



Boston Edison

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360-5599

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

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

The enclosed Licensee Event Report (LER) 98-022-00, "Unplanned Start of 'A' Emergency Diesel Generator While Performing the Core Spray System 'A' Logic Functional Test," is submitted in accordance with 10 CFR Part 50.73.

No commitments are made in this letter.

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

(FOR JFA)
J. F. Alexander

J. F. Alexander
Nuclear Assessment Group Manager

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Enclosure: LER 98-022-00

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LICENSEE EVENT REPORT (LER)

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

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FACILITY NAME (1)

PILGRIM NUCLEAR POWER STATION

DOCKET NUMBER (2)

05000-293

PAGE(3)

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TITLE (4)

Unplanned Start of 'A' Emergency Diesel Generator While Performing the 'A' Core Spray System Logic Functional Test

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
10	02	98	1998	022	00	10	30	98	N/A	05000
									N/A	05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)				
N	100	20.2201 (b)		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(viii)
		22.2203(a)(1)		20.2203(a)(3)(i)	50.73(a)(2)(ii)(B)	50.73(a)(2)(x)
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)		20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)		50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)		50.36(c)(2)	50.73(a)(2)(vii)	or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME

Kristin R. DiCroce - Senior Regulatory Affairs Engineer

TELEPHONE NUMBER (Include Area Code)

(508) 830-7667

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE(15)

MONTH DAY YEAR

ABSTRACT:

On October 2, 1998 at 1950 hours, an unplanned actuation of the 'A' Emergency Diesel Generator occurred during a surveillance test of related logic system testing.

The cause was utility non-licensed I&C technician error. The technician failed to properly insulate (boot) a contact of a logic relay for the testing that was being performed in accordance with an approved procedure. The surveillance test was terminated and the affected components were restored to their normal status.

Corrective action included terminating the surveillance test until this event could be reviewed. The I&C technicians involved in this event were briefed on the proper installation of insulating boots on relay contacts. Corrective action to be taken includes reviewing surveillance procedures for improvement and including this event in I&C and electrical maintenance training.

This event occurred while the plant was operating at 100 percent reactor power with the reactor mode selector in the RUN position. The reactor vessel pressure was approximately 1035 psig with the reactor vessel water temperature at saturation temperature for the reactor pressure.

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BACKGROUND

The Core Standby Cooling Systems (CSCS) consist of the high pressure coolant injection (HPCI) system, automatic depressurization system (ADS), residual heat removal (RHR) system/low pressure coolant injection (LPCI) mode, and the core spray system. Low pressure core cooling is provided by the RHR/LPCI mode and core spray system with the emergency diesel generators (EDGs) providing emergency ac power in the event of a design basis accident.

Technical Specification 3/4.5.A "Core Spray and Containment Cooling Systems" assures the operability of the core and suppression pool cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities. Technical Specification 4.2.B specifies that logic system functional testing is required once per operating cycle (every 24 months). This testing includes PNPS procedure 8.M.2-2.10.1-4 (rev. 23), "Core Spray System 'A' Logic Functional Test." In order to perform this test, the core spray system is declared inoperable and a 7-day limiting condition for operation (LCO) is entered. The test is scheduled and tracked by the master surveillance tracking program (MSTP).

On 10/2/98 at 1930 hours, Operations entered active LCO A98-502 (removed the Core Spray system from service) in order to perform surveillance procedure 8.M.2-2.10.1-4.

A pre-evolution briefing was held at 1930 hours in accordance with procedure 1.3.34, "Conduct of Operations," and the performance of procedure 8.M.2-2.10.1-4 (Attachment 1) began. I&C technicians were in the process of insulating contact 7 of relay 14A-K17A at panel C932. The contacts are insulated (booted) to prevent an unnecessary start of the 'A' EDG during the surveillance test. Surveillance procedure 8.M.2-2.10.1-4 includes a caution statement to this effect prior to the installation of the insulating boot.

Using non-conducting "boots" to insulate contact closure so as not to electrically complete logic circuitry, yet still observe the relay response to an actuation signal, is one way to prevent system actuations during logic system functional testing. This method of insulating relay contacts precludes the lifting and relanding wires of relays, the associated hazards of working on energized circuits, the shorting of lifted leads, and the retorquing of terminal hardware. There are numerous surveillance procedures that require action to prevent automatic initiation during surveillance tests, including logic system testing. These actions include the use of test switches, lifting leads, installing jumpers, operating keylocked switches, tagging breakers, or "booting" relay contacts. The method used varies from procedure to procedure.

Core Spray channel 'A' relay 14A-K17A is a normally de-energized, semi-flush mounted General Electric (G.E.) type HGA (model HGA111) relay equipped with a 125 vdc coil. The relay is designed to energize if a low reactor water level condition occurs and thereby, initiate a start signal to 'A' EDG. The relay was de-energized while the I&C technician attempted to install a boot to insulate contacts 1 & 7. To insulate contacts 1 & 7, an insulating boot is applied to the relay contact 7. This will prevent contacts 1 & 7 from making an electrical connection when the relay is energized later in the surveillance, and thereby, prevents an inadvertent start of the 'A' EDG.

EVENT DESCRIPTION

On 10/2/98 at 1950 hours, the control room received the alarm "Voltage/Frequency Abnormal" for 'A' EDG and noted the EDG had started. The event occurred during step 12(b), Attachment 1 of procedure 8.M.2-2.10.1-4. When the I&C technician was depressing the armature of relay 14A-K17A to install an insulating boot on contact 7, contacts 1 & 7 on relay 14A-K17A were inadvertently closed. The emergency diesel started and all systems responded in accordance with the configuration that existed at the time of the event.

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The surveillance test was terminated. The I&C technicians removed all test equipment (insulating boots) per procedure 8.M.2-2.10.1-4 and verified the associated alarms were clear in the control room.

At 2005 hours, Operations cleared active LCO (A98-502) and the core spray system was returned to its operable status.

At 2035 hours, 'A' EDG was stopped but declared inoperable and an active LCO (A98-505) was entered until a review of events by Operations and I&C could be performed. I&C verified that the 'A' EDG starting circuits were intact and would respond to a valid signal and the emergency start relay (EMSR) was verified to be reset at which time Operations declared 'A' EDG operable and cleared the active LCO (A98-505) at 2038 hours.

Problem report (PR) 98.9510 was written to document this event.

The NRC Operations Center was notified of the event in accordance with 10CFR50.72(b)(2)(ii) at 2206 hours on 10/2/98 for an inadvertent initiation of an emergency diesel generator automatic starting circuit.

This event occurred while the plant was operating at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was approximately 1035 psig with the reactor vessel water temperature at saturation temperature for the reactor pressure.

CAUSE

The direct cause of the unplanned start of the 'A' EDG was due to contacts 1 & 7 making contact when the I&C technician was depressing the relay armature sufficiently in order to insulate the contacts as required by procedure 8.M.2-2.10.1-4. Contacts 1 & 7 are normally open and are designed to close when the coil of relay 14A-K17A energizes.

The root cause was utility non-licensed I&C technician error in that the technician experienced difficulties with insulating contact 7 on relay 14A-K17A at panel C932 during the performance of the core spray system 'A' logic functional surveillance test 8.M.2-2.10.1-4.

A contributing factor is the design of relay 14A-K17A which is not conducive to having relay contacts insulated in this application.

The technician involved was highly experienced and had received training on this task. To properly insulate relay contacts, the installation of non-insulating material is required between the stationary normally open (N.O.) contact and the moveable contact of the relay. The insulating hardware is referred to as a "boot" and must be slipped over the moveable contact so as not to fall off during energization and de-energization of the relay coil. The contact orientation for G.E. type HGA relays is physically different from the type HFA relays that are also part of logic system functional testing. The difference in the relays affects the degree of difficulty during the installation of "boots".

Interviews with the I&C technicians who were performing procedure 8.M.2-2.10.1-4 indicated that the procedure was proceeding as planned without time pressure, and good communications were in use. There was no confusion on which relay contacts required "booting", no problems related to the procedure write-up, no distractions, and the procedure was being followed verbatim. The procedure contains CAUTION statements providing awareness aids to indicate that the action required by the steps involved the EDG and were necessary to prevent the EDG from starting later in the test. The risk involved was also discussed in the pre-evolution brief.

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When the surveillance procedure was originally developed, it and other procedures like it, used the concept of "defense in depth" to prevent an unplanned actuation of a component (i.e., 'A' EDG). As part of the logic system design, test procedures, including procedure 8.M.2-2.10.1-4, utilize test switches to block logic relay signals (i.e., 'A' EDG start on low reactor water level condition). The procedures also require the installation of insulating boots, and other devices such as jumpers, as a secondary means of ensuring the component will not actuate unnecessarily (i.e., 'A' EDG). For procedure 8.M.2-2.10.1-4, steps such as step 12(b), requiring the technician to insulate the relay contacts, add an element of risk.

CORRECTIVE ACTION

The following corrective actions were taken:

- A review of the 'A' EDG EMSR relay was performed with satisfactory results.
- Procedure 8.M.2-2.10.1-4 was placed on hold to prevent rescheduling prior to corrective actions being performed.
- The proper installation of insulating boots on relay contacts was emphasized to the I&C technicians involved with this event.
- A critique of the event was conducted and attended by appropriate personnel on 10/5/98 in accordance with procedure 1.3.63, "Conduct of Critiques and Investigations."

The following corrective actions are planned and are being tracked by PR 98.9510 in the corrective action program:

- The I&C and electrical maintenance surveillance procedures will be reviewed for improvement. The focus of the review is for instances where "booting" HGA relay contacts are performed. A determination will be made in each case for a better method of testing.
- This event will be reviewed in the I&C plant status update (PSU), session #98-03 (module T-TT-15-01-32) and electrical maintenance continuing training programs. The focus of this training will enable the technicians to recognize similar situations that may cause safety system actuations. The training will also include the lessons learned and human factors involved from this event.
- Procedure 8.M.2-2.10.1-4 will be reperformed prior to its surveillance interval expiration date which is 12/1/98.

When this report was prepared, maintenance personnel were in the process of conducting a detailed root cause analysis (RCA) for PR 98.9510. Identification of additional corrective or preventive actions beyond the immediate corrective actions taken is pending the completion of the RCA. A supplemental report will be submitted if significant new information is identified as a result of the analysis.

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SAFETY CONSEQUENCES

This event posed no threat to the health and safety of the public.

No component or system failure was caused by or resulted from the event.

This report is submitted in accordance with 10CFR50.73(a)(2)(iv) because the start of 'A' EDG, although an invalid start signal, 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 1989. The review focused on LERs submitted in accordance with 10CFR50.73(a)(2)(iv) involving an inadvertent ESF actuation while performing logic functional system testing.

The review identified the following LERs:

- LER 89-012-00 Unplanned Actuation of the Residual Heat Removal System/Low Pressure Coolant Injection Circuitry During Logic Relay Testing
- LER 89-017-00 Unplanned Actuators of the Residual Heat Removal System/Low Pressure Coolant Injection Logic Circuitry During Functional Testing
- LER 89-027-00 Unplanned Automatic Start of Diesel Generator "A" and Actuation of the Residual Heat Removal System/Low Pressure Coolant Injection Circuitry During Logic Relay Testing

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODES
Relay, tripping	94
Relay (14A-K17A)	RLY
Generator, diesel (EDG)	DG
SYSTEMS	
Engineered Safety Features Actuation System	JE
Core Spray System	BM
Emergency on-site power supply system (EDG)	EK