

LICENSEE EVENT REPORT (LER)

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) Perry Nuclear Power Plant, Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 4 4 0										PAGE (3) 1 OF 0 3																													
TITLE (4) Loss of Reactor Protection System Bus Due to Electrical Protection Assembly Trip Results in Balance of Plant and RWCV Isolations																																																	
EVENT DATE (5) 0 2 2 7 9 2 9 2										LER NUMBER (6) 0 0 1										REPORT DATE (7) 0 0 0 3 2 7 9 2										OTHER FACILITIES INVOLVED (8)																			
MONTH DAY YEAR YEAR										MONTH DAY YEAR										FACILITY NAMES										DOCKET NUMBER(S)																			
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OPERATING MODE (9)										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																																							
POWER LEVEL (10) 1 0 0										20.402(b)										20.405(e)										50.73(a)(2)(iv)										73.71(b)									
										20.405(a)(1)(i)										50.38(a)(1)										50.73(a)(2)(v)										73.71(e)									
										20.405(a)(1)(ii)										50.38(a)(2)										50.73(a)(2)(vi)										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)(vii)(A)																			
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LICENSEE CONTACT FOR THIS LTR (12)																																																	
NAME Henry L. Hegrat, Compliance Engineer, Extension 5185																				TELEPHONE NUMBER 2 1 1 6 2 1 5 9 1 - 3 1 7 1 3 7																													
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																						
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SUPPLEMENTAL REPORT EXPECTED (14)																																																	
YES (If yes, complete EXPECTED SUBMISSION DATE)																				X NO										EXPECTED SUBMISSION DATE (15)																			
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On February 27, 1992 the Reactor Protection System (RPS) distribution Bus B became deenergized, resulting in a Nuclear Steam Supply Shutoff System Balance of Plant isolation, along with a Reactor Water Cleanup isolation. The operators responded in accordance with plant procedures to restore the affected systems.

The cause of this event was failure of an Electrical Protection Assembly (EPA) logic board. Troubles potting resulted in spurious trips of the EPA under load conditions, and identified unsatisfactory reading for the trip and time delays settings. The RPS Motor Generator Set was determined not to be a factor in this event.

The faulty EPA logic board was replaced and, following a successful load test, the EPAs were returned to service. The board is being returned to the manufacturer for failure analysis. Additionally, this event will be reviewed with licensed and nonlicensed operators as part of routine operator requalification training.

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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-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Perry Nuclear Power Plant, Unit 1	0 5 0 0 0 1 4 0	9 2	0 0 1	0 1 0	0 2	OF 0 3

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

I. Introduction

On February 27, 1992 at 2148 the Reactor Protection System (RPS) [JC] distribution Bus B became deenergized, resulting in Nuclear Steam Supply Shutoff System (NSSSS) [JM] Balance of Plant (BOP) isolation, along with a Reactor Water Cleanup (RWCU) [CE] isolation. At the time of the event, the plant was in Operational Condition 1 at 100 percent rated thermal power. The reactor pressure vessel [RPV] was at 1026 psig and saturated conditions. At 0053 on February 28, the required non-emergency four-hour notification was made to the NRC pursuant to the requirements of 10CFR50.72(b)(2)(ii). This event is being reported under the requirements of 10CFR50.73(a)(2)(iv).

II. Event Description

At 1549 on February 27, 1992, the Reactor Protection System B Motor Generator [MG] and Electrical Protection Assemblies (EPAs) were declared operable following routine maintenance and implementation of a design change. At 2132, the RPS Bus B was shifted from its alternate power supply to the normal MG supply. At 2148, an EPA trip resulted in a loss of RPS Bus B. The loss of supply power to RPS trip channels B and D resulted in an Inboard BOP isolation and a RWCU isolation. The operators reacted appropriately by entering Off-Normal Instruction (ONI-C71-2) "Loss of One RPS Bus". RPS Bus B was transferred to the alternate power supply at 2151. The BOP and RWCU isolations were reset at 2156. The RWCU system was restarted at 2318 and ONI-C71-2 was exited at 2337. Troubleshooting on the system continued until 1930 on March 2, 1992 when the EPA logic board was replaced and calibrated. Following a successful retest, the system was declared operable at 0020 on March 4, 1992.

III. Cause Analysis

The cause of this event was failure of one of two EPAs provided for RPS Bus B MG set. Prior to the event, the EPA logic boards had been replaced as part of preventive maintenance. Additionally, at that time, design changes were made to the MG set to facilitate calibration and testing. To determine the cause of the event, the MG set was subjected to load changes while the voltage regulator performance was monitored; no problems with the MG set operation were identified. A normal plant load was then applied at the output of the suspect EPA. With the MG set operating properly, the EPA spuriously tripped after approximately one hour. In an attempt to calibrate the installed EPA it was energized for five hours, at which time the overvoltage and undervoltage trips and the undervoltage and underfrequency time delays were determined to be out of tolerance. Additional spurious trips of the EPA were noted when the simulated input was at the normal supply conditions of 120 volts AC and 60 hertz. Therefore, the troubleshooting concluded that the trip was not related to the MG set and the component responsible for the loss of RPS Bus B was the EPA logic board [CBD], General Electric, model number 147D8652G001. Following replacement of the logic board, the EPAs successfully completed a four hour load test and were returned to service.

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Perry Nuclear Power Plant, Unit 1	0 5 0 0 0 4 4 0 9 2	—	0 0 1	—	0 0 0 3	OF 0 3

TEXT (If more space is required, use additional NRC Form 365A's) (1-7)

IV. Corrective Action

As described above, the EPA logic board was replaced following satisfactory calibration and a six hour warm-up period, and no further corrective actions were necessary to return the system to service. To determine the exact cause of the logic board trip, the board is being returned to the manufacturer for failure analysis. Additionally, this event will be reviewed with licensed and nonlicensed operators as part of routine operator requalification training.

V. Safety Analysis

There are two EPAs in series between each source of power (a motor generator set and an alternate power transformer [XFMR]) and the associated RPS bus. Each EPA senses the supply voltage, and if voltage or frequency deviates beyond set limits, the EPA will trip open causing a loss of power to the respective bus. Although the faulty EPA was demonstrated to be unreliable during this event, the redundant EPA remained operable and available to protect the RPS Bus. In this event, all systems functioned as designed upon the loss of RPS power, including the appropriate NSSSS BOP and RWCU isolations received. Operators acted appropriately and quickly to restore the systems. Therefore, this event is considered to have no safety significance. Previous losses of the RPS buses were reviewed for similarity to this event; no prior events within the past two years were related to EPA failures. Additionally, no failures had occurred with newly installed EPA logic boards.

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