



Prairie Island Nuclear Generating Plant  
1717 Wakonade Drive East  
Welch, MN 55089

06/21/2016

L-PI-16-052  
10 CFR 50.73

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

Prairie Island Nuclear Generating Plant, Units 1 and 2  
Docket Nos. 50-282 and 50-306  
Renewed Facility Operating License Nos. DPR-42 and DPR-60

Licensee Event Report 50-282/2016-004-00, Missing Fire Barrier Between Fire Area (FA) 59 and 85 / Fire Hazard Analysis Drawings Do Not Match Boundary Description

Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), encloses Licensee Event Report (LER) 50-282/2016-004-00, Missing Fire Barrier Between Fire Area (FA) 59 and 85 / Fire Hazard Analysis Drawings Do Not Match Boundary Description.

If there is any question or if any additional information is needed, please contact Frank Sienczak, at 651-267-1740.

Summary of Commitments

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

A handwritten signature in black ink, appearing to read 'Scott Northard'.

Scott Northard  
Acting Site Vice President  
Prairie Island Nuclear Generating Plant  
Northern States Power Company-Minnesota

Enclosures:

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



## LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of  
digits/characters for each block)

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), 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.

## 1. FACILITY NAME

Prairie Island Nuclear Generating Plant Unit 1

## 2. DOCKET NUMBER

05000 282

## 3. PAGE

1 OF 4

## 4. TITLE

Missing Fire Barrier Between Fire Area (FA) 59 and 85 / Fire Hazard Analysis Drawings Do Not Match Boundary Description

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
04	21	2016	2016	- 004	- 00	06	21	2016	Prairie Island Unit 2	05000 306
									FACILITY NAME	DOCKET NUMBER
										05000

## 9. OPERATING MODE

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

Unit 1 Mode 1 Unit 2 Mode 1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
10. POWER LEVEL  Unit 1 100% Unit 2 100%	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A

## 12. LICENSEE CONTACT FOR THIS LER

## LICENSEE CONTACT

Frank Sienczak

## TELEPHONE NUMBER (Include Area Code)

651-267-1740

## 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)☒ NO15. EXPECTED  
SUBMISSION  
DATE

MONTH	DAY	YEAR

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

On April 21, 2016, during a walkdown of fire barriers for the National Fire Protection Association (NFPA) 805 project, it was determined that the fire barrier between Fire Area (FA) 59 (Auxiliary Building Mezzanine Unit 1) and FA 85 (Holdup Tank/ Demineralizer Area) is not a rated barrier due to unsealed combustible pathway penetrations in the barrier.

The walkdown also identified that penetrations in the fire barriers between FA 68 (Unit 1 Annulus) and FA 60 (Auxiliary Building Operating Level Unit 1), FA 68 and FA 61A (Auxiliary Building Hatch Area), FA 72 (Unit 2 Annulus) and FA 75 (Auxiliary Building Operating Level Unit 2), and FA 72 and 61A are not sealed with fire rated materials.

Both conditions were reported under 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degrades plant safety due to the missing fire barrier between redundant Appendix R safe shutdown trains.

The apparent cause was determined to be that the Engineering Manual 3.4.2 does not require Appendix R program owner review of Fire Protection Engineering Evaluations that depend on Appendix R Safe Shutdown analysis.

The corrective action is to revise the Engineering Manual 3.4.2 to require Appendix R review when the program is impacted.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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		YEAR	SEQUENTIAL NUMBER	REV NO.
Prairie Island Nuclear Generating Plant Unit 1	05000-282	2016	- 004	- 00

**NARRATIVE****BACKGROUND**

The original Fire Hazards Analysis (FHA) was submitted to the NRC with drawings that show the walls (between Fire Area (FA) 59 & 85, 74 & 85, FA 68 & 60, FA 72 & 75, 68 & 61A, 72 & 61A) are fire area boundaries.

[Northern States Power (NSP)-NRC Fire Hazards Analysis report dated March 11, 1977]

Sections 3.1.1 (2) through (4) of the Fire Protection Safety Evaluation Report (SER) require fire barrier modifications to upgrade penetration seals in various plant areas, to install qualified seal designs in the future, and to replace or modify existing seals which contain polyurethane foam.

[NRC Safety Evaluation Report dated September 6, 1979]

In response to the requirements above from the September 6, 1979, NRC SER, NSP committed to review and upgrade seals as necessary, to use 3-hour rated seal designs for new seals and to upgrade seals in specific areas. Among the areas listed were the Elevation 735' Auxiliary Building barriers shared with Turbine Building and Hatch Area (FA 61) barriers shared with parts of the Auxiliary Building. The barriers that are the subject of this event were not included in the list of areas where seals would be upgraded. The details of the penetration seal upgrades laid out in the November 30, 1979, letter was accepted in NRC SER dated April 21, 1980.

[NSP letter to the NRC dated November 30, 1979; NRC Safety Evaluation Report dated April 21, 1980]

Revision 12 to the FHA updated the FHA Boundary drawings to reflect boundaries discussed in licensing correspondence and the results of the Safe Shutdown Analysis (GEN-PI-026 Rev.1 dated December 15, 1997, and F5 App E Rev. 4). The FHA drawings were updated to remove and add Appendix R barriers. The barriers between FA 59 & 85, FA 74 & 85, FA 68 & 60, FA 72 & 75, FA 68 & 61A and FA 72 & 61A were not addressed in the FHA or Safety Evaluation 502.

[Safety Evaluation (SE) 502, F5 Appendix F Rev.12 – Fire Hazards Analysis dated March 12, 1999]

On August 16, 2012, Fire Protection Engineering Evaluation (FPPE) 12-006 Rev. 1 was completed. The FPPE evaluated the fire area boundaries between FA 85 and FA 59. The evaluation concludes that the fire area boundary is not required for separation of safe shutdown equipment therefore the barrier is acceptable as is.

The safe shutdown analysis section of the FPPE states, "All the cabling for required equipment in FA 85, except for CV-31198, is also routed in FA 59. FA 59 does not contain cabling for the component redundant to CV-31198. As such, fire safe shutdown capability is identical between FA 59 and FA 85 for the identified components and there is no impact on fire safe shutdown capability should a fire spread between FA 59 and FA 85." The methodology used to justify the condition was inappropriate because it considered availability of safe shutdown components in the fire area instead of availability of the entire safe shutdown train.

The evaluation was prepared in accordance with Engineering Manual 3.4.2 which provides guidelines for completing FPPEs in accordance with NRC Generic Letter 86-10. The preparer and reviewer were assigned in accordance with the procedure which does not require an Appendix R program owner to review FPPEs. An Appendix R program owner review would have identified that the evaluation was not consistent with the Appendix R Safe Shutdown Analysis.

[FPPE 12-006; AR 1311038-03 Evaluate change to F5 App K barrier]

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**DESCRIPTION OF EVENT**

At the time of discovery, both units were operating in Mode 1 at 100 percent power. There were no other structures, systems or components inoperable that contributed to the condition.

On April 21, 2016, walkdowns were performed to support the NFPA 805 License Amendment Request. Specifically, fire barriers that will be credited for the NFPA 805 licensing basis that were not credited for Appendix R separation were inspected to identify required upgrades. During review of the fire barrier between FA 59 (Auxiliary Building Mezzanine Unit 1) / FA 74 (Auxiliary Building Mezzanine Unit 2) and FA 85 (Holdup Tank/ Demineralizer Area), the vendor questioned the conclusion of FPEE 12-006, which states that the fire barrier between FA 59 and 85 is not required for separation of Appendix R safe shutdown equipment.

The walkdowns also identified that the fire barriers identified in the FHA drawing for FAs 68 and 72 do not agree with the boundary description in the FHA for each fire area. The FHA drawing shows the FA 68 Containment Annulus Unit 1) and FA 72 (Containment Annulus Unit 2) boundary as the shield building wall up to the containment airlock. The descriptions in the FHA show the boundary between FA 68 (Unit 1 Annulus) and FA 60 (Auxiliary Building Operating Level Unit 1), FA 68 and FA61A (Auxiliary Building Hatch Area), FA 72 (Unit 2 Annulus) and FA 75 (Auxiliary Building Operating Level Unit 2), and FA 72 and 61A at the shield building vent zone boundary since the personnel and maintenance airlock doors are listed as part of the boundary. The annulus airlock doors are 3-hour fire rated and the airlock is constructed of concrete thick enough to qualify as a 3-hour fire barrier; however, there are unnumbered penetrations<sup>1</sup> in the barrier that have not been sealed with fire rated materials.

The fire barriers above were evaluated and it was determined that the fire barriers between FA 59 & 85, FA 68 & 60, FA 68 & 61A, FA 72 & 75 and FA 72 and 61A separate redundant Appendix R safe shutdown trains. The fire barrier between 74 and 85 does not separate redundant Appendix R safe shutdown trains.

On April 21, 2016, at 2303 CST this condition was reported to the NRC in EN# 51877.

**EVENT ANALYSIS**

This condition is being submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an "Unanalyzed Condition That Significantly Degrades Plant Safety" due to a missing fire barrier between redundant trains of Appendix R safe shutdown equipment. As a result of the non-functional fire barrier, a fire in one area could propagate to the adjacent fire area.

**SAFETY SIGNIFICANCE**

PINGP has procedures and controls in place to minimize the likelihood and severity of fires occurring, and a significant fire impacting the ability to safely shutdown did not occur. This is a postulated event and there were no nuclear, environmental, radiological or industrial safety consequences related to this event.

The postulated fire scenarios for FA 59 and 85, 60 and 68, 75 and 72, require that a significant fire of sufficient size and intensity to propagate between the fire areas. The in-situ combustible loading in FA 59, 60 and 75 is low and is primarily IEEE-383 qualified electrical cable insulation. The combustible loading in FA 85, 68 and 72 is very low. The combustible loading in Fire Area 61A is low except during outages when it is frequented by personnel. The walls, albeit with unrated penetrations, continue to provide some fire confinement of a postulated fire and fire detection is available on one side of each of these barriers in Fire Areas 59, 74, 60, 75, and 61A, to initiate a prompt response by the fire brigade.

<sup>1</sup>(IEEE Code - PEN)

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The fire modeling performed to support the Fire PRA for the NFPA 805 LAR indicates that a hot gas layer would not be developed in Fire Compartment 59GRP (Fire Areas 59 and 74), Fire Compartment 85, Fire Compartment 60, Fire Compartment 75, Fire Compartment 68, Fire Compartment 72 or Fire Compartment 4GRP (which includes Fire Area 61A). Based on this information, the risk of a fire propagating between these areas is low. Therefore, the overall risk to the site is very low.

**CAUSE**Apparent Cause

Engineering Manual (EM) 3.4.2 does not require Appendix R program owner review of FPEEs dependent on Appendix R analysis.

Contributing Causes

- The scope of fire barrier upgrades was determined based on protection of safety related equipment and fire loading adjacent to fire barriers instead of Appendix R separation.
- The risk of introducing errors was not assessed during the pre-job brief and Subject Matter Expert review was not obtained.

**CORRECTIVE ACTION**Immediate Actions

For compensatory measures a fire watch was established for the fire barrier impairments per F5 Appendix K, Fire Protection System Functional Requirements.

Corrective Actions

- Engineering Change Request (ECR) 8790 submitted to upgrade 13 penetration seals. The ECR has been reviewed in ECR Screening and approved to be a Work Order (WO) Modification.
- Revise safe shutdown analysis in FPEE 12-006
- Track Procedure Change Request (PCR) for F5 Appendix F – airlock penetrations
- Track Resolution for the Operation Status Non-Functional (OSNF) OPS Status

Corrective Actions to Preclude Repetition (CAPR)

The corrective action is to revise the Engineering Manual 3.4.2 to require Appendix R review when the program is impacted.

**PREVIOUS SIMILAR EVENTS**

LER 50-282/2014-006-00, identified a missing fire barrier. The missing fire barrier is related to separation of redundant pressurizer heater cables credited for safe shutdown in FA 32 (Unit 1, Train B Aux Feedwater Pump Room). The cause of the foam material in the seismic joint seals is consistent with the cause identified in Root Cause Evaluation for "Aux Feedwater Pump Room Penetration Left Unsealed Without Compensatory Measures," which was due to lack of rigor in the 1979 design change. The corrective action had the combustible foam material in the seismic gap seals replaced with fire rated material by implementation of a design change with work orders.