



**Northern States Power Company**

**Prairie Island Nuclear Generating Plant**

1717 Wakonade Dr. East  
Welch, Minnesota 55089

February 11, 2000

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

**LER 1-00-01**

**Missed Surveillance of Steam Exclusion Damper  
Due To Incorrect Wiring and Malfunctioning Of Limit Switch**

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The Licensee Event Report for this occurrence is attached. In this report, we have made no new NRC commitments.

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

Don A. Schuelke  
Plant Manager  
Prairie Island Nuclear Generating Plant

c: Regional Administrator - Region III, NRC  
NRR Project Manager, NRC  
Senior Resident Inspector, NRC  
Steve Minn, State of Minnesota

Attachment

IE22

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, 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)

05000 282

PAGE (3)

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TITLE (4)

Missed Surveillance Of Steam Exclusion Damper Due To Incorrect Wiring and Malfunctioning of Limit Switch

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENCE #	REV #	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	12	00	00	-- 01	-- 00	02	11	00	Prairie Island Unit 2	05000 306
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
1	100	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	<input type="checkbox"/>	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	<input type="checkbox"/>	50.73(a)(2)(iv)	OTHER:
		20.2203(a)(2)(iii)	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	
		20.2203(a)(2)(iv)	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
John Stanton	651-388-1121 ext. 4083

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	NO <input checked="" type="checkbox"/>	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 6, 2000, with Prairie Island Units 1 and 2 operating at 100% power, the CLOSE limit switch on the Auxiliary Building Steam Exclusion Area Train A damper CD-34176 was determined to provide improper indication of damper position. Damper position indication is relied upon during the monthly performance of the surveillance procedure SP 1112, "Steam Exclusion Damper Test" to verify that all of the dampers in the Steam Exclusion Ventilation Isolation System have moved to the closed position as required to perform the safety function, ventilation isolation. The combination of a wiring error at the limit switch and a malfunctioning limit switch created a situation where each non-conforming condition concealed the other non-conforming condition from detection during the performance of SP 1112. A work order has been issued to conduct an inspection of all 26 steam exclusion dampers and their associated limit switches to establish that all dampers are operable, all associated limit switches are wired correctly and all associated limit switches function properly. A work order has been issued to remove the malfunctioning limit switch from CD-34176 and have it analyzed to determine the failure mechanism and identify a probable root cause for the failure. This issue will be tracked and resolved through the Prairie Island Corrective Action program.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**EVENT DESCRIPTION**

On January 6, 2000, with Prairie Island Units 1 and 2 operating at 100% power, a walkdown of CD-34176, "121 Control Room Outside Air Isolation Damper," was performed to support the preparation of Work Order 9901039, which was to direct the replacement of CD-34176 in accordance with MOD 98ZN05. During this walkdown a system engineer noticed that the wiring of the CLOSE limit switch did not appear to match the configuration on drawing NE-40298-3. A Condition Report, # 20000064, was initiated and Work Order # 0000106 was initiated to investigate this situation. On January 12, 2000, at the direction of this work order a detailed investigation of the wiring and functioning of the CLOSE limit switch on CD-34176 was conducted, which revealed that in addition to the switch being incorrectly wired it was also broken.

Wires 19P6 and 121SE-RL were found to be terminated on a set of 33/bc contacts. All properly functioning steam exclusion damper 33/bc limit switch contacts will be closed when the limit switch is engaged by a fully closed damper and will be open when the limit switch is disengaged; that is when the damper is in either an intermediate position or a fully open position. These wires should have been terminated on a set of 33/ac contacts, which will be open when the limit switch is engaged by a fully closed damper and will be closed when the limit switch is disengaged; that is when the damper is in either an intermediate position or a fully open position.

The position indication signals from the CLOSE and OPEN limit switches on the dampers in the Steam Exclusion Ventilation Isolation System are arranged into four groups: Aux. Bldg. Train A, Aux. Bldg. Train B, Turb. Bldg. Train A, and Turb. Bldg. Train B. The Turb. Bldg. Steam Exclusion System has 12 dampers with 6 in each train. The Aux. Bldg. Steam Exclusion System has 14 dampers with 7 in each train. Each of these subgroups is represented by a green indicator light and a red indicator light.

The 33/ac contacts in the CLOSE limit switches are connected in parallel to the red indicator light for their subgroup. While any damper is "NOT CLOSED" its 33/ac contact will be closed and the red indicator light for its subgroup will be illuminated. When the steam exclusion system is ACTUATED, a solenoid valve isolates the air supply to each damper and vents to atmosphere the damper's air volume that holds the damper open. Each damper will then move to its fail CLOSED position and its 33/ac contacts will open. If all dampers in the subgroup reach the CLOSED position and the 33/ac contact for each damper opens, then the red indicator light for the subgroup will go dark.

The versions of the surveillance procedure SP 1112, "Steam Exclusion Damper Test," executed prior to the incorporation of TCN 1999-1413 in November 1999 relied upon the red indicator light going dark as evidence that all the associated dampers had successfully isolated. In the case of CD-34176 the 33/bc contact was wired in parallel with the 33/ac contacts from the other dampers in its subgroup to their red indicator light. When all the dampers were open, the 33/bc contact was open, but all the 33/ac contacts

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were closed, and since only one of the contacts needs to be closed to illuminate the red light, the light was illuminated as expected by the procedure. However, when all the dampers were closed, the 33/bc contact on CD-34176 moved to close but stopped 20 mils short of making contact, while all the 33/ac contacts were open. With the malfunction of the 33/bc contact in the CLOSE limit switch of CD-34176, whereby it failed to close when the limit switch was engaged, all contacts open, so the red light is dark as expected by the procedure.

CAUSE OF THE EVENT

The CLOSE limit switch on CD-34176 only functions to provide indication of the damper's position. It is possible that the malfunctioning 33/bc contact in this limit switch is a condition that has existed since initial plant construction. It is also possible that the wiring error is a condition that occurred either during initial plant construction or during troubleshooting of discrepant valve position indication in the early years of plant operation. A review of records from more recent plant operation has not provided any plausible evidence that this event is of recent origin. While analysis of the limit switch may identify a root cause for the malfunction in the 33/bc contact, it is unlikely that a definitive root cause can be identified for the wiring error.

ANALYSIS OF THE EVENT

Currently the safety function of CD-34176 is being performed by a blank flange installed upstream by T-MOD 98T058. This was done to isolate the flowpath through CD-34176 until the damper could be replaced, because the engineering staff had identified that the performance of the damper's seal was degrading. This blank flange will remain in place until the replacement and acceptance testing of CD-34176 is completed in accordance with MOD 98ZN05.

The two most recent monthly performances of SP-1112 in December 1999 and January 2000 were conducted with additional steps added by TCN 1999-1413, that required visual verification that each damper had actually moved to the CLOSED position after the Steam Exclusion control switch has been moved to the ACTUATE position. The successful performance of this surveillance without the need for any corrective maintenance has demonstrated that each damper is currently operable and capable of performing its safety function. In addition it has provided evidence to support a conclusion that each damper, including CD-34176 has also been operable throughout the past and able to perform its intended safety function; which is to isolate the auxiliary building and turbine building ventilation systems in the event of a high energy line break outside containment.

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Because the ability of the damper CD-34176 to perform its ventilation isolation safety function was not impacted by either the wiring error inside the CLOSE limit switch, the failure of the 33/bc contact inside the CLOSE limit switch to make up when the limit switch was engaged by the damper closing fully, or the combination of the two conditions, this event had no impact upon the health and safety of the public and was of negligible safety significance. However, the reliance upon the red and green indicator lights by the monthly surveillance procedure SP 1112, "Steam Exclusion Damper Test," to verify, that each and every damper required to close upon an ACTUATE signal from the steam exclusion system actually did close, when circumstances had rendered this indication incapable of providing the necessary verification, resulted in a failure to satisfy a Technical Specification surveillance requirement. This is reportable pursuant to 10CFR50.73(a)(2)(i)(B), as operation prohibited by the plant's Technical Specifications.

Loss Of Safety Function

This event did not represent a safety system functional failure. The CLOSE limit switch on CD-34176 only functions to provide indication of the damper's position. The damper is currently capable of performing those portions of its safety function relevant to this issue. While the ventilation flow path is blocked off by a blank flange to compensate for degraded damper seals, it been demonstrated that the damper will move to its closed position in response to a steam exclusion ventilation isolation actuation signal. Nor is there any evidence or indication to suggest that in the past this damper has failed to reach the closed (safety function) position when given an actuation signal.

By itself this event could not have prevented the fulfillment of the safety function of structures or systems that are needed to:

- (A) Shutdown the reactor and maintain it in a safe shutdown condition;
- (B) Remove residual heat;
- (C) Control the release of radioactive material; or
- (D) Mitigate the consequences of an accident.

Significance Determination

This event has minimal risk significance.

CORRECTIVE ACTION

This issue will be tracked and resolved through the Prairie Island Corrective Action program, Condition Report, # 20000064. The following activities are currently scheduled as part of our efforts to resolve this issue:

- 1) Work Order # 0000374 has been issued to remove the broken CLOSE limit switch from CD-34176.

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- 2) After the broken limit switch has been obtained it will be examined to determine the failure mechanism and identify a probable root cause for the failure.
- 3) Work Order #0000523 has been issued to conduct an inspection of all 26 steam exclusion dampers and their limit switches to establish that all dampers are operable, that both OPEN and CLOSE limit switches on each damper are wired correctly and all these limit switches function properly. (The CLOSE limit switch for CD-34176 has been removed and is not included in this task.)

PREVIOUS SIMILAR EVENTS

No LERs have been identified for the years 1997 through 1999 that appear relevantly similar to this issue.