

DCS MS-016

SEP 1 1983

Docket Nos. 50-282  
and 50-306

Mr. D. M. Musolf  
Nuclear Support Services Department  
Northern States Power Company  
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Minneapolis, Minnesota 55401

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Dear Mr. Musolf:

The Commission has issued the enclosed Amendment Nos. 65 and 59 to Facility Operating License Nos. DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2 in response to your application dated June 10, 1983.

The amendments revise the sodium hydroxide (NaOH) concentration in the spray additive tank of the containment spray system from 30% by weight to a range of 9% to 11% by weight inclusive. In addition the amendments allow the concentration to be out of specification limits for a period not to exceed 72 hours at which time shutdown procedures would have to be initiated.

A copy of the Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular monthly Federal Register Notice.

Sincerely,

Original signed by

Dominic C. DiIanni, Project Manager  
Operating Reactors Branch #3  
Division of Licensing

Enclosures:

1. Amendment No. 65 to DPR-42
2. Amendment No. 59 to DPR-60
3. Safety Evaluation

cc: w/enclosures  
See next page

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*Immediately before  
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Northern States Power Company

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

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-282

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 65  
License No. DPR-42

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Northern States Power Company (the licensee) dated June 10, 1983, 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 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.

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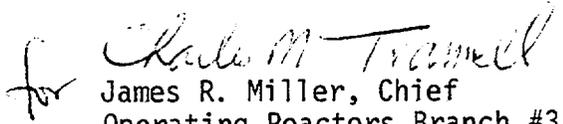
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-42 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 65, 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

  
James R. Miller, Chief  
Operating Reactors Branch #3  
Division of Licensing

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: September 1, 1983



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

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-306

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 59  
License No. DPR-60

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Northern States Power Company (the licensee) dated June 10, 1983, 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 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-60 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 59, 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

*for* *Charles M. Trammell*  
James R. Miller, Chief  
Operating Reactors Branch #3  
Division of Licensing

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: September 1, 1983

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NOS. 65 AND 59 TO FACILITY OPERATING LICENSE

NOS. DPR-42 AND DPR-60

DOCKET NOS. 50-282 AND 50-306

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

Remove

TS.3.3.3  
TS.3.3.4  
Table TS.4.1-1 (pg. 5 of 5)

Insert

TS.3.3.3  
TS.3.3.4  
Table TS.4.1-1 (pg. 5 of 5)

- c. (1) The spray additive tank contains not less than 1950 gallons of solution with a sodium hydroxide concentration of not less than 30% by weight.
- (2) The spray additive tank contains not less than 2590 gallons of solution with a sodium hydroxide concentration of 9% to 11% by weight inclusive.

\*Technical specification c(2) above will be applicable when modifications to the spray additive tank are operational for that unit and c(1) will not be applicable. When the modifications are operational for both units, technical specification c(1) will be deleted.

- d. Manual valves in the above systems that could (if improperly positioned) reduce spray flow below that assumed for accident analysis, shall be blocked and tagged in the proper position. During power operation, changes in valve position will be under direct administrative control.
  - e. Automatic valves, interlocks, ducts, dampers, controls and piping associated with the above components and required for accident conditions are operable.
  - f. The following motor-operated valve conditions shall exist:
    - (1) The Unit 1 operation, containment spray system motor-operated valves MV32096 and MV32097 shall be closed and shall have the motor control center supply breakers open.
    - (2) For Unit 2 operation, containment spray system motor-operated valves MV32108 and MV32109 shall be closed and shall have the motor control center supply breakers open.
2. During startup operation or power operation, any one of the following conditions of inoperability may exist for each unit provided startup operation is discontinued until operability is restored. The reactor shall be placed in the hot shutdown condition if during power operation operability is not restored within the time specified. The reactor shall be placed in the cold shutdown condition if operability is not restored within an additional 48 hours.
- a. One fan cooler unit or one duct for a fan cooler unit may be out of service for a period not to exceed 48 hours. Prior to initiating repairs and once every 24 hours thereafter, both containment spray pumps and the remaining three fan cooler units shall be demonstrated to be operable.
  - b. One containment spray pump may be out of service for a period not to exceed 48 hours. The remaining containment spray pump and the four fan units shall be demonstrated to be operable before initiating repairs and once every 24 hours thereafter.

- c. Any redundant valve or damper required for functioning of the containment air cooling system and the containment spray system during and following accident conditions may be inoperable provided it is restored to operable status within 24 hours. Prior to initiating repairs, all valves in the system that provide redundancy shall be demonstrated to be operable.
- d. The sodium hydroxide concentration of the spray additive tank may be out of specification for a period not to exceed 72 hours.

### C. Component Cooling Water System

#### 1. Single Unit Operation

- a. A reactor shall not be made or maintained critical nor shall it be heated or maintained above 200°F, unless the following conditions are satisfied, except as permitted in Specification 3.3.C.1.b. below.
  - (1) The two component cooling pumps assigned to that unit are operable.
  - (2) The two component cooling heat exchangers assigned to that unit are operable.
  - (3) All valves, interlocks, instrumentation and piping associated with the above components, and required for the functioning of the system during accident conditions, are operable.
- b. During startup operation or power operation, any one of the following conditions of inoperability may exist provided startup operation is discontinued until operability is restored. The reactor shall be placed in the hot shutdown condition if during power operation operability is not restored within the time specified, and it shall be placed in the cold shutdown condition if operability is not restored within an additional 48 hours.
  - (1) One of the assigned component cooling pumps may be out of service for a period not to exceed 24 hours.
  - (2) One of the assigned component cooling heat exchangers may be out of service for a period not to exceed 48 hours.

#### 2. Two-Unit Operation

- a. A second reactor shall not be made or maintained critical nor shall it be heated or maintained above 200°F, unless the following conditions are satisfied, except as provided by Specification 3.3.C.2.b. below.

Prairie Island Unit 1  
Prairie Island Unit 2

TABLE TS.4.1-1  
(Page 5 of 5)

	<u>Channel Description</u>	<u>Check</u>	<u>Calibrate</u>	<u>Functional Test</u>	<u>Response Test</u>	<u>Remarks</u>
40.	Auxiliary Feedwater Pump Suction Pressure	NA	R	R	NA	
41.	Auxiliary Feedwater Pump Discharge Pressure	NA	R	R	NA	
42.	NaOH Caustic Stand Pipe Level	W	R	M**	NA	

Amendment No. 39, 46, 49, 50, 51, 55, 59  
Amendment No. 33, 40, 43, 44, 55, 59

- 
- S - Each Shift
  - D - Daily
  - W - Weekly
  - M - Monthly
  - Q - Quarterly
  - R - Each refueling shutdown
  - P - Prior to each startup if not done previous week
  - T - Prior to each startup following shutdown in excess of 2 days if not done in the previous 30 days.
  - NA - Not applicable
  - \* - See Specification 4.1.D
  - \*\* - Will be effective 60 days from issuance date of Amendment Nos. 65 and 59.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 65 AND 59

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

Introduction

By letter dated June 10, 1983, Northern States Power Company (NSP) (the licensee) requested technical specification (TS) changes for Prairie Island Nuclear Generating Plant Unit Nos. 1 and 2 concerned with the sodium hydroxide concentration of the containment spray system. Specifically, the TS changes would permit a change of the sodium hydroxide (NaOH) concentration in the spray additive tank of the containment spray system from the existing 30% by weight to a range of 9% to 11% by weight, inclusive. In addition, the amendments would permit the concentration to be out of specification limits for a period not to exceed 72 hours at which time the licensee would have to initiate shutdown procedures. The licensee's analysis shows that, under various accident scenarios, the electrical equipment inside containment could be subject to an environment having a pH of 13 during the injection phase under the existing TS requiring that (NaOH) concentrations in the containment spray additive tank be limited to 30% by weight. This exceeds a pH of 10.5, the environmental pH limit to which the electrical equipment inside the containment is qualified. Reducing the NaOH concentration assures that an acceptable environmental pH limit for the electrical equipment inside containment will not exceed a pH of 10.5 at any time.

Discussion and Evaluation

By letter dated June 10, 1983, the licensee requested TS changes that are in conformance with IE Bulletin 79-01B, requiring an evaluation of the qualification of safety related electrical equipment when exposed to various harsh environmental conditions. The licensee's evaluation indicated that some accident scenarios result in a containment spray pH of greater than 13 during the injection phase which exceeds the 10.5 environment pH limit for the electrical equipment inside containment.

The licensee proposes to increase the volume and decrease the concentration of NaOH in the spray containment spray additive tank. The containment spray additive tank volume would be increased from 2190 to 2590 gallons and the decrease in NaOH concentration is such that the ratio of boric acid to NaOH is maintained at a ratio where the pH will remain greater than 7 after thorough mixing of the containment spray solution and containment sump

water in the event of a LOCA. Maintaining the pH greater than 7 meets our Standard Review Plan 6.1.1 Branch Technical Position MTEB 6-1 which recommends a minimum pH of 7.0 to reduce the probability of stress corrosion cracking of austenitic stainless steel.

We evaluated the pH of the containment sump water following mixing in the containment sump with the educted sodium hydroxide. We verified by independent calculations that 2590 gallons of 9 to 11 weight percent NaOH when mixed with 333,000 gallons of boric acid at 2000 ppm will raise the containment sump water pH to greater than 7. Our verification shows that, with normal tank levels and solution concentrations, the sump pH would be 8.4. Under worst case conditions, the sump pH would be 8.2. Therefore, the proposed TS change meets the acceptance criteria of Branch Technical Position MTEB 6.1 of SRP 6.1.1. On this basis we find that, from a coolant chemistry standpoint, the proposed TS change request is acceptable.

Based on the staff review, the proposed change is consistent with the Prairie Island Final Safety Analysis Report and with our guidelines of the Standard Review Plan with the following exception. The Standard Review Plan (SRP) (NUREG-0800), Section 6.5.2, "Containment Spray as a Fission Product Cleanup System," states that, "Long-term iodine retention with no significant re-evolution may be assumed only when the equilibrium sump pH, after mixing and dilution with the primary coolant and ECCS injection, is above 8.5." As noted above, because the minimum sump pH under worst case conditions (e.g. 8.2) could be lower than 8.5, some iodine re-evolution should be assumed in a recalculation of LOCA doses. To address this concern, the staff re-evaluated the LOCA doses that were presented in the Units 1 and 2 Safety Evaluation Report, assuming diminished long-term iodine retention effectiveness for the spray system.

The Prairie Island Nuclear Generating Plant Units Nos. 1 and 2 are designed to use containment sprays with NaOH additive to remove airborne elemental iodine from the containment atmosphere and retain it in the sump and spray water in the event of a LOCA. The staff, as per the guidance of SRP 6.5.2, assumes that the long-term iodine retention efficiency in the sump and spray water is a function of the pH of the post-LOCA sump solution. At a pH of 8.2, the maximum elemental iodine decontamination factor of 200 suggested in SRP 6.5.2, is not appropriate. The LOCA dose was re-evaluated using an elemental iodine decontamination factor of 88 as suggested by the method contained in SRP 6.5.2. This lower decontamination factor did not have a large effect on the total calculated dose, and for the worst case LOCA scenarios, the iodine retention would be more effective than assumed in this evaluation. The dose calculations were made in accordance with SRP 6.5.2 and 15.6.5, Appendix A, and used the current estimate of the atmospheric

dispersion characteristics of the Prairie Island site. Assumptions regarding containment leakage and the shield building filtration and recirculation system operation were consistent with the September 1972 Safety Evaluation Report (SER), Supplement 2 to the SER (April 1973), and a safety evaluation regarding containment leakage transmitted in a letter from R. C. DeYoung to the Northern States Power Company, November 29, 1973. The parameters and assumptions used in the dose calculation are listed in Table 1.

The results of the dose calculations shown in Table 2 indicate that the re-evolution of iodine due to the sump solution having a pH of 8.2 instead of 8.5 is not significant. This is shown by the values given in Table 2 for thyroid dose rems for the 0-2 hours, Exclusion Area Boundary (e.g. 97 vs 96) and for 0-30 days low population zone outer boundary (e.g. 34 vs 32). The whole body dose was essentially unchanged for pH changes in sump solution from 8.5 to 8.2. In addition, all dose levels are substantially below the 10 CFR Part 100.11 guideline values of 300 rems to the thyroid and 25 rems whole body.

On this basis, we find that a sump solution having a pH of 8.2 for the worst case LOCA scenarios will not significantly reduce the existing margin of safety for offsite doses and these calculated doses are well within the guidelines of 10 CFR Part 100.11. We, therefore, find the proposed change is acceptable from the standpoint of airborne elemental iodine removal from the containment atmosphere during potential accident conditions.

The licensee's proposed change was modified to include the surveillance requirements for the level instrument on the NaOH spray additive tank. The surveillance requirements that are put in place for this level instrument are the same as those existing for the level instruments of the refueling water storage tank since these two components (i.e. NaOH spray additive tank and refueling storage tank) are used together during potential accident conditions. In addition these surveillance requirements are compatible with those appearing in the standard technical specifications. These modifications were discussed with and agreed to by the licensee.

The proposed amendment would also allow the licensee 72 hours to correct the concentration when found outside the technical specification limits before requiring a plant shutdown. Such an allowance is consistent with standard practice for such a technical specification limit in order to permit the licensee a reasonable time period to take the corrective actions necessary to achieve an acceptable concentration before requiring a plant shutdown. In addition, the 72 hour period is consistent with the similar requirement appearing in our standard technical specifications. On this basis we find the licensee's proposed request of the 72 hours to allow for a potential concentration correction acceptable.

In conclusion, based on the above considerations, we find the licensee's proposed TS change request acceptable.

### Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendments.

### Conclusion

We have 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: September 1, 1983

#### Principal Contributors:

P. Easely  
F. Witt  
D. C. DiIanni

Table 1

Assumptions Used in Calculation of Thyroid and Whole Body Doses for a Postulated Loss-of-Coolant Accident at Prairie Island 1 and 2

Spray Effectiveness for Iodine Removal

Elemental	6. per hour
Organic	0.
Particulate	0.45 per hour

Final Elemental Iodine Decontamination Factor, Based on Minimum Sump pH=8.2 88.

Total Containment Leak Rate Directly to Environment 0.01% of containment volume per day

Total Containment Leak Rate that is Treated by Auxiliary Building Special Ventilation

Zone 0.1% per day

Total Containment Leak Rate to Shield

Building 0.14% per day

0-6 minutes: This leakage bypasses shield building filters

6-7 minutes: This leakage is filtered and released without mixing

7-24 minutes: Half of this leakage is filtered and released without mixing, half mixes in shield building at 2800 cfm, recirculation of 2760 cfm.

after 24 minutes: 18% of this leakage is filtered and released, 82% mixes in shield building volume, filtered release from shield building at 1000 cfm, recirculation of 4560 cfm.

Atmospheric Dispersion Coefficients

0-2 hours at Exclusion Area Boundary	$4.7 \times 10^{-4}$ sec/m <sup>3</sup>
0-8 hours at Low Population Zone	
Outer Boundary	$7.0 \times 10^{-5}$ sec/m <sup>3</sup>
8-24 hours Outer Boundary	$5.0 \times 10^{-5}$ sec/m <sup>3</sup>
1-4 days Outer Boundary	$2.5 \times 10^{-5}$ sec/m <sup>3</sup>
4-30 days Outer Boundary	$9.5 \times 10^{-5}$ sec/m <sup>3</sup>

Iodine Filter Efficiencies

Elemental Iodine	90%
Organic Iodine	70%
Particulate Iodine	99%

RHR leakage (assumed negligible contribution to dose)<sup>2</sup> gal. per hour

Table 2

A. Calculated Offsite Thyroid and Whole Body Doses for a Postulated Loss-of-Coolant Accident at Prairie Island 1 and 2  
Based on a Sump Solution having a pH of 8.2

	Thyroid Dose, Rems	Whole Body Dose, Rems
0-2 hours, Exclusion Area Boundary	97	2.9
0-30 days, Low Population Zone Outer Boundary	34	1.4

B. Calculated Offsite Thyroid and Whole Body Doses for a Postulated Loss-of-Coolant Accident at Prairie Island 1 and 2  
Based on a Sump Solution having a pH of 8.5

	Thyroid Dose, Rems	Whole Body Dose, Rems
0-2 hours, Exclusion Area Boundary	96	2.9
0-30 days, Low Population Zone Outer Boundary	32	1.4