gpm to 202,500 gpm is acceptable, because all appropriate safety analyses confirm that the required DNBR safety limits will be met for Cycle 21.

4.0 STATE CONSULTATION

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

5.0 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 2927). 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.

6.0 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.

7.0 REFERENCES

1. Letter from W. G. Gates, Omaha Public Power District to US Nuclear Regulatory Commission, "Fort Calhoun Station Unit 1 - License Amendment Request, Minimum Reactor Coolant System Flow Rate," dated December 14, 2001.
2. Letter from R. T. Ridenoure, Omaha Public Power District to US Nuclear Regulatory Commission, "Fort Calhoun Station Unit 1 - 'Updated Evaluation of Minimum Reactor Coolant System Flow Rate License Amendment Request'," dated January 15, 2002.
3. Letter from R. T. Ridenoure, Omaha Public Power District to US Nuclear Regulatory Commission, "Fort Calhoun Station Unit 1 - 'Confirmation of Minimum Flow Rate Amendment Request Assumptions'," dated April 15, 2002.

4. Letter from NRC (L. R. Wharton) to OPPD, "Fort Calhoun Station, Unit 1 Issuance of Amendment Re: Reactor Coolant System Flow Rate," dated October 6, 1999.

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Date: May 24, 2002

Ft. Calhoun Station, Unit 1

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