

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Peach Bottom Atomic Power Station - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 2 7 7	PAGE (3) 1 OF 0 4
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TITLE (4)
Design Deficiency that Could Permit Diesel Generator Trips During a Seismic Event

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)																																		
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">OPERATING MODE (9) N</td> <td colspan="11">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)</td> </tr> <tr> <td rowspan="5">POWER LEVEL (10) 9 9 0</td> <td>20.402(b)</td> <td>20.405(a)(1)(i)</td> <td>20.405(a)(1)(ii)</td> <td>20.405(a)(1)(iii)</td> <td>20.405(a)(1)(iv)</td> <td>20.405(a)(1)(v)</td> <td>20.406(e)</td> <td>50.38(a)(1)</td> <td>50.38(a)(2)</td> <td>50.73(a)(2)(i)</td> <td>50.73(a)(2)(ii)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(iv)</td> <td>50.73(a)(2)(v)</td> <td>50.73(a)(2)(vi)</td> <td>50.73(a)(2)(vii)(A)</td> <td>50.73(a)(2)(vii)(B)</td> <td>50.73(a)(2)(x)</td> <td>73.71(b)</td> <td>73.71(e)</td> <td><input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 306A) 50.73(a)(2)(vi)</td> </tr> </table>												OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)											POWER LEVEL (10) 9 9 0	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.406(e)	50.38(a)(1)	50.38(a)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vi)	50.73(a)(2)(vii)(A)	50.73(a)(2)(vii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(e)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 306A) 50.73(a)(2)(vi)
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LICENSEE CONTACT FOR THIS LER (12)

NAME W. C. Birely, Senior Engineer - Licensing Section	TELEPHONE NUMBER 2 1 5 8 4 1 - 5 0 4 8
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15) 0 4 2 2 8 8
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

Abstract: 2-87-28

A design deficiency was discovered which could result in Diesel Generator trips during a Loss of Offsite Power (LOOP) event. Four relays in the Diesel Generator Room Carbon Dioxide Fire Suppression (Cardox) system control circuits, which are not classified as safety-related or seismic, could initiate Diesel Generator trip signals during a LOOP event if actuated by seismic conditions. There are four Diesel Generators common to Unit 2 and Unit 3, and each Diesel Generator could be tripped by its respective Cardox system relay. The original design does not prevent a seismic-induced diesel generator trip signal from these relays. On December 17, 1987 it was determined that this condition was reportable pursuant to 10 CFR 50.73 (a)(2)(vi). The condition was discovered approximately one month earlier.

This condition compromised the ability to safely shut down the plant during a LOOP event concurrent with a seismic event. Both Peach Bottom units are shutdown. The Cardox System/Diesel Generator interface is being reviewed. Upon completion of this review, corrective actions will be established and a revised LER will be submitted by April 22, 1988.

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

Description of the Event:

On December 17, 1987 it was determined that a recently discovered design deficiency was reportable pursuant to 10 CFR 50.73 (a)(2)(vi). There are four pneumatic-electric relays with mercury tube switches in the Diesel Generator Room Carbon Dioxide Fire Suppression (Cardox) System control circuitry. Each of these relays initiates a trip signal to its respective Diesel Generator when the Cardox System actuates. There is one relay for each Diesel Generator. These relays are not seismically qualified and might be actuated during a seismic event due to the nature of mercury tube switches and initiate Diesel Generator trip signals. There are four Diesel Generators at Peach Bottom common to Unit 2 and Unit 3. Both Peach Bottom units are shutdown.

This condition was discovered by an investigation prompted by the discovery of a 10 CFR 50, Appendix R non-compliance at Limerick Generating Station, Unit 1 as reported to the NRC in LER 87-055 on Docket No. 50-352.

Additional time (beyond the required 30-day reporting period) was needed to determine the cause of the condition reported by this LER and to carefully assess the significance of the condition. Extensive engineering review of the "Significance of the Event" section was necessary to ensure that it accurately and completely addresses the requirements of 10 CFR 50.73. Further, it was determined late in the LER preparation process that finalizing the corrective actions would require additional engineering evaluation.

Significance of the Event:

The safety objective of the Diesel Generators and standby ac power supply and distribution system is to provide a reliable source of ac electrical power, independent of offsite sources, for the safe shutdown of the reactors. The condition being reported compromised that objective by posing a potential for tripping Diesel Generators at a time when they are needed. The probability that this condition could have actually impacted reactor safety is very small because a seismic event would have to have occurred shortly prior to or during a Loss of Offsite Power (LOOP) event. Two independent and reliable offsite sources supply power to Peach Bottom. The sources are physically

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

separated; therefore, a seismic event would not necessarily affect both sources.

When a LOOP occurs both reactors scram due to loss of power to the Reactor Protection System, resulting in a loss of auxiliary power from the main generators. Consequently, the only source of ac power to shut down the reactors would be the Diesel Generators. If a seismic-induced actuation of the subject relays were to trip the Diesel Generators, there would be no ac power available, at least for the period of time the relay contacts are closed. This situation is referred to as a station blackout.

If a station blackout occurs during power operation or shortly after a reactor shutdown, reactor steam would be available to drive the Reactor Core Isolation Cooling (RCIC) System pump and/or High Pressure Coolant Injection (HPCI) System pump to control reactor level and, in conjunction with the Main Steam Relief Valves, control pressure. The Automatic Depressurization System (ADS), which uses five of the Main Steam Relief Valves, would be available to manually control reactor pressure. The HPCI, RCIC and Automatic Depressurization Systems use dc power from emergency batteries (except for the HPCI/RCIC turbine steam supply valves inside containment which are normally open and remain open after loss of ac power). It is expected that the Diesel Generator trip signals would be removed and the Diesel Generators would be placed in service before the emergency battery power was depleted.

By operating HPCI/RCIC, coolant is added to the reactor vessel while energy is removed with the steam that drives the HPCI/RCIC turbines. The reactor fuel would be protected from overheating in this manner. HPCI/RCIC could be cycled on and off to maintain sufficient coolant inventory until ac power is restored to the normal shutdown cooling systems. Fuel failure would not occur during this blackout scenario as long as coolant level is maintained above two-thirds active fuel.

If a station blackout occurs when the reactor is shutdown and there is no reactor steam available, there would be no external systems available to remove decay heat or add coolant to the core. However, the heat-up and boiling of coolant inventory would protect the reactor fuel from overheating, as long as level does not decrease below two-thirds active fuel. It is expected that the Diesel Generator trip signals would be removed and the Diesel Generators would be placed in service before coolant level decreased below two-thirds active fuel.

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

Cause of the Event:

The cause of this condition is a deficiency in the original design. During the original system design it was not recognized that seismic-induced actuation of these relays constituted a common cause which could make more than one Diesel Generator unavailable. These relays were not classified and were not procured as seismic or safety-related.

Corrective Actions:

A design review of the Cardox system interface with the Diesel Generators has been initiated to review this condition, determine if other design deficiencies exist and identify potential improvements. The initial stage of this review is expected to be complete by March 11, 1988. This LER will be revised by April 22, 1988 to describe the results of the review and the corrective actions to be taken.

EIIS Codes:

The EIIS Codes for the systems referred to in this LER are BJ (HPCI), BN (RCIC), BO (LPCI), BM (Core Spray), AC (Reactor Core), EK (Emergency Onsite Power Supply/Diesel Generators), LW (Cardox), KP (Fire Protection), SB (Main Steam/ADS), JC (Reactor Protection), CE (Reactor Water Cleanup) and FK (Switchyard/Offsite Power Sources). The EIIS Codes for the components referred to in this LER are P (pump), RV (relief valve), ISV (isolation valve), V (valve), TRB (turbine), RPV (reactor vessel), DG (diesel generator), BTRY (battery) and RLY (relay).

Previous Similar Occurrences:

LER 3-86-15 reported a design error associated with electrical wiring in the Reactor Water Cleanup System.

Tracking Code: B99 - Design Deficiency, general

PHILADELPHIA ELECTRIC COMPANY

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February 22, 1988

Docket Nos. 50-277
50-278

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

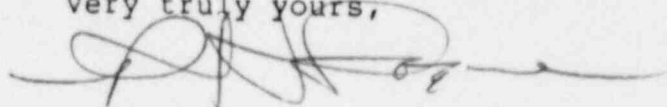
SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Units 2 and 3

This LER concerns a design deficiency which could have resulted in diesel generator trips during a Loss of Offsite Power event.

Reference: Docket Nos. 50-277 and 50-278
Report Number: 2-87-28
Revision Number: 00
Event Date: December 17, 1987
Report Date: February 22, 1988
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)(vi). We regret the delayed submittal of this LER. The delay is discussed in the LER.

Very truly yours,



R. H. Logue
Assistant to the Manager
Nuclear Support Division

cc: W. T. Russell, Administrator, Region I, USNRC
T. P. Johnson, NRC Resident Inspector

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