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Peach Bottom Atomic Power Station
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10CFR 50.73

January 13, 2012

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Peach Bottom Atomic Power Station (PBAPS) Unit 3
Renewed Facility Operating License No. DPR-56
NRC Docket No. 50-278

Subject: Licensee Event Report (LER) 3-11-04

Enclosed is a Licensee Event Report concerning an unanalyzed condition involving an error in routing a cable which affected the plant's post-fire safe shutdown analysis. In accordance with NEI 99-04, the regulatory commitment contained in this correspondence is to restore compliance with the regulations. The specific methods that are planned to restore and maintain compliance are discussed in the LER. If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,



Gary L. Stathes
Plant Manager
Peach Bottom Atomic Power Station

GLS/djf/IR 1290922

Attachment

cc: US NRC, Administrator, Region I
US NRC, Senior Resident Inspector
R. R. Janati, Commonwealth of Pennsylvania
S. Grey, State of Maryland
P. Steinhauer, PSE&G, Financial Controls and Co-owner Affairs
INPO Records Center

CCN: 12-07

IER22
NRA

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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4. TITLE
HPCI Cable Routing Error Results in Degraded Post Fire Safe Shutdown (FSSD) Analysis

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	13	2011	11	004	00	01	13	2012		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
10. POWER LEVEL 100%	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME PBAPS Unit 3, James M. Armstrong, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) 717-456-3351
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE MONTH: _____ DAY: _____ YEAR: _____
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 11/15/11, a Fire Protection Program (FPP) document impact review was performed for the Multiple Spurious Operation (MSO) modifications installed during the Unit 3 refueling outage in September 2011 (P3R18). During this review, it was determined that the modification for the High Pressure Coolant Injection (HPCI) turbine steam supply valve (MO-3-23-014) implemented during the refueling outage adversely impacted the PBAPS post-fire safe shutdown (FSSD) analysis. A new cable was routed through a room that relies on the HPCI system to achieve safe shutdown following a fire in the room.

The design of the modification was performed by a contract engineering firm, who did not communicate the change in the route of the cable to PBAPS. Further investigation determined that procedures and other administrative controls were not followed, resulting in the FSSD analysis of the modification not being performed until after the modification was completed. An hourly fire watch patrol was established in the room upon identification of the issue. The circuit design for the valve was modified so that a new cable is not needed. These modifications were completed on 12/19/11. Additional actions to address the root causes have been identified and progress in completing the actions is being tracked by the corrective action program. There were no actual safety consequences as a result of this event.

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NARRATIVE

Unit Conditions Prior to the Event

Unit 3 was in Mode 1, operating at 100% of rated thermal power when this event was discovered on 11/15/11.

Description of the Event

On 11/15/11, a Fire Protection Program (FPP) document impact review was performed for the Multiple Spurious Operation (MSO) modifications installed during the Unit 3 refueling outage in September 2011 (P3R18). The review was to identify changes necessary for FPP documents to accurately reflect the modifications. During this review, it was determined that the modification for the High Pressure Coolant Injection (EII:BJ)(HPCI) turbine steam supply valve (EII:V) (MO-3-23-014) implemented during the refueling outage adversely impacted the PBAPS post-fire safe shutdown (FSSD) analysis.

A prompt notification to the NRC was made on 11/15/11 at 2219 hours (EN# 47442).

Background

The licensing basis for Peach Bottom Atomic Power Station (PBAPS) assumes a single spurious operation of safe shutdown components during any single fire event. The industry in general used the single spurious operation assumption when analyzing the capability to achieve safe shutdown following a fire. In 2001, the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI) performed a series of cable functionality fire tests, which showed that multiple circuit faults could occur during a single fire, resulting in an undesired operation of one or more systems or components. Such Multiple Spurious Operations (MSOs) of valves, pumps or other equipment could complicate a post-fire safe shutdown (FSSD).

Using information obtained from the testing, NEI issued NEI 00-01, "Guidance for Post Fire Safe Shutdown Circuit Analysis" for the purpose of providing a consistent process for analyzing MSOs and to help resolve differences between the NRC and the industry related to fire-induced circuit failures. Regulatory Guide 1.189, Revision 2, "Fire Protection for Nuclear Power Plants" issued November 2, 2009, generally endorses NEI 00-01 and clarifies the NRC's position on safe shutdown analysis. Position 5.3.1 states that safe shutdown success paths are required to be protected from all spurious actuations, either single or multiple, and provides guidance for providing such protection. The NRC Enforcement Guidance Memorandum 09-002 provided a three year period from the date of issuance of the Reg. Guide for licensees to resolve noncompliances (i.e., 11/02/12).

PBAPS established an Expert Panel in accordance with NEI 00-01 to review NEI's generic list of MSOs and to investigate other plant-specific MSO scenarios. A total of 71 MSO scenarios were identified, including the scenario identified as 5k in Table G-1 of NEI 00-01. This scenario ("MSO 5k") involves a fire-induced short-circuit that results in a spurious motor-operated valve (MOV) operation and a wire-to-wire short that bypasses the torque and limit switches. This

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could cause mechanical or electrical damage to the MOV, which could prevent further operation of the valve.

During Peach Bottom's Unit 3 2011 refueling outage (P3R18), plant modifications were made to resolve MSO 5k issues for 27 Unit 3 MOVs. These generally involved modifications to control circuits that change the location in the circuit of the torque and limit switches. The modifications varied by MOV, but included the installation of new cable, installation of new relays or the replacement of control power transformers.

Analysis of the Event

This report is being submitted pursuant to:

10CFR 50.73(a)(2)(ii)(B) – Unanalyzed Condition – This occurrence is reportable under this criterion since the HPCI pump would not have been available in the event of a fire in Fire Area 13S. This condition is outside of the bounding FSSD analysis for this area. MO-3-23-014 was at all times capable of performing its safety design function. An assumption of the FPP is that a fire does not occur simultaneously with and independently from plant accidents or severe natural phenomena.

The modification to the control circuitry (EIS:CBL) for the HPCI turbine steam supply valve routed a new cable from the valve to the 250 volt dc motor control center (MCC) 30D011. Part of the new cable was routed through Room 257, South CRD Equipment Room, located at elevation 135' in the reactor building (outside of containment). This room is in an area designated as Fire Area 13S. In the event of an Appendix R fire in this area, the FSSD analysis relies on the HPCI to maintain water level in the reactor vessel to obtain safe shutdown. Fire-induced damage to the cable could result in a spurious operation of the valve along with bypassing of the valve's torque and limit switches. This could cause mechanical damage to the valve or damage to the windings of the motor. Damage to the valve could result in an inability to operate the valve either remotely or manually. In the event this valve was closed and could not be opened, it would result in the HPCI pump becoming unavailable, and there would be no FSSD credited method for controlling reactor vessel level.

There were no actual safety consequences associated with this event.

Cause of the Event

The design of the MSO 5k modification for the 27 valves was performed by a contract engineering firm. The plan for the design change package was to have the new cable for MO-3-23-014 follow the route of the existing cable. However, during a review of the route in the plant, the designer (non-utility) determined that cable tray limits would prevent the cable from following its original route. The designer modified the route of the cable to send it through Room 257. When the design package was reviewed by the designer's supervisor (non-utility) and by the responsible engineer (non-utility), neither of them recognized that the cable had been re-routed

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or that the route would affect the FSSD analysis. As a result, the contractor did not communicate to plant personnel that a cable had been re-routed.

Further investigation to identify the root cause of this event determined that procedures and other administrative controls were not followed, resulting in the FSSD analysis of the modification not being performed until after the modification was completed. Plant procedures provide controls to ensure such analyses are complete and approved, but it had been an accepted practice to deviate from this standard for FSSD analysis modifications. Contributing causes included failure to have the appropriate personnel involved in a plant walkdown of the modification, inadequate risk/rigor assessments and pre-job briefs for technical human performance tasks, poor communication and procedural weaknesses.

A third party independent review of the plant modification package was performed prior to the outage which determined that procedures were not followed for evaluating the impact the new cables would have on the existing FSSD analysis. The issue was entered into the corrective action program with the recommendation that the routing (by fire area) of the new cables be evaluated to determine the impact on safe shutdown equipment. Since plant personnel believed that no cables were being routed differently, it was believed that there would be no adverse impact.

Inadequate accountability for following procedures, poor communication, insufficient work management of schedules and lack of detail and clarity in the procedures were also identified as causes.

Corrective Actions

Immediate actions were taken to review other MSO modifications installed during P3R18. No other similar issues were identified. An hourly fire watch patrol was established in Fire Area 13S upon identification of the issue on 11/15/11. The circuit design for MO-3-23-014 was modified at the MOV and at the MCC so that a new cable is not needed. These modifications were completed on 12/19/11.

Configuration change procedures and accountability standards are being enhanced to prevent recurrence. Additional actions to address the root causes have been identified and progress in completing the actions is being tracked by the corrective action program.

Previous Similar Occurrences

No previous similar occurrences dealing with design change deficiencies for MSOs were identified.