

LICENSEE EVENT REPORT (LER)

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| FACILITY NAME (1) Pilgrim Nuclear Power Station | DOCKET NUMBER (2) 0 5 0 0 0 2 9 3 | PAGE (3) 1 OF 0 4 |
|--|--------------------------------------|----------------------|

TITLE (4)
Automatic Closing of the Outboard Primary Containment System Group 6 Isolation Valves

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | |
|----------------|-----|------|----------------|-------------------|-----------------|-----------------|-----|------|-------------------------------|--|--|
| MONTH | DAY | YEAR | AR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | | |
| 0 4 | 2 6 | 8 8 | 8 8 | 0 1 4 | 0 0 | 0 5 | 2 3 | 8 8 | N/A | | |
| | | | | | | | | | DOCKET NUMBER(S) 0 5 0 0 0 | | |

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|---------------------------|---|------------------|-------------------------------------|----------------------|--|--|--|--|--|--|
| 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(c) | <input checked="" type="checkbox"/> | 50.73(a)(2)(iv) | 73.71(b) | | | | | |
| | 20.405(a)(1)(i) | 50.38(c)(1) | <input type="checkbox"/> | 50.73(a)(2)(v) | 73.71(c) | | | | | |
| | 20.405(a)(1)(ii) | 50.38(c)(2) | <input type="checkbox"/> | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below and in Text, NRC Form 355A) | | | | | |
| | 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)(ix) | | | | | | |

LICENSEE CONTACT FOR THIS LER (12)

| | |
|---|--|
| NAME Douglas W. Ellis - Compliance Division Engineer | TELEPHONE NUMBER AREA CODE 6 1 1 7 7 1 4 7 1 - 8 1 6 1 0 |
|---|--|

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRRDS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRRDS |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| B | J E | R L Y | G 0 8 0 | Y | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

| | | |
|--|-------------------------------|----------------------|
| <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | EXPECTED SUBMISSION DATE (15) | MONTH DAY YEAR |
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On April 26, 1988 at 1405 hours, an automatic actuation of a portion of the Primary Containment Isolation Control System (PCIS) occurred. The actuation resulted in the automatic closing of the outboard Primary Containment System Group 6 (i.e., Reactor Water Cleanup System) isolation valves and thereby interrupted the operation of the Reactor Water Cleanup (RWCU) System. The inboard RWCU System isolation valve remained open as expected.

Following initial investigation, one outboard RWCU System isolation valve was tagged and manually opened. Letdown of water from the Reactor Vessel through the RWCU System to the Main Condenser resumed on April 26, 1988 at 1502 hours. Water was being introduced into the Reactor Vessel as a result of the normal operation of a Control Rod Drive System pump.

The root cause for the actuation was the failure of the coil in a logic relay. When the coil failed, excessive current in the circuit energizing the coil caused the circuit's fuse to blow and de-energized the circuit. The actuation was the expected result of the circuit becoming de-energized.

The relay coil and fuse were replaced. Post work testing was completed satisfactorily on May 3, 1988 at 1800 hours. Based on analysis, additional relays (or relay coils) have been selected for replacement prior to startup.

This event occurred during an extended outage while in cold shutdown. The reactor mode switch was in the SHUTDOWN position. The control rods were in the inserted position. The reactor power level was zero megawatts-thermal. This event posed no threat to the health and safety of the public.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

EVENT DESCRIPTION

On April 26, 1988 at 1405 hours, an automatic actuation of a portion of the Primary Containment Isolation Control System (PCIS) occurred.

The actuation resulted in the automatic closing of the outboard Primary Containment System (PCS) Group 6 (i.e., Reactor Water Cleanup System) isolation valves, and the automatic trip of the Reactor Water Cleanup (RWCU) System pump 'B'. The actuation was coincident with the Control Room alarm, "Cleanup Line Excess or Negative Flow". The inboard RWCU System isolation valve remained open as expected.

Following initial investigation, one outboard RWCU System isolation valve (MO-1201-5) was manually opened and tagged. Gravity induced letdown of water from the Reactor Vessel through the RWCU System to the Main Condenser began on April 26, 1988 at 1502 hours.

Failure and Malfunction Report 88-92 was written to document the event. A Maintenance Request (MR 88-12-18) was issued to further investigate the cause (blown fuse) for the actuation. Notification of the event was made to the NRC Operations Center on April 26, 1988 at 1530 hours.

This event 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. The control rods were in the inserted position. The Reactor Vessel water temperature was approximately 95 degrees Fahrenheit with negligible core decay heat. The Reactor Vessel pressure was zero psig. The reactor power level was zero megawatts-thermal. The RWCU System was in service with the 'B' pump in operation. The Reactor Vessel water level was being maintained by the normal letdown of a portion of the RWCU System flow to the Main Condenser. The letdown (approximately 20 gpm) was equal to the flow of water being introduced into the Reactor Vessel as a result of the normal operation of a Control Rod Drive System pump.

CAUSE

The root cause for the actuation was the failure of the coil of an outboard PCIS logic relay (16A-K64). When the coil failed, excessive current in the 120 VAC circuit that energizes the coil caused the circuit's fuse (16A-F18) to blow thereby de-energizing the circuit. The RWCU System response and alarm was the expected result of the circuit becoming de-energized.

Inboard and outboard logic relays of the PCIS are located in logic Panels C-941 and C-942, respectively. Relay 16A-K64 is located in logic Panel C-942. The relay, type CR120A, is manufactured by General Electric. The CR120A relays located in these panels are normally energized and are mounted in a closely packed array.

The probable cause for this and other failed (burned) relay coils has been attributed to the end of useful life; reference Memorandum TCH 87-464, "CR120A Relay Evaluation". The failure mode appears to be mechanical stressing of the coil terminal connection resulting in physical separation, overheating and burning of the connection internal to the coil encapsulation.

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

CORRECTIVE ACTION

Following the investigation for the cause of the blown fuse, a new coil was installed in relay 16A-K64 and the blown fuse was replaced. Post work testing was completed on May 3, 1988 at 1800 hours with satisfactory results. The RWCU System was returned to normal service on May 3, 1988 at 2040 hours.

Previous failures of CR120A relays led to the evaluation documented in Memorandum TCH 87-464. The evaluation resulted in the issuance of an Engineering Service Request (ESR 87-643). The ESR requested implementation of recommendations (TCH 87-464) to improve the reliability of CR120A relays. The technical evaluation documented in TCH 87-464 reviewed CR120A relays installed at Pilgrim Station. The review included the specific application of each individual relay, the overall operating history of these relays as compared to industry information and a failure effects analysis of the safety related relays. Based on this technical evaluation, specific relays (or relay coils) have been selected for replacement prior to startup. Sixteen (16) relays (or relay coils) remained to be replaced when this report was being prepared. Our concern with this coil failure (and previous failures) prompted a reassignment to the priority for the remaining replacement work. The replacement(s) is scheduled for completion in June 1988.

SAFETY CONSEQUENCES

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

The design objectives of the RWCU System are to maintain high reactor water purity, remove corrosion products from the reactor water, and to provide a method for decreasing reactor water inventory (level) during heatup. The objectives would be interrupted temporarily by the closing of the valves.

Had the interruption occurred during startup, the inability to reject reactor water inventory would cause an increase in the reactor water level due to the swell (expansion) of reactor water during heatup. The increased water level could result in a delay for startup or possibly result in a high Reactor Vessel water level trip signal.

Had the interruption occurred during power operation, the reactor water chemistry would degrade progressively over time. The degradation could possibly result in unsatisfactory water chemistry values and thereby lead to a plant shutdown.

Control Room operator actions for response to RWCU System alarms or malfunctions are addressed in written procedures. The procedures include "Alarm Response Procedure", ARP-904C (Center), and 2.4.27, "Reactor Water Cleanup System Malfunctions".

This event was determined to be reportable pursuant to 10 CFR 50.73(a)(2)(iv) because the outboard PCS/RWCU System isolation valves closed automatically from a (false) PCIS Group 6 logic trip signal.

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SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) written since January 1984. The review focused on LERs submitted pursuant to 10 CFR 50.73(a)(2)(iv) that were caused by the failure of a CR120A relay (or relay coil).

The review identified previous CR120A relay coil failures reported in LERs 50-293/87-018-00, 50-293/88-001-00, and 50-293/88-005-00.

For LER 50-293/87-018-00, the failure of the coil in a CR120A logic relay (16A-K55) occurred during an outage and resulted in the automatic closing of the outboard PCS Group 6/RWCU System isolation valves. The relay is located in Panel C-942.

For LER 50-293/88-001-00, the failure of the coil in a CR120A logic relay (16A-K57) occurred during an outage and resulted in the Train 'B' PCS Group 2 isolation valves receiving an isolation signal, the automatic closing of the Train 'B' ventilation dampers of the Secondary Containment System (SCS), and the automatic start of Train 'B' of the SCS/Standby Gas Treatment System (SGTS). The relay is located in Panel C-942.

For LER 50-293/88-005-00, the failure of the coil in a CR120A logic relay (16A-K56) occurred during an outage and resulted in the Train 'A' PCS Group 2 isolation valves receiving an isolation signal, the automatic closing of the Train 'A' ventilation dampers of the SCS, and the automatic start of Train 'A' of the SCS/SGTS. The relay is located in Panel C-941.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this event are as follows:

COMPONENTS

Coil
Fuse (16A-F18)
Relay, Tripping (16A-K64)
Valve, Isolation (MO-1201-5 and -80)

CODES

CL
FU
94
ISV

SYSTEMS

Containment Isolation Control System (PCIS)
Control Rod Drive System
Engineered Safety Features Actuation System (PCIS)
Primary Containment System (PCS)
Reactor Water Cleanup System (RWCU)

JM
AA
JE
JM
CE



BOSTON EDISON

Executive Offices
800 Boylston Street
Boston, Massachusetts 02199

Ralph G. Bird
Senior Vice President — Nuclear

May 23, 1988
BECo Ltr. #88-078

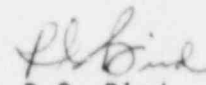
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

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

Dear Sir:

The attached Licensee Event Report (LER) 88-014-00 "Automatic Closing of the Outboard Primary Containment System Group 6 Isolation Valves" is submitted in accordance with 10CFR Part 50.73.

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


R.G. Bird

DWE/b1

Enclosure: LER 88-014-00

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

Standard BECo LER Distribution

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