Exelon Generation

10CFR 50.73

CCN: 18-122

November 30, 2018

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) 3-18-004

Enclosed is a Licensee Event Report concerning a Main Steam Isolation Valve to fully close. In accordance with NEI 99-04, the regulatory commitment contained in this correspondence is to restore compliance with the regulations. The specific methods that have been 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 Matt Retzer at 717-456-4351.

Sincerely,

Patrick D. Navin
Site Vice President
Peach Bottom Atomic Power Station

PDN/dnd/IR 4178993

Enclosure

cc: US NRC, Regional Administrator, Region I
US NRC, Senior Resident Inspector
R. R. Janati, Commonwealth of Pennsylvania
D. Tancabel, State of Maryland
B. Watkins, PSE&G, Financial Controls and Co-Owner Affairs

NRC FORM 366 (04-2018) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name	2. Docket Number	3. Page
Peach Bottom Atomic Power Station Unit 3	05000278	1 OF 4

4. Title

Failure of a Main Steam Isolation Valve to Fully Close

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
10	01	2018	2018	- 004	- 0	11	30	2018	Facility Name	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
3	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
0%	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Matthew E. Retzer, Regulatory Assurance Manager	717-456-4351

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
B	SB	ISV	A585	Yes					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On 10/1/18 at approximately 12:32 pm, Main Steam Isolation Valves (MSIVs) were stroked closed in preparation for entering Mode 4. The Unit 3 'B' inboard MSIV, AO-3-01A-080B, gave a split indication and it was determined that the valve had stopped approximately 1 inch short of full closure.

Turbulent steam flow had caused vibration of the MSIV poppet, causing the poppet cap guide to wear against the anti-rotation lug, resulting in a notch in the poppet cap guide. During valve closure, the poppet traveled its normal path, but the last 1 inch of stem travel did not occur because the stem anti-rotation lug was caught in the notch, which prevented the stem from reaching the pilot seating surface. The stem and the poppet cap guide were replaced, and a modification was performed to stabilize the poppet to prevent recurrence.

There were no actual safety consequences as a result of this event. The Unit 3 outboard MSIV was operable for performing its containment isolation function.

Unit Conditions Prior to the Event

Unit 3 was in Mode 3, Hot Shutdown, following a reactor scram that occurred on 9/30/18 (ref. LER 3-18-003). There were no structures, systems or components out of service that contributed to this event.

Description of Event

On 9/30/18, at 11:28 am, Unit 3 experienced an automatic reactor scram following a loss of the '3A' and '3B' condensate pumps. In the process of transitioning to Mode 4, Cold Shutdown, and in accordance with plant procedures, the Main Steam Isolation Valves (MSIVs)[EIIS:ISV] were closed at approximately 12:32 pm on 10/1/18 when reactor pressure reached 10 psig. Seven of the eight MSIVs indicated full closed. AO-3-01A-080B ("MSIV 80B"), the Unit 3 'B' inboard MSIV, gave a split indication (both open and closed lights lit) with its control switch in the close position.

In-field inspection of MSIV 80B identified that the valve had stopped approximately 1 inch short of full closure. After disassembling the valve, an inspection found that an anti-rotation lug on the shaft had worn into a guide in the poppet cap. The stem and the poppet cap guide were replaced, and a modification was performed to stabilize the poppet to prevent recurrence. The valve was tested on 10/8/18 and met all performance criteria.

An extent of condition review determined that the outboard MSIVs are not susceptible to this failure mechanism due to design differences. A visual inspection and diagnostic testing was performed on the three remaining inboard MSIVs (80A, 80C and 80D). During diagnostic testing, both the 80A and 80D valves showed normal operation, with test data closely aligned with their as-left test data from 2011. Based on these results, it was concluded that both 80A and 80D MSIVs are capable of performing their design function for the remainder of the cycle.

During diagnostic testing of MSIV 80C, the test data showed a difference in the operating characteristics. Therefore, the valve was disassembled. In-body inspection identified wear of the poppet cap guide from the anti-rotation lugs. The valve stem was not prevented from reaching full travel and seating properly. The stem and the poppet cap guide were replaced, and a modification was performed to stabilize the poppet to prevent recurrence.

Analysis of Event

Each MSIV is a 'Y'-shaped, 26 inch globe valve manufactured by Atwood & Morrill (model 20851-H) and provides primary containment isolation for the four main steam lines during a design basis event. The bottom end of the valve stem closes a small hole in the main plug (the poppet). When open, it acts as a pilot valve to relieve differential pressure on the poppet. The valve stem travel is approximately 10 inches; the poppet travels 9 inches and the last 1 inch of stem travel closes the pilot hole.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Peach Bottom Atomic Power Station Unit 3	05000278	2018	- 004	- 0

NARRATIVE

Technical Specification (TS) 3.6.1.3 requires each Primary Containment Isolation Valve (PCIV) to be operable during Modes 1, 2 and 3. With the condition described above, MSIV 80B would exceed the maximum allowed single MSIV leakage limit of 85 standard cubic feet per hour (scfh) and would be inoperable. With one MSIV inoperable, TS 3.6.1.3 Condition D requires leakage limits to be restored to within limits in 8 hours, or be in Mode 3 in 12 hours and Mode 4 in 36 hours. At the time of discovery, the unit was in Mode 3, and entered Mode 4 within approximately 15 minutes of when the condition was discovered. Therefore, TS requirements were met following discovery of the condition.

The valve was last closed approximately 8 days prior to this event on 9/23/18, following a reactor shutdown. The previous valve closure was on 10/23/17 during the last Unit 3 refueling outage. There was no indication of a degraded condition during either of these closures. However, the condition of the poppet cap guide suggests the degradation process had been occurring for a significant period of time. Although the successful closure of the valve 8 days prior to this event provides evidence it could perform its design function at that time, it does not provide firm evidence that the valve would have been able to continue to perform its design function. This results in the valve being inoperable for approximately 8 days, exceeding its TS allowed outage times.

This event is being reported in accordance with the following:

- 10 CFR 50.73(a)(2)(i)(B) – any condition prohibited by plant Technical Specifications. Because MSIV 80B was inoperable for a period of approximately 8 days, TS 3.6.1.3 Condition D was not met for restoring leakage limits within 8 hours and Condition F was not met for being in Mode 3 in 12 hours and Mode 4 in 36 hours if Condition D is not met.

There were no safety consequences as a result of this event. The outboard MSIV for the 'B' main steam line (AO-3-01A-086B) was operable and would have been able to perform its containment isolation function. The as-left leakage rate during the last Unit 3 refueling outage (Fall of 2017) for MSIV 86B was below the TS allowable limit.

Cause of the Event

An in-body inspection of the valve found that an anti-rotation lug on the shaft had worn the guide in the poppet cap, creating a notch in one side of the guide. During normal operation, with the MSIVs open, the poppet is supported by the valve stem and is exposed to steam flow. The observed damage to the poppet cap guide is indicative of poppet vibration as a result of turbulent steam flow. The steam flow applied a consistent vibration to the poppet causing the poppet cap guide to wear against the anti-rotation lug, resulting in a notch in the poppet cap guide. During valve closure, the poppet traveled its normal path, but the last 1 inch of stem travel did not occur because the stem anti-rotation lugs were caught in the notch, which prevented the stem from reaching the pilot seating surface.

Corrective Actions

The stem and the poppet cap guide were replaced, and the poppet was modified to improve stabilization for MSIV 80B and 80C. During the Unit 2 Fall 2018 refueling outage, which took place shortly after this event, three of the four Unit 2 inboard MSIVs were modified to improve stability. The fourth valve had the modification installed in a prior outage. As with Unit 3, the Unit 2 outboard MSIVs also do not have the anti-rotation lugs and are not susceptible to this particular failure mechanism.

Additional corrective actions are documented in the Corrective Action Program.

Previous Similar Occurrences

MSIV leakage exceeding TS limits has occurred in the past, however, the failure mechanism was different than in this event. Unit 2 LER 06-001 identified high MSIV leakage due to the poppet not properly seating on the main seating surface. Unit 2 LER 08-001 identified high MSIV leakage due to main seat degradation.