



PEACH BOTTOM—THE POWER OF EXCELLENCE

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

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Delta, Pennsylvania 17314

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June 20, 1991

Docket Nos. 50-277
50-278

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Unit 2 and 3

This LER concerns the potential for the inoperability of the High Pressure Coolant Injection System due to the use of unqualified relays in the Cardox logic.

Reference:	Docket Nos. 50-277 50-278
Report Number:	2-91-017
Revision Number:	00
Event Date:	05/18/91
Discovery Date:	05/21/91
Report Date:	06/20/91
Facility:	Peach Bottom Atomic Power Station RD 1, Box 208, Delta, PA 17314

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(v).

Sincerely,

cc: J. J. Lyash, USNRC Senior Resident Inspector
T. T. Martin, USNRC, Region I

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Peach Bottom Atomic Power Station - Unit 2 and 3										DOCKET NUMBER (2) 0 5 0 0 0 2 7 7 1										PAGE (3) 1 OF 0 4																															
TITLE (4) Potential for the Inoperability of the High Pressure Coolant Injection System due to the use of Unqualified Relays in the Cardox Logic																																																			
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LICENSEE CONTACT FOR THIS LER (12)																																																			
NAME Albert A. Fulvio, Regulatory Engineer																				TELEPHONE NUMBER AREA CODE 7 1 7 4 5 6 1 - 7 0 1 4																															
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																			
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On 5/21/91, it was discovered that the High Pressure Coolant Injection (HPCI) system had been unknowingly rendered inoperable on 5/18/91 during the performance of a Surveillance Test (ST). As a result of additional investigation, it was determined on 5/22/91 that the Unit 2 & 3 HPCI systems were possibly inoperable due to non-Qualified (Q) and non-Environmentally Qualified (EQ) relays in the HPCI Room Cooler fan logic. The cause of these events has been attributed to a procedural inadequacy and a less than adequate design review and subsequent system reviews. Temporary Plant Alterations have been installed to maintain HPCI operable and a modification will be initiated to upgrade the relays or remove the trip signal. The ST involved will be enhanced. A review has been completed on other fire suppression system interlocks and no additional non-Q interlocks were identified. Finally, investigations will be performed to determine why the existing processes failed to identify these relays. No actual safety consequences occurred as a result of this event. There were three previous similar LERs.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Peace Bottom Atomic Power Station Unit 2 and 3	DOCKET NUMBER (2) 0500027791-07-0002 OF 04	LER NUMBER (3)			PAGE (3)	
		YEAR	SEQUENCE NUMBER	REVISION NUMBER		

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

Requirements for the Report

This report is being submitted to satisfy the requirements of 10 CFR 50.73 (a) (2)(v) describing conditions that alone could have prevented the fulfillment of a safety function.

Unit Conditions at Time of Discovery

On 5/18/91, Unit 2 was in the STARTUP mode at 170 psig reactor (EIIIS:EA) pressure. On 5/22/91, Unit 2 was in the RUN mode at 35% power while Unit 3 was in the REFUEL mode. There were no other systems, structures, or components that were inoperable that contributed to the event.

Description of the Events

On 5/21/91 at 1600 hours, it was discovered that the High Pressure Coolant Injection (HPCI) system (EIIIS:BJ) had been unknowingly rendered inoperable on 5/18/91 during the performance of a Surveillance Test (ST). The purpose of this ST was to functionally check the HPCI Room heat detectors by applying a heat source to the heat detectors to simulate a high temperature condition. Since these heat detectors actuate the HPCI Room Carbon Dioxide (Cardox) fire suppression system, the Cardox tank manual shutoff valve was closed and the Cardox injection logic bypass switch was placed in the 'defeat' position to prevent an unwanted logic actuation. With this switch in the 'defeat' position, only the room alarm and the annunciators will actuate during the ST.

During the performance of the test on 5/18/91, one of the heat detectors was inadvertently fused by the heat source. This fused condition prevented resetting the audible alarm. It appears that during efforts to silence the alarm, the bypass switch was placed in the "Normal" position. Because the actuation signal was present, this caused the injection relays to trip. An actual cardox injection was prevented by the closed manual shutoff valve at the cardox tank. It was subsequently discovered on 5/21/91 that this actuation also provided a trip signal to the HPCI Room Coolers. Since the Room Coolers are required for HPCI operability, the HPCI system was essentially rendered inoperable during the period of time that the Cardox injection logic signal relays were actuated. These relays were actuated for no longer than one hour. The NRC was notified via ENS on 5/21/91 at 1858 hours.

As a result of additional investigation, it was determined on 5/22/91 at 1450 hours that the Unit 2 & 3 HPCI systems were possibly inoperable due to non-Qualified (Q) and non-Environmentally Qualified (EQ) relays in the HPCI Room Cooler fan logic. These relays trip HPCI Room Cooler fans in the event of cardox initiation. The NRC was notified via ENS on 5/22/91 at 1628 hours.

Consequently, Temporary Plant Alterations (TPA) were installed on 5/22/91 on both Units to defeat the HPCI Room Cooler fan trip from the Cardox initiation logic in order to maintain the HPCI Room Coolers in an operable status.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1) Peach Bottom Atomic Power Station Unit 2 and 3	DOCKET NUMBER (2) 0 5 0 0 0 2 7 7 9 1 — 0 1 7 — 0 0 0 3 OF 0 4	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			

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

Cause of the Events

The causes of these two events have been attributed to the following:

The ST did not provide adequate precautions regarding how the logic can impact HPCI system operability. Additionally, although the test cautions that heat detector failure is possible, it does not provide the necessary direction if a heat detector failure would occur. It is believed that this lack of direction lead to the mispositioning of the bypass switch during the efforts to reset the alarm.

The original system design review appears to have been less than adequate. The relays were not originally installed Q-listed and the relays were not identified during the development of the component Q-list.

Additionally, the relays were inadvertently missed during the HPCI System EQ upgrade in April of 1990 and had not been identified in a subsequent EQ review which began in January of 1991.

Additionally, the relays were not addressed during a similar emergency diesel Generator (EDG) Cardox relay qualification concern which was identified in 1987 and was resolved via modification 2390. The review associated with this event appears to have been limited to the EDG cardox system.

Analysis of Event

No actual safety consequences occurred as a result of this event. If a design basis accident or transient would have occurred and HPCI did not perform properly, the Reactor Core Isolation Cooling (RCIC) System (EIIS:BN) and the Automatic Depressurization System were operable to provide core cooling and, if required, reduce reactor (EIIS:RPV) pressure to allow the Low Pressure Coolant Injection (EIIS:BO) Systems to inject.

Corrective Actions

TPAs have been installed to defeat the HPCI Room Cooler fan trip from the Cardox initiation logic in order to maintain the HPCI Room Coolers in an operable status. An evaluation has been performed to assess the impact on the HPCI room cardox fire suppression capabilities with the room coolers operating. It has been determined that operating room coolers would not reduce the effectiveness of HPCI cardox system. Therefore, a modification will be initiated to either permanently remove cardox injection trip signal from the fan logic or upgrade the relays to satisfy the applicable Q and EQ requirements.

The ST will be revised to include precautions regarding how the logic impacts HPCI system operability and to provide proper directions to the performer if a heat detector failure occurs.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

The pertinent information from this event will be provided to other I&C and Operations personnel.

An investigation of why the relays were not classified during the development of the component Q-list is in progress. Appropriate additional corrective actions will be taken as necessary.

A Task Force has been formed to review the HPCI system and verify that there are no other components that were missed in the EQ program.

A review has been completed on other fire suppression system interlocks and no additional non-Q fire suppression interlocks were identified that could affect the operation of any safety related systems.

Finally, an investigation will be performed on the process used to implement modification 2390 to identify why the HPCI Cardox was not included in this review.

Previous Similar Events

There have been three other previous similar LERs involving similar events. The corrective actions taken as a result of one LER (2-87-028) only upgraded the Diesel Generator Building Cardox switches. Additionally, the corrective actions taken as a result of the last two LERs (2-90-007 and 2-91-001) should have identified the unqualified relays and their impact on operability. Implementation of the corrective actions addressed above should prevent future recurrences.