

#### **BOSTON EDISON**

Pilgrim Nuclear Power Station Rocky Hill Road Plymouth, Massachusetts 02360

Ralph G. Bird Senior Vice President — Nuclear

> June 19, 1989 BECo Ltr. 89-083

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

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

Dear Sir:

The enclosed Licensee Event Report (LER) 89-017-00, "Unplanned Actuations of the Residual Heat Removal System/Low Pressure Coolant Injection Logic Circuitry During Functional Testing", is submitted in accordance with 10 CFR Part 50.73.

Please do not hesitate to contact me if there are any questions regarding this report.

DWE/bal

Enclosure: LLR 89-017-00

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

Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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FACILITY NAME (1) Pilgrim Nuclear Power St	ation	D	OCKET NUMBER (2)	PAGE	(3)			
TITLE (4) Unplanned Actuations of the Re	esidual Heat Rep	noval System/Lov	w Pressure	219 3 1 0F	011			
Injection Logic Circuitry Duri	ing Functional '	lesting						
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MODE (9) 14 20.402(b)	20.405(c)	50.73(s)(2)(iv)		73.71(b)				
POWER 20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	-	73.71(c)				
(10) 20.405(a)(1)(ii)	50.36(c)(2)	50,73(#)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC For				
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NAME			TEL	EPHONE NUMBER				
Douglas W. Ellis - Senior Compl	lance Engineer		AREA CODE 510187	14171-18116	1			
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#### LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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# EVENT DESCRIPTION

NRC Form 366Å (9-83)

> On May 20, 1989 at 2215 hours, and on May 21, 1989 at 2025 hours, unplanned actuations of the same portion of the Residual Heat Removal System (RHRS)/Low Pressure Coolant Injection (LPCI) loop selection logic circuitry occurred while shutdown. No RHRS/LPCI injection flow occurred because of the actuation(s) in the affected portion of the circuitry.

The actuations occurred during a scheduled functional test of the control circuitry for the Recirculation System Loop 'B' motor-generator (M-G) set drive motor breaker. The testing was being performed per Procedure 3.M.3-37 Attachment 2 (two), "Reactor Recirculating M-G Set 'B' Lockout Relay and 4160V Drive Motor Breaker Trip". The testing was being performed as scheduled (once per 18 month frequency) in accordance with the surveillance program.

The actuation(s) occurred at procedure step 28.c. At this step, the normally de-energized relay 10A-K28B was manually actuated. The manual actuation of this relay is equivalent to a RHRS/LPCI initiation signal (low Reactor Vessel water level or high Drywell pressure) and should have resulted in an automatic trip of the M-G Set 'B' drive motor breaker (152-401). In accordance with the test procedure, breaker was in the test position, and a pair of contacts in each of two relays (10A-K29B and 10A-K105B) were to be insulated. Insulating contacts one and two of relay 10A-K29B prevents an automatic trip of the M-G Set 'A' drive motor breaker during the test. Insulating contacts two and eight of relay 10A-K105B prevents an actuation of the 'B' RHRS/LPCI loop selection logic circuitry during the test.

On each occasion, the test resulted in the following designed responses. The RHRS/LPCI Loop 'A' injection valves closed automatically. The valves (MO-1001-28A and -29A) were in the open position with the RHRS loop 'A' in the Shutdown Cooling (SDC) mode of operation. The RHRS/LPCI Loop 'B' injection valves (MO-1001-28B and -29B) received an opening signal. Valve MO-1001-28B, normally in the open position, remained open and valve MO-1001-29B, normally in the closed position, opened automatically.

On both occasions, the initial Control Room licensed operator response was to manually trip the RHRS loop 'A' pump that was in service for the RHRS/SDC mode of operation. The testing was suspended and the affected components were restored to normal after verifying the cause for the actuation(s). After the second actuation, a team was formed to investigate.

Failure and Malfunction Report (F&MR) 89-201 was written to document the May 20, 1989 actuation and the NRC Operations Center was notified on May 21, 1989 at 0015 hours. F&MR 89-202 was written to document the May 21, 1989 actuation and the NRC Operations Center was notified on May 21, 1989 at 2053 hours.

The actuations occurred while shutdown in a cold condition. The reactor mode selector switch was in the SHUTDOWN position. The control rods were in the inserted position. The Reactor Vessel (RV) pressure was zero psig and the RV water temperature was approximately 110 degrees Fahrenheit. The reactor power level was zero percent. The Recirculation System (Loops 'A' and 'B') was not in service.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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# CAUSE

NRC Form 386A

The cause for the actuations was utility non-licensed Electrical Maintenance engineer error. On both occasions the same engineer ineffectively insulated (i.e. blocked open) contacts two and eight of relay 10A-K105B. The blocking of the contacts was identified at step 28.a of the test (3.M.3-37 Attachment 2). Factors contributing to the error(s) were the type and location of the relay (10A-K105B).

Relay 10A-K105B is a General Electric type HGA relay. The relay is flush mounted and is located approximately six inches above floor level on Panel C-933. With the relay cover removed, the pair of normally open contacts of the relay were to be insulated. The movable contact together with the relay location, made it difficult to insulate (block open) the contacts without causing an inadvertent actuation of the related circuitry.

The May 20, 1989 actuation occurred because the electrical tape, used to insulate the contacts, fell off when the relay (10-K105B) was subsequently actuated during the test. The tape was removed and the test procedure (3.M.3-37 Rev. 8) was revised to identify the material (heat shrink type tubing or approved equivalent) to be used for the test. The May 21, 1989 actuation occurred because the heat shrink type tubing used to insulate the contacts, settled and exposed the contacts when the relay (10A-K105B) was subsequently actuated during the test.

The investigation team verified that the applicable elementary drawings, connection diagrams, Panel C-933 wiring, and the test procedure were consistent for function and nomenclature. The applicable Panel C-933 wiring was checked for possible improper jumpers or lifted leads with satisfactory results. The 10A-K105B relay wiring was inspected for possible cuts or degraded insulation with satisfactory results. The 10A-K105B relay wiring was checked for continuity with satisfactory results.

## CORRECTIVE ACTION

Following the investigation a supplemental test was prepared and performed per Procedure TP 89-58, "Troubleshooting LPCI Loop Selection Logic Initiation by Relay 10A-K28B". The test was performed with conditions that duplicated the May 20, 1989 and May 21, 1989 testing. For the test (TP 89-58), the physical blocking of the 10A-K105B relay contacts was observed. The test (TP 89-58) began on May 23, 1989 at 2040 hours and was completed satisfactorily at 2145 hours. The functional test (3.M.3-37) resumed at step 28 of Attachment 2 (two) on May 23, 1989 at 2355 hours. The test was completed satisfactorily on May 24, 1989 at 0010 hours.

Additional corrective measures are being planned. The measures include the review and revision of test procedures that involve the blocking of contacts of (type HGA) relays installed in safety-related applications. When possible, an alternative means for testing will be performed without insulating an HGA relay contact(s).

NRE Form 388A				U.5	. NUC	LEAR REG	ULATORY CO	MMISSION
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#### SAFETY CONSEQUENCES

The actuations posed no threat to the public health and safety.

The coils of the affected RHRS/LPCI logic relays are normally de-energized and are designed to become energized as a result of an accident mitigating signal(s). The error(s) resulted in a portion of the RHRS/LPCI loop selection logic circuitry to become energized and caused an unnecessary challenge(s) to the RHRS/LPCI injection valves.

The actuation(s) resulted in a temporary interruption(s) of the Loop 'A' RHRS/SDC mode of operation. The interruption(s) had negligible impact to the RV water temperature. The Loop 'B' RHRS/SDC mode of operation was available while the Loop 'A' valves were in the closed position.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) because the actuation(s) of the RHRS/LPCI loop selection logic circuitry, although an appropriate designed response, was not a planned part of the testing being performed.

## SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review was focused to LERs submitted in accordance with 10 CFR 50.73(a)(2)(iv) that involved an actuation(s) of the RHRS/LPCI loop selection logic circuitry.

The review identified an event reported in LER 50-293/89-012-00. For that event, an unplanned actuation of the RHRS/LPCI loop selection logic circuitry occurred during logic relay time delay testing while shutdown in a cold condition. The actuation resulted in a similar closing of the RHRS/LPCI Loop 'A' injection valve(s) and opening of the Loop 'B' injection valve(s). The cause for the actuation was attributed to utility non-licensed Instrumentation and Control technician error. The technician failed to properly insulate a normally closed pair of contacts of a (dissimilar type) logic relay for a test that was being performed in accordance with an approved procedure.

## ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

COMPONENTS	CODES
Relay, Tripping	94
Valve, Isolation (MO-1001-29A/B)	ISV
Valve, Injection (MO-1001-28A/B)	INV
SYSTEMS	
Engineered Safety Features Actuation System	JE
Reactor Recirculation System	AD
Residual Heat Removal System (RHRS/LPCI)	BP

NRC FORM 366A