

December 11, 1987

Docket No. 50-263

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Mr. D. M. Musolf, Manager
Nuclear Support Services
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

Dear Mr. Musolf:

The Commission has issued the enclosed Amendment No. 56 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. This amendment is in response to your application dated June 22, 1987.

The amendment changes Sections 3.4 and 4.4 of the Technical Specifications in order to implement the purpose of 10 CFR Part 50, Section 50.62(c)(4), related to the standby liquid control system (SLCS).

A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next regular bi-weekly Federal Register notice.

Sincerely,

151

Dominic C. DiIanni, Project Manager
Project Directorate III-3
Division of Reactor Projects

Enclosures:

1. Amendment No. 56 to License No. DPR-22
2. Safety Evaluation

cc w/enclosures:
See next page

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P	PDR

*SEE PREVIOUS CONCURRENCE

Office: LA/PDIII-3	PM/PDIII-3	SRXB/DEST	PD/PDPI-3
Surname: *PKreutzer	*DDianni/tg	*TCollins	KPerkins
Date: 11/20/87	11/20/87	11/23/87	11/25/87
Office: OGC	SRXB/DEST		
Surname: MHodges	MHodges		
Date: 11/ /87	11/23/87		

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as part of package

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Dominic C. DiIanni, Project Manager
Project Directorate III-3
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Surname: PKreutzer
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Office: OGC
Surname:
Date: 11/ /87

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MHodges
11/23/87

Mr. D. M. Musolf
Northern States Power Company

Monticello Nuclear Generating Plant

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

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-263

MONTICELLO NUCLEAR GENERATING PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 56
License No. DPR-22

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Northern States Power Company (the licensee) dated June 22, 1987 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. A related exemption from the provisions of 10 CFR 50.62(c)(4) was issued at the same time as this amendment;
 - 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 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-22 is hereby amended to read as follows:

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P PDR

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.56 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Kenneth E. Perkins, Director
Project Directorate III-3
Division of Reactor Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 11, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 56

FACILITY OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE

93
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3.0 LIMITING CONDITIONS FOR OPERATION

3.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the operating status of the standby liquid control system.

Objective

To assure the availability of an independent reactivity control mechanism.

SPECIFICATION:

A. Normal Operation

The standby liquid control system shall be operable at all times when fuel is in the reactor and the reactor is not shut down by control rods, except as specified in 3.4.B.

4.0 SURVEILLANCE REQUIREMENTS

4.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the periodic testing requirements for the standby liquid control system.

Objective:

To verify the operability of the standby liquid control system.

SPECIFICATION

A. The operability of the standby liquid control system shall be verified by performance of the following tests:

1. At least once per month -

Demineralized water shall be recycled to the test tank. Pump minimum flow rate of 26 gpm shall be verified against a system head of 1275 psig.

2. At least once during each operating cycle -

a. Manually initiate one of the two standby liquid control

B. Operation with Inoperable Components

From and after the date that a redundant component is made or found to be inoperable, Specification 3.4.A shall be considered fulfilled, provided that:

1. The component is returned to an operable condition within 7 days.

b. Explode one of two primer assemblies manufactured in the same batch to verify proper function. Then install, as a replacement, the second primer assembly in the explosion valve of the system tested for operation.

c. Test that the setting of the system pressure relief valves is between 1350 and 1450 psig.

B. Surveillance with Inoperable Components

When a component becomes inoperable, its redundant component shall be demonstrated to be operable immediately and daily thereafter.

3.0 LIMITING CONDITIONS FOR OPERATION

C. Boron Solution Requirements

At all times when the Standby Liquid Control System is required to be operable:

1. The liquid poison tank shall contain a boron bearing solution that satisfies the volume, concentration and enrichment requirements of Figure 3.4.1, or compliance can be demonstrated by satisfying the following equations:

Equation 1 (Original Design Basis):

$$V \geq \left(\frac{71.18}{0.0051xC + 0.998} \right) \left(1 + \frac{4821}{1101-E} \right) \left(\frac{19.8}{E} \right) \left(\frac{100}{C} \right) + 128 \text{ gal}$$

Equation 2 (ATWS Design Basis):

$$C \geq 8.28 \left(\frac{86}{Q} \right) \left(\frac{19.8}{E} \right)$$

where:

- V - Boron solution tank volume (gal)
- E - Boron solution enrichment (atom%)
- C - Boron solution concentration (wt%)
- Q - measured pump flow rate (gpm) at 1275 psig

If Equation 1 is satisfied, but Equation 2 cannot be met, continued plant operation is permissible, provided that:

- a. Compliance with Equation 2 is demonstrated within 7 days or
 - b. The Commission shall be notified and a special report provided outlining the actions taken and the plans and schedule for demonstrating compliance with the ATWS Design Basis.
2. The temperature shall not be less than the solution temperature presented in Figure 3.4.2.
 3. The heat tracing on the pump suction lines shall be operable whenever the room temperature is less than the solution temperature presented in Figure 3.4.2.

4.0 SURVEILLANCE REQUIREMENTS

C. Boron Solution Surveillance

The availability of the proper boron bearing solution shall be verified by performance of the following tests:

1. At least once per cycle -

Boron enrichment shall be determined. In addition, the boron enrichment shall be determined any time new chemicals are added to the liquid poison tank. The laboratory analysis to determine enrichment shall be obtained within 30 days of sampling or chemical addition.

2. At least once per month -

Boron concentration shall be determined. In addition, the boron concentration shall be determined any time water or boron are added or if the solution temperature drops below the limits specified by Figure 3.4.2.

3. At least once per day -

- a. Solution volume shall be checked.
- b. The solution temperature shall be checked.
- c. The room temperature shall be checked in the vicinity of the standby liquid control system pumps.

3.0 LIMITING CONDITIONS FOR OPERATION

4.0 SURVEILLANCE REQUIREMENTS

D. If Specifications 3.4.A through C are not met, an orderly shutdown shall be initiated and the reactor shall be in Hot Shutdown within 12 hours.

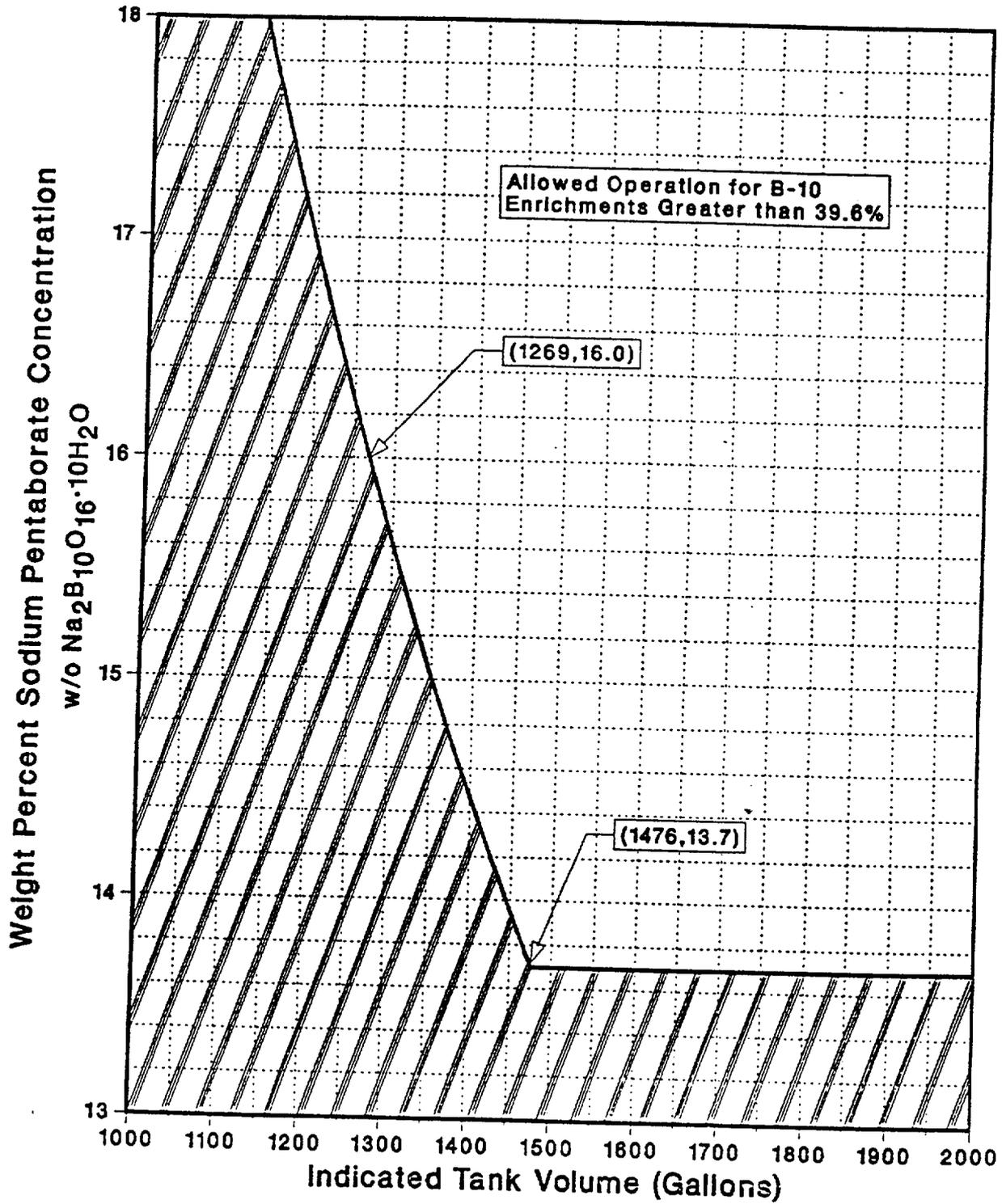


Figure 3.4-1 Sodium Pentaborate Solution Volume Concentration Requirements

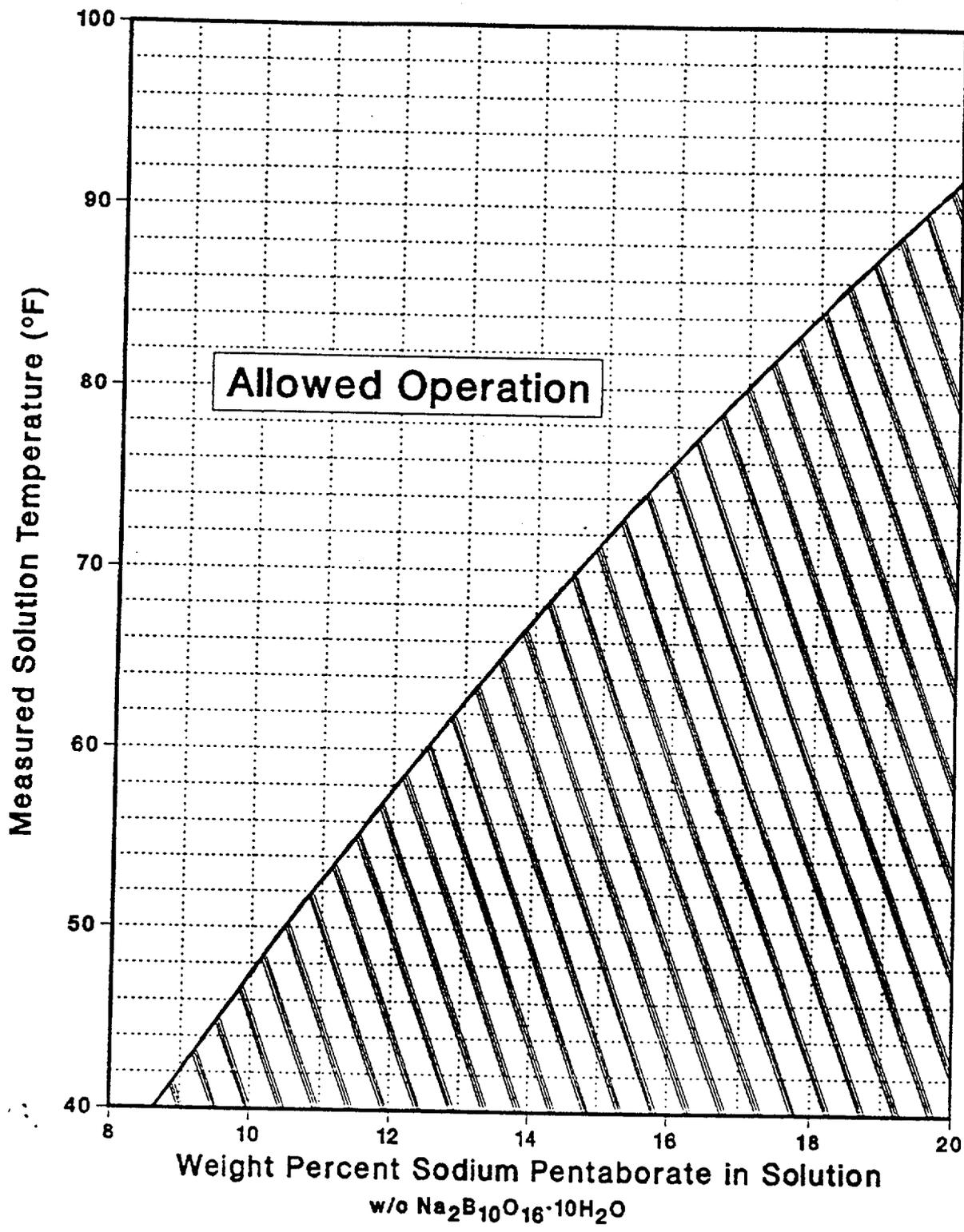


Figure 3.4-2 Sodium Pentaborate Solution Temperature Requirements

Basis 3.4 and 4.4:

- A. The design objective of the standby liquid control system is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown assuming that none of the withdrawn control rods can be inserted. To meet this objective, the liquid control system is designed to inject a quantity of boron which produces a concentration of boron in the reactor core in less than 125 minutes sufficient to bring the reactor from full power to a 3% delta k subcritical condition considering the hot to cold reactivity swing, xenon poisoning and an additional 25% boron concentration margin for possible imperfect mixing of the chemical solution in the reactor water and dilution from the water in the cooldown circuit.

The time requirement (125 minutes) for insertion of the boron solution was selected to override the rate of reactivity insertion due to cooldown of the reactor following the xenon poison peak.

The ATWS Rule (10CFR50.62) requires the addition of a new design requirement to the generic SLC System design basis. Changes to flow rate, solution concentration or boron enrichment to meet the ATWS Rule do not invalidate the original system design basis. Paragraph (c)(4) of 10CFR50.62 states that:

"Each boiling water reactor must have a Standby Liquid Control System (SLCS) with a minimum flow capacity and boron content equivalent in control capacity to 86 gallons per minute of 13 weight percent sodium pentaborate solution" (natural boron enrichment).

The described minimum system parameters (equivalent to 26 gpm, 13.7% concentration and 39.6 atom percent Boron-10 enrichment) will ensure an equivalent injection capability that meets the ATWS rule requirement.

Boron enrichment concentration, solution temperature, and volume (including check of tank heater and pipe heat tracing system) are checked on a frequency to assure a high reliability of operation of the system should it ever be required. Experience with pump operability demonstrates that testing at a three-month interval is adequate to detect if failures have occurred.

The only practical time to test the standby liquid control system is during a refueling outage and by initiation from local stations. Components of the system are checked periodically as described above and make a functional test of the entire system on a frequency of less than once each refueling outage unnecessary. A test of explosive charges from one manufacturing batch is made to assure that the replacement charges for the tested system are satisfactory. A continual check of the firing circuit continuity is provided by pilot lights in the control room.

The relief valves in the standby liquid control system protect the system piping and positive displacement pumps which are nominally designed for 1500 psi from overpressure. The pressure relief valves discharge back to the standby liquid control solution tank.

Bases 3.4 and 4.4 Continued

- B. Only one of the two standby liquid control pumping circuits is needed for proper operation of the system. If one pumping circuit is found to be inoperable, there is no immediate threat to shutdown capability, and reactor operation may continue while repairs are being made. Assurance that the remaining system will perform its intended function and that the reliability of the system is good is obtained by demonstrating operation of the pump in the operable circuit at least once daily. A reliability analysis indicates that the plant can be operated safely in this manner for ten days. For additional margin, the allowable out of service time has been reduced to seven days.
- C. The solution saturation temperature varies with the concentration of sodium pentaborate. The solution will be maintained at least 5 F above the saturation temperature within the tank and suction piping to guard against precipitation. The 5 F margin is included in Figure 3.4.2. Temperature and liquid level alarms for the system are annunciated in the control room.

Pump operability is checked on a frequency to assure a high reliability of operation of the system should it ever be required.

Once the solution has been made up, boron concentration will not vary unless more boron or more water is added. Level indication and alarm indicate whether the solution volume has changed which might indicate a possible solution concentration change. Boron Enrichment will not vary unless more Boron is added. No deterioration of the Boron-10 enrichment level should occur during system standby operation. Considering these factors, the test intervals have been established.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. TO FACILITY OPERATING LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263

1.0 INTRODUCTION

By letter dated June 22, 1987, Northern States Power Company (the licensee) requested an amendment to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment would change the Technical Specifications dealing with the requirement for the standby liquid control system (SLCS). The licensee's proposed changes address the requirement of 10 CFR 50.62(c)(4) reflecting the SLCS minimum flow capacity and boron content equivalent in the control capacity to 86 GPM of 13 weight percent of sodium pentaborate solution. Specifically, the proposed changes to the Technical Specifications in order to meet the requirements of 10 CFR 50.62 include (a) increasing the required pump flow rate from 24 to 26 GPM; (b) adding a new Figure 3.4-1 showing the tank volume as a function of concentration of the new enriched boron; (c) modifying the format of Figure 3.4-2 (wt. % sodium pentaborate solution vs. solution temperature); (d) adding the boron enrichment surveillance requirement; and (e) adding a limiting condition of operation for an inoperable SLCS.

2.0 EVALUATION

The changes proposed by the licensee have been reviewed by the staff against the requirements of the ATWS rule (10 CFR 50.62), and Generic Letter 85-03, "Clarification of Equivalent Control Capacity for Standby Liquid Control Systems," dated January 28, 1985. The licensee proposed a varying sodium pentaborate concentration as a function of storage tank volume as illustrated by Figure 3.4-1 in order to meet the requirements of 10 CFR 50.62. In conjunction with the concentration requirement, the flow rate of 26 GPM and the reactor vessel diameter of 206 inches will provide negative reactivity in an ATWS event which is equivalent to the control capacity of 86 GPM of 13 weight percent sodium pentaborate solution for the larger, 251-inch diameter reactor vessel common to BWR5 and BWR6 designs. Therefore, Figure 3.4-1 which provides boundaries of the area of operation consistent with the purpose of 10 CFR 50.62, and therefore is acceptable.

The licensee's proposal to test one SLCS system pump at a time instead of two pumps is also acceptable. This is based upon the need for only one pump to deliver the required flow rate. To assure the operability of the second pump, the licensee will alternate the monthly pump testing so that each pump is tested once every two months. The staff finds this surveillance method acceptable.

Other surveillances dealing with monitoring the boron enrichment and concentration were also found acceptable.

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The Technical Specification changes proposed by the licensee are acceptable because they are consistent with the purpose of 10 CFR 50.62.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and a change to a surveillance requirement. The 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

4.0 CONCLUSION

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 the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Dom DiIanni

Dated: December 11, 1987