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December 7, 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

Auto-start of Control Room Special Ventilation System
Due to Spike on Newly Installed Radiation Monitor

An updated 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 23, 1991. Please contact us if you require additional information related to this event.

Thomas M Parker
Director of Licensing
Nuclear Generation

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

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 (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 Nuclear Generating Plant Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 2 8 2				PAGE (3) 1 OF 0 4		
TITLE (4) Auto-start of Control Room Special Ventilation System Due to Spike on Newly Installed Radiation Monitor																
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(S)				DOCKET NUMBER(S)			
0 3	2 3	9 1	9 1	0 0 2	0 1 1	2 0	7	9 2	Prairie Island Unit 2				0 5 0 0 0 3 0 6			
														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)				XX 50.73(a)(2)(ix)				73.71(b)		
POWER LEVEL (10)		20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)		
1 0 0		20.405(a)(1)(ii)				50.38(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)(ix)						
LICENSEE CONTACT FOR THIS LER (12)																
NAME Arne A Hunstad										TELEPHONE NUMBER 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	V I M O N	N 3 0 5	Yes													
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 March 23, 1991, both units were operating at full power. At 0019 hours a spike on radiation monitor R-23 caused control room annunciation of control room High Radiation Train A which resulted in auto-start of No. 121 Control Room Cleanup Fan and isolation of the control room outside air supply.

Several unplanned actuations of Engineered Safety Features ventilation systems had taken place over a period of several years as a result of spiking in the circuitry of radiation monitors. To help prevent recurrences, upgraded monitor modules had been ordered from the manufacturer, received, and installed. Spurious high radiation alarms occurred in these new monitors in the first few hours of operation.

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 (4)			PAGE (3)
Prairie Island Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		91	002	01	

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

EVENT DESCRIPTION

On March 23, 1991, both units were operating at full power. At 0019 hours a spike on radiation monitor R-23 (EIS Component Identifier: MON) caused control room annunciation of control room High Radiation Train A, which resulted in auto-start of No. 121 Control Room Cleanup Fan and isolation of the control room outside air supply. Upon investigation, the control room operator found radiation monitor R-23 in alarm with the meter reading at normal background levels. Redundant monitor R-24 was also reading at normal background levels. When operators determined that the monitor actions were spurious, they removed radiation monitor R-23 from service and returned the control room ventilation system to normal.

Several unplanned actuations of Engineered Safety Feature systems (Auxiliary Building Special Ventilation and Spent Fuel Pool Special Ventilation) had taken place over a period of several years as a result of spiking in the circuitry of radiation monitors. These events were reported as Unit 1 LER's 88-007, 88-011, 89-008, 89-016, 89-018 and 90-005. To help prevent recurrences, upgraded monitor modules had been ordered from the manufacturer, Nuclear Measurements Corporation (NMC). The upgrades were intended to eliminate unwanted actions caused by either intermittent component failures or poor connectors within the monitor; another monitor improvement would provide time-delay circuitry to prevent actuation of control functions even if a spike was generated.

Four upgraded monitor modules were received and three of these were installed in radiation monitors R-23 (Control Room Air Supply Radiation Monitor), R-25 (Spent Fuel Pool Air Monitor) and R-37 (Auxiliary Building Ventilation Gas Monitor). Monitor R-23, which was installed on March 22, produced a spurious high radiation alarm in its first few hours of service. Since wiring changes to provide the time delay feature of the module had not yet been made, the spurious high radiation alarm produced an auto-start of No. 121 Control Room Cleanup Fan.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
Prairie Island Unit 1		05000 282		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
				91	002	01	

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

CAUSE OF THE EVENT

The root cause of this event is the result of a firmware problem in the EPROM. This firmware problem was caused by an error in the algorithm that keeps track of the increase in the number of pulses from one time period to the next. This error failed to initialize a counter chip at the proper time therefore causing a momentary step change in the output signal. The EPROM was loaded correctly and with the intended program, however, the program itself was in error.

Regardless of the firmware problem, if the time delay feature of monitor R-23 had been enabled before placing the monitor in service, the spurious alarm would not have caused an unplanned actuation of Engineered Safety Features (ESF) equipment. The installation procedure did not provide for making the wiring changes to enable the time delay feature before placing all of the upgraded modules in service. This order of installation was intentional and was a result of an evaluation of the risks of inadvertently causing an ESF actuation during all parts of the modification process. This was based on spikes caused by the old modules when the rack is powered down. This rack would have to be powered down for the time delay wiring changes to be made and would have resulted in an increased chance of an ESF actuation during installation of this modification.

ANALYSIS OF THE EVENT

The functional response of the automatic actuation of the control room cleanup fan and isolation of the outside air to the control room was according to design. The purpose of this isolation is to protect control room personnel from exposure to airborne radioactivity. Since this occurrence was not triggered by the presence of airborne radioactivity, there was no threat to the operation of the plant. Therefore, this event did not affect the health and safety of the public.

Since this was an unplanned actuation of ESF equipment, the event is reportable pursuant to 10 CFR Part 50, Section 50.73(a)(2)(iv).

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TEXT CONTINUATION

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				91	002	01	

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CORRECTIVE ACTION

After experiencing multiple spurious alarms in two of the three installed new modules, the fourth was bench tested for several days and exhibited the same symptoms. The manufacturer was then requested to withhold shipment of the other four modules ordered pending identification of the problem. NMC investigated the spurious Hi Rad alarm and identified the cause of this problem to be an improper program on the firmware associated with this function. The problem was corrected and those four modules have been received and are installed. New EPROMs were received and replaced in the four original modules. Receipt inspection and pre-operational testing was performed on all eight modules with satisfactory results. A ninth module, a shop spare, was also tested satisfactory and placed into I & C spare parts. Wiring changes to provide the time delay feature for all modules have been made.

We had previously reported that the monitor improvements would be completed by March 31, 1991. As discussed above, the modifications were interrupted March 23, 1991, pending resolution of the problems. This commitment was met on September 13, 1991. The monitor improvements both to the modules and the time delay circuits now appear to be effective. There have been no spurious alarms or auto actuations to date. The key element to preventing future problems is by improving the quality of NMC products. If NMC had provided a correct program, no event would have occurred.

Corrective Actions Are:

1. NMC has corrected the problem in the EPROM by debugging the firmware program.
2. On November 21, 1991, PSQA performed a Quality Audit, number VS-91-28, of NMC. As a result of this audit, NMC was removed from our Qualified Suppliers List. After satisfying all of PSQA's findings, NMC was reinstated to the Qualified Suppliers List.

FAILED COMPONENT IDENTIFICATION

Nuclear Measurements Corporation Model APM-625 gas monitor with totalizer.

PREVIOUS SIMILAR EVENTS

Similar events were reported as Unit 1 LER's 88-007, 88-011 89-008, 89-016, 89-018 and 90-005.