

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Pilgrim Nuclear Power Station										DOCKET NUMBER (2) 0 5 0 0 0 2 1 9 3 1 OF 0 5										PAGE (3) 1 OF 0 5	
TITLE (4) Unplanned Automatic Actuations of Portions of Primary Containment, Secondary Containment and Standby Gas Treatment Systems																					
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 NAMES					DOCKET NUMBER(S)							
0 2	0 2	8 8	8 8	0 0 4	0 0	0 3	0 2	8 8	N/A					0 5 0 0 0 0 0 0 0 0 0 0							
OPERATING MODE (9) N			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																		
POWER LEVEL (10) 0 0 0			20.402(b)				20.405(e)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)						
			20.405(a)(1)(i)				50.38(e)(1)				<input type="checkbox"/> 50.73(a)(2)(v)				73.71(e)						
			20.405(a)(1)(ii)				50.38(e)(2)				<input type="checkbox"/> 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)				<input type="checkbox"/> 50.73(a)(2)(viii)(A)										
			20.405(a)(1)(iv)				50.73(a)(2)(ii)				<input type="checkbox"/> 50.73(a)(2)(viii)(B)										
			20.405(a)(1)(v)				50.73(a)(2)(iii)				<input type="checkbox"/> 50.73(a)(2)(x)										
LICENSEE CONTACT FOR THIS LER (12)																					
NAME Douglas W. Ellis - Compliance Management Engineer										TELEPHONE NUMBER 6 1 7 7 4 1 7 - 1 8 1 1 6 0											
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)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR					
YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO									
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																					
<p>On February 2, 1988 at 1115 hours, unplanned automatic actuations of portions of the Primary Containment Isolation Control System (PCIS) and Reactor Building Isolation Control System (RBIS) occurred.</p> <p>The actuations resulted in isolation signals and automatic closure of appropriate Primary Containment System (PCS) isolation valves, the automatic closure of the "A" train dampers of the Secondary Containment System (SCS), and the automatic start of the "A" train of the SCS/Standby Gas Treatment System. The operation of the Reactor Water Cleanup (RWC) System was temporarily interrupted. Following immediate investigation, the isolations were reset at 1315 hours and the affected systems were returned to normal.</p> <p>The cause for the actuations was inadequate instructions for work being performed in a PCIS/RBIS logic panel.</p> <p>Corrective actions resulting from the actuations consisted of reviewing and revising instructions related to the work that caused the actuations, initiating a change that supplements the work plan process, and installing appropriate cautionary signs in the PCIS/RBIS panels.</p> <p>The actuations occurred during an extended outage while in cold shutdown with plant conditions that were as follows. The reactor mode selector switch was in the SHUTDOWN position. There was negligible core decay heat with the reactor water temperature at approximately 105 degrees Fahrenheit. The RWC System was in service. The actuations posed no threat to the health and safety of the public.</p>																					

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TEXT (If more space is required, use additional NRC Form 385A's) (17)

EVENT DESCRIPTION

On February 2, 1988 at 1115 hours, unplanned automatic actuations of portions of the Primary Containment Isolation Control System (PCIS) and Reactor Building Isolation Control System (RBIS) occurred.

The actuations occurred during a planned modification work activity undertaken to tie-in valve position signals to the new process computer.

Inboard and outboard logic relays (of the PCIS and RBIS) are located in panels C-941 and C-942, respectively. In these panels, the neutral leads of the coils of the relays are connected in a string (daisy-chain) fashion such that the disconnection, i.e. lifting of a lead from the neutral string causes the downstream relay coils to become ungrounded and thereby de-energized. The relays are normally energized and are designed to become de-energized as a result of receiving an appropriate signal(s). During the tie-in performed by a qualified non-licensed contractor technician, the neutral lead at terminal CC-20 (Panel C-941) was intentionally lifted and thereby de-energized the entire string of relay coils grounded from the terminal. The relays in the string consist of: 16A-K14, -K17, -K17X, -K25, -K26, -K28, -K29, -K53, -K56, -K60, and -K61. Further, when the neutral lead at terminal CC-20 was lifted, the lead became inadvertently in contact with the adjacent 120 VAC (positive) terminal CC-19. The inadvertent contact caused excessive current to blow fuse 16A-F17. This fuse is in the 120 VAC power supply circuit for relays (16A-K25, -K26, -K60, and -K61) that were already de-energized due to the lifted neutral lead. As a result of the relays becoming de-energized, the principle actuations and coincident alarms listed below were noted.

- ° The inboard Primary Containment System (PCS) Group 6/Reactor Water Cleanup (RWCU) System isolation valve (MO-1201-2) closed automatically as designed and thereby interrupted the operation of the RWCU System. The alarms "Cleanup Hi Temp Non Regen Heat Exch", "Cleanup Excess Flow or Negative Flow", and "Cleanup Reject Hi/Lo Press" were received in the Control Room. The isolation and alarms were consistent with relays 16A-K25, -K26, -K60, and -K61 becoming de-energized.
- ° The PCS Group 3/Residual Heat Removal System (RHRS) isolation valves received an isolation signal. The RHRS was not in service at the time of the isolation signal. The alarm "RHR Shutdown Cooling Mode Rx Hi Press Channel A" was received in the Control Room. The isolation signal and alarm was consistent with relays 16A-K28, -K29, and -K53 becoming de-energized.

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APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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- Portions of the "A" train PCS Group 1 and Group 2 isolation valves received an isolation signal. The isolation signal(s) was consistent with relays 16A-K14, -K17X and -K56 becoming de-energized.
- The "A" train ventilation dampers of the Secondary Containment System (SCS) closed automatically as designed. The "A" train of the SCS/Standby Gas Treatment System (SGTS) started automatically as designed. The closure of the SCS dampers and start of the SCS/SGTS was consistent with relay 16A-K17 becoming de-energized.

Failure and Malfunction Report 88-32 was written to document the actuations. Following immediate investigation, a priority Maintenance Request (MR 88-58) was issued to further investigate. Notification was made to the NRC Operations Center on February 2, 1988 at 1130 hours. At 1315 hours the isolations were reset, the RWCU System isolation valve (MO-1201-2) was opened, and the systems were returned to normal service.

The actuations occurred during an extended outage while in cold shutdown with plant conditions that were as follows. The reactor mode selector switch was in the SHUTDOWN position. There was negligible core decay heat with the reactor water temperature at approximately 105 degrees Fahrenheit. The RWCU System was in service. The RHRS was not in service for any of its operating modes.

CAUSE

The cause for the actuations was inadequate instructions for the work task being performed. A modification (PDC 83-51D) was being implemented via a Maintenance Request (MR 87-45-479) to add a signal for the position of the inboard PCS Group 1/Main Steam Line "D" isolation valve (AO-203-1D) to the new process computer (EPIC). The work task was being performed in accordance with an EPIC signal cut-in work sheet (FRN 83-51D-150 function ID #ISO 726). Step 4 (four) of the work sheet specified that the wire at terminal CC-20 in Panel C-941 was to be lifted. The cut-in was being made as a live cut-in for purposes of verifying the valve position prior to and after the cut-in to the computer. The cut-in sheet did not provide precautions for jumpering of the neutral lead at CC-20 prior to lifting the lead.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

CORRECTIVE ACTION

Immediate corrective actions were taken following the actuations. The actions consisted of investigating the actuations, halting further EPIC cut-in work, relanding the lifted lead, replacing the blown fuse, resetting the isolations, and restoring the effected systems to normal service.

Interim actions were also taken. A critique was held on February 2, 1988 at 1430 hours. The critique was conducted to establish relevant facts, determine root cause, and to make recommendations to management of measures to prevent the likelihood of a similar event in the future.

The measures taken and initiated included the following.

- ° The remaining EPIC cut-in work sheets were reviewed and revised where necessary.
- ° A revision to the Maintenance Request procedure, used to implement modifications, was initiated. The revision supplements the process used in the preparation of a work plan for the work task to be performed. The supplement provides for an increased level of work plan details when a work task is to be performed on electrical equipment. The detail includes the use of internal wiring diagrams to identify the potential for actuations, and the use of jumpers for work tasks involving the lifting or landing of daisy-chained or looped leads.
- ° Signs were installed on the interior of the doors for Panels C-941 and C-942. Each sign, cautioning that the neutral leads are daisy-chained in the panel, is at eye level when the door is open for work.

SAFETY CONSEQUENCES

Based on the redundancy of systems and procedures available, the actuations posed no threat to the health and safety of the public.

Control room operator actions for response to alarms and malfunctions are addressed in written procedures. The procedures include the following:

- ° Alarm Response Procedure (ARP) ARP-904C (Center) and 2.4.27, "Reactor Water Cleanup System Malfunctions".
- ° ARP-903L (Left) and 2.4.25, "Loss of Shutdown Cooling".
- ° ARP-7L (Left) and 2.4.147, "Reset of Secondary Containment Isolation on Panel C-7".

This event was determined to be reportable pursuant to 10CFR50.73(a)(2)(iv) because the PCIS/RBIS relays that became de-energized resulted in the automatic actuations of portions of accident mitigating systems (PCS, SCS, SGTS).



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

SIMILARITY TO PREVIOUS EVENTS

A review of Pilgrim Station Licensee Event Reports (LERs) written since January 1984 was conducted. The review focused on LERs submitted pursuant to 10CFR50.73(a)(2)(iv) that involved relays becoming unexpectedly de-energized during work activities in Panels C-941 or C-942.

The review identified similar events reported in LERs 50-293/87-008-00 and 87-016-00. For LER 50-293/87-008-00, a normally energized relay, located in the inboard PCIS/RBIS logic panel C-941, became unexpectedly de-energized during a refueling outage work task. When the relay became de-energized, an automatic actuation of the PCS Group 3 isolation valves occurred. For LER 50-293/87-016-00, eight normally energized relays located in the outboard PCIS/RBIS logic panel C-942, became unexpectedly de-energized during a refueling outage work task when a neutral lead was lifted for the replacement of a relay coil. When the relays became de-energized, automatic actuations of portions of the PCS, SCS and SGTS occurred.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for the actuations are as follows:

COMPONENTSCODES

Relay, tripping (de-energized relays)  
Fuse (16A-F17)

94  
FU

SYSTEMS

Containment Isolation Control System (PCIS/RBIS)	JM
Engineered Safety Features Actuation System (PCIS/RBIS)	JE
Primary Containment System (PCS)	JM
Reactor Building (SCS)	NG
Reactor Water Cleanup System (RWCU)	CE
Residual Heat Removal System (RHRS)	BO
Standby Gas Treatment System (SGTS)	BH

**BOSTON EDISON**

Pilgrim Nuclear Power Station  
Rocky Hill Road  
Plymouth, Massachusetts 02360

**Ralph G. Bird**

Senior Vice President — Nuclear

March 2, 1988

BECo Ltr. #88-034

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

Docket No. 50-293  
License No. DPR-35

Dear Sir:

The attached Licensee Event Report (LER) 88-004-00 "Unplanned Automatic Actuations of Portions of Primary Containment, Secondary Containment and Standby Gas Treatment Systems" is submitted in accordance with 10CFR Part 50.73.

Please do not hesitate to contact me if you have any questions regarding this subject.

  
R.G. Bird

DWE/bl

Enclosure: LER 88-004-00

cc: Mr. William Russell  
Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Rd.  
King of Prussia, PA 19406

Sr. Resident Inspector - Pilgrim Station

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