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June 20, 1989

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

Automatic Start of an Auxiliary Feedwater Pump
Due to Failure of an Undervoltage Sensor

The Licensee Event Report for this occurrence is attached.

This event was reported via the Emergency Notification System in acordance with 10 CFR Part 50, Section 50.72, on May 22, 1989. Please contact us if you require additional information related to this event.

Monica M Parker for

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

IE22
1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNIT 1	0 5 0 0 0 2 8 2	1 OF 0 4

TITLE (4)
Automatic Start of an Auxiliary Feedwater Pump Due to Failure of an Undervoltage Senor

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 5 0 0 0
0 5	2 2	8 9	8 9	— 0 0 5	— 0 0	0 6	2 1	8 9		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
N		20.402(b)	20.405(c)	X	50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
1 0 0		20.405(a)(1)(ii)	50.36(c)(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)(i)		50.73(a)(2)(viii)(A)		
		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	TELEPHONE NUMBER
	AREA CODE
Arne A Hunstad, Staff Engineer	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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	E C	X X X X	M 4 5 5	Y							

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

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

On May 22, 1989, both units were at 100%. At 0216 alarms indicating trouble with the DC control power to nonsafeguards 4160V buses 11 and 12 and indication of an automatic start of No. 12 motor driven auxiliary feedwater (MDAFW) pump were received in the control room. Local investigation by Operations personnel found that the DC control power to 4160V bus 11 was normal. However, the Automatic Bus Transfer Switch (ABT) for DC control power to 4160V bus 12 had transferred to its alternate source. This transfer resulted in a momentary loss of DC control power to 4160V Bus 12 which caused the No. 12 MDAFW pump to start. Control room operators stopped No. 12 MDAFW pump at 0219. This was a non-ESF actuation of ESF equipment.

Investigation by plant electricians found that the ABT DC undervoltage sensor had failed to the de-energized condition, which in turn caused the ABT to transfer to the alternate source. Further investigation found that a Motorola 2N4927 transistor inside the DC undervoltage sensor had failed. A replacement DC undervoltage sensor was obtained from the manufacturer, tested and installed on May 25, 1989.

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

EVENT DESCRIPTION

On May 22, 1989, both units were at 100%. At 0216 alarms (EIIS Identifier ANN) indicating trouble with the DC control power to nonsafeguards 4160V buses 11 and 12 (EIIS System Identifier EC) and indication of an automatic start of No. 12 motor driven auxiliary feedwater pump (EIIS Identifier P) were received in the control room. Local investigation by Operations personnel found that the DC control power to 4160V bus 11 was normal. However, the Automatic Bus Transfer Switch (ABT) for DC control power to 4160V bus 12 had transferred to its alternate source. Control room operators stopped No. 12 motor driven auxiliary feedwater pump at 0219.

The only loads on 4160V Buses 11 and 12 are the reactor coolant pumps and the main feedwater pumps. No. 12 motor driven auxiliary feedwater pump is designed to automatically start on the loss of both Unit 1 main feedwater pumps (both main feedwater pump breakers open). Operators confirmed through the use of electrical prints that a momentary loss of DC control power to 4160V Bus 12 would cause the No. 12 motor driven auxiliary feedwater pump to start. A work request was prepared by the control room operators at 0240 to initiate an investigation into why the 4160V Bus 12 ABT had transferred to its alternate source.

This was a non-ESF actuation of ESF equipment.

CAUSE OF THE EVENT

On a loss of the normal DC control power supply (DC panel 11), the ABT DC undervoltage sensor will de-energize, and if power is available from the alternate source (DC panel 21), the ABT will break its contact with the normal source and transfer to the alternate source.

The normal and alternate DC power sources were stable throughout the event. Investigation by plant electricians found that the ABT DC undervoltage sensor had failed to the de-energized condition, which in turn caused the ABT to transfer to the alternate source. Further investigation found that a Motorola 2N4927 transistor inside the DC undervoltage sensor had failed. The DC undervoltage sensor is continuously energized, and failure of the transistor after 15 years of service is not considered abnormal.

ANALYSIS OF THE EVENT

The purpose of the ABT's for 4160V Buses 11 and 12 is to ensure that DC control power is always available to the reactor coolant pump breakers. The ABT responded as designed to the momentary loss of normal DC control power voltage and transferred to the alternate DC control power source. The interruption in control power to 4160V Bus 12 was less than a second. The momentary loss of DC control power caused the auxiliary feedwater system circuitry to respond, as designed, to a sensed loss of both main feedwater pumps and to start No. 12 motor driven auxiliary feedwater pump. No. 12 motor driven auxiliary feedwater pump was secured only after the control room operators determined that main feedwater flow was normal.

Since both the 4160V Bus 12 ABT and the auxiliary feedwater system responded as designed during this event 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.

Since this event resulted in an unplanned automatic start of an engineered safeguards component, the No. 12 motor driven auxiliary feedwater pump, it is reportable pursuant to 10CFR50.73(a)(2)(iv).

CORRECTIVE ACTION

The cause of the automatic transfer of 4160V Bus 12 DC control power to the alternate source was investigated by the plant electricians. The investigation found that a transistor in the ABT DC undervoltage sensor had failed causing the DC undervoltage sensor to fail in the de-energized condition.

A replacement DC undervoltage sensor was shipped from the manufacturer on May 23, 1989. The replacement was bench tested and installed in the ABT on May 24, 1989. To prevent an automatic start of No. 12 motor driven auxiliary feedwater pump during the restoration of the 4160 V Bus 12 DC control power to the normal source, control room operators placed the pump control switch in the shutdown-auto position. In the shutdown-auto position, the automatic start of the motor driven auxiliary feedwater pump on loss of both main feedwater pumps is bypassed. After the 4160V Bus 12 ABT had been transferred back to the normal source, the control room operators placed No. 12 motor driven auxiliary feedwater pump control switch back in the auto position.

Replacement transistors have been obtained for the ABT DC undervoltage sensor that failed. Plant electricians will repair and test the faulty DC undervoltage sensor and will then return it to plant spares.

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

FAILURE DATA

The ABT is a model RMT 1002AE manufactured by Russelectric of Hingham, MA. The failed DC undervoltage sensor within the ABT was a UB 200 UV sensor with a part number of CR-001-R79. The failed transistor is a Motorola 2N4927.

PREVIOUS SIMILAR EVENTS

There have been other automatic starts of auxiliary feedwater pumps, but this was the first failure of an ABT component at Prairie Island.