UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

March 22, 2011

EA 11-029

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company, Minnesota
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, EXERCISE OF ENFORCEMENT DISCRETION 05000282/2011008; 05000306/2011008

Dear Mr. Schimmel:

On February 24, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an evaluation of an Unresolved Item (URI 05000282/2010011-01; 05000306/2010011-01) to address the license bases requirements for flooding in the turbine building and the preservation of safety-related equipment functions. The enclosed report documents the results of the evaluation, which were discussed on February 24, 2011, with you and other members of your staff.

During a Regulatory Conference conducted at the NRC Region III Office on July 13, 2010, you and your staff presented a position that no violation of regulatory requirements occurred based upon your review of licensing and design basis documents. The NRC staff was not able to confirm your position at that time. As a result, the NRC withdrew the preliminary finding and initiated the unresolved item to further review your position. Subsequently, NRC Region III and the Office of Nuclear Reactor Regulation reviewed your position through the Task Interface Agreement process and determined that a violation of NRC requirements existed.

The enclosure to this letter closes the unresolved item and documents a violation of 10 CFR 50, Appendix B, Criterion III, “Design Control,” for the failure to protect safety-related equipment from the effects of internal flooding. Although the issue constitutes a violation of NRC requirements, we have concluded that the violation resulted from matters not reasonably within Northern States Power Company - Minnesota’s ability to foresee and correct; and therefore was not a performance deficiency.

Using the NRC’s Enforcement Policy, the violation met the criteria for enforcement discretion. As such, I have been authorized, after consultation with the Director, NRC Office of Enforcement and the Region III Regional Administrator, to exercise enforcement discretion in accordance with Section 3.5 of the Enforcement Policy and refrain from issuing enforcement

action for the violation. I am requesting that you respond on the docket(s) within 30 days of receipt of this letter with the actions you have taken or planned to resolve the noncompliance with regulations. Send your response to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; and the Resident Inspector Office at the Prairie Island Nuclear Generating Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Steven West, Director
Division of Reactor Projects

Docket Nos. 50-282; 50-306; 72-010
License Nos. DPR-42; DPR-60; SNM-2506

Enclosure: Inspection Report 05000282/20110008; 05000306/20110008
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-282; 50-306; 72-010
License Nos:	DPR-42; DPR-60; SNM-2506
Report No:	05000282/2011008; 05000306/2011008
Licensee:	Northern States Power Company, Minnesota
Facility:	Prairie Island Nuclear Generating Plant, Units 1 and 2
Location:	Welch, MN
Dates:	August 23, 2010, through February 24, 2011
Inspectors:	K. Stoedter, Senior Resident Inspector P. Zurawski, Resident Inspector R. Lerch, Project Engineer
Approved by:	John B. Giessner, Chief Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000282/2011008, 05000306/2011008; 08/23/2010 – 02/24/2011; Prairie Island Nuclear Generating Plant, Units 1 and 2; Review of turbine building internal flooding vulnerability license requirements.

This report covers the review of the unresolved item initiated following information provided by the licensee at a Regulatory Conference on July 13, 2010, concerning an apparent violation associated with the failure to protect several safety-related systems from a loss of safety function following a turbine building internal flooding event. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

None

B. Licensee-Identified Violations

No violations were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

4OA5 Other Activities

.1 (Closed) Unresolved Item 05000282/2010011-01; 05000306/2010011-01, License Bases Requirements For Flooding In The Turbine Building And Preserving The Safety Function of the Emergency Diesel Generator, Auxiliary Feedwater, and Safety-Related Battery Systems.

a. Inspection Scope

In Inspection Report 05000282/2010011; 05000306/2010011 an unresolved item (URI) was identified regarding a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," relating to potential failure to establish measures to ensure that engineered safety features such as the emergency diesel generators (EDGs), the auxiliary feedwater system, and the safety-related batteries were not adversely affected following a turbine building internal flooding event. Specifically, the licensee's position that flooding caused by high energy line break (HELB) pipe whip causing the rupture of an adjacent pipe was not part of the licensing bases, had not been reviewed.

Between August 23, 2010, and early January 2011, both Region III and Office of Nuclear Reactor Regulation (NRR) staff completed a detailed review of the HELB licensing and design basis for Prairie Island as it relates to flooding. In November 2010, Region III developed a draft concurrence task interface agreement (TIA) based upon the Region's review of the licensing and design basis information. The Office of Nuclear Reactor Regulation responded to Region III via TIA 2011-007 dated January 28, 2011, (ML110240359).

b. Other

Introduction: The NRC staff identified a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for failure to protect safety-related equipment from internal flooding which could result from several water sources, including water sources resulting from damage caused by unrestrained high energy pipe breaks. Although the issue constituted a violation of NRC requirements, we have concluded that the violation resulted from matters not reasonably within Northern States Power Company - Minnesota's ability to foresee and correct; and therefore was not a performance deficiency and not a Finding. Using the NRC's Enforcement Policy, the violation met the criteria for enforcement discretion.

Description: In late 2009, the NRC issued a Green finding for Unit 1 and a White finding for Unit 2 due to the discovery that a HELB in the turbine building could result in a loss of safety function for the component cooling water (CCW) system. As part of the extent of condition review, the licensee identified that a turbine building HELB could result in the subsequent failure of cooling water piping and the actuation of fire protection sprinklers such that a large supply of water could be introduced into the turbine building. The licensee believed that this large supply of water could create an internal flooding condition that resulted in a loss of safety function for equipment required to mitigate a

HELB event (specifically the Unit 1 EDGs, the auxiliary feedwater system (for both units), and the safety-related batteries (both units)). The licensee also identified that a turbine building internal flooding analysis had not been performed. These issues were documented in a corrective action document (CAP 1178236) dated April 15, 2009.

The licensee performed an operability review of this issue and determined that the continued operability of the safety-related equipment mentioned above could not be assured. The licensee opened the turbine building roll-up doors to remedy this immediate safety issue.

The same day (April 15, 2009) the inspectors reviewed the licensee's corrective action database to determine how the licensee had evaluated and addressed industry internal flooding operating experience (OpE) from 2005, specifically the Kewaunee flooding issue. The inspectors found that the licensee had conducted an OpE review, determined that the OpE was applicable to Prairie Island, and assigned several actions to evaluate specific portions of the turbine building (including the battery rooms, the EDG rooms, and the auxiliary feedwater pump room). The OpE was general in nature and did not discuss the interaction of HELB piping. The OpE focused on the need to assume breaks of non-seismic piping, especially on high flowrate systems. The NRC determined that detailed reviews of the specific turbine building areas had not been performed as of April 2009. As a result, this issue was documented as a URI in NRC Inspection Report 05000282/2009003; 05000306/2009003.

On May 27, 2010, the NRC issued Inspection Report 05000282/2010010; 05000306/2010010 (EA-10-070; ML101470607). This inspection report closed the URI mentioned above and issued a preliminary greater than green finding for both units due to the failure to established measures to ensure that engineered safety features such as the EDGs, the auxiliary feedwater system, and the safety-related batteries were not adversely affected by events that cause turbine building flooding.

On July 13, 2010, the NRC held a Regulatory Conference with Prairie Island regarding the issue discussed above. Although the licensee's staff did not contest the characterization of the risk significance of this issue, the licensee presented a position that no violation existed because the most recent review of licensing documentation developed by the Prairie Island staff concluded that a non-compliance with the design basis failed to exist. Specifically, the licensee believed that the licensing and design basis for the plant did not require that the impact of consequential flooding following a HELB event be considered when determining whether the HELB resulted in a loss of safety function of equipment required to mitigate the consequences of a HELB event. After determining the issue required further evaluation, the NRC withdrew the preliminary greater than green finding via NRC Inspection Report 05000282/2010011; 05000306/2010011 dated August 23, 2010, (ML102360168).

Between August 23, 2010, and early January 2011, both Region III and Office of Nuclear Reactor Regulation (NRR) staff completed an additional detailed review of the HELB licensing and design basis for Prairie Island. In November 2010, Region III developed a draft concurrence TIA based upon the Region's review of the licensing and design basis information.

The NRR staff responded to Region III via TIA 2011-007 dated January 28, 2011, (ML110240359). The response contained detailed licensing and design basis information and concluded that the issue was within the plant's licensing basis.

Specifically, the TIA documented that, on December 12, 1972, the licensee received a letter from the Atomic Energy Commission (AEC) requesting that the licensee review the plant design to ensure that the rupture of a HELB pipe would not directly or indirectly result in a loss of required redundancy in any engineered safety features equipment required to mitigate the consequences of a HELB event and place the reactors in a cold shutdown condition. This letter became known as the Giambusso letter.

The NRC staff determined that Supplement 1 to the NRC's Safety Evaluation Report for Prairie Island dated March 21, 1973, provided information on what the AEC expected as part of the licensee's review. For example, the supplement stated that "protection of equipment necessary to shut down the reactor and maintain it in a safe shutdown condition should be provided from the effects resulting from HELBs. Breaks should be assumed to occur in those locations specified in the pipe whip criteria. The rupture effects on equipment to be considered include pipe whip, structural (including the effects of jet impingement) and environmental."

Appendix I of the Prairie Island Updated Safety Analysis Report (USAR) provides a description of the licensee's compliance with the HELB criteria. Section I.5.2, "Pipe Whip," states that restraints are provided to prevent pipe whip where there is a possibility that whip following a pipe rupture would damage structures, systems or components that are required to mitigate the consequences of that rupture. Table I.1.4-1, "Required Equipment for Pipe Rupture Events," list the EDGs, the auxiliary feedwater pumps, and the safety-related batteries as equipment needed to mitigate the consequences of a pipe rupture event. Section 12.2.5.1 of the USAR, "Protection for Class I Items," states that Class I items are protected against damage from rupture of a pipe or tank resulting in serious flooding or excessive steam release to the extent that a Class I function is impaired. Lastly, USAR Section I.2.1, "Pipe Rupture Induced Loads," states that if a whipping pipe was capable of impacting adjacent pipes of equal or greater nominal pipe size and equal or heavier wall thickness, the adjacent pipe was considered to be free from rupture. Protection from a pipe wall whip was not provided if pipe rupture occurred in such a manner that the unrestrained pipe movement of either end of the ruptured pipe, in any possible direction about a plastic hinge formed at the nearest pipe whip restraint, could not impact any structure, system or component required to survive the accident.

According to TIA 2011-007, the statement in USAR Section I.2.1 could be restated as follows: "If a whipping pipe was capable of impacting an adjacent pipe of smaller pipe size and smaller or lighter wall thickness, the adjacent pipe was considered to be ruptured." Both the resident inspectors and the licensee identified several examples of turbine building HELB lines that failed to contain pipe whip restraints to prevent the possibility of whip into adjacent pipe of smaller pipe size and smaller or lighter wall thickness. The licensee identified multiple adjacent pipes that contained unlimited sources of water (such as cooling water piping). Lastly, the licensee determined several HELB scenarios which would result in temperatures sufficient to initiate fire protection sprinkler systems. Based upon the results of TIA 2011-007, the NRC concluded that the licensee was required to include the volume from these unlimited sources of water when determining whether damage would occur to mitigating structures, systems, or components following a pipe rupture event. When these volumes were taken into account, the mitigating systems provided above were not protected against damage from rupture of a pipe or tank resulting in serious flooding or excessive steam release to the extent that a Class I function is impaired. Although not specifically evaluated in the

TIA, other initiating events need to be considered in ensuring adequate protection of safety equipment from internal flooding. These events include random breaks of piping and seismic events. These events have reasonably developed licensing bases, and are not discussed further.

The NRC staff determined that the largest sources of flooding water were primarily from the interaction described above where a HELB pipe, without whip restraints, could damage adjacent piping. This adjacent piping has a large source of water (part of an open loop system from the Mississippi river) and could be ruptured. Although there is OpE related to internal flooding in adjacent rooms from the turbine buildings, the focus of the OpE was on circulating water breaks, which are not a concern at PINGP. In addition, there is no existing OpE that discusses the HELB interaction. The requirement exists, nonetheless, but the evaluation on damage is complex and the licensing basis for the plant, in this area, is not well laid out. The Region determined that it was reasonable to conclude that, without the previous White Finding on the HELB/CCW interaction, the issue would not have been detected through either normal plant quality assurance assessments or review of OpE.

There is no current safety issue since the licensee took compensatory actions after discovery of the issue to ensure safety related equipment was protected from the sources of internal flooding. These actions remain in effect.

Analysis: In accordance with the Reactor Oversight Process (ROP) Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," the staff determined that this issue did not meet the definition for a performance deficiency since it was not reasonably within the licensee's ability to foresee and correct. Inspection Manual Chapter 0612 then directs an assessment to determine if the issue involves a more than minor violation. Under traditional enforcement, this is done by review of examples in the Enforcement Policy. The resident staff, in consultation with the Office of Enforcement, determined that the issue was similar to an example of a Severity Level III violation in accordance with Section 6.1, example c.2, of the Enforcement Policy. This example discusses a system needed to mitigate the consequences of an accident that is not able to perform its safety function. In addition, a phase 3 Significance Determination Process SDP evaluation was previously completed for this issue. The previous risk evaluation determined that the total delta CDF estimate was 5.50E-6/yr for Unit 1 and 5.03E-6/yr for Unit 2. Therefore, had the issue met the criteria for a performance deficiency, it would have been a finding of low to moderate safety significance (White). Since the violation was determined to be more than minor, but did not include a performance deficiency, IMC 0612 defers to the Enforcement Policy for disposition, including use of Enforcement Discretion, if warranted.

The NRC staff used Section 3.5 of the Enforcement Policy and Section 5 of the Enforcement Manual to determine if enforcement discretion was appropriate. The staff determined that there were three main factors that warranted consideration in the decision to grant enforcement discretion. First, the licensee identified the issue as follow-on from the extent of condition review for a previous ROP White Finding. Second, the NRC staff determined that the requirement was not clear. Although the USAR required the protection of Class I components, the details in the HELB section of the USAR, as well as older correspondence in the Giambusso letter, were not clear. The issue required an assessment by NRR and a TIA to determine the requirements. Finally, the licensee lacked a reasonable, previous opportunity to identify the issue.

The existing OpE focused on different water sources and flow rates that did not apply to PINGP. Therefore the NRC determined that the issue warranted enforcement discretion.

This violation is not a Finding under the ROP in accordance with IMC 0305 and, therefore, no cross-cutting aspect is assigned to the violation.

Enforcement:

From initial licensing in 1974 and prior to April 15, 2009, the licensee did not provide restraints for the feedwater, condensate, and heater drain system high energy lines that would prevent pipe whip where that whip, following a pipe rupture, would damage adjacent piping. The water sources resulting from these consequential events could impact the safety function of systems required to mitigate the consequences of that rupture. Therefore, the failure to adequately design safety equipment from credible licensing basis events is a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." As a result of the design deficiency, Class I items such as the emergency diesel generators, the auxiliary feedwater system, and the safety-related batteries were not protected against damage from rupture of a pipe or tank causing serious flooding or excessive steam release resulting in the impairment of the Class I function.

The NRC staff determined that this violation resulted from matters not reasonably within the licensee's control; that is, the requirements could not be readily identified and therefore addressed. Therefore, in accordance with the Enforcement Policy, and after consultation with the Director of the Office of Enforcement and the Region III Regional Administrator, the NRC has decided to exercise enforcement discretion in accordance with Section 3.5 of the NRC Enforcement Policy and to refrain from issuing enforcement action for the violation. In accordance with the NRC's Reactor Oversight Process, this condition will not be considered in the assessment process or the NRC's Action Matrix.

4OA6 Management Meetings

Exit Meeting Summary

On February 24, 2011, the inspectors presented the inspection results to Mr. M. Schimmel, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
M. Schimmel, Site Vice President
K. Davison, Plant Manager
T. Roddey, Site Engineering Director
J. Anderson, Regulatory Affairs Manager
C. Bough, Chemistry and Environmental Manager
B. Boyer, Radiation Protection Manager
K. DeFusco, Emergency Preparedness Manager
D. Goble, Safety and Human Performance Manager
J. Hamilton, Security Manager
J. Lash, Nuclear Oversight Manager
M. Milly, Maintenance Manager
J. Muth, Operations Manager
S. Northard, Performance Improvement Manager
A. Notbohm, Performance Assessment Supervisor
K. Peterson, Business Support Manager
A. Pullam, Training Manager
R. Womack, Production Planning Manager

Nuclear Regulatory Commission
J. Giessner, Chief, Reactor Projects Branch 4
T. Wengert, Project Manager, NRR

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

	VIO	Exercise of Enforcement Discretion for Turbine Building HELB Design

Closed

05000282/2010011-01; 05000306/2010011-01	URI	License Bases Requirements for Flooding in the Turbine Building and Preserving the Safety-Related Function of the Emergency Diesel Generator, Auxiliary Feedwater, and Safety-Related Battery Systems
	VIO	Exercise of Enforcement Discretion for Turbine Building HELB Design

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
CAP	Corrective Action Program
CCW	Component Cooling water
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
EDG	Emergency Diesel Generator
HELB	High Energy Line Break
IMC	Inspection Manual Chapter
IR	Inspection Report
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OpE	Operating Experience
PARS	Publicly Available Records System
PINGP	Prairie Island Nuclear generating Plant
ROP	Reactor Oversight process
SDP	Significance Determination Process
SP	Surveillance Procedure
SPAR	Simplified Plant Analysis Risk
SRA	Senior Reactor Analyst
SSC	Structures, Systems, and Components
TIA	Task Interface Agreement
TS	Technical Specification
USAR	Updated Safety Analysis Report
URI	Unresolved Item

action for the violation. I am requesting that you respond on the docket(s) within 30 days of receipt of this letter with the actions you have taken or planned to resolve the noncompliance with regulations. Send your response to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; and the Resident Inspector Office at the Prairie Island Nuclear Generating Plant.

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Sincerely,

/RA/

Steven West, Director
Division of Reactor Projects

Docket Nos. 50-282; 50-306; 72-010
License Nos. DPR-42; DPR-60; SNM-2506

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NRR and OE review was completed via e-mail from C. Hott on 3/21/2011.

OFFICIAL RECORD COPY

Letter to M. Schimmel from S. West dated March 22, 2011

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, EXERCISE OF ENFORCEMENT DISCRETION 05000282/2011008; 05000306/2011008

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