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

DOCKET FILE
50-282/306

October 29, 1997

Mr. Roger O. Anderson, Director
Licensing and Management Issues
Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

SUBJECT: CORRECTION TO NRC'S SAFETY EVALUATION OF PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NOS. 1 AND 2, LICENSE AMENDMENTS NOS. 125 AND 117 (TAC NOS. M96492 AND M96493)

Dear Mr. Anderson:

On February 10, 1997, the Commission issued Amendment No. 125 to Facility Operating License No. DPR-42 and Amendment No. 117 to Facility Operating License No. DPR-60 for the Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2, respectively. The amendments changed the Technical Specifications in response to your application dated August 15, 1996. On April 10, 1997, Northern States Power Company sent in comments on the NRC staff's safety evaluation.

In the first two sentences of the second paragraph of Section 2.1 we stated that "During normal plant operation, fan coil units are supplied with chilled water supply to cool the containment. Under accident conditions, the cooling water supply is switched to the safety-grade, shared cooling water system which also provides cooling water to the residual heat removal (RHR) emergency core cooling system (ECCS) heat exchanger." In accordance with your first and second comments we have changed these two sentences to read, "During normal warm weather operation, fan coil units are supplied with cooling water from a nonsafety-grade chilled water system. During normal cold weather operation and during accident conditions, the fan coil units are supplied with cooling water from the safety-grade Cooling Water System (river water)."

These two corrected sentences address your first comment by distinguishing between the different sources for the fan coil units during warm and cold weather operations in addition to accident conditions. The second corrected sentence also addresses your second comment by eliminating the incorrect statement which implies that the cooling water system supplies cooling water directly to the residual heat removal system heat exchangers.

In the second sentence of the first paragraph of Section 2.2 we have deleted the reference to Unit 1, as noted in your comment, since the hypothesized condition applies to both Unit Nos. 1 and 2.

In the fourth paragraph of Section 2.2 the parenthetical expression "(for at least 45 minutes)" is incorrect, as you point out in your letter. We have therefore deleted the parenthetical statement.

A copy of the entire updated safety evaluation with revisions marked by vertical lines in the margin is enclosed and supersedes the safety evaluation issued February 10, 1997.

We regret any inconvenience these errors may have caused. If you have any questions, please give me a call on (301) 415-1355.

Sincerely,
ORIGINAL SIGNED BY

Beth A. Wetzel, Senior Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure: Revised Safety Evaluation

cc w/encl: See next page

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Mr. Roger O. Anderson, Director
Northern States Power Company

Prairie Island Nuclear Generating
Plant

cc:

J. E. Silberg, Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N. W.
Washington DC 20037

Plant Manager
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Adonis A. Neblett
Assistant Attorney General
Office of the Attorney General
455 Minnesota Street
Suite 900
St. Paul, Minnesota 55101-2127

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
1719 Wakonade Drive East
Welch, Minnesota 55089-9642

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Mr. Jeff Cole, Auditor/Treasurer
Goodhue County Courthouse
Box 408
Red Wing, Minnesota 55066-0408

Kris Sanda, Commissioner
Department of Public Service
121 Seventh Place East
Suite 200
St. Paul, Minnesota 55101-2145

Site Licensing
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Tribal Council
Prairie Island Indian Community
ATTN: Environmental Department
5636 Sturgeon Lake Road
Welch, Minnesota 55089

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

REVISED SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 125 AND 117 TO

FACILITY OPERATING LICENSE NOS. DPR-42 AND DPR-60

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-282 AND 50-306

1.0 INTRODUCTION

By letter dated August 15, 1996, the Northern States Power Company (NSP or the licensee) requested amendments to the Technical Specifications (TS) appended to Facility Operating License Nos. DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2. The proposed amendments would revise TS 3.3.B.2. TS 3.3.B.2 specifies operability requirements for operation of the containment cooling systems.

2.0 DISCUSSION AND EVALUATION

2.1 Original Licensing Basis for Prairie Island Containment Cooling Systems

The containment cooling systems for each unit include two diverse methods of post-accident containment cooling: the containment spray system and the containment fan cooler system. These systems are engineered safety features whose safety functions are to cool the post-accident internal containment atmosphere. Each system consists of two independent, redundant trains. Each of the two trains of the containment spray system is provided with a pump that discharges to containment spray nozzles. Each of the two trains of the fan cooler system has two fan coil units that transfer heat in the containment atmosphere to cooling water circulating through the fan cooler coils. The containment fan cooler system is used during normal operation in addition to providing a post-accident safety function. The two trains of the containment spray system are provided with a common (i.e., shared) sodium hydroxide-filled spray additive tank that enables the containment spray system to serve the additional safety function of pH reduction. The pH control function promotes containment atmosphere iodine removal to minimize offsite and control room radiological dose consequences due to containment leakage (offsite dose, but not control room dose criteria can be met without credit for the spray system iodine fission product removal safety function).

During normal warm weather operation, fan coil units are supplied with cooling water from a nonsafety grade chilled water system. During normal cold weather operation and during accident conditions, the fan coil units are supplied with cooling water from the safety-grade Cooling Water System (river water). The

containment spray system water supply is from the RWST [refueling water storage tank] prior to recirculation switchover, and, following switchover (if operated), it is from the ECCS at a point downstream of the RHR heat exchanger. (As a result of Information Notice 87-63, "Inadequate Net Positive Suction Head in Low Pressure Safety Systems," RHR pump runout studies, EOPs [emergency operating procedures] were revised in 1988 to prohibit spray pump operation after switchover.)

As originally designed, in the event of a design-basis accident, any one of the following combinations of containment cooling systems trains would provide sufficient containment cooling:

> Both trains of the containment fan cooler system (i.e., four fan coolers), or
>
> Both trains of the containment spray system, or
>
> One train of the containment spray system and one train of the containment fan cooler system.

These combinations meet General Design Criteria 41 and 52 and provide the basis for the current TS 3.3.B.2.

2.2 Findings of Licensee's Reanalysis

In 1995, the licensee developed an analytical model of the cooling water system to better understand and evaluate its capabilities. The licensee subsequently found that under post-accident conditions, system pressure would be so low that boiling could occur in the upper level fan coolers. The licensee then performed containment pressure analyses using the CONTEMPT code to evaluate the effect.

The licensee found that, for a loss-of-coolant accident (LOCA), the design-basis requirements for containment pressure response could be met with one spray train and one fan cooler during injection and one fan cooler during recirculation (spray secured during recirculation), but could not be met with four fan coolers and no spray.

The licensee found that for a main steam line break (MSLB), design-basis pressure response criteria were met with one spray train. (Due to the higher containment temperatures associated with an MSLB, the licensee's analysis conservatively assumes that all four fan coil units are unavailable for that event.)

New radiological analyses also confirmed that containment spray is not needed for offsite dose mitigation, but is needed for LOCA control room dose mitigation.

In view of the above findings, the current TS 3.3.B.2 does not ensure adequate containment cooling and fission product control for all postulated design-basis accidents when equipment is operating under certain permitted operating conditions.

2.3 Proposed TS Changes

The TS would be such that the allowed completion times to restore inoperable equipment would reflect the results of the new analyses. The completion times would not be dependent on the operability status of the fan cooler system. Similarly, the completion times for inoperable containment fan cooler units would not be dependent on the operability status of the containment spray system. The completion times for inoperable fan cooler units would be deleted and replaced by completion times for inoperable fan cooler trains. Under the proposed TS, one train (two units) of containment fan cooling would be allowed to be out of service for up to 7 days. One train of spray would be allowed to be out of service for 72 hours. The spray additive tank would be allowed out of service for up to 24 hours.

The staff has established standard generic criteria for completion times in the event required equipment is inoperable. These criteria are:

> 7 days of continued operation is permitted while in a degraded condition if an additional single failure (including loss of an AC power subdivision) could be tolerated.
>
> 72 hours of continued operation is permitted if the operable containment cooling systems are sufficient.
>
> Commence a shutdown if a safety function is completely lost.

The 7-day completion time for an inoperable train of fan cooling is based on the redundant heat removal capabilities afforded by combinations of the containment spray system and containment fan cooler system and low probability of a design-basis accident occurring during this period. The 72-hour completion time for an inoperable spray train is based on the redundant heat removal capabilities afforded by the containment spray system and containment fan cooler trains, reasonable time for repairs, and low probability of a design-basis accident occurring during this period. These changes have been proposed to conform the TS to the results of recent Prairie Island containment cooling analyses. The proposed containment cooling systems completion times are consistent with the staff criteria. They are also consistent with NUREG-1431, Standard Technical Specifications, Westinghouse Plants.

Because the findings by the licensee indicate that the containment spray system will not adequately mitigate a design-basis accident if no pH adjustment is provided and because a common spray additive tank supplies both containment spray trains, 72 hours allowed outage time is judged by the

licensee to be excessive. Lack of spray additive during a design-basis LOCA would result in partial loss of the spray systems' iodine removal safety function (but no loss of containment heat removal capability). A 24-hour completion time has been conservatively selected to reflect the importance of the iodine removal safety function for control room dose control and the fact that it is a highly reliable (essentially passive) system that can be quickly restored if found inoperable. Based on these factors, the proposed 24-hour allowed outage time for the spray additive tank is acceptable. Also, the staff finds it acceptable that the interdependencies of the fan cooler units and the containment spray pumps have been eliminated, allowing one train of containment fan cooler units to be inoperable for 7 days and one containment spray train to be inoperable for 72 hours. The staff also agrees with the licensee's assessment that at least one containment spray pump should be required to be operable and, therefore, the deletion of the technical specification allowing one pump to be inoperable is acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 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 64388). 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.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the staff concludes that the proposed changes are acceptable.

Principal Contributor: W. Long

Date: February 10, 1997

Revised: October 29, 1997