

Docket 50-~~302~~

MARCH 2 1979

Docket Nos. 50-282  
and 50-302

Mr. L. O. Mayer, Manager  
Nuclear Support Services  
Northern States Power Company  
414 Nicollet Mall - 8th Floor  
Minneapolis, Minnesota 55401

Dear Mr. Mayer:

In response to your application dated November 3, 1978 the Commission has issued the enclosed Amendment Nos. **33** and **27** to Facility Operating License Nos. DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2, respectively.

The amendments permit the deletion of the reactor turbine trip below 50 percent power in both units.

Copies of the related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

Original Signed By

A. Schwencer, Chief  
Operating Reactors Branch #1  
Division of Operating Reactors

Enclosures:

- 1. Amendment No. **33** to DPR-42
- 2. Amendment No. **27** to DPR-60
- 3. Safety Evaluation
- 4. Notice of Issuance

cc: w/enclosures  
See next page

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

March 2, 1979

Docket Nos. 50-282  
and 50-306

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Nuclear Support Services  
Northern States Power Company  
414 Nicollet Mall - 8th Floor  
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Dear Mr. Mayer:

In response to your application dated November 3, 1978 the Commission has issued the enclosed Amendment Nos. 33 and 27 to Facility Operating License Nos. DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2, respectively.

The amendments permit the deletion of the reactor turbine trip below 50 percent power in both units.

Copies of the related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

A handwritten signature in cursive script, appearing to read "A. Schwencer".

A. Schwencer, Chief  
Operating Reactors Branch #1  
Division of Operating Reactors

Enclosures:

1. Amendment No. 33 to DPR-42
2. Amendment No. 27 to DPR-60
3. Safety Evaluation
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cc: w/enclosures  
See next page

March 2, 1979

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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. 33  
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 November 3, 1978, 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 License No. DPR-42 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 33, 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



A. Schwencer, Chief  
Operating Reactors Branch #1  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 2, 1979



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. 27  
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 November 3, 1978, 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 License No. DPR-60 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 27, 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



A. Schwencer, Chief  
Operating Reactors Branch #1  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 2, 1979

ATTACHMENT TO LICENSE AMENDMENT NOS. 33 AND 27

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

DOCKET NOS. 50-282 AND 50-306

Remove and insert the below indicated pages of the Appendix A Technical Specifications for the above indicated licenses. Each area of change is reflected by a line in the right margin of the page.

Remove

Insert

2.3-4

2.3-4

2.3-6

2.3-6

2. Low power block of single loop loss of flow is permitted whenever power range neutron flux is  $\leq 10\%$  of rated power.
3. Power range high flux low setpoint trip and intermediate range high flux trip shall be unblocked whenever power range neutron flux is  $\leq 9\%$  of rated power.
4. Source range high flux trip shall be unblocked whenever intermediate range neutron flux is  $\leq 10^{-10}$  amperes.
5. Reactor trip on turbine trip shall be unblocked whenever power range neutron flux is  $\leq 50\%$  of rated power.

#### C. Control Rod Withdrawal Stops

1. Block automatic rod withdrawal:
  - a. Turbine load  $\leq 15\%$  of full load turbine impulse pressure.

#### Basis

The power range high flux reactor trips (low set point) provides redundant protection in the power range for a power excursion beginning from low power. This trip was used in the safety analysis. <sup>(1)</sup>

The intermediate and source range high flux reactor trips provide additional protection against uncontrolled startup excursions. As power level increases, during startup, these trips are manually blocked to prevent unnecessary plant trips.

The power range high flux (high set point) reactor trip protects the reactor core against reactivity excursions which are too rapid to be protected by temperature and pressure protective circuitry. The prescribed set point, with allowance for errors, is consistent with the trip point assumed in the accident analysis. <sup>(2)</sup>

The high and low pressure reactor trips limit the pressure range in which reactor operation is permitted. The high pressurizer pressure reactor trip setting is lower than the set pressure for the safety valves (2485 psig) such that the reactor is tripped before the safety valves actuate. The low pressurizer pressure reactor trip <sup>(4)</sup> trips the reactor in the unlikely event of a loss-of-coolant accident.

The overtemperature  $\Delta T$  reactor trip provides core protection against DNB for all combinations of pressure, power, coolant temperature, and axial power distribution, provided only that (1) the transient is slow with respect to piping transit delays from the core to the temperature detectors (about 4 seconds), <sup>(3)</sup> and (2) pressure is within the range between the high and low pressure reactor trips. With normal axial power distribution, the reactor trip limit, with allowance

The other reactor trips specified in A.3. above provide additional protection. The trip initiated by steam/feedwater flow mismatch in coincidence with low steam generator water level is designed for protection from a sudden loss of the reactor's heat sink. The safety injection signal trips the reactor to decrease the severity of the accident condition. The reactor is tripped when the turbine generator trips above a power level equivalent to the load rejection capacity of the steam dump valves. This reduces the severity of the loss-of load transient.

The positive power range rate trip provides protection against rapid flux increases which are characteristic of rod ejection events from any power level. Specifically, this trip complements the power range nuclear flux high and low trip to assure that the criteria are met for rod ejection from partial power.

The negative power range rate trip provides protection satisfying all IEEE criteria to assure that minimum DNBR is maintained above 1.30 for all multiple control rod drop accidents. Analysis indicates (Section 14.1.3) that in the case of a single rod drop, a return to full power will be indicated by the automatic reactor control system in response to a continued full power turbine load demand and it will not result in a DNBR of less than 1.30. Thus, automatic protection for a single rod drop is not required. Administrative limits in Specification 3.10 require a power reduction if design power distribution limits are exceeded by a single misaligned or dropped rod.

#### References:

- (1) FSAR 14.1.1
- (2) FSAR Page 14-3
- (3) FSAR 14.2.6
- (4) FSAR 14.3.1
- (5) FSAR 14.1.2
- (6) FSAR 7.2, 7.3
- (7) FSAR 3.2.1
- (8) FSAR 14.1.9
- (9) FSAR 14.1.11



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 33 AND 27 TO FACILITY

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 November 3, 1978 (Reference 1) Northern States Power Company (the licensee) submitted a proposed amendment to the Technical Specifications for Prairie Island Nuclear Generating Plant, Units 1 and 2. The amendment consists of deleting the requirement for the reactor trip on turbine trip whenever the plant is operated below 50 percent of its rated power. The licensee expects deletion of this requirement to lead to an increase in plant availability by reducing the length of time needed to restart a unit following turbine trips at low power. The licensee has provided an analysis for our review indicating that the proposed change would not degrade safe operation of the plant.

Evaluation of Reactor Performance Without Reactor Trip for Turbine Trips Above 50 Percent Power

In the analysis provided in support of the proposed change, the licensee has shown that when the reactor operating at 52 percent of its rated power (858 MWt) fails to scram on turbine trip, the resultant transient would not cause the plant to exceed its safety limits before other reactor protection systems would trip the reactor and bring the plant to the safe shutdown condition. The licensee has presented the analyses for the four cases corresponding to four different sets of assumptions covering the most limiting conditions which could occur after a turbine trip. In two of them the licensee assumes that the spray system and the safety relief

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valves in the pressurizer remain operative and the pressurizer pressure is fully controlled. In these cases it is assumed that a reactor scram occurs at 30 seconds after a turbine trip and is caused by the pump undervoltage resulting from a failure of the network bus transfer which switches the power to the pumps from the generator to the external power source. In the other two cases it is assumed that the pressurizer spray system and the safety relief valves are inoperative and the reactor scrams on high pressurizer pressure. In both of these cases the analyses were performed with a minimum reactivity feedback in one case and a maximum feedback in the other. The change in reactivity feedback was achieved by postulating least negative moderator temperature coefficient for the minimum feedback and a very large negative moderator coefficient for the maximum feedback. Doppler power coefficients were adjusted to provide consistent minimum and maximum reactivity feedbacks. The values of these coefficients are shown below:

Moderator Temperature Coefficient:

$$0 \text{ to } -4.0 \times 10^{-4} \Delta\rho/^\circ\text{F}$$

Doppler Power Coefficient:

$$-0.99 \times 10^{-4} \text{ to } -1.42 \times 10^{-4} \Delta\rho/\% \text{ power at } 52\% \text{ power}$$

In the analysis no credit was taken for steam dump, auxiliary feedwater flow or operation of the safety relief valves in the steam generators. The analysis was performed using four Westinghouse computer codes: PHOENIX, LOFTRAN, FACTRAN and THINC. The PHOENIX code was used for calculating the loop and core flows, the LOFTRAN code determined system parameters, the FACTRAN code was used to calculate the heat flux transient based on the previously determined nuclear power and the THINC code was employed for computing DNBR values during the transient.

The results of the analysis have indicated that the highest reactor coolant system (RCS) pressure is reached when no credit is taken for the pressurizer pressure control and a minimum reactivity feedback is assumed. The transient is terminated by the reactor scram on high pressurizer pressure before the RCS pressure could exceed its maximum allowable limit.

The lowest value of departure from nucleate boiling ratio (DNBR) occurs when the pressurizer pressure is fully controlled and a minimum reactivity feedback is assumed. In this case a significant decrease in the DNBR is observed, but the DNBR never drops below the minimum allowable limit of 1.3 and the reactor scrams safely on pump undervoltage. The above analyses demonstrate that all the pertinent plant parameters remain within their safety limits.

Based on our review of the proposed amendment, we conclude that: the licensee's analysis, Exhibit C, shows that the requested Technical Specification changes will not degrade the other reactor safety systems or change their mode of operation; and since both units as presently designed will accept a 50 percent load rejection, a reactor trip is not necessary for turbine trips below 50 percent power. The licensee has presented sufficient evidence indicating that whenever a turbine trip occurs in the plant operating at  $\leq 50$  percent of its rated power, it is safe for the reactor to remain operating and there is no need for its scram on the signal generated directly by the turbine trip. We conclude therefore that the proposed change of the turbine-reactor trip setting is acceptable.

#### Evaluation of Proposed Reactor Protection System Hardware Changes

Presently, the reactor protection system provides for a reactor trip upon a turbine trip when above 10 percent power. The licensee proposes design change to initiate a reactor trip upon a turbine trip only when at or above 50 percent. Two-of-four channels logic would be used to detect 50 percent power and yield permissive P-9 above that level. This permissive would be developed in the reactor protection logic racks, and would be wired into the reactor trip matrices. The P-9 logic would be testable, using the same design techniques as for other protection logic relays. An associated logic change would modify the steam dump logic. We find these proposed changes to be 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 these amendments.

### Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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: March 2, 1979

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NOS. 50-282 AND 50-306NORTHERN STATES POWER COMPANYNOTICE OF ISSUANCE OF AMENDMENTS TO FACILITYOPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 33 and 27 to Facility Operating License Nos. DPR-42 and DPR-60, issued to the Northern States Power Company (the licensee), which revised Technical Specifications for operation of Unit Nos. 1 and 2 of the Prairie Island Nuclear Generating Plant (the facilities) located in Goodhue County, Minnesota. The amendments are effective as of their date of issuance.

These amendments permit the deletion of the reactor turbine trip below 50 percent power in both Units.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

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The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the application for amendments dated November 3, 1978, (2) Amendment Nos. 33 and 27 to License Nos. DPR-42 and DPR-60, respectively and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C. and at the Environmental Conservation Library of the Minneapolis Public Library, 300 Nicollet Mall, Minneapolis, Minnesota 55401. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors, Office of Nuclear Reactor Regulation.

Dated at Bethesda, Maryland, this 2nd day of March, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

  
A. Schmieder, Chief  
Operating Reactors Branch #1  
Division of Operating Reactors