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Prairie Island Nuclear Generating Plant
Northern States Power Company, Minnesota

MAY 22 2009

L-PI-09-063
10 CFR 50.73

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Prairie Island Nuclear Generating Plant Unit 1
Docket 50-282
License No. DPR-42

LER 1-09-03, Component Cooling System Vulnerability to Tornado Missile Hazard

Northern States Power Company, a Minnesota corporation (NSPM) herewith encloses Licensee Event Report (LER) 1-09-03. The LER describes a condition where a postulated missile hazard in the fuel handling area could cause a component cooling line to the spent fuel pool heat exchanger to fail thereby causing a loss of both trains of component cooling for Prairie Island Nuclear Generating Plant (PINGP) Unit 1.

Please contact us if you require additional information related to this event.

Summary of Commitments

This letter contains no new commitments and no changes to existing commitments.

Michael D. Wadley
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
Department of Commerce, State of Minnesota

1717 Wakonade Drive East • Welch, Minnesota 55089-9642
Telephone: 651.388.1121

ENCLOSURE

LICENSEE EVENT REPORT 1-09-03

4 Pages Follow

NRC FORM 366 (9-2007) **U.S. NUCLEAR REGULATORY COMMISSION**

APPROVED BY OMB NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Prairie Island Nuclear Generating Plant Unit 1	05000282	1 of 4

4. TITLE
Component Cooling System Vulnerability to Tornado Missile Hazard

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	23	2009	2009	– 003 –	00	05	22	2009	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☑ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☑ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Jorge L. O'Farrill, Licensing Engineer	651.388.1121

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

○ YES (If yes, complete 15. EXPECTED SUBMISSION DATE). ⊙ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On March 23, 2009, at approximately 1200 CDT, Northern States Power Company – a Minnesota corporation (NSPM) design engineering personnel discovered a potential vulnerability with Prairie Island Nuclear Generating Plant (PINGP) Unit 1 component cooling (CC) piping. The potential exists for a tornado missile hazard to impact the CC piping that supplies the 122 spent fuel pool (SFP) heat exchanger (HX). In the normal configuration, a missile impact to this piping would affect both trains of PINGP Unit 1 component cooling thus rendering the CC system inoperable.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degrades plant safety and 10 CFR 50.73(a)(2)(v)(A) as a condition that could have prevented the fulfillment of a safety function of a system that is needed to maintain the reactor in a safe shutdown condition.

The condition was caused by a design change that added the 122 SFP HX prior to initial plant startup. The 122 SFP HX is currently isolated to protect the CC system function from a tornado missile hazard.

EVENT DESCRIPTION

On March 23, 2009, at approximately 1200 CDT, Northern States Power Company – a Minnesota corporation (NSPM) design engineering personnel discovered a potential vulnerability with Prairie Island Nuclear Generating Plant (PINGP) Unit 1 component cooling[1] (CC) piping with respect to a tornado missile hazard. This condition was discovered during reviews and walkdowns for potential CC vulnerabilities.

The potential exists for a tornado missile hazard to impact the CC piping that supplies the 122 spent fuel pool[2] (SFP) heat exchanger (HX). In the normal configuration, a missile impact to this piping would affect both trains of PINGP Unit 1 component cooling thus rendering the CC system inoperable. A tornado missile hazard to the 122 SFP HX is a credible event because the 122 SFP HX is located inside the auxiliary building fuel handling drop area which is not protected by the auxiliary building concrete structure. This accident scenario is not applicable for the 121 SFP HX because it is located in the concrete portion of the auxiliary building structure. Therefore, by isolating the CC system between these two heat exchangers this condition can be removed.

At approximately 1500 CDT PINGP engineering staff determined that this potential unanalyzed condition could affect operability of the 122 SFP HX and notified the operations department. At 1521 CDT, operations began taking steps to place the 121 SFP HX in operation based on data that the 122 SFP HX was being investigated for a potential operability concern. Operations personnel also verified there were no current severe weather warnings in affect for the counties surrounding the PINGP. Engineering personnel continued to evaluate the potential impact and at 1700 CDT it was concluded that this condition had not been previously analyzed and that a potential loss of safety function had occurred because the condition affects both trains of CC. Thus, operations declared the CC system inoperable and the applicable limiting condition for operation (LCO) condition statement was also entered. At 1759 CDT, operations completed the isolation of CC flow to the 122 SFP HX and restored the CC to operable status. Thus, there was a period of approximately 3 hours before the CC system was returned to operable status following determination that there was an operability concern.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degrades plant safety and 10 CFR 50.73(a)(2)(v)(A) as a condition that could have prevented the fulfillment of a safety function of a system that is needed to maintain the reactor in a safe shutdown condition.

This condition was previously reported in accordance with 10 CFR 50.72(b)(3)(ii)(B) and 10 CFR 50.72 (b)(3)(v)(A) on March 23, 2009.

[1] EIIS System Identifier: CC
[2] EIIS System Identifier: DA

EVENT ANALYSIS

The original design of PINGP Unit 1 did not consider having a second HX in the spent fuel pool cooling system (SF) and was initially designed with only the 121 SFP HX. During construction, the 122 SFP HX was added in order to accommodate the heat load of a full core off load immediately following a plant shutdown. In 2000, a design change was performed that replaced the 122 SFP HX with a larger unit that allowed for full redundant capacity of the 121 SFP HX. While the design change considered seismic events, other external events such as tornado missile hazards were not considered.

During a review of potential CC vulnerabilities by the PINGP Design Engineering Department, it was discovered that PINGP design as it applies to the CC piping going to the SF system does not meet the requirements of PINGP's Updated Final Safety Analysis Report (USAR) for tornado loads. Specifically, the USAR requires that PINGP design consider a tornado driven missile equivalent to a 4 inch x 12 inch x 12 foot plank traveling at 300 miles per hour or a 4000 pound automobile flying through the air at 50 miles per hour at no more than 25 feet above ground level be considered as potential missile hazards. These are considered the design missile hazards and no other potential missile hazards are as damaging.

The location of the 121 SFP HX in the auxiliary building concrete structure provides protection from these hazards. However, the 122 SFP HX is located in the Auxiliary Building fuel handling drop area and is not protected by the concrete structure. Thus, the 122 SFP HX and CC piping in the area of the 122 SFP HX is vulnerable to a tornado missile hazard. This portion of CC piping does not have automatic isolation features and thus a postulated tornado missile impact to this piping would cause a loss of CC inventory that would eventually render both trains of the Unit 1 CC system inoperable. By manually isolating this segment of CC piping, the hazard posed to the CC system no longer applies. In this isolated configuration, the CC system is considered operable but non-conforming as the isolation must be maintained in order to keep the CC system operable.

This condition has existed since initial plant startup when the design change to add the 122 SFP HX was implemented. Since there is normally CC flow going through the 122 SFP HX even when the 121 SFP HX is in service, it is necessary to assume that the CC piping supplying the 122 SFP HX was inoperable at all times during tornado seasons since initial plant startup. Thus, this condition represents a safety system functional failure reportable under 10 CFR 50.73(a)(2)(v)(A).

SAFETY SIGNIFICANCE

In order for safety systems to have been affected under the conditions described in this LER, tornado missiles associated with tornados of the highest wind speeds (as considered for design basis requirements) must be assumed. The HX and piping is heavy wall steel construction physically located more than 25 feet above grade and adjacent to the concrete portion of the Auxiliary Building. The CC supply to the SFP HX is remotely isolated if a Safety Injection (SI) signal is observed in the control room to limit heat loads on the CC system during accident conditions.

In the event that an SI signal is not generated, abnormal operating procedures and emergency procedures are in place to direct the operator response to the event. Depending on the extent of damage to the 122 SFP HX related CC piping, operator response may not be timely enough to prevent the loss of the CC system. However, the frequency of tornadoes occurring at Prairie Island with wind speeds required to generate missiles capable of damaging the CC supply to the SFP HX is considered to be extremely low. In addition, no actual loss of safety function occurred. Therefore, this event did not affect the health and safety of the public and the safety significance of this event is considered minimal.

CAUSE AND CORRECTIVE ACTIONS

The condition was caused by a design change that added the 122 SFP HX during initial construction. PINGP's investigation indicates that the change to have a normal CC supply to the 122 SFP HX did not consider the affect of tornado missile hazards on the CC system.

The 122 SFP HX supply and return CC piping are currently isolated to prevent any affect of CC function from a tornado missile hazard. Spent fuel pool cooling is being provided by the 121 SFP HX which is protected from tornado hazards by the auxiliary building concrete structure.

Interim use of the 122 SFP HX is currently being examined through means of procedural measures that would ensure the CC system is isolated from tornado hazards based on local weather conditions and/or severe weather alerts applicable to the Prairie Island Nuclear Generating Plant.

Final resolution of the non-conforming condition is being evaluated and is expected to include changes to the facility and procedures.

PREVIOUS SIMILAR EVENTS

In August 2004, PINGP discovered that some of the equipment that was included within the CC system pressure boundary was not seismic class I design. This was a non-conformance with PINGP's design basis which stated that the entire CC system is a class I system. As a result, this has prompted further analyses into the design bases for the component cooling system.

A potential vulnerability of the CC piping to a high energy line break (HELB) in the feedwater or condensate system was found as a result of these further reviews. This condition is captured in PINGP's corrective action program and is currently being investigated further by engineering personnel.