

April 30, 1998

Mr. Roger O. Anderson, Director  
Nuclear Energy Engineering  
Northern States Power Company  
414 Nicollet Mall  
Minneapolis, Minnesota 55401

SUBJECT: EXEMPTION FROM 10 CFR 50.60 BY APPLYING ASME CODE CASE  
N-514 FOR PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1  
AND 2 (TAC NOS. MA0682 AND MA0683)

Dear Mr. Anderson:

In response to your request dated March 6, 1998, the Commission has issued the enclosed exemption from the requirements of 10 CFR 50.60 and Appendix G to modify the methodology incorporated in the Prairie Island Nuclear Generating Plant Units 1 and 2 licensing basis. The exemption allows Northern States Power Company to apply American Society of Mechanical Engineers (ASME) Code Case N-514 for determining each unit's overpressure protection system pressure setpoint.

A copy of the exemption has been forwarded to the Office of the Federal Register for publication.

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: Exemption

cc w/encl: See next page

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

Prairie Island Nuclear Generating  
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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
NORTHERN STATES POWER COMPANY	)	Docket Nos. 50-282, 50-306
	)	
(Prairie Island Nuclear Generating Plant,	)	
Units 1 and 2)	)	
	)	
	)	

EXEMPTION

I.

Northern States Power Company (NSP, the licensee) is the holder of Facility Operating License Nos. DPR-42 and DPR-60, which authorize operation of Prairie Island Nuclear Generating Plant, Units 1 and 2, respectively. The licenses provide, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The facility consists of two pressurized-water reactors located at the licensee's site in Goodhue County, Minnesota.

II.

In its letter dated March 6, 1998, the licensee requested an exemption from specific requirements of Title 10 of the Code of Federal Regulations Part 50, Section 60, and Appendix G. Specifically, NSP proposed to use American Society of Mechanical Engineers (ASME) Code Case N-514 to permit setting the pressure setpoint of each unit's overpressure protection system (OPPS) so that the pressure-temperature (P-T) limits required by 10 CFR

Part 50, Appendix G, could be exceeded by 10 percent during a low temperature pressure transient.

The NRC has established requirements in 10 CFR Part 50 to protect the integrity of the reactor coolant system pressure boundary. As a part of these, 10 CFR Part 50, Appendix G, requires that P-T limits be established for reactor pressure vessels during normal operation, including anticipated operational occurrences and vessel hydrostatic testing and as stated in Appendix G, "The appropriate requirements on...the pressure-temperature limits...must be met for all conditions." In order to ensure these P-T limit curves are not exceeded and provide pressure relief during low temperature overpressurization events, pressurized-water reactor licensees have installed protection systems (OPPS) as part of the reactor coolant system pressure boundary. NSP is required as part of the Prairie Island Units 1 and 2 Technical Specifications to develop, update, and submit reactor vessel P-T limits and OPPS setpoints for NRC review and approval.

By letter dated March 6, 1998, NSP submitted an exemption request to enable the use of ASME Code Case N-514 as an alternative method for determining the OPPS pressure setpoint. NSP determined that the exemption request from the provisions of 10 CFR 50.60 and Appendix G was necessary since these regulations require, as noted above, that the reactor vessel conditions not exceed the P-T limits established by Appendix G. In referring to 10 CFR 50.12 on specific exemptions, NSP cited special circumstances as stated in 10 CFR 50.12(a)(2)(ii) on achieving the underlying purpose of the regulations as its basis for requesting this exemption.

### III.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50

when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security, and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The underlying purpose of 10 CFR Part 50, Appendix G, is to establish fracture toughness requirements for the RCS pressure boundary to provide adequate margins of safety during any condition of normal operation. NSP stated that the OPPS provides a physical means of protecting the vessel by not exceeding the limits. NSP proposed that establishing the OPPS pressure setpoint per the N-514 provisions such that the vessel pressure would not exceed 110 percent of the P-T limit allowables would still provide an acceptable level of safety and mitigate the potential for an inadvertent actuation of the OPPS. The finding of an "acceptable level of safety" while using N-514 was made based on the conservatisms that have been explicitly incorporated into the procedure for developing the P-T limit curves. This procedure, referenced from Appendix G to Section XI of the ASME Code, includes the following conservatisms: (1) a safety factor of 2 on the pressure stresses, (2) a margin factor applied to the determination of  $RT_{NDT}$  [reference temperature nil ductility temperature] (using Regulatory Guide 1.99 "Radiation Embrittlement of Reactor Vessel Materials," Revision 2), and (3) a limiting material toughness curve based on bounding dynamic crack initiation and crack arrest data.

In addition, NSP explained that plant operators must operate the plant between the minimum pressure required to preserve reactor coolant pump seals and a maximum pressure that does not challenge the power-operated relief valve setpoint. Without the application of ASME Code Case N-514, Prairie Island would have an operating window that is too narrow to

permit reasonable system makeup and pressure control. NSP continued by stating that further reduction of the OPPS pressure setpoint below 500 psig would increase the probability that the reactor coolant pump's no. 1 seal will fail as a result of OPPS operation, and that such a seal failure could produce a breach in the reactor coolant system boundary that could not be isolated. Therefore, inadvertent OPPS actuation could lead to a small break loss-of-coolant accident and the unnecessary release of reactor coolant inside containment.

#### IV.

For the foregoing reasons, the NRC staff has concluded that the licensee's proposed use of the alternate methodology in determining the acceptable setpoint for OPPS events will not present an undue risk to public health and safety and is consistent with the common defense and security. The NRC staff has determined that there are special circumstances present, as specified in 10 CFR 50.12(a)(2)(ii), in that the application of 10 CFR 50.60 is not necessary in order to achieve the underlying purpose of this regulation.

The NRC staff agreed with NSP's determination that an exemption would be required to approve the use of Code Case N-514. The NRC staff examined NSP's rationale to support the exemption request and concluded that the use of Code Case N-514 would also meet the underlying intent of the regulations. Based upon a consideration of the conservatisms that are explicitly defined in the Appendix G methodology (as listed in Section III above), the staff concluded that permitting the OPPS setpoint to be established such that the vessel pressure would not exceed 110 percent of the limit defined by the P-T limit curves would provide an adequate margin of safety against brittle failure of the reactor vessel. This is also consistent with the determination that the staff has reached for other licensees under similar conditions based on the same considerations. Therefore, requesting the exemption under the special circumstances of 10 CFR 50.12(a)(2)(ii) was found to be appropriate. The staff also agrees

that limiting the potential for inadvertent OPPS actuation (and limiting the potential for reactor coolant pump seal damage) may improve plant safety.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), an exemption is authorized by law, will not endanger life or property or common defense and security, and is otherwise in the public interest. Therefore, the Commission hereby grants an exemption from the requirements of 10 CFR 50.60 and Appendix G to allow NSP to apply the methods in ASME Code Case N-514 for the determination of the Prairie Island Nuclear Generating Plant Units 1 and 2 pressure setpoints.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (63 FR 23477).

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 30th day of April 1998.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by  
Samuel J. Collins

Samuel J. Collins, Director  
Office of Nuclear Reactor Regulation

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