January 25, 19

Mr. Guy R. Horn
Vice-President, Nuclear
Nebraska Public Power District
Post Office Box 499
Columbus, Nebraska 68602-0499

SUBJECT: COOPER NUCLEAR STATION - AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. DPR-46 (TAC NO. M90488)

Dear Mr. Horn:

The Commission has issued the enclosed Amendment No. 166 to Facility Operating License No. DPR-46 for the Cooper Nuclear Station. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated September 26, 1994.

The amendment revises TS 3.5.C.1 and 3.5.C.4 to increase the minimum pressure at which the high pressure coolant injection system is required to be operable from 113 psig to 150 psig.

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

Sincerely,

ORIGINAL SIGNED BY:

James R. Hall, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosures: 1. Amendment No. 166 to License No. DPR-46
2. Safety Evaluation

cc w/encls: See next page

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

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cc w/encls: See next page

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

NEBRASKA PUBLIC POWER DISTRICT

DOCKET NO. 50-298

COOPER NUCLEAR STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 166
License No. DPR-46

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

   A. The application for amendment by Nebraska Public Power District (the licensee) dated September 26, 1994, 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, 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-46 is hereby amended to read as follows:

   2. Technical Specifications

      The Technical Specifications contained in Appendix A, as revised through Amendment No. 166, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

James R. Hall

James R. Hall, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Technical Specifications

Date of Issuance: January 25, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 166

FACILITY OPERATING LICENSE NO. DPR-46

DOCKET NO. 50-298

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE PAGES	INSERT PAGES
117	117
118	118

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.B (Cont'd.)	4.5.B (Cont'd.)
2. From and after the date that any RHR Service Water booster pump is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding thirty days, unless such pump is sooner made operable provided that during such thirty days the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump, and all active components that affect operability of the operable RHR Service Water subsystem are operable.	2. When it is determined that any RHR Service Water booster pump is inoperable, the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump and all active components that affect operability of the operable RHR Service Water subsystem shall be verified to be operable immediately and weekly thereafter.
3. From and after the date that one RHR Service Water subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such subsystem is sooner made operable, provided that all active components that affect operability of the operable RHR Service Water subsystem, its associated LPCI subsystem, and its associated diesel generator, are operable.	3. When one RHR Service Water subsystem becomes inoperable, the operable RHR Service Water subsystem and its associated LPCI subsystem shall be verified to be operable immediately and daily thereafter.
4. If the requirements of 3.5.B.1, 3.5.B.2 or 3.5.B.3 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 24 hours.	
C. HPCI System	C. HPCI System
1. The HPCI System shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 150 psig, and prior to reactor startup from a Cold Condition, except as specified in 3.5.C.2 and 3.5.C.3 below.	1. HPCI System testing shall be performed as follows:

	Item	Frequency
a.	Simulated Automatic Actuation Test	Once/operating Cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.C HPCI System (cont'd.)	4.5.C. HPCI System (cont'd.)
2. From and after the date that the HPCI System is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such system is sooner made operable, providing that during such seven days all active components that affect operability of the ADS, the RCIC System, both LPCI subsystems and both Core Spray subsystems are operable.	
3. With the surveillance requirements of 4.5.C not performed at the required intervals due to reactor shutdown, a reactor startup may be conducted provided the appropriate surveillance is performed within 48 hours of achieving 150 psig reactor steam pressure.	
4. If the requirements of 3.5.C.1 cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to 150 psig or less within 24 hours.	
	Item / Frequency d. Flow Rate at approximately 1000 psig Steam Press. — Once/3 months e. Flow Rate at approximately 150 psig Steam Press. — Once/operating cycle The HPCI pump shall be demonstrated to be capable of delivering at least 4250 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.
	2. When it is determined that the HPCI System is inoperable, the RCIC System, both LPCI subsystems, and both Core Spray subsystems shall be verified to be operable immediately. The RCIC System shall be verified to be operable daily thereafter. In addition, the ADS logic shall be demonstrated to be operable immediately and daily thereafter.
D. Reactor Core Isolation Cooling (RCIC) System	D. Reactor Core Isolation Cooling (RCIC) System
1. The RCIC System shall be operable whenever there is irradiated fuel in the reactor vessel, the reactor pressure is greater than 113 psig, and prior to reactor startup from a Cold Condition, except as specified in 3.5.D.2 and 3.5.D.3 below.	1. RCIC System testing shall be performed as follows: Item / Frequency a. Simulated Automatic Actuation Test — Once/operating cycle

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. DPR-46

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By letter dated September 26, 1994, Nebraska Public Power District (the licensee) requested a change to the Cooper Nuclear Station (CNS) technical specifications (TSs). The proposed changes would revise CNS TS limiting condition for operation 3.5.C.1 and 3.5.C.4 to increase the minimum pressure at which the high pressure coolant injection (HPCI) system is required to be operable from 113 psig to 150 psig.

From a systems viewpoint, the staff considered the impact of the proposed changes on the outcome of design-basis events and the ability of the emergency core cooling systems (ECCS) to provide sufficient core cooling over the range of system pressures associated with design basis events. In particular, the ECCS response to both the large break and small break loss of coolant accident (LOCA) was evaluated. These events have been analyzed in both the Cooper updated safety analysis report (USAR) and vendor reports. Other ECCS components were evaluated on an individual basis to determine the impact of the proposed modifications.

2.0 TECHNICAL SPECIFICATION CHANGES

The Cooper TS changes resulting from the proposal are as follows:

(1) TS 3.5.C.1:

The low pressure limit above which HPCI is required to be operable is changed from 113 psig to 150 psig.

(2) TS 3.5.C.4:

If TS 3.5.C.1 cannot be met, reactor system pressure must be reduced in 24 hours to 113 psig or less. This limit is changed to 150 psig.

3.0 EVALUATION

The purpose of the HPCI system is to maintain reactor vessel water inventory after a small LOCA which does not depressurize the reactor vessel. The HPCI system is described in Section IV-4-1 of the Cooper USAR. HPCI consists of a

single 4250 gpm turbine-driven constant flow pump assembly and system piping, valves, controls, and instrumentation. The design basis of the HPCI system includes coolant injection into the core at 4250 gpm between 150 to 1120 psig (Reference 1). The HPCI system is a component of the ECCS, which also includes the automatic depressurization system (ADS), low pressure coolant injection (LPCI), and core spray (CS). The other components of the ECCS add redundancy and diversity in satisfying high pressure and low pressure core cooling requirements. If HPCI becomes inoperable at pressures near normal operating values or if the leak rate is greater than HPCI capacity, ADS is designed to reduce the nuclear system pressure so that CS and LPCI can provide flow to the reactor. The ADS uses six of the eight nuclear system pressure relief valves to relieve high pressure steam to the suppression pool. The valves open upon coincident signals of low level and discharge pressure of either LPCI or core spray. The LPCI system is initiated upon a low vessel water level or high containment drywell pressure signal (Reference 2). CS is initiated on the same signals.

During reactor startup, the HPCI low steam supply isolation pressure switch setpoint is established above the required TS minimum pressure of 100 psig and below the HPCI TS operability limit of 113 psig. The pressure switches are used to ensure HPCI is not isolated for system pressures greater than 113 psig. However, the licensee submittal states that surveillance data has indicated the pressure switches would not reset within an allowable range to ensure HPCI operability at the TS limit. Furthermore, switches able to meet the TS limit could not be obtained. Problems with the HPCI pressure switches have also been identified in Cooper licensee event report (LER) 94-012, dated August 8, 1994. Increasing the TS limit to 150 psig will provide greater margin for the pressure switches. The greater margin will allow switch tolerances and instrument inaccuracies to be taken into account when determining switch setpoints.

The small break LOCA event has been analyzed in the Cooper USAR and in accident analyses provided by General Electric in NEDO-21662-2, "Loss-of-Coolant Accident Report" (Reference 3). For a small break in the coolant pressure boundary where the vessel remains pressurized, the proposed modifications will not affect the operability status of the HPCI system. Normal operating pressure is near 1000 psig, which is well above the existing and proposed minimum pressure for HPCI operability. The ECCS system also provides redundancy and diversity for the HPCI function. If the HPCI system is inoperable for other reasons, the ADS system and LPCI are designed to provide adequate coolant injection for all break sizes normally covered by HPCI. Consequently, the HPCI system, taken together with the redundant LPCI/ADS systems, should provide sufficient protection against inventory loss events occurring with the vessel remaining pressurized.

The large break LOCA event is analyzed in the Cooper USAR and in accident analyses provided by General Electric in NEDO-24045, "Loss-of-Coolant Accident Analysis Report" (Reference 4). In order to ensure adequate core cooling for the LOCA event with the incorporation of the proposed modifications, it is necessary to evaluate the importance of high pressure injection as opposed to low pressure injection and core spray. The analysis performed for the large

break LOCA event does not take credit for HPCI availability at pressures below 150 psig. Therefore, the new range of inoperability for HPCI from 113 to 150 psig should not affect the outcome of the large break LOCA event. Design information from the USAR also states that the range of pressures over which HPCI is required to deliver rated flow of 4250 gpm is 150-1120 psig. During a LOCA event leading to depressurization, effective injection flow from LPCI begins when system pressure has decreased below approximately 290 psig (Reference 5). Therefore, overlap of HPCI and LPCI should exist between 290 psig and 150 psig, which is the low pressure cutoff setpoint for the HPCI turbine (Reference 6). When the HPCI system becomes inoperable at 150 psig, LPCI is operating and is rated for a flow rate greater than the HPCI capacity of 4250 gpm for an injection pressure of 150 psig (Reference 7). The LPCI and core spray systems are designed to provide cooling for break areas ranging from approximately 0.2 square feet up to and including the double-ended recirculation line break without availability of the high pressure emergency core cooling systems (Reference 8). Operation of both LPCI and CS should not be impacted by the proposed changes. Therefore, the LOCA analysis previously submitted by the licensee bounds the effects of the proposed changes.

The proposed changes to CNS TSs have been reviewed at the systems-level. Analyses of design-basis events submitted by the licensee and General Electric, particularly loss of coolant events, have been reviewed by the staff. The entire range of break sizes for the most limiting location in the coolant pressure boundary have been considered. For small breaks during normal operations, the reactor system pressure will remain near 1000 psig, and the HPCI system will not be affected by the proposed changes. For larger break sizes outside the capacity of HPCI, the LPCI and ADS systems will provide adequate cooling. The operability of LPCI and ADS should not be affected by the proposed modifications. Analysis of these events therefore bounds the effects of the proposed changes. On these bases, the staff finds the proposed changes acceptable.

REFERENCES

1. Cooper Nuclear Station Updated Safety Analysis Report, page VI-3-2.
2. Cooper Nuclear Station Updated Safety Analysis Report, page VI-4-8.
3. NEDO-21662-2, "Loss of Coolant Accident Report", General Electric, July 1977.
4. NEDO-24045, "Loss of Coolant Accident Report", General Electric, August 1977.
5. Cooper Nuclear Station Updated Safety Analysis Report, page VI-5-2.
6. Cooper Nuclear Station Updated Safety Analysis Report, page VI-5-10.
7. Cooper Nuclear Station Licensee Event Report 94-012, August 8, 1994.
8. Cooper Nuclear Station Technical Specifications, page 124.

3.0 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 comment.

4.0 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 (59 FR 53841). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 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.

5.0 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.

Principal Contributors: G. Golub
T. Kim

Date: January 25, 1995