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Peach Bottom Atomic Power Station
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10CFR 50.73

November 22, 2011

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

Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: Licensee Event Report (LER) 2-11-04

Enclosed is a Licensee Event Report concerning an oil leak in the E1 Emergency Diesel Generator resulting in it being declared inoperable. 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,



Garey L. Stathes
Plant Manager
Peach Bottom Atomic Power Station

GLS/dnd/IR 1266837

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: 11-93

JEDD
MRR

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.

1. FACILITY NAME Peach Bottom Atomic Power Station (PBAPS) Unit 2	2. DOCKET NUMBER 05000277	3. PAGE 1 OF 4
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4. TITLE
Oil Leak Resulting in E1 Emergency Diesel Generator Inoperability

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
09	23	2011	11	004	00	11	21	2011	PBAPS Unit 3	05000278
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>							
10. POWER LEVEL 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

FACILITY NAME PBAPS Unit 2, 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	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
A	EK	TBG	F010	Y					

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 9/23/11 at approximately 0127 hours, an oil leak was discovered on the E1 Emergency Diesel Generator (EDG). The leak was discovered when the EDG was being shut down as part of functional testing of the emergency 4-kV bus. The leak was from a crack on the lube oil drain line for the combustion air intake blower (supercharger). Analysis determined that the condition had previously existed and would have resulted in the EDG being unable to perform its safety function. This was a condition prohibited by Technical Specification 3.8.1, which requires all four EDGs to be operable or, if one is inoperable, then it must be returned to operable status within 7 days.

The drain line was removed and replaced with a new line. The failure was caused by a crimp in the drain line that, when combined with the bending vibrations experienced by the line, caused a fatigue crack to develop. Inadequate maintenance work practices during maintenance performed in 2009 resulted in the damaged line not being identified. The use of a flexible drain line is being evaluated to prevent vibration fatigue.

There were no actual safety consequences associated with this event.

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

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		11	- 004	- 00	

NARRATIVE

Unit Conditions Prior to the Discovery of the Event

Unit 2 was in Mode 1 operating at approximately 100% rated thermal power and Unit 3 was in Mode 5 for its 18th refueling outage when this event occurred on 9/23/11. At the time of the event, Loss-of-Coolant Accident (LOCA) / Loss of Offsite Power (LOOP) functional testing was in progress for the E13 4-kV bus. The E13 4-kV bus was considered inoperable during the performance of this testing. The E13 4-kV bus functional testing was a planned evolution being performed during the Unit 3 refueling outage.

Description of the Event

During the night shift on 9/22/11, procedure ST-O-054-751-3, "E13 4KV Bus Undervoltage Relays and LOCA LOOP Functional Test" was being performed to satisfy Technical Specification Surveillance Requirement SR 3.8.1.8, SR 3.8.1.11, SR 3.1.8.16 and SR 3.8.1.18. At 0019 hours on 9/23/11, EDG E1 (E1S:EK) was taken out of service for performance of the procedure. Emergency bus E13 was de-energized twice. The first, at approximately 0036 hours, resulted in EDG E1 automatically starting as expected. The EDG was shut down in accordance with procedure at 0050 hours, approximately 14 minutes after start. Shortly afterward, Section 6.5 of the procedure, "Simulated Loss of 2EA Emergency Transformer with 3EA Emergency Transformer De-energized" was performed. At approximately 0115 hours, bus E13 was de-energized according to the test procedure and EDG E1 automatically started as expected. After verifying systems responded appropriately, the EDG was shut down in accordance with procedure at 0127 hours, approximately 12 minutes after start. During shutdown, an equipment operator stationed at the EDG reported an oil leak near the intake air blower. Further investigation identified a crack in the EDG blower outer bearing plate lube oil drain line (E1S:TBG). The crack was located at a crimp in the drain line. Oil was leaking through the crack onto the blower's catch pan. The test was suspended and the EDG remained inoperable with Technical Specification 3.8.1 Condition C in effect (7 days to return EDG to operable status).

In accordance with Technical Specification 3.8.1, action statement B.4.1, the remaining three EDGs were inspected to verify a common cause failure did not exist. No similar condition was identified.

A clearance was placed on EDG E1 at 1330 hours on 9/23/11, the drain line was replaced, and the EDG was made available at 1421 hours. LOCA/LOOP testing resumed, with a start of EDG E1 at 1532 hours. The EDG ran without incident for approximately 43 minutes before being secured in accordance with the test procedure. Following completion of the test procedure, EDG E1 was declared operable at 2359 hours on 9/23/11.

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Analysis of the Event

The four standby diesel generators at Peach Bottom are Colt / Fairbanks Morse 38TD8-1/8 opposed piston engines. The EDG blower is an engine driven positive displacement type blower that provides air to the turbocharger inlet, which provides combustion air to the engine. The turbocharger, driven by engine exhaust, is more effective at higher engine loads, when the amount of exhaust gases generated is higher. At low or no load conditions, the EDG blower is more effective and provides a greater amount of combustion air compression relative to the turbocharger. The blower has inner and outer bearings that are lubricated by oil supplied by the engine. Oil from the outer bearing plate returns to the engine through a 3/4" diameter copper tube, approximately 36" long, with fittings at each end to allow it to be connected to blower end cover and the blower housing at the inner bearing plate.

Near the connection to the blower end cover on EDG E1, the tubing was crimped approximately one inch from the fitting. The crimp distorted the cross-section of the tubing from a nominal 0.75" circular cross-section to an eye-shaped cross-section with a minimum dimension of 0.66" and a maximum dimension of 0.83". A crack extended approximately 65% around the circumference of the tube at the crimp. The tube was sent to a laboratory for further analysis. The analysis concluded that the crack was fatigue related, initiated by the crimp and most likely propagated by bending vibration loads. The analysis also identified that the fracture surface was worn due to rubbing against the opposing fracture surface. This indicates the fracture existed for some period of time prior to it being identified, although the length of time was not determined.

Based on the extent of the crack and the vibrations present at that location, it is our judgment that the tube would have completely failed during a 24-hour run of the EDG. A complete failure of this tube would result in all oil draining from the blower to escape. It is conservatively estimated that approximately 2 gpm passes through the blower bearings. If the minimum allowed lube oil inventory of 300 gallons (Tech Spec 3.8.3 Condition B) is available, the leak rate would drain the entire inventory in 2.5 hours. Since the crimp and the crack existed in the drain line prior to its identification on 9/23/11, the EDG would not have been able to perform its intended safety function. The last 24-hour endurance run of the E1 EDG was successfully conducted on 4/21/11.

This report is being submitted pursuant to:

10CFR 50.73(a)(2)(i)(B) – Condition Prohibited by Technical Specifications – An equipment failure was identified that would have caused EDG E1 to be inoperable. The condition leading to the failure existed prior to the identification of the failure and would have prevented the EDG from performing its safety function. Technical Specification 3.8.1 requires all four EDGs to be operable, or if one is inoperable, it must be restored to operable status in 7 days (Condition C). Since it is likely the condition existed for more than 7 days at the time of its discovery, this requirement was not met.

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There were no actual safety consequences associated with this event. The Class 1E onsite AC power supply consists of four EDGs that power eight safety related 4kV buses common to both Unit 2 and Unit 3. The three remaining EDGs were operable and capable of supplying power in the event of a loss of offsite power.

Cause of the Event

The failure mode of the event was the fatigue related crack in the blower lube oil drain line. The crack was initiated by a crimp located approximately one inch from a connection at the end of the line. The line is located in an area where it could not be stepped on once installed and is also in an area that is not readily observable. The tube is removed every two years for a blower inspection, which was last performed on 6/23/09. The crimped tubing was installed with no discrepancies noted, although it may not have been recognized that the crimp could initiate a failure. Not addressing the crimp in the drain line is poor maintenance practice and is the cause of this event. A contributing cause is the material in which the drain line is constructed. Due to the location and the angle of the connections, it is difficult to connect the rigid copper tube. The rigid tube is also susceptible to vibration fatigue.

Corrective Actions

The damaged drain line was replaced with a new one on 9/23/11. The event was discussed with the maintenance staff to emphasize the importance of addressing deficiencies identified in the field. The event was reviewed with the maintenance team that will be working the the EDG during the next diesel outage. Changes were made to the associated maintenance procedure to inspect blower tubing to identify similar defects. The use of a flexible drain line in place of the rigid tube is being evaluated to reduce the potential for damage during installation and also to eliminate the possibility of vibration fatigue. These actions are being tracked in the corrective action program.

Previous Similar Occurrences

No previous failures of the blower drain line were identified. Due to the lack of a specific cause, a broader review of similar occurrences could not be performed.