



**CENTERIOR
ENERGY**

PERRY NUCLEAR POWER PLANT

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Robert A. Stratman
VICE PRESIDENT - NUCLEAR

April 16, 1993
PY-CEI/NRR-1639 L

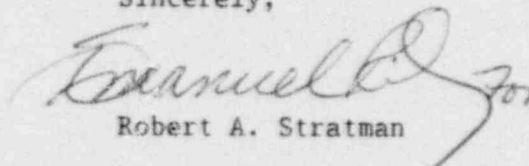
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
LER 93-008

Dear Sir:

Enclosed is Licensee Event Report 93-008 for the Perry Nuclear Power Plant.

Sincerely,



Robert A. Stratman

RAS:CRE:ss

Enclosure: LER 93-008

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

190172

Operating Companies:
Cleveland Electric Illuminating
Toledo Edison

9304190264 930416
PDR ADOCK 05000440
S PDR

Handwritten initials: JE22

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) Perry Nuclear Power Plant, Unit 1						DOCKET NUMBER (2) 05000 440			PAGE (3) 1 OF 4		
TITLE (4) Fire Detection Malfunction Results in Fire Protection Program Violation											
EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
03	17	93	93	008	00	04	16	93		05000	
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10) 99			20.402(b)			20.405(c)			50.73(a)(2)(iv)		
			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		
			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)		
SPEC. 6.9.4											
LICENSEE CONTACT FOR THIS LER (12)											
NAME Charles R. Elberfeld, Compliance Engineer						TELEPHONE NUMBER (include Area Code) Ext. 5264 (216) 259-3737					
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	
SUPPLEMENTAL REPORT EXPECTED (14)											
YES (If yes, complete EXPECTED SUBMISSION DATE)						N		NO		EXPECTED SUBMISSION DATE (15)	
MONTH DAY YEAR											
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)											
<p>On March 17, 1993, between 0823 and 1005, a Proprietary Signaling (Fire and Security Monitoring) System "Fire" side malfunction resulted in a condition which could have adversely affected the ability to achieve and maintain safe shutdown of the reactor in the event of a fire. The system malfunctioned in a way that was not readily perceivable, and this resulted in the inoperability of fire detection equipment for impaired fire barriers without the required continuous fire watches.</p> <p>The cause of this event is equipment malfunction, design. The "Fire" side computer malfunctioned due to a phenomenon called "Scan Shutdown Condition". In this condition, the "Fire" side computer self-checking feature did not detect a malfunction (because power was not lost); however the function of the computer that scans the alarm panels in the plant and updates alarm status had stopped. The self-checking feature of the computer does not monitor the scan function.</p> <p>Administrative controls have been implemented to require a check every thirty minutes to ensure the ability of the "Fire" side computer to update alarm state changes. These administrative controls will remain in place until appropriate equipment or software changes to monitor the computer scan function are implemented. Efforts by engineering personnel are in progress to develop a method to automatically monitor the scan function of the "Fire" side computer.</p>											

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TEXT CONTINUATION

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

I. Introduction

On March 17, 1993, between 0923 and 1005, a Proprietary Signaling (Fire and Security Monitoring) System "Fire" side [IC] malfunction resulted in a violation of the approved Fire Protection Program which could have adversely affected the ability to achieve and maintain safe shutdown of the reactor in the event of a fire. At the time of the event, the plant was in Operational Condition 1 (Power Operation) at ninety-nine percent of rated thermal power with the Reactor Pressure Vessel [RPV] pressure at 1018 psig and saturated conditions. This event is being reported under the requirement of Technical Specification 6.9.4.

II. Event Description

On March 17, 1993, at 0823, a Central Alarm Station (CAS) Operator noticed a "Loss of Power" (LOP) alarm that did not reset through the operator interface in the CAS. The alarm indicated that the uninterruptible power supply [EE] (UPS) for the Fire and Security Monitoring System had switched to its alternate source. The monitoring equipment is designed to continue operating under such a transient and no response to the alarm was required by procedure, so there was no immediate concern. At approximately 0939, the Secondary Alarm Station (SAS) Operator was advised by a Fire Protection Inspector that the SAS would receive a Fire and Security Monitoring System alarm from a position switch as part of a Periodic Test Instruction (PTI-P54-P0033), "Fire Protection System Valve Position Verification and Position Switch Alarm Functional Test". The alarm was not received by the SAS and the Fire Protection Inspector indicated that a work order would be written for the switch.

At approximately 0958, operations personnel contacted the SAS to coordinate the testing of a fire point as part of a Periodic Test Instruction (PTI-P54-P0035), "Electric and Diesel Fire Pump Weekly Operability Test". Again no alarm was received by the SAS and at this time the SAS Operator suspected that the monitoring system was not operating properly. The SAS Operator then began a system test to attempt to identify any malfunctions. This resulted in the SAS Operator's terminal locking up. Only the "Fire" side of the Fire and Security Monitoring System was affected. The SAS Operator requested CAS personnel to reset the LOP alarm but the alarm would not reset. At 1000, the SAS Operator contacted a Fire Protection Inspector and on March 17, 1993 at 1005, compensatory actions in the form of continuous fire watches were established at applicable fire protection panels throughout the plant.

Plant Administrative Procedure (PAP-1914), "Fire Protection System Operability" provides the requirement that if any fire rated assembly which separates safety related fire areas or portions of redundant safe shutdown circuits/components is inoperable, then (within one hour) if operable detection exists on at least one side of the barrier, establish an hourly firewatch patrol on one side of the

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barrier. Hourly firewatch patrols had been previously established on December 4, 1991, for 10CFR50 Appendix R raceway fire impairments caused by inadequate fire barriers identified in LER 91-020-01. On March 17, 1993, at 0823, when the "Fire" side of the Fire and Security Monitoring System stopped updating alarm information, the associated fire detection equipment became inoperable. Additionally, PAP-1914 requires that (within one hour) if operable detection does not exist on at least one side of the barrier, establish a continuous fire watch on one side of the barrier. The "one hour" requirement for establishing continuous fire watches was not met because the inoperable detection was not discovered until 1000 hours. Therefore, on March 17, 1993, from 0923 until 1005, there were violations of the requirements of the fire protection program which could have adversely affected the ability to achieve and maintain safe shutdown in the event of a fire.

On March 17, 1993, at 0915, the system engineer who was performing a routine system walkdown, noted that the UPS inverter (preferred source) was running, but that the alternate supply was selected by the electronic switch for the UPS. That equipment lineup was indicative of multiple shifts between the preferred and alternate sources for the UPS. The system engineer requested that the equipment be restored to its normal configuration, and at 1021, operations personnel reset the associated uninterruptible power supply inverter in accordance with System Operating Instruction (SOI-R15), "Technical Support Center Uninterruptible Power Supply System", which realigned the UPS to its preferred source. The LOP alarm in the SAS was cleared and detection functions of the "Fire" side of the Fire and Security Monitoring System began to update. All alarm panels in question were tested to ensure that the "Fire" side computer would update changes of alarm states. Testing was completed and the continuous fire watches were terminated on March 17, 1993, at 1346.

III. Cause Analysis

The cause of this event is equipment malfunction, design. Although the switching of the uninterruptible power supply between its preferred and alternate sources initiated and terminated this event, the Fire and Security Monitoring System is designed to operate normally under such transients and has done so numerous times in the past. The only equipment to malfunction as a result of the transient was the "Fire" side computer. The "Fire" side computer malfunctioned due to a phenomenon called "Scan Shutdown Condition". In this condition, the "Fire" side computer self-checking feature did not detect a malfunction (because power was not lost); however the function of the computer that scans the alarm panels in the plant and updates alarm status had stopped. The self-checking feature of the computer does not monitor the scan function. The "Scan Shutdown Condition" is believed to be initiated by the electronic switching functions for the UPS sources caused by transients on the electronic switching sensing circuits. The sensing circuit transients are related to

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ground loops and the operation of other loads on the UPS. The "Scan Shutdown Condition" had never occurred in the past and has not recurred since the event on March 17, 1993.

IV. Analysis of Event

The Fire Protection Program as described in the Updated Safety Analysis Report states that in order to protect the ability to achieve safe shutdown, as analyzed in the Safe Shutdown Capabilities Report, adequate fire barriers will be in place. This was not the case during the event due to the degraded barriers associated with the Thermo-Lag installation issues identified in LER 91-020-01. The program further requires that if the barriers are degraded, compensatory measures (such as continuous fire watches in areas with inoperable fire detection equipment) will be taken. This requirement was not met between 0923 and 1005 hours on March 17, 1993. As redundant trains of various ECCS systems rely on the affected fire barriers, failure to perform the required fire watches could have impacted the operability of multiple ECCS systems in the event of a fire. No fires occurred in the areas of degraded fire barriers during the period of time in question and no demands were placed on any ECCS systems; therefore, this event is not considered to be safety significant. LER 92-018 documented an event in which a missed hourly fire watch resulted in a Fire Protection Program violation. The corrective actions for LER 92-018 could not be reasonably expected to prevent the March 17, 1993 event.

V. Corrective Actions

Fire and Security Monitoring System "Fire" side computer batteries and a power supply were replaced to optimize the system's response to any further transients caused by UPS electronic switching of sources. To prevent recurrence, administrative controls have been implemented to require the SAS Operator to check every thirty minutes to ensure the ability of the "Fire" side computer to update alarm state changes. These administrative controls will remain in place until appropriate equipment or software changes to monitor the computer scan function are implemented.

Efforts by engineering personnel are in progress to develop a method to automatically monitor the scan function of the "Fire" side computer. Additionally, engineering personnel are investigating to find and remedy the cause of the uninterruptible power supply switching from its "preferred" to "alternate" source. Procedural changes are being implemented to ensure that, upon the receipt of an LOP alarm that does not immediately reset, the "Fire" side computer is promptly checked for proper operation and actions are initiated to correct the alarm condition.

Energy Industry Identification System Codes are identified in the text as [XX].