



Northern States Power Company

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April 9, 1990

10 CFR Part 50
Section 50.73

Director of Nuclear Reactor Regulation
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
Unit 2 Reactor Trip from Generator Lockout
Caused by Faulty Relay in Test Circuitry

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 8, 1990. 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
MPCA
Attn: Dr J W Ferman

Attachment

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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 (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20585, 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 2** DOCKET NUMBER (2) **0 5 0 0 0 3 0 6** PAGE (3) **1 OF 0 3**

TITLE (4) **Unit 2 Reactor Trip from Generator Lockout
Caused by Faulty Relay in Test Circuitry**

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)
0 3	0 8	9 0	9 0	0 0 1	0 0 0	4	0 6	9 0	Prairie Island Unit 1	0 5 0 0 0 2 8 2
										0 5 0 0 0 1 1

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)
N	20.402(b) <input checked="" type="checkbox"/> 50.73(a)(2)(iv) 73.71(b)
POWER LEVEL (10) 1 0 0	20.405(a)(1)(iii) 50.36(e)(1) 73.71(c)
	20.405(a)(1)(iv) 50.36(e)(2) 50.73(a)(2)(vii) OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(A)
	20.405(a)(1)(iv) 50.73(a)(2)(vi) 50.73(a)(2)(viii)(B)
	20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(ix)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Arne A Hunstad, Staff Engineer	AREA CODE 6 1 2 3 8 8 - 1 1 2 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	
B	I M R L	X 9 9 9	Yes							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	NO				

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

On March 8, 1990, Unit 2 was at 100% power. An Operations Instructor and a trainee were making operator rounds in the Turbine Building. The bus duct cooler local panel test was to be demonstrated to the trainee. When the test button was depressed, a relay failed to operate properly and a generator lockout signal was produced, resulting in a turbine trip and reactor trip at 1104. Plant response to the trip was as expected for a secondary-side initiated reactor trip; some water hammer occurred in secondary side piping. After the circumstances of the trip were reviewed and corrective action taken, the unit was restarted.

Cause of the event was failure of a test relay to operate properly, allowing a trip signal to be generated. The circuit is designed so that when the test button is depressed, relay K3 deenergizes, removing the trip relay (23-X) from the circuit prior to simulating a high temperature condition. The K3 relay contacts failed to open as designed. Thus, when the high temperature condition was simulated, a trip signal was generated, producing a generator lockout and resulting in a turbine trip and reactor trip.

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 RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), 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 Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 0 6 9 0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0	0 0 1	0 0	0 2	OF 0 3

TEXT (If more space is required, use additional NRC Form 386A's) (17)

EVENT DESCRIPTION

On March 8, 1990, Unit 2 was at 100% power. An Operations Instructor and a trainee were making operator rounds in the Turbine Building. The bus duct cooler local panel test was to be demonstrated to the trainee. When the test button was depressed, a relay (EIIIS Component Identifier: RLY) failed to operate properly and a main generator lockout signal was produced, resulting in a turbine trip and reactor trip at 1104. Plant response to the trip was as expected for a secondary-side initiated reactor trip; some water hammer occurred in secondary side piping. After the circumstances of the trip were reviewed and corrective action taken, the unit was restarted.

The Generator Bus Duct Cooling System is provided to cool the generator output busses. Each of these three busses is located inside of a duct which provides protection, insulation and cooling for the bus. The bus duct cooling system consists of an air filter, two blowers and two water cooled heat exchangers. The system filters, cools and circulates the air inside of the bus ducts. One of the blowers and its associated cooler is normally in service and the other in standby. The standby blower/cooler unit will start if the primary unit trips or if the bus duct temperature exceeds 62 degrees C. If the bus duct temperature exceeds 80 degrees C the generator is tripped automatically. A local control and alarm panel is provided near the bus duct coolers. The alarm panel on this local panel is tested occasionally by the Turbine Building operators as they make their rounds of the plant. The test circuitry is designed to test the trip signals without actually causing a trip to occur.

CAUSE OF THE EVENT

Cause of the event was failure of a test relay to operate properly, allowing a trip signal to be generated. The circuit is designed so that when the test button is depressed, relay K3 deenergizes, removing the trip relay (23-X) from the circuit prior to simulating a high temperature condition. The K3 relay contacts failed to open as designed. Thus, when the high temperature condition was simulated, a trip signal was generated, producing a generator lockout and resulting in a turbine trip and reactor trip.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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-520), 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 Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 0 6 9 0	LER NUMBER (6)			PAGE (3)	
		YEAR 9 0	SEQUENTIAL NUMBER 0 0 1	REVISION NUMBER 0 0	0 3 OF 0 3	

TEXT (If more space is required, use additional NRC Form 386A's) (17)

ANALYSIS OF THE EVENT

Because the plant responded as designed to the generator lockout signal, and because all plant safeguards equipment remained available for service throughout this event, there was no effect on the health and safety of the public.

This event is reportable pursuant to 10CFR50.73(a)(2)(iv) since this was an unplanned actuation of the reactor protection system.

CORRECTIVE ACTION

On-line testing of the Unit 1 and Unit 2 bus duct cooler local panel has been discontinued. The value of on-line testing of this panel is being studied. If on-line testing is deemed advisable, modification to the test circuitry will be made prior to the resumption of testing.

FAILED COMPONENT IDENTIFICATION

K3 Relay in an OmniGuard System Model 310.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events at Prairie Island.