CENTERIOR ENERGY

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
LER 95-008

Gentlemen:

Enclosed is Licensee Event Report 95-008, Inverter Failure Results in Reactor Scram.

If you have questions or require additional information, please contact Mr. James D. Kloosterman, Manager - Regulatory Affairs at (216) 280-5833.

Very truly yours,

DWC:sc

Enclosure: LER 95-008

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III

130028

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Perry Nuclear Power Plant, Unit 1	05000 440	1 OF 4

TITLE (4)
Inverter Failure Results in Reactor Scram

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
										05000
09	11	95	95	-- 008 --	00	10	10	95	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
		20.402(b)		20.405(c)	X	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	100	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)	X 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	TELEPHONE NUMBER (Include Area Code)
Keith R. Jury, Supervisor - Compliance	**(216) 280-5594**

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
B	BO	INVT	T248	NO						

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

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

On September 11, 1995, at 1351 hours, the Perry Nuclear Power Plant was at 100 percent rated thermal power when the reactor automatically scrammed due to a trip of the main turbine and subsequent closure of the turbine control and stop valves.

The root cause of the reactor scram was equipment failure. A capacitor in a 125 VDC to 120 VAC Topaz inverter failed, resulting in degradation of a 24 VDC instrument power supply to Reactor Pressure Vessel level instrumentation. Upon degradation of the 24 VDC power supply, reactor low water level initiation logic was satisfied, resulting in the generation of a Reactor Core Isolation Cooling (RCIC) system initiation signal. The RCIC initiation in turn caused an immediate main turbine trip and subsequent reactor scram. Plant systems and components functioned as designed during this transient. This event had minimal safety significance; the scenario is bounded by accident analyses, and plant systems and components functioned as designed.

Corrective actions for this event include: replacement of the Topaz inverter and restoration of the instrument power supply; evaluation of inverter refurbishment schedules and upgrades; and evaluation of plant modifications to preclude an immediate reactor scram upon loss of an inverter. This event is being reported in accordance with the requirements of 10CFR50.73(a)(2)(iv). This report is also being submitted to fulfill the requirements of Technical Specification 3.5.1, Action h.

I. Introduction

On September 11, 1995, at 1351 hours, the Perry Nuclear Power Plant automatically scrammed from 100 percent rated thermal power, due to a trip of the main turbine and subsequent closure of the turbine control and stop valves. During the transient, reactor pressure vessel (RPV) water level decreased to approximately 128 inches above the top of active fuel. RPV water level was restored utilizing the High Pressure Core Spray (HPCS) system, the Reactor Core Isolation Cooling (RCIC) system, and the motor driven feedwater pump (MFP).

Notification was made to the NRC via the Emergency Notification System at 1436 hours in accordance with 10CFR50.72(b)(1)(iv), for an Emergency Core Cooling system (ECCS) discharge to the Reactor Coolant system (RCS); in accordance with 10CFR50.72(b)(2)(ii), for actuations of Engineered Safety Features (ESFs) including actuation of the Reactor Protection system (RPS); and in accordance with 10CFR50.72(b)(2)(vi), for a planned news release. This condition is being reported in accordance with 10CFR50.73(a)(2)(iv) for an event that resulted in ESF and RPS actuations.

Submittal of this report also satisfies the requirements for Technical Specification (TS) 3.5.1, Action h, which requires a Special Report following any ECCS actuation and injection into the RCS. This was the tenth HPCS injection cycle to date. The injection nozzle usage factor is currently less than 0.70.

II. Description of Event

On September 11, 1995, at 1351 hours, the Perry Nuclear Power Plant automatically scrammed from 100 percent rated thermal power following the degradation of a Division 2 Topaz inverter power supply which caused a RCIC initiation, resulting in a trip of the main turbine and a reactor scram. Reactor water level decreased to the level 3 setpoint (178 inches above the top of active fuel), which caused a Residual Heat Removal (RHR) system isolation (the affected valves were already closed), then further to the level 2 setpoint (130 inches above the top of active fuel). Upon reaching the level 2 setpoint, the HPCS system actuated and the following additional ESF actuations (i.e., isolations) occurred: Balance of Plant (BOP); Reactor Water Cleanup system; and Reactor Sample system. Reactor water level was restored utilizing HPCS, RCIC, and the MFP. The plant was stabilized in Operational Condition 3. Plant systems and components functioned as designed during this transient.

III. Cause of Event

The root cause of this event was equipment failure. Failure of an output capacitor in a 125 VDC to 120 VAC Topaz inverter [INVT] resulted in degradation of a 24 VDC

instrument power supply [JX] to RPV level instrumentation. Upon degradation of the 24 VDC power supply, reactor low water level initiation logic was satisfied and a RCIC initiation signal was generated. The RCIC initiation in turn caused a main turbine trip and resultant reactor scram.

The subject Division 2 Topaz inverter had been replaced on September 2, 1995, with a spare master/slave inverter unit (see LER 95-005) that was refurbished in 1989. This equipment was satisfactorily tested after installation and returned to service. However, after being energized for approximately 10 days, this output capacitor ('C3B', paper type) [CAP] failed. To date, it has not been determined why the capacitor failed.

IV. Safety Analysis

This event is bounded by the Updated Safety Analysis Report (USAR) Chapter 15.2.3, "TURBINE TRIP," which provides analysis for a variety of turbine or nuclear system malfunctions that initiate a turbine trip. In addition, USAR Chapter 15.2.7, "LOSS OF FEEDWATER FLOW," assumes a total loss of feedwater flow with make-up to the RPV being provided by ECCS. This analysis also bounds this transient. The impact of the HPCS initiation and injection, inclusive of fatigue, is enveloped by design analyses for the reactor, reactor internals, and HPCS piping. Therefore, this transient was bounded by the existing safety analysis and is considered to have minimal safety significance. Plant systems and components functioned as designed throughout the event.

V. Similar Events

Three previous events involving similar loss of instrument power supplies resulting in initiation of RPV low water level logic were reported in LERs 86-041, 93-012, and 95-005. The events associated with LERs 86-041 and 93-012 were caused by voltage fluctuations in the output of the reserve battery charger upstream of a 125 VDC to 120 VAC Topaz inverter.

LER 93-012 contained a corrective action stating engineering personnel would evaluate replacement of the 125 VDC to 120 VAC Topaz inverters. A design change was initiated to replace these inverters, and is currently being re-evaluated for implementation.

The corrective actions associated with LERs 86-041 and 93-012 would not have precluded occurrence of this event.

LER 95-005 was attributed to failure of a resistor within the master/slave unit in the same 125 VDC to 120 VAC Topaz inverter which resulted in the loss of a 24 VDC instrument power supply to RPV level instrumentation. Longer term corrective actions associated with this event were in-process when the September 11, 1995, reactor scram occurred. While both this event and the event delineated in LER 95-005 were caused by component failures in the Division 2 125 VDC to 120 VAC inverter, the failure mechanisms were not similar.

VI. Corrective Actions

1. The inverter was replaced and the instrument power supply was restored.

2. A failure analysis will be performed on the failed capacitor.

3. Station personnel will determine optimum refurbishment schedules with respect to Topaz inverters, associated power supplies, and battery charger parts. Based on these analyses, appropriate changes will subsequently be incorporated into station procedures/instructions.

4. Engineering is evaluating plant modifications which would preclude an immediate reactor scram upon loss of an inverter.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].