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April 27, 1992

10 CFR Part 50
Section 50.73

U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Condition Found Outside Appendix R Design - Basis
Reactor Coolant System Head Vent Solenoid Valve

The Licensee Event Report for this occurrence is attached.

This event was reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72, on March 26, 1992. Please contact us if you require additional information related to this event.

Thomas M Parker
Manager
Nuclear Support Services

c: Regional Administrator - Region III, NRC
NRR Project Manager, NRC
Senior Resident Inspector, NRC
State of Minnesota
Attn: Kris Sanda

Attachment

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PDR ADOCK 05000282
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-500), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1): PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT 1	DOCKET NUMBER (2): 0 5 0 0 0 2 8 2	PAGE (3): 1 OF 0 5
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TITLE (4): **Condition Found Outside Appendix R Design - Loss Reactor Coolant System Head Vent Solenoid Valve**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
03	26	92	92	06	00	04	27	92	Prairie Island Unit 2	0 5 0 0 0 3 0 6
										0 5 0 0 0 1 1 1

OPERATING MODE (9): N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11):				
POWER LEVEL (10): 1 0 1 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)	
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)		
	<input type="checkbox"/> 20.405(a)(1)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)		
	<input type="checkbox"/> 20.405(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)		

LICENSEE CONTACT FOR THIS LER (12)

NAME: Arne Hunstad, Senior Production Engineer	TELEPHONE NUMBER: 5 1 1 2 3 1 8 8 - 1 1 1 2 1
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If Yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15):	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On March 26, 1992 a condition was identified that is considered outside the 10 CFR 50, Appendix R, requirements. This condition was discovered during the Design Basis Reconstitution effort. Specifically, a design deficiency exists which could result in a loss of pressurizer level in the indicating range in the event of a catastrophic fire in the Control Room. This situation was not previously identified in system reviews, or accounted for in the Control Room fire response procedures.

A modification had installed a reactor coolant system venting system for post-accident operation. At the time, full charging pump flow was available for post Control Room fire; thus, spurious head vent valve operation was not an issue. Subsequent to the reactor coolant system venting modification, the Control Room evacuation procedure was revised to secure the Instrument Air System to minimize other spurious valve operations. This resulted in the charging pump failing to a minimum flow rate. At this time, potential spurious head vent valve operation was not re-evaluated.

Corrective actions have been taken.

LICENSEE EVENT REPORT (LER) /
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 509 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, D.C. 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3170-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D.C. 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Prairie Island Nuc Pwr Plant Unit 1	0 5 0 0 0 2 8 2	9 2	- 0 0 6	- 0 0 0	2 OF 0 5

TEXT (If more space is required, use additional NRC Form 305A's) (17)

EVENT DESCRIPTION

On March 26, 1992 a condition was identified that is considered outside the 10 CFR 50, Appendix R, requirements. This condition was discovered during the Design Basis Reconstitution effort. Specifically, a design deficiency exists which could result in a loss of pressurizer level in the indicating range in the event of a catastrophic fire in the Control Room. This situation was not previously identified in system reviews, or accounted for in the Control Room fire response procedures.

10 CFR 50, Appendix R, Section III.L, specifies the required functions of the alternate and dedicated shutdown systems. Subsection L.2.e states:

"the reactor coolant makeup function shall be capable of maintaining the reactor coolant level...within the level indication in the pressurizer for PWR's."

During the postulated Control Room fire with loss of all offsite power, charging pumps are unavailable for makeup and reactor coolant system inventory is lost through continued letdown and reactor coolant pump seal leakage. In this scenario, pressurizer level does not go off-scale low until 42 minutes after a complete loss of AC power. A walkdown of the Control Room fire procedure showed that within 30 minutes D1 Diesel Generator starts and re-powers a charging pump, providing makeup to keep pressurizer level on scale.

The Safe Shutdown Analysis specifies the equipment necessary for safe shutdown of the plant in a fire, including a list of valves whose spurious operation could result in a loss of reactor coolant system inventory, e.g., the pressurizer power-operated relief valves. To prevent spurious operation of pressurizer power-operated relief valves from impacting safe shutdown, the block valves are closed from the Control Room prior to evacuation. To prevent spurious operation of the power-operated relief valves, following closure of the block valves, the Control Room evacuation procedure requires operators to remove the fuses at the associated DC Panels. This was accepted by the NRC during the Appendix R inspection, and subsequent follow-up inspection. (Reference NRC Inspection Reports 50-282/88013 and 50-306/88013.)

Following a sequence of modifications and procedure changes, the possibility was created that could have prevented the maintenance of a reactor coolant makeup function "...capable of maintaining the reactor coolant level...within the level indication in the pressurizer...."

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATE: 1 HOUR PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST. 100 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Prairie Island Nuc Pwr Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 2 9 2	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	- 0 0 6	- 0 0	0 3	OF 0 5

TEXT OF THIS TABLE IS REQUIRED; USE ADDITIONAL NRC FORM 366A (7) (17)

A reactor coolant system venting system was installed. The piping is tapped off the top of the reactor vessel and the pressurizer, and is used to vent gases in a post-accident scenario. An orifice is built into the vent lines from both the pressurizer and the reactor vessel head to limit the vent flow at full system pressure to less than 40 gpm.

A catastrophic Control Room fire could cause a hot short from a positive wire(s) (from the same battery) to the wires for the reactor vessel head vent solenoid valve(s), resulting in the valve(s) opening. The wires are located in close proximity to each other. Two valves opening in series result in an open path from the reactor coolant system to either the pressurizer relief tank or containment atmosphere. This would result in pressurizer level decreasing faster than previously determined, and level possibly dropping off-scale low.

To minimize spurious valve operation in a Control Room fire, the Control Room evacuation procedure was changed to secure the Instrument Air System. Loss of instrument air will cause the charging pump to supply makeup at the minimum flow rate (approximately 16 gpm). Thus, using the current procedure, charging flow cannot be increased to make up for the increased loss rate of reactor coolant system inventory. In addition, the safety injection pumps are assumed to be unavailable in a Control Room fire scenario.

CAUSE OF THE EVENT

A modification installed a reactor coolant system venting system for post-accident operation. At the time, full charging pump flow was available for post Control Room fire; thus, the spurious head vent valve operation was not an issue. Subsequent to the reactor coolant system venting modification, the Control Room evacuation procedure was revised to secure the Instrument Air System to minimize other spurious valve operations. This resulted in the charging pump speed controller failing to a minimum flow rate. At this time, potential spurious head vent valve operation was not re-evaluated.

ANALYSIS OF THE EVENT

This event is reportable pursuant to 10 CFR Part 50, Section 50.73 (a)(2)(ii) as it is considered outside the design basis for compliance with 10 CFR 50, Appendix R. This event was verbally reported on March 26, 1992 pursuant to 10 CFR Part 50, Section 50.72 (b)(1)(ii).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORW. RD. COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Prairie Island Nuc Pwr Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 2	LER NUMBER (6)			PAGE (3) 4 OF 5
		YEAR 9 2	SEQUENTIAL NUMBER — 0 0 6	REVISION NUMBER — 0 0 0	

TEXT (If more space is required, use additional NRC Form 366A 2/117)

CORRECTIVE ACTION

Immediate Corrective Actions:

1. A temporary procedure was issued to provide instructions for the operator to remove the fuses for the reactor vessel head vent solenoid valves. Fuse pullers are staged at the appropriate DC Panels. It should be noted that operators already remove fuses at three of these panels for the pressurizer power-operated relief valves in the event of a fire. Thus, the increase in time required to complete the additional actions is minimal.
2. An initial evaluation was performed which indicates valve isolation and makeup flow recovery would occur prior to pressurizer indicated level dropping off-scale low.

Long Term Corrective Actions:

1. A more detailed analysis will be performed to document the effect on pressurizer level indication due to the increased loss of inventory due to spurious operation of the reactor vessel head vent valves (prior to fuse pulling).
2. The Control Room evacuation procedure will be revised to include the actions identified in the temporary procedure regarding fuse removal. This is considered satisfactory based on the following:
 - a. The fuse panels (4) are readily accessible, the operators already remove fuses at three of these panels,
 - b. The fuses are clearly identified in the panels,
 - c. The fuse panels have sufficient space to permit ready/easy access for pulling fuses,
 - d. Permanent emergency lighting is available for three of the four fuse panels, and will be installed for the fourth (actions are being added to the emergency lighting surveillance procedure to periodically verify the adequacy of the lighting for the one additional fuse panel),
 - e. Fuse pullers are staged at the fuse panels,

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 800 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1) Prairie Island Nuc Pwr Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 2 9 2 - 0 0 6 - 0 0	LER NUMBER (5)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

- f. The operators are trained and experienced in removing/pulling fuses.
 - g. Similar actions were found satisfactory for the pressurizer power-operated relief valves. (Reference NRC Inspection Reports 50-282/88013 and 50-306/88013.)
3. Accountability for Appendix R and fire protection related items has been consolidated under one person. This has improved the review of procedure changes.
 4. A complete review of the Appendix R program is in progress as part of the Design Basis Reconstitution effort at Prairie Island. Any other discrepancies will be identified and resolved through this program.

FAILED COMPONENT IDENTIFICATION

None.

PREVIOUS SIMILAR EVENTS

Unit 1 Licensee Event Report Numbers 92-002 and 92-005 document similar deficiencies discovered during Design Basis Reconstitution of the Appendix R program. These items were all identified and addressed in a review of the capability of achieving hot shutdown with a fire in the Control Room. Although the Design Basis Reconstitution of the Appendix R program is not yet complete, it is believed that most major issues have been identified and addressed.