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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

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

| NRC Form 366A | VENT REPORT (LER) TEXT CONTI | NUATION | U.S | APPROVED O EXPIRES 8/3 | MB NO. 3150-0 | 104 |
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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 'urbine 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 ir 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 shut down 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 Juel.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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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:

It has been determined that the only electrical interface problem between the Diesel Generators and the Cardox System is this trip feature. The purpose of the trip is to prevent the diesel engines from drawing in the carbon dioxide discharged during actuation of the Cardox System since the diesel engines draw combustion air from the room. Two possible design modifications to resolve this problem are being evaluated. The first alternative involves upgrading the affected components of the Cardox system to prevent a seismic-induced actuation. The second alternative involves removing the Cardox initiation diesel trip feature and relocating the diesel generator combustion air intake to draw outside air. This LER will be updated after the final modification alternative has been chosen. Implementation of either of these alternatives requires further engineering review and design. The actual installation may not be completed by the time the plant is ready for restart. In that situation, an interim corrective action plan would be developed and submitted to the NRC prior to restart.

EIIS Codes:

NRC FORM 3664

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).

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US NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104

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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

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PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4000

April 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 revised LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(vi) and concerns a design deficiency which could have resulted in diesel generator trips during a Loss of Offsite Power event. Revision 0 of this LER did not include a proposed solution to the design problem because an engineering review was in progress. This LER has been revised to include the corrective actions as indicated by vertical bars in the page margins. Two possible design modifications that could resolve this design deficiency have been identified. These design modifications are discussed in greater detail in the revised LER. This LER will be revised again after the final modification alternative has been chosen.

Reference: Report Number: Revision Number: Event Date: Report Date: Facility:

Docket Nos. 50-277 and 50-278 2-87-28 01 December 17, 1987 April 22, 1988 Peach Bottom Atomic Power Station RD 1, Box 208, Delta, PA 17314

Very truly yours,

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

cc:

W. T. Russell, Administrator, Region I, USNRC T. P. Johnson, USNRC Senior Resident Inspector T. E. Magette, State of Maryland