Exelon Nuclear
Peach Bottom Atomic Power Station
1848 Lay Rd.
Delta, PA 17314

www.exeloncorp.com

Exelon Nuclear

10CFR 50.73

March 19, 2010

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

Peach Bottom Atomic Power Station (PBAPS) Unit 2
Facility Operating License No. DPR-44
NRC Docket Nos. 50-277

Subject: Licensee Event Report 2-10-01

Enclosed is a Licensee Event Report concerning a condition prohibited by Technical Specifications involving the Control Rod Drive system. 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/djf/IR 1023827

Attachment
cc: S. J. Collins, US NRC, Administrator, Region I
F. L. Bower, 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: 10-16

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

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 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Peach Bottom Atomic Power Station Unit 2	05000277	1 OF 5

4. TITLE

Multiple Slow Control Rods Results in Condition Prohibited by Technical Specifications

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
										05000
01	30	2010	2010	- 01 -	00	03	19	2010	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

1

10. POWER LEVEL

060

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☒ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
PBAPS Unit 2, James Armstrong, Regulatory Assurance Manager	717-456-3351

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
E	AA	FSV	A610	Y					

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)*

A condition prohibited by Technical Specifications was identified as a result of the performance of a surveillance test involving control rod scram time testing. As a result of the testing, it was identified that 21 of the 185 control rods were slow from control rod notch posiiton 48 to notch position 46. Stroke timing to other notches required by Technical Specifications were acceptable for these 21 control rods. The cause of the slow control rods was due to degradation of the diaphragms associated with the Scram Solenoid Pilot Valves (SSPVs). The SSPV diaphragms were replaced and the scram times were restored to acceptable values. Performance monitoring and the preventive maintenance program will be upgraded.

There were no actual safety consequences associated with this event.

There were no previous similar LERs identified.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Peach Bottom Atomic Power Station, Unit 2	05000277	2010	- 01 -	00	2 OF 5

NARRATIVE

Unit Conditions Prior to the Event

Unit 2 power was reduced to approximately 60% rated thermal power for a planned maintenance / testing load drop. The unit power was maintained between approximately 55% to 65% rated thermal power during the Control Rod Drive (CRD) surveillance test. There were no other structures, systems or components out of service that contributed to this event.

Description of the Event

On 1/31/10, based on review of surveillance testing performed on 1/30/10 and 1/31/10, Operations personnel identified a potential condition prohibited by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.1.4, Control Rod Scram Times. TS LCO 3.1.4 states that the number of slow operable control rods shall be limited to 13. Contrary to this requirement, a total of 21 control rods (EIIS: AA) were identified as being slow from control rod notch position 48 to position 46. All 185 control rods were ultimately scram time tested during the surveillance test. During the surveillance test, control rods were declared inoperable for repair and therefore, there was no time during the test where the declared number of slow control rods exceeded the TS allowable number.

TS Surveillance Requirement (SR) 3.1.4.2 requires that for a representative sample, each tested control rod scram time is within the limits of TS Table 3.1.4-1 with reactor steam dome pressure $\geq$ 800 psig. Four separate scram time limits are required to be met for each control rod tested. These four scram time limits meaure the timing of the control rod from the fully withdrawn position (notch 48) to notch position 46 ($\leq$ 0.44 seconds), to notch position 36 ($\leq$ 1.08 seconds), to notch position 26 ($\leq$ 1.83 seconds) and to notch position 06 ($\leq$ 3.35 seconds). The 21 slow control rods were only slow from notch position 48 to notch position 46. All other scram times for these control rods were met.

In accordance with TS, surveillance testing had begun with a 10% sample of all control rods (19 of 185). Three of the 19 control rods (16%) exhibited a slow time between control rod notch position 48 to notch position 46. As required by TS 3.1.4 bases, if more than 7% of the sample is declared slow, additional control rods are required to be tested until less than 7% of the tested control rods are slow. This resulted in testing all 185 control rods, with 21 slow rods (11% of control rods) identified.

This report is being submitted pursuant to:

10CFR 50.73(a)(2)(i)(B) – Condition Prohibited by TS – This event is reportable under this criterion since 21 slow operable control rods existed during Mode 1 operations. TS LCO 3.1.4 only allows for a maximum of 13 slow operable control rods. Additionally, of the 21 slow control rods, there were 5 pairs of adjacent slow operable control rods during Mode 1 operations. TS LCO 3.1.4 only allows for a maximum of 2 operable slow control rods being in adjacent positions.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Peach Bottom Atomic Power Station, Unit 2	05000277	2010	- 01 -	00	3 OF 5

NARRATIVE

Description of the Event, continued

10CFR 50.73 (a)(2)(vii) – Common Cause Inoperability – This occurrence is reportable under this criterion since certain slow control rods were declared inoperable during surveillance testing in order to perform maintenance and to ensure that the TS LCO 3.1.4 limit for slow control rods (i.e., 13 control rods) would not be exceeded. Therefore, there were multiple control rods declared inoperable as a result of having slow stroke times from position 48 to position 46.

Once control rods were found slow, actions were promptly taken to identify and remedy the slow control rod condition. It was identified that the Scram Solenoid Pilot Valves (SSPVs) associated with the Hydraulic Control Unit (HCU) for each affected drive exhibited signs of degradation associated with the SSPV diaphragm.

The surveillance testing of the 185 control rods was completed by 1500 hours on 2/1/10. The affected HCU SSPV diaphragms were replaced and re-tested by 2/3/10.

Analysis of the Event

There were no actual safety consequences associated with this event.

The control rod drive mechanism provides control of reactor power, including the ability to provide a sufficiently rapid insertion of control rods (scram) so that no fuel damage results from any abnormal operating transient and limits fuel damage under accident conditions. The 185 control rods (EIIS: ROD) are located uniformly throughout the core. The control rods are operated by CRD mechanisms. The CRD hydraulic system HCU (EIIS: HCU) supplies and controls the pressure and flow requirements to the CRDs. The HCUs provide hydraulic power to be able to position Control Rods in the reactor core. HCU scram accumulators are designed with a limited nitrogen pressure and volume, which are sufficient to initiate control rod scram motion. Operation of the HCU scram valves are initiated by SSPVs for each HCU. During a scram signal, the SSPVs (EIIS: FSV) vent the air from the scram inlet and outlet valves for each CRD HCU, allowing the control rods to rapidly move to the full in position and shutdown the reactor. The SSPVs are supplied by the Automatic Switch Company (Model # HVA 266000-2J).

In accordance with TS 3.1.3, Control Rod Operability, SR 3.1.3.4, if a control rod has a scram time of greater than 7 seconds, then the control rod is considered inoperable. None of the 185 Unit 2 control rods had a scram time that exceeded 7 seconds.

In accordance with TS 3.1.4, Control Rod Scram Times, SR 3.1.4.2 requires that for a representative sample, each tested control rod scram time is within the limits of TS Table 3.1.4-1 with reactor steam dome pressure $\geq$ 800 psig. Four separate scram time limits are required to be met for each control rod tested. These four scram time limits measure the timing of the control rod from the fully withdrawn position (notch 48) to notch position 46 ($\leq$ 0.44 seconds), to

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Peach Bottom Atomic Power Station, Unit 2	05000277	2010	- 01 -	00	4 OF 5

NARRATIVE

Analysis of the Event, continued

notch position 36 (≤ 1.08 seconds), to notch position 26 (≤ 1.83 seconds) and to notch position 06 (≤ 3.35 seconds). These scram times are faster than those assumed in the design basis analyses. The scram times have a margin that allows up to 7% of the 185 control rods (13 control rods) to be slow, combined with an assumed single stuck control rod and a single failure of another control rod to scram in accordance with the single failure criterion. Based on surveillance testing performed, there were no stuck control rods and all control rods were able to be scrammed. In addition, the 21 slow control rods were only slow from notch position 48 to notch position 46. Licensing basis analyses state that a relaxation of the 5% scram insertion time requirement has a negligible impact on plant transient performance. Because all other scram times for these control rods (i.e., notch 48 to 36, notch 48 to 26 and notch 48 to 06) were met, there were no stuck control rods and all control rods were able to be scrammed, it can be concluded that there was no significant adverse impact to the control rod drive reactivity safety function.

This event is not considered risk significant.

Cause of the Event

The primary cause of this event was due to degradation of the Viton-A diaphragms of the SSPVs associated with 21 of the 185 control rod HCUs. The degradation of these diaphragms resulted in delays in control rod motion which caused the control rod notch 48 to notch 46 scram time speed to be slightly slow. The TS required time from control rod notch position 48 to notch position 46 is ≤ 0.44 seconds. Tested times of the 21 slow control rods ranged from 0.443 to 0.565 seconds.

Further review of the 21 slow control rods revealed that all 21 had SSPVs that were installed between 4/18/95 and 5/10/95 and all had indicated a scram time from control rod notch position 48 to notch position 46 of greater than 0.360 seconds during the previous surveillance test.

Another cause of this event was determined to be inadequate performance monitoring associated with the SSPVs. Other contributing causes are being pursued in accordance with the Corrective Action Program.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Peach Bottom Atomic Power Station, Unit 2	05000277	2010	- 01 -	00	5 OF 5

NARRATIVE

Corrective Actions

All 21 slow control rods were removed from service and the SSPV diaphragms were replaced. The 21 control rods were re-tested satisfactorily and returned to service.

Near term replacements of other SSPV diaphragms are scheduled for both Units 2 and 3 for other SSPVs with Viton-A diaphragms.

Performance monitoring and the preventive maintenance program will be upgraded.

Other actions are being pursued in accordance with the Corrective Action Program.

Previous Similar Occurrences

There were no previous LERs identified involving conditions prohibited by TS involving slow control rods. Previous concerns with SSPV diaphragms occurred at PBAPS Units 2 and 3 in 1995. The resolution of these previous concerns is being factored into a root cause evaluation that is being performed for this event.