



Northern States Power Company

Prairie Island Nuclear Generating Plant

1717 Wakonade Dr. East  
Welch, Minnesota 55089

November 23, 1994

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

Determination That Scaling for Overtemperature  
Delta T Reactor Trips Was Inadequate

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

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

*Jack Leveille for*

Roger O Anderson  
Director  
Licensing and Management Issues

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

Attachment

290019

9411300284 941123  
PDR ADDCK 05000282  
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## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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 U1

## DOCKET NUMBER (2)

05000 282

## PAGE (3)

1 OF 3

TITLE (4) Determination That Scaling for Overtemperature Delta T Reactor Trips Was Inadequate

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 NAME	DOCKET NUMBER
10	27	94	94	-- 10 --	00	11	23	94	Prairie Island U2	05000 306
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Arne A Hunstad

TELEPHONE NUMBER (Include Area Code)

612-388-1121

## 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).

X

NO

EXPECTED SUBMISSION DATE (15)

MONTH

DAY

YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 26, 1994, the NRC resident inspector informed plant staff that a similar plant was investigating a concern with their reactor trip functions, specifically with the overtemperature delta temperature (OTDT) trips. Plant Instruments and Controls Engineering contacted the other plant and our own Nuclear Analysis Department to determine if a similar concern existed at Prairie Island. On October 27, it was determined that, although the  $T_{hot}$  temperature channels are calibrated for the range 520F to 620F, the maximum temperature requiring protection by the OTDT trip corresponds to a  $T_{hot}$  of 635F.

On October 28, testing of spare modules verified that they could operate reliably in the extended range of 520F to 651F. In-service modules in both Units 1 and 2 were verified to operate in the range 520F to 645F, and a Safety Evaluation was written justifying the extended range. The Safety Evaluation addressed all the required testing of the modules to validate acceptable performance in the extended range. On October 29, the Operations Committee reviewed the Safety Evaluation and determined that the event was reportable.

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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)		DOCKET NUMBER (2)		LER NUMBER (6)	
Prairie Island Unit 1		05000 282		YEAR 94	SEQUENTIAL NUMBER -- 10 --
				REVISION NUMBER 00	PAGE (3) 2 OF 3

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

### EVENT DESCRIPTION

On October 26, 1994, the NRC resident inspector informed plant staff that a similar plant was investigating a concern with their reactor trip functions, specifically with the overtemperature delta temperature (OTDT) trips. Plant Instruments and Controls Engineering contacted the other plant and our own Nuclear Analysis Department to determine if a similar concern existed at Prairie Island. On October 27, it was determined that, although the  $T_{hot}$  temperature channels are calibrated for the range 520F to 620F, the valid range of the channels should extend beyond 620F so that the OTDT reactor trip can prevent all combinations of reactor core conditions from exceeding the safety limit curves, Technical Specification Figure TS.2.1-1. The Nuclear Analysis Department determined that at normal reactor coolant system operating pressure,  $T_{hot}$  could exceed 620F for certain permissible operating conditions with an elevated  $T_{avg}$ . Specifically,  $T_{hot}$  could exceed 620F for power levels below 96%. A Daily Order was written directing control room operators to trip the reactor if power level dropped below 96%. Subsequent analysis determined that the maximum temperature requiring protection by the OTDT trip corresponds to a  $T_{hot}$  of 635F.

On October 28, testing of spare modules verified that they could operate reliably in the extended range of 520F to 651F. In-service modules in both Units 1 and 2 were verified to operate in the range 520F to 645F, and a Safety Evaluation was written justifying the extended range. The Safety Evaluation addressed all the required testing of the modules to validate acceptable performance in the extended range. On October 29, the Operations Committee reviewed the Safety Evaluation and determined that the event was reportable. The Daily Order was rescinded when the Safety Evaluation was approved.

### CAUSE OF THE EVENT

Cause of the event is insufficient evaluation of  $T_{hot}$  scaling against the plant safety limits during original design of the OTDT reactor protection functions.

MRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95							
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Prairie Island Unit 1		05000 282		<table border="1"> <tr> <td>YEAR</td> <td>SEQUENTIAL NUMBER</td> <td>REVISION NUMBER</td> </tr> <tr> <td>94</td> <td>-- 10 --</td> <td>00</td> </tr> </table>		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	94	-- 10 --	00
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94	-- 10 --	00									
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				3 OF 3							

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

### ANALYSIS OF THE EVENT

The OTDT trips protect against departure from nucleate boiling for the slow reactivity insertion accidents of slow control rod withdrawal and boron dilution. Although the OTDT temperature channels were calibrated in the range of 520F to 620F, it was shown that the trips would have functioned at an elevated  $T_{hot}$  temperature of 635F, as required. Therefore, no safety limits would have been exceeded during a slow reactivity insertion event. Health and safety of the public were unaffected.

This event is reportable pursuant to 10CFR50.73(a)(2)(v).

### CORRECTIVE ACTION

Upon notification of the concern raised at another plant, an internal investigation was begun.

When analysis indicated that the OTDT trips did not protect against all conceivable reactor core conditions, a Daily Order was written for interim protection.

Testing of spare modules verified that they could operate reliably in the extended range of 520F to 651F.

In-service modules in both Units 1 and 2 were verified to operate in the range 620F to 645F.

A Safety Evaluation was written justifying the extended range. The Safety Evaluation addressed all the required testing of the modules to validate acceptable performance in the extended range.

### FAILED COMPONENT IDENTIFICATION

None.

### PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported at Prairie Island.