

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 50.6 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (IMRB 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 5

TITLE (4)

Containment Isolation Valve Actuations During Restoration from Divisional Bus Outage

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
04	21	94	94	011	01					05000
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		N	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)		000	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)	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

K. R. Jury, Supervisor-Compliance

TELEPHONE NUMBER (include Area Code)

(216) 280-5594

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 21, 1994, at 2225, several containment isolation valves automatically closed during the restoration from a Division II electrical bus outage. Investigation identified that auxiliary relays in the isolation logic were de-energized due to a newly installed transformer which had not been properly placed into operation.

A Human Performance Evaluation System (HPES) evaluation was performed to identify the causes that contributed to this event. It was determined that a combination of inadequate instructions and failure to follow procedure allowed the newly installed transformer to be placed into service without ensuring that it was supplying power to its electrical bus.

Corrective actions include design change and work management program improvements, as well as an improved computer-based Work Order preparation system. Additionally, a post-maintenance test manual is being developed to provide a consistent set of requirements for testing following maintenance, and the fuse policy has been revised to address the installation of fuses for design changes.

This report is submitted in accordance with 10CFR50.73(a)(2)(iv).

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TEXT CONTINUATION

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Perry Nuclear Power Plant, Unit 1		05000 440		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF 2 5
				94	011	01	

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

I. Introduction

On April 21, 1994, at 2225, several containment isolation valves automatically closed during the restoration from a Division II electrical bus outage. At the time of this event, the plant was in a refueling outage with the reactor defueled. Primary containment integrity was not required during this event. On April 22 at 0120, notification was made to the NRC in accordance with 10CFR50.72(b)(2)(ii), as an event or condition that resulted in an engineered safety feature actuation. This event is being reported in accordance with 10CFR50.73(a)(2)(iv).

II. Description of Event

On April 21, 1994, 4160 volt bus EH12 (Division II) was being restored from a bus outage which had been performed to support work being done during the refueling outage. During the re-energization of equipment on motor control center (MCC) EF1C07, several containment isolation valves automatically closed at 2225. The restoration was stopped, the affected valves were repositioned as appropriate, and investigation of the automatic closures was initiated.

This investigation identified that power to 120 volt bus EK-1-B1 from transformer 1R25-S0035 was not available. Bus EK-1-B1 provides power to auxiliary relays for the Nuclear Steam Supply Shutoff System [JM] (NSSS) Division II Balance of Plant (BOP) isolation system. The affected containment isolation valves had been manually placed in the open position to support system operations when power had been removed from the valve motor operators for the EH12 bus outage. When power was restored to the motor operators for these valves from EF1C07, the NSSS BOP auxiliary relays provided an isolation signal since they were de-energized.

The disconnect switch powering transformer 1R25-S0035 had been closed prior to the re-energization of EF1C07; however, line fuses had not been installed and an integrated circuit breaker on the transformer had not been closed. Therefore, the auxiliary relays on bus EK-1-B1 were still de-energized when the valve motor operators were re-energized.

Transformer 1R25-S0035 had been replaced during the EH12 bus outage by Design Change Package (DCP) 91-0060A. This DCP replaced the existing non-regulating 480 to 120 volt transformer with a new regulating type transformer. Installation of this transformer was performed by work order (WO) 94-246.

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As part of this design change, the fusible disconnect switch assembly was replaced and the fuse size was changed from 100 ampere to 40 ampere. Additionally, the new transformer contained an integrated circuit breaker that was not included in the original design. When the newly installed transformer was placed in service, the 40 ampere fuses had not been installed, the integrated circuit breaker had not been closed, and checks to ensure that the transformer was properly operating had not been performed.

Changes to plant procedures to include the transformer circuit breaker were completed, the fuses were installed, and bus EK-1-B1 was energized on April 22.

III. Cause of Event

The following combination of inadequate instructions and failure to follow procedure were identified as the cause of this event:

1. Circuit Breaker - The Design Change Package (DCP) did not clearly identify the integrated circuit breaker as a component within the new design. As a result, the work order (WO) did not provide direction with regard to the proper lineup of this circuit breaker following installation.

2. Fuses - The WO included specific instructions to "install" the fuses in the transformer supply disconnect switch; however, because of previous training associated with fuse installation, the electrician did not actually install the fuses. He placed the fuses in the MCC bucket rather than installing them in their fuse holders, and he signed the WO step as being complete. He failed to provide a status of the fuses in the work-in-progress log. The WO was deficient in two respects. It should have specified that Operations personnel perform the fuse installation, and it should have included instructions for independent verification of fuse installation as required by procedure.

3. Post-Modification Testing - The DCP included instructions for a pre-installation performance test of the transformer; however, no post-modification testing was specified or performed.

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IV. Safety Analysis

The systems affected by this event were the Fuel Pool Cooling and Cleanup system [DA], the Liquid Radwaste Disposal system [WD], the Liquid Radwaste Sumps system [WD], and the Containment Vessel Chilled Water system. All affected components responded as designed. At the time of this event, the plant was shutdown and primary containment integrity was not required. The reactor was defueled with the spent fuel stored in the Fuel Handling Building storage pools. Cooling to the spent fuel storage pools was not affected by this event. The containment isolations and resultant short term shutdown of the affected systems would not be safety significant regardless of power level.

V. Similar Events

On April 9, 1989, at 2245, while restoring from a maintenance outage of the Reactor Protection System (RPS) bus B, three containment isolation valves closed when power was restored to their motor operators (see LER 89-012-00). In that event, a fuse in the containment isolation logic reset circuit had been removed by an unrelated safety tagout which rendered the reset circuit inoperable. Due to inadequate reviews of the tagout, the isolation signals were not reset prior to restoring the power to the containment isolation valves. The corrective actions taken for LER 89-012-00 would not have been expected to preclude this event.

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VI. Corrective Actions

Plant procedures were modified to include the transformer circuit breaker, the fuses were installed, and bus EK-1-B1 was successfully energized on April 22, 1994.

A Human Performance Evaluation System (HPES) evaluation was performed to identify the causes that contributed to this event. Based upon the results of this evaluation, the following corrective actions either have been or will be taken:

1. Design change program improvements have been made. The design change program has been extensively revised as described in the Perry Course of Action (PCA).
2. A separate Work Management Section has been formed and a Work Management Improvement Plan is being implemented. An improved computer-based WO preparation system is also being developed as described in the PCA.
3. A post-maintenance test manual is being developed to provide a consistent set of requirements for post-maintenance/modification testing of equipment and components as described in the PCA.
4. The fuse policy has been revised to address the installation of fuses associated with design changes.
5. The WO planners and appropriate other plant personnel have been trained regarding this event.

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