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10CFR 50.73

August 22, 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) 3-12-002

Enclosed is a Licensee Event Report concerning a condition prohibited by Technical Specifications related to foreign material in a primary containment isolation valve. 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,

Patrick D. Navin  
Plant Manager  
Peach Bottom Atomic Power Station

PDN/dnd/IR 1381865

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: 12-63

JE22  
NRK

**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](mailto: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.

<b>1. FACILITY NAME</b> Peach Bottom Atomic Power Station (PBAPS) Unit 3	<b>2. DOCKET NUMBER</b> 05000278	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Failure of Primary Containment Isolation Valve due to Foreign Material Results in Condition Prohibited by TS

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
05	17	2012	12	- 002 -	00	08	22	2012		

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)			
<b>10. POWER LEVEL</b>  100%	<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)
	<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 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 checked="" 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**

<b>FACILITY NAME</b> PBAPS Unit 3, James M. Armstrong, Regulatory Assurance Manager	<b>TELEPHONE NUMBER (Include Area Code)</b> 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**☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On June 24, 2012, during a surveillance test for the High Pressure Coolant Injection (HPCI) system, primary containment isolation valve (PCIV) AO-3-23-137 failed to close. Investigation determined a triangular, metallic piece of foreign material was lodged between the valve poppet and the valve seat. The PCIV is located on a 2-inch diameter condensate drain line that is connected to the HPCI pump turbine steam exhaust line and is required to close upon receipt of a containment isolation signal. The material was likely in the valve since May 17, 2012, resulting in the valve being inoperable for a period of 38 days. With one inoperable PCIV, Technical Specifications require the affected containment penetration flow path to be isolated in four hours. This was not done, resulting in a condition prohibited by Technical Specifications.

The foreign material was removed, the valve seat was repaired and the valve was returned to an operable status on June 27, 2012. It was determined that the foreign material was likely a piece from a partition in the reversing chamber of the HPCI turbine. Inspection of the system will be performed during a future refueling outage to identify any additional foreign material. This event did not affect operability of the HPCI system.

There were no actual safety consequences as a result of this event.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

U.S. NUCLEAR REGULATORY COMMISSION

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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. There were no other structures, systems or components out of service that contributed to this event.

**Description of the Event**

On June 24, 2012, a quarterly Unit 3 High Pressure Coolant Injection (HPCI)(EIS:BJ) pump, valve and flow surveillance test was being performed. The test verifies that the HPCI pump can develop its design flow rate and pressure to satisfy the requirements of Technical Specification (Tech Spec) surveillance requirement (SR) 3.5.1.8. The test also verifies the capability of the HPCI Primary Containment Isolation Valves (PCIV)(EIS:ISV) to close as required by Tech Spec SR 3.6.1.3.8. The test was aborted when PCIV AO-3-23-137, "HPCI Turbine Exhaust Line Drain to Gland Seal Condenser Inboard Isolation Valve", failed to fully close. As a result, Tech Spec 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)", Condition A was entered for one inoperable PCIV. Required Action A.1 calls for the affected containment penetration flow path to be isolated in four hours. A manually operated valve was closed within four hours in accordance with plant procedures. AO-3-23-138, the redundant PCIV, remained operable throughout this event.

An internal investigation of the valve identified a triangular, metallic piece of foreign material was lying between the valve poppet and the valve seat, which was preventing the valve from fully closing and caused damage to the seating surface. A boroscope inspection of accessible areas of piping near the valve identified a second piece of foreign material between AO-3-23-137 and AO-3-23-138. Both pieces of foreign material were removed, the valve seat for AO-3-23-137 was replaced, local leak rate and post-maintenance testing was performed, and the valve was returned to service on June 27, 2012. The failure of the valve to close had no impact on the function or operability of the remainder of the HPCI system.

**Analysis of the Event**

The HPCI pump is a turbine driven pump that uses steam from the 'B' Main Steam Line. Steam is exhausted to the Torus. Condensate that forms in the exhaust line drains to a 2-inch diameter line that is routed to the HPCI gland seal condenser. The inner PCIV for the drain line, AO-3-23-137, is a normally open air operated valve. It provides an equipment protection function in the open position to keep the exhaust line free of condensate to prevent startup transients, such as water hammer. The valve has an active safety function to automatically close, if open, to maintain containment integrity. The foreign material found in the valve would have prevented the valve from performing its safety function upon receipt of a containment isolation signal.

The foreign material was sent to an external lab for analysis. The triangular piece of material found in the valve was approximately one inch long on each side, approximately 0.145" thick and determined to be a material consistent with 400-series stainless steel. The second piece found in the piping near the valve was irregular in shape and approximately 1-3/8" x 3/4" x 0.012" thick and determined to be a material consistent with 300-series stainless steel, most likely type 316.

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**Analysis of the Event, continued**

Based on a review of plant drawings and discussions with the original equipment manufacturers, it has been determined that the triangular piece of foreign material is likely to be a piece from a partition in the reversing chamber of the HPCI turbine. Fracture surfaces along the edge of the fragment were oxidized indicating that it is not likely to be from a recent failure. A review of the Lost Parts Database did not identify any past inspections where a section of the reversing chamber was identified to be missing. The last major inspection of the HPCI turbine was performed in 2007 and no deficiencies were noted. A review of previous inspections identified an inspection in 1988 where cracking of reversing chamber segments was noted and several reversing chamber segments were replaced.

The second piece of foreign material was identified as material from a rupture disc. Rupture discs are located on the HPCI turbine exhaust line to prevent an excessive vacuum from forming from condensing steam after the pump is secured. There were several failures of these rupture discs in the 1980s, which resulted in rupture disc fragments entering the exhaust line. A rupture disc of a different design was installed following these events, and there have been no further rupture disc failures.

Based on discussions with the pump manufacturer, a failure of a reversing chamber section would not impact HPCI pump operability. In addition, operability has been confirmed with routine surveillance testing. There were no actual safety consequences associated with this event.

**Reportability**

This report is being submitted pursuant to:

10CFR 50.73(a)(2)(i)(B) – Any operation or condition which was prohibited by the plant's Technical Specifications.

Steam and condensate flow would be required to transport foreign material to AO-3-23-137. The last time the turbine was operated prior to the surveillance test was on May 17, 2012. Therefore there is firm evidence that the foreign material was in the valve from May 17, 2012 until the valve failed to close during the surveillance test on June 24, 2012 and that the valve was inoperable during this time period (38 days). With one inoperable PCIV, Condition A of Tech Spec 3.6.1.3 should have been entered, which requires the affected containment penetration flow path to be isolated in four hours. This was not done, resulting in a condition prohibited by Technical Specifications.

**Cause of the Event**

The immediate cause of the PCIV failing to close was the foreign material on the valve seat which prevented the valve poppet from closing. The material has been determined to be from a partition of the reversing chamber of the HPCI turbine. The appearance of the material indicates it may have been in the system for some period of time. Further causal analyses have been performed in accordance with the site Corrective Action Program.

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**Corrective Actions**

The two pieces of foreign material were removed and the valve seat for AO-3-23-137 was repaired. A local leak rate test of the valve was performed and the surveillance test was re-performed and successfully completed on June 27, 2012. Valves AO-3-23-137 and 138 were stroked following the surveillance test to verify their function. Additional inspections will be performed during a future refueling outage. Inspection points and methodology will be improved from previous inspections to ensure all legacy foreign material is identified and removed. Additional corrective actions to address underlying causes are being performed in accordance with the site Corrective Action Program.

**Previous Similar Occurrences**

As reported in LERs 04-002 (Unit 2) and 06-001 (Unit 3), foreign material has previously prevented this valve, and the same valve in Unit 2, from closing.

In 2004, a reversing chamber bolt found on the seating area of AO-2-23-137 (Unit 2) prevented the valve from fully closing during a surveillance test performed on 8/8/04. Although the exact cause and time that the bolt became loose was not determined, loose reversing chamber bolts on HPCI turbines has been an industry issue since the 1970s. Corrective actions included a boroscope inspection of the HPCI turbine exhaust line and the turbine shell. No foreign material was identified.

In 2006, metal fragments from a rupture disc prevented AO-3-23-137 (Unit 3) from fully closing. Rupture discs failures in the 1980s introduced fragments into the system and it was determined that one of these fragments was the cause of the event. A reversing chamber bolt was also found in the system, which was determined to be from bolts that were identified to be missing during an inspection in 1977. Corrective actions included an inspection of the turbine exhaust piping and drain lines during the Unit 3 refueling outage. No additional foreign material was found.