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Mark E. Warner
Plant Manager
Peach Bottom Atomic Power Station

PECO Energy Company
1848 Lay Road
Delta, PA 17314-9032
717 456 4244

July 16, 1999

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

Docket No. 50-277
SUBJECT: Licensee Event Report, Peach Bottom Atomic Power Station Unit 2

This LER reports a failure to maintain the provisions of the Fire Protection Program, where the Fire Safe Shutdown analysis did not recognize that a Unit 2 HPCI vacuum breaker motor operated isolation valve could fail closed during a fire, preventing the HPCI system from performing its required function.

Reference:	Docket No. 50-277
Report Number:	2-99-005
Revision Number:	00
Event Date:	06/16/99
Report Date:	07/16/99
Facility:	Peach Bottom Atomic Power Station Unit 2 1848 Lay Road, Delta, PA 17314

Sincerely,

Mark E. Warner
Plant Manager

DMW/dmw

enclosure

cc: N.J. Sproul, Public Service Electric & Gas
R. R. Janati, Commonwealth of Pennsylvania
INPO Records Center
H. J. Miller, US NRC, Administrator, Region I
R. I. McLean, State of Maryland
A.C. McMurtray, US NRC, Senior Resident Inspector
A. F. Kirby III, DelMarVa Power

CCN 99-14057

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)

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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
06	16	99	99	065	00	07	16	99	Facility Name	Docket Number

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10)	100		20.2201(B)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)		
			20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		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)		50.73(a)(2)(iv)		OTHER		
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 336A		
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include area code)
Andy Winter	717.456.3598

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)			EXPECTED Submission Date (15)	Month	Day	Year
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

During a review of the Fire Safe Shutdown (FSSD) supporting analyses, an issue associated with a failure to maintain the provisions of the Fire Protection Program was identified. This issue involves potential damage to the Unit 2, High Pressure Coolant Injection (HPCI) vacuum breaker motor operated isolation valve's motive and control power source as a result of a postulated fire. Spurious closure of the vacuum breaker motor operated isolation valve due to fire damage, would allow initial start of the HPCI system, but could prevent subsequent restarts of the HPCI system as required for the Fire Safe Shutdown scenario. Subsequent restarts of the HPCI system could be impacted as a result of potential damage from a waterhammer event in the steam exhaust line.

The primary cause of issue has been attributed to less than adequate engineering rigor in both the development and review of an analysis that supports the Fire Safe Shutdown Program. An hourly roving fire watch was immediately established for the affected fire area.

This condition represent a failure to maintain the provisions of the Fire Protection Program.

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TEXT (If more space is required, use additional copies of NRC form 366A) (17)

Requirements of the Report

This report is submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B) for conditions outside the design basis of the plant. This condition represents a failure to maintain the provisions of the approved Fire Protection Program and is a violation of Facility Operating License Condition 2.C.(4) for the Peach Bottom Atomic Power Station (PBAPS) Unit 2.

Unit Conditions at Time of Events

PBAPS Unit 2 was in Mode 1 (RUN) operating at 100 percent thermal reactor power (EIIS:RCT). PBAPS Unit 3 was in Mode 1 (RUN) operating at 100 percent thermal reactor power (EIIS:RCT). There were no other systems, structures, or components inoperable that contributed to the event.

Description of the Event

On June 16, 1999, as part of the on-going Thermo-Lag reduction project's analysis and documentation efforts, it was concluded that for Unit 2 only, the HPCI (EIIS:BJ) vacuum breaker motor operated isolation valve could fail closed due to a postulated fire in Fire Area 6S, preventing HPCI system operation post-fire. Per the Fire Safe Shutdown analysis, the HPCI system is required to operate during a fire in Fire Area 6S for a hot shutdown. Closure of the HPCI vacuum breaker motor operated isolation valve during this scenario would allow an initial HPCI system start, but it could preclude subsequent HPCI restarts.

Per the FSSD analysis, the HPCI system is the protected hot-shutdown reactor make-up system for a fire in Fire Area 6S. HPCI would be expected to control reactor water level for approximately 3 hours before the RHR (EIIS:BO) system could be placed in service, due to the large number manual actions that may be required to transition to cold shutdown. The HPCI system flow capacity is greater than the makeup capacity necessary for a reactor isolation in a fire scenario, requiring the excess flow to either be diverted through the recirculation or test lines, or cycling of the system. It has been determined that a postulated high drywell pressure signal could occur during this scenario which would preclude the HPCI system from being run continuously in the recirculation or test modes. This would require the HPCI system to be cycled on and off to maintain reactor level. To support system cycling, the vacuum breaker isolation valve is required to be open for FSSD to prevent damage to the HPCI system.

The motor control center and control cables for the HPCI vacuum breaker motor operated isolation valve are located in Fire Area 6S. Therefore, a postulated fire in this area could cause the valve to spuriously close. With the HPCI vacuum breaker motor-operated isolation valve closed, the HPCI system would be capable of initially starting but may not be capable of subsequent restarts. Restarts may not be possible due to water from the torus being drawn into the HPCI turbine exhaust line as a result of steam condensing in the line when the system is cycled off. This introduction of water into the exhaust line would result in an unanalyzed condition in that a waterhammer event could impair the ability of the system to operate as assumed.

On June 16, 1999 it was concluded that for Fire Area 6S, this condition represented a failure to maintain the provisions of the approved Fire Protection Program and is therefore a violation of Facility Operating License Condition 2.C.(4) for the Peach Bottom Atomic Power Station (PBAPS) Unit 2.

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TEXT (If more space is required, use additional copies of NRC form 336A) (17)

Causes of the Events

The primary cause of this design deficiency has been attributed to the following:

- Less than adequate engineering rigor in both the development and review of an analysis that supports the Fire Safe Shutdown Program

The failure of the HPCI vacuum breaker motor operated isolation valve had been initially evaluated for impact on fire safe shutdown assuming that the HPCI system was to operate continuously during an Appendix R fire. When the system was operated continuously, the vacuum breaker function was not required. However, subsequent review of the fire safe shutdown analysis determined that the HPCI system would cycle, due to the anticipated closure of the recirculation and test bypass valves on a high drywell pressure signal. The assessment of the closure of the recirculation and test bypass valves was limited, and did not recognize the impact of the concurrent failure of the vacuum breaker valve on the ability to cycle the HPCI system.

The investigation concluded that this cause did not involve willful errors.

Analysis of the Event

There were no actual consequences for this condition since a fire did not occur that challenged the fire protection program or required the safe shutdown of the unit.

The potential for a fire and the impact of a fire is minimized by a combination of many factors. The design of the Fire Protection Program relies on a 'defense-in-depth' approach which serves to:

- prevent a fire from starting,
- quickly detect and suppress fires which do start,
- provide reasonable electrical isolation and separation of circuits to minimize the plant system challenge of fires prior to detection and suppression,
- prevent the rapid spread of fires by selecting fire retardant construction materials, and
- protect sufficient equipment so that a fire will not prevent SSD of the plant.

Based upon these factors, the risk associated with this condition is extremely low.

Corrective Actions

Completed corrective actions include the following:

- Upon discovery, Fire Watches were promptly dispatched for Fire Area 06S.

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TEXT *(If more space is required, use additional copies of NRC form 336A)* **(17)**

Future corrective actions include:

- Several plant modifications are being evaluated. The final method will ensure that the HPCI system and its associated components are protected in the event of a fire in Fire Area 06S.

- A complete review and update of the FSSD analysis is currently being performed in conjunction with the Thermo-Lag reduction project for PBAPS. This includes a multi-disciplined engineering review, incorporation of additional NRC guidance, as well as "lessons learned" from the nuclear industry and the Limerick Generating Station Thermo-Lag reduction project. Any additional findings as a result of this review, will be reported as they are discovered.

Previous Similar Events

There were two previous similar events at PBAPS associated with a failure to maintain the provisions of the Fire Protection Program.

The first event was where PBAPS reported a failure to maintain the provisions of the Fire Protection Plan (FPP) due to the spurious opening of the High/Low pressure interfaces in the Reactor Water Clean-up System (RWCU). In December, 1989, LER 3-89-012, reported that during the review of the FPP safe shutdown analysis, it was concluded that the potential existed for a loss of reactor coolant inventory in Unit 3 beyond the makeup capability of the Reactor Core Isolation Cooling System. The RCIC system was relied upon in the FPP analysis for a fire in fire area 13N. A fire in this fire area was postulated to cause Reactor Water Cleanup (RWCU) electrically controlled High/Low pressure interface valves to spuriously open, resulting in loss of reactor coolant through the RWCU reject line. The cause of this design deficiency was the misapplication of a previous analysis for a stuck open relief valve to the FPP safe shutdown analysis. The investigation for this event focused solely on the RWCU High/Low pressure interface design deficiency and did not address any other fire areas or system interfaces.

The second event was identified in March 1999, LER 2-99-003, where potential damage from a postulated fire in several specific fire areas could result in spurious operation of the High/Low pressure interface motor operated valves and air operated valves in the Residual Heat Removal (RHR) or Core Spray Reactor Pressure Vessel injection lines resulting in pressure relief valve discharge and unacceptable flooding in the Unit 2 or Unit 3 Reactor Building sump pump rooms. Water damage to the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems instruments located in these rooms may result in the failure of these systems to operate as required to support the Fire Safe Shutdown capability. The cause of this event was attributed to previous analysis' containing erroneous information regarding the potential effects of a fire on the associated equipment in the affected rooms.