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Peach Bottom Atomic Power Station
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10CFR 50.73

December 4, 2006

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

Peach Bottom Atomic Power Station (PBAPS) Unit 3
Facility Operating License No. DPR-44
NRC Docket No. 50-277

Subject: Licensee Event Report (LER) 2-06-03

This LER reports a condition involving a Technical Specifications required shutdown for an inoperable Primary Containment as a result of a leak discovered on the High Pressure Coolant Injection return piping to the Torus. 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,



Joseph P. Grimes
Plant Manager
Peach Bottom Atomic Power Station

JPG/djf/IR 541265

Attachment

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

CCN 06-14082

IE22

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: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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.

1. FACILITY NAME Peach Bottom Atomic Power Station Unit 2	2. DOCKET NUMBER 05000 277	3. PAGE 1 OF 4
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4. TITLE
Elbow Leak on Piping Attached to Suppression Pool Results in Loss of Containment Integrity

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	7	2006	06	- 03 -	0	12	4	2006		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)			
10. POWER LEVEL 22%	<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 checked="" 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 checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" 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

FACILITY NAME PBAPS Unit 2, James 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	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO			

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

On 10/7/06 at 1802 hours, an Unusual Event was declared for Unit 2 as a result of the discovery of a leak at an elbow for piping that penetrates the Primary Containment Suppression Pool (i.e. Torus). The 4" piping is the High Pressure Coolant Injection (HPCI) / Reactor Core Isolation Cooling (RCIC) Torus Flush line. This line is normally isolated from the HPCI / RCIC systems by a closed motor-operated valve and is only used during testing activities. The leak was discovered by an equipment operator at approximately 1741 hours during a planned inspection associated with a RCIC system check valve. The leak occurred on the intrados of a 45 degree elbow of the 4" piping. The elbow was located approximately 1 foot above the Torus penetration (i.e. the leak was outside of Primary Containment). The cause of the crack in the elbow is due to cavitation and abrasive erosion and/or localized water-jet cutting resulting from excessively high flow velocities through this piping during test conditions in conjunction with an apparent lack of fusion between the weld backing ring and the weld root at the elbow weld. The leaking elbow was replaced and non-destructive testing was performed. The similar pipe on Unit 3 was examined and no significant concerns were noted. Extensive walk downs of similar piping that is attached to the Torus was conducted for both Units 2 and 3. There were no similar deficiencies discovered. Selected ultrasonic testing was performed on Unit 2 and 3 Torus attached piping that involved higher flow rates. These examinations also did not identify any similar concerns.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Peach Bottom Atomic Power Station, Unit 2	05000277	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		06	- 03	- 00	

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

Unit Conditions at the Time of Discovery

Unit 2 was in Mode 1 at approximately 22% reactor thermal power when the event was discovered. Unit 2 was restarted from the P2R16 Refueling Outage on 10/6/06. There were no other structures, systems or components out of service that contributed to this event.

Description of the Event

On 10/7/06 at 1802 hours, an Unusual Event was declared for Unit 2 as a result of the discovery of a leak at an elbow (EIIS: PSF) for piping that penetrates the Primary Containment Suppression Pool (i.e. Torus) (EIIS: NH). The 4" piping is the High Pressure Coolant Injection (HPCI) / Reactor Core Isolation Cooling (RCIC) Torus Flush line. This line is normally isolated from the HPCI (EIIS: BJ)/ RCIC systems by a closed motor-operated valve (EIIS: ISV) and is only used during testing activities. The leak was discovered by an equipment operator at approximately 1741 hours during a planned inspection associated with a RCIC (EIIS: BN) system check valve (EIIS:V). The inspection was scheduled to occur during startup activities associated with the P2R16 refueling outage. At the time of the discovery, the RCIC system was being operated in the test mode with the return flow being returned to the Torus. The leaking elbow is common piping for the HPCI / RCIC 'Flush' lines that return to the Torus. The leak occurred on the intrados of a 45 degree elbow of the 4" piping. The elbow was located approximately 1 foot above the Torus penetration (i.e. the leak was outside of Primary Containment).

Licensed Main Control Room operators declared Primary Containment inoperable at approximately 1750 hours. This resulted in a Technical Specification 3.6.1.1, Primary Containment, required shutdown. Unit 2 was manually scrammed (and therefore, entered Mode 3) at approximately 2016 hours. This resulted in expected Primary Containment Isolation System (PCIS) Group II and III isolations (including a start of the Standby Gas Treatment system) as a result of reactor water level reaching the PCIS Level 3 reactor water level set point.

The PCIS Group II and III isolations were reset by 2035 hours. The Standby Gas Treatment system was secured by 2043 hours and the normal Reactor Building ventilation system was restarted. At 2055 hours, the Main Steam Isolation Valves (MSIVs) were manually closed to maintain appropriate reactor pressure and temperature control. The scram was reset at approximately 2104 hours. The unit achieved Mode 4 and the Unusual Event was terminated by 0513 hours.

This report is being submitted pursuant to the following reporting requirements:

10CFR 50.73(a)(2)(i)(B) – Condition Prohibited by Technical Specifications – The plant entered Mode 2 on 10/6/06 at approximately 1659 hours. Primary Containment was declared inoperable on 10/7/06 at approximately 1750 hours. Since Primary Containment was unknowingly inoperable for a period of time greater than allowed by Technical Specification 3.6.1.1, a condition prohibited by Technical Specifications existed.

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

Description of the Event, continued

10CFR 50.73(a)(2)(i)(A) – Completion of a Plant Shutdown Required by Technical Specifications – Because the plant entered into Mode 3 at approximately 2016 hours, a condition existed where a plant shutdown was completed as a result of a Technical Specification Required Action.

10CFR 50.73(a)(2)(ii)(A) – Principal Safety Barrier Degraded – Because a pipe crack existed which resulted in a leak from Primary Containment, a principal safety barrier was considered as degraded.

10CFR 50.73(a)(2)(v) – Condition that Prevented the Fulfillment of a Safety Function - Because Primary Containment was considered to be inoperable as a result of the pipe crack in piping attached to the Torus, a condition existed that prevented the fulfillment of the Primary Containment safety function.

Cause of the Event

Detailed failure analyses of the cracks in the HPCI / RCIC Flush return line elbow were performed. The failure analysis determined that axial and circumferential flaws developed as a result of cavitation and abrasive erosion and /or water jet cutting. The underlying cause of the issue was due to excessively high flow velocities through this piping during test conditions in conjunction with an apparent lack of fusion between the weld backing ring and the weld root at the elbow weld. These analyses identified that a portion of the original installation weld-backing ring was missing. This observation suggests lack of fusion between the weld root and the backing ring when performed during original plant construction. Evidence suggests that flow underneath the backing ring created localized erosion immediately adjacent (downstream) to the weld root.

Analysis of the Event

There were no actual safety consequences associated with this event.

The leaking elbow is in common piping for the HPCI / RCIC 'Flush' line that returns to the Torus. This line is normally isolated from the HPCI / RCIC systems by a closed motor-operated valve and is only used during testing activities. Therefore, there was no impact on HPCI or RCIC system functional capability.

The 4" carbon steel piping is attached to the Torus and is not isolable from the Torus (i.e. Primary Containment). The piping terminates under the normal Torus water level and therefore, the water in the Torus serves as another barrier to prevent radioactive gaseous releases from the Torus air space during design basis events. Therefore, there were no actual gaseous releases involved with this event.

The HPCI / RCIC 'Flush' line is pressurized during Integrated Leak Rate Tests (ILRTs). The leakage would have been detected during this test. The last ILRT was successfully completed on 10/4/00 and there was no leakage identified at that time.

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

Analysis of the Event, continued

Further examination of the leaking elbow noted that axial and circumferential cracking existed at the elbow intrados. Failure analyses of the elbow determined that only minimal leakage existed at the elbow with the as-found indications. This minimal leakage only occurred when the HPCI or RCIC system was being operated in the test mode involving return flow being routed to the Torus.

In the unlikely event that a worst-case design basis event had occurred and the elbow did not maintain its integrity, additional leakage would have occurred. If both subsystems of containment cooling (including containment spray) were used during the design event, the Torus water level would only be minimally impacted. If only one subsystem of containment cooling were used with no containment spray, then water leakage would have occurred until the HPCI / RCIC 'Flush' line became uncovered (approximately 5 feet below normal Torus water level) and a gaseous release could have occurred. The water leakage would be contained within the Torus Room. The gaseous leakage would be processed through the secondary containment and Standby Gas Treatment System. The Torus Room is within the Secondary Containment boundary.

Safety systems operated as designed during the unit shutdown.

Preliminary assessments indicate that this event would not be risk significant.

Corrective Actions

The leaking elbow was replaced and non-destructive testing was performed. The similar pipe on Unit 3 was examined and no significant concerns were noted. Extensive walk downs of similar piping that is attached to the Torus were conducted for both Units 2 and 3. There were no similar deficiencies discovered. Selected ultrasonic testing was performed on Unit 2 and 3 Torus attached piping that involved higher flow rates. These examinations also did not identify any similar concerns.

Plant test procedures were revised to prevent using the HPCI / RCIC Torus Flush line at high flow conditions.

Additional corrective actions including extent of condition evaluations are being evaluated in accordance with the Corrective Action Program.

Previous Similar Occurrences

There were no previous similar events identified.