

MAR 27 1986

Docket No. 50-263

Mr. D. M. Musolf  
Nuclear Support Services Department  
Northern States Power Company  
414 Nicollet Mall - 8th Floor  
Minneapolis, Minnesota 55401

Dear Mr. Musolf:

SUBJECT: JET PUMP OPERABILITY (TAC NO. 49158)

Re: Monticello Nuclear Generating Plant

The Commission has issued the enclosed Amendment No. 42 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment consists of changes to the Technical Specifications in response to your application dated September 24, 1982, as supplemented by letters dated September 29, 1983 and November 15, 1985.

The amendment revises Technical Specifications 3.6.G and 4.6.G and the associated bases to reflect the latest General Electric guidance on jet pump operability and surveillance requirements.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be biweekly Federal Register notices.

Sincerely,

~~Signature~~ by

John A. Zwolinski, Director  
BWR Project Directorage #1  
Division of BWR Licensing

Enclosures:

- 1. Amendment No. 42 to License No. DPR-22
- 2. Safety Evaluation

cc w/enclosures:  
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*[Handwritten signature]*  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

March 27, 1986

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Sincerely,

A handwritten signature in black ink, appearing to read "John A. Zwolinski".

John A. Zwolinski, Director  
BWR Project Directorate #1  
Division of BWR Licensing

Enclosures:

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2. Safety Evaluation

cc w/enclosures:  
See next page

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. 42  
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 September 24, 1982, as supplemented September 29, 1983, and November 15, 1985, 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-22 is hereby amended to read as follows:

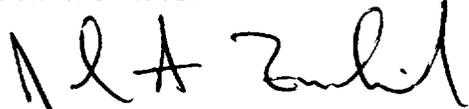
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2 Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 42 , 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



John A. Zwolinski, Director  
BWR Project Directorate #1  
Division of BWR Licensing

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 27, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 42

FACILITY OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

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

REMOVE

128

153

154

INSERT

128

153

154

### 3.0 LIMITING CONDITIONS FOR OPERATION

F. (Deleted)

G. Jet Pumps

When the reactor is in the Run mode, all jet pumps shall be operable with the requirement that each individual jet pump diffuser to lower plenum differential pressure (D/P) percent deviation from average loop D/P shall not differ by more than 20% deviation from its normal range of deviation. With one or more jet pumps exceeding the stated criteria, evaluate the reason for the deviation, and in the circumstance that one or more of the jet pumps are determined to be inoperable, the reactor shall be placed in a cold shutdown condition within 24 hours.

### 4.0 SURVEILLANCE REQUIREMENTS

F. (Deleted)

G. Jet Pumps

1. Whenever there is recirculation flow with the reactor in the Run mode, operating jet pumps shall be demonstrated Operable daily and following any unexplained change in core flow, jet pump loop flow, recirculation loop flow, or core plate differential pressure, by recording jet pump loop flows, recirculation pump flows, recirculation pump speeds, and individual jet pump D/P, and verifying that:
  - a. The recirculation pump flow/speed ratio deviation from normal expected operating range does not exceed 5%.
  - b. The jet pump loop flow/speed ratio deviation from normal expected operating range does not exceed 5%.
2. If either of these conditions are not met with pump speed greater than or equal to 60%, determine individual jet pump D/P percent deviation from average loop D/P and compare to the Limiting Conditions for Operation. If the pump speed is less than 60% and the deviation of the jet pump D/P exceeds the Limiting Condition for Operation criteria, the Jet Pump D/P shall be monitored, and evaluated every 24 hours until such time as evaluation at the higher pump speed is made.

Bases Continued 3.6 and 4.6:

G. Jet Pumps

By monitoring jet pump performance on a prescribed schedule, significant degradation in performance that would precede jet pump failure can be detected. An inoperable jet pump is not, in itself, a sufficient reason to declare a recirculation loop inoperable, but it may present a hazard in the event of a large break accident by reducing the capability of reflooding the core; thus, the requirement for shutdown of the reactor with an inoperable jet pump.

The jet pump performance monitoring procedures are comprised of the following tests:

1. Core Flow versus Square Root of Core Plate Differential Pressure: change in core resistance is the main contributor to recirculation system performance changes. If core resistance increases, it requires more energy (pump speed) to produce rated core flow. If resistance decreases, less speed is needed.
2. Recirculation Pump Flow/Speed Ratio: the pump operating characteristic is determined by the flow resistance from the loop suction through the jet pump nozzle. Since this resistance is essentially independent of core power, the flow is linearly proportional to pump speed, making their ratio a constant (flow/RPM is constant). A decrease in the ratio indicates a plug, flow restriction, or loss in pump hydraulic performance. An increase indicates a leak or new flow path between the recirculation pump discharge and jet pump nozzle.
3. Jet Pump Loop Flow/Recirculation Pump Speed Ratio: this relationship is an indication of overall system performance.
4. Jet Pump Differential Pressure Relationships: if a potential problem is indicated, the individual jet pump differential pressures are used to determine if a problem exists since this is the most sensitive indicator of significant jet pump performance degradation.

The data base used to determine the normal operating range for (2) and (3) above is verified during the startup following each refueling outage. Surveillance tests are performed as soon as practical after reaching a pump speed of 60%.

## II. Snubbers

All snubbers are required to be operable above Cold Shutdown to ensure that the structural integrity of the reactor coolant system and all other safety related systems is maintained during and following a seismic or other event initiating dynamic loads. Snubbers excluded from this inspection program are those installed on non-safety related systems and then only if their failure or failure of the system on which they are installed would have no adverse effect on any safety-related system.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to systems. Therefore, the required inspection interval varies inversely with the observed snubber failures and is determined by the number of inoperable snubbers found during an inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule.

When the cause of the rejection of a snubber is clearly established and remedied for that snubber and for any other snubbers that may be generically susceptible, and verified by inservice functional testing, that snubber may be exempted from being counted as inoperable. Generically susceptible snubbers are those which are of a specific make or model and have the same design feature directly related to rejection of the snubber.

When a snubber is found inoperable, an engineering evaluation or inspection is performed, in addition to the determination of the snubber mode of failure, in order to determine if any safety-related component or system has been adversely affected by the inoperability of the snubber. The evaluation or inspection will determine whether or not the snubber mode of failure has imparted a significant effect or degradation on the supported component or system.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 42 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 September 24, 1982 (Reference 1), Northern States Power Company (NSP/the licensee) proposed revised Technical Specifications (TS) 3.6.G and 4.6.G and the associated bases to include the recommended jet pump monitoring procedures in General Electric Service Information Letter (SIL) 330. The licensee stated that the proposed modification would provide additional assurance that jet pump degradation would be detected prior to jet pump failure. In its letters of September 29, 1983 and November 15, 1985 (References 2 and 5), the licensee revised the earlier submittal by adding to the bases a brief reference to the data base used to determine the normal operating range of two jet pump parameters involved in the surveillance procedures. In addition, changes were made to the surveillance procedure involving recirculation pump operation at speeds below 60%.

2.0 EVALUATION

During 1980 and 1981, hold-down beam bars for jet pumps at six BWR/3 plants and one BWR/4 plant were found to have stress corrosion cracking. At two BWR/3 plants, the cracking was severe enough to cause failure of a beam bar with a resultant displacement of the jet pump mixer section. The mixer displacement causes degradation of jet pump performance during normal operation. Of greater concern is the effect of the mixer displacement on core conditions following a postulated LOCA. The elevation of the jet pump inlets corresponds approximately to the two-thirds height of the active fuel region and helps assure maintenance of a relatively high water level in the core region following a postulated break in a recirculation line. However, displacement of the mixer section opens a lower level leakage path for injected water and might reduce the margin of safety during postulated accidents.

Staff and industry concerns with respect to this issue are presented in References 3 and 4. IE Bulletin No. 80-07, "BWR Jet Pump Assembly Failure" (Reference 3) provided staff requirements for justification of continued operation. A surveillance program specified in the bulletin was to be followed until either (a) the plant TS were changed or (b) the cause of beam failure was identified and corrected.

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General Electric SIL 330, "Jet Pump Beam Cracks," (Ref. 4) provides a discussion of jet pump performance monitoring to detect potential beam failure and gives recommendations for modifications to the TS to improve detection of impending failure. In addition, General Electric has developed improved hold-down beam bars. Although no cracking of beam bars was detected at Monticello Nuclear Generating Plant, all 20 beam bars were replaced in 1982 with improved beam bars which are BWR/4 type bars with a new heat treatment. Complete replacement of beam bars has been done at four other operating BWR plants.

The revision prescribes a program to monitor various parameters, such as core flow, core plate differential pressure, recirculation pump flow and speed, so the acceptability of jet pump performance can be clearly determined. The proposed limiting condition for operation contains the minimum acceptable standards for jet pump operability and when they are not met, the reactor would be shut down within 24 hours. In addition, the surveillance requirements will include evaluation of the jet pump deviation every 24 hours whenever the recirculation pump speed is below 60%. The revised surveillance program would provide additional assurance that jet pump degradation will be detected before actual jet pump failure.

The staff has reviewed the proposed changes and concludes that the revised TS 3.6.G and 4.6.G and the associated bases will reflect the recommended procedures in General Electric SIL 330. In addition, with the replacement of the beam bars and the changes in the TS, Monticello has satisfied the Short-term and Long-term Actions Criteria on page D-3 of NUREG/CR-3052, "Closeout of IE Bulletin 80-07: BWR Jet Pump Assembly Failure," November 1984. The staff, therefore, finds the proposed changes acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves a change to the requirements with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: C. Graves

Dated: March 27, 1986

REFERENCES

1. Letter from D. Musolf of Northern States Power Company to Director of NRR, "Licensee Amendment Request dated September 24, 1982, Miscellaneous Technical Specifications Changes."
2. Letter from D. Musolf of Northern States Power Company to Director of NRR, "Revision No. 1 to Licensee Amendment Request dated September 24, 1982", September 29, 1983.
3. US NRC, IE Bulletin No. 80-07, "BWR Jet Pump Assembly Failure", April 4, 1980.
4. General Electric Service Information Letter (SIL) 330, "Jet Pump Beam Cracks", June 9, 1980.
5. Letter from D. Musolf of Northern States Power Company to Dresden to NRR, "Revision No. 2 to License Amendment Request Dated September 24, 1982", November 15, 1985.