



10 CFR 50.73

CCN: 22-01

January 12, 2022

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

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

Subject: Licensee Event Report (LER) 2-2021-003-00 Manual Reactor Scram due to Degrading Condenser Vacuum

References: ENS 55575

This subject report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) for manual actuation of the Reactor Protection System and automatic actuation of the Primary Containment Isolation System which affected containment isolation valves in more than one system.

There are no commitments contained in this letter. If you have any questions, please contact the Peach Bottom Regulatory Assurance Manager, Siobhan O'Dwyer at (717) 456-3047.

Respectfully,

A handwritten signature in black ink, appearing to read "Matthew J. Herr".

Matthew J. Herr
Site Vice President
Peach Bottom Atomic Power Station

Enclosure

cc: USNRC, Administrator, Region I
USNRC, Senior Resident Inspector
W. DeHaas, Commonwealth of Pennsylvania
S. Seaman, State of Maryland
B. Watkins, PSE&G, Financial Controls and Co-Owner Affairs



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)
(See NUREG-1022, R.3 for instruction and guidance for completing this form
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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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk ail: aira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Peach Bottom Atomic Power Station, Unit 2	2. Docket Number 05000 277	3. Page 1 OF 3
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4. Title
Manual Reactor Scram due to Degrading Condenser Vacuum

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
11	14	2021	2021	- 003 -	00	1	12	2022		05000
									Facility Name	Docket Number
										05000

9. Operating Mode 1 **10. Power Level** 079

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<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)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Siobhan O'Dwyer, Regulatory Assurance Manager	Phone Number (Include area code) 7174563047
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
B	WF	PCV	F052	Y					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)				

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 11/14/2021 at 05:25 EST, a manual reactor scram was inserted on Unit 2 from 79 percent power due to degrading Main Condenser (EIS: SG) vacuum. The loss of vacuum occurred due to an isolation of the Offgas System (EIS: WF) on high Steam Jet Air Ejector discharge pressure and high Jet Compressor suction pressure. The manual reactor scram occurred with no complications and plant systems responded as expected. Unit 3 was unaffected. The scram resulted in an automatic Primary Containment Isolation System (PCIS)(EIS: JM) Group II/III isolation. Upon initial investigation, it was identified that the valve positioner for the Jet Compressor Bypass Valve (EIS: PCV) had a significant air leak which prevented the valve from closing. The root cause of the positioner failure was determined to be the use of low temperature soft parts in a high temperature environment. The soft parts within the failed positioner were replaced with higher-temperature rated components. Actions are in place to replace other low temperature soft parts within the Offgas System.

There were no safety consequences as a result of the event. This report is made pursuant to 10CFR50.73(a)(2)(iv)(A) for manual actuation of the Reactor Protection System (scram) (EIS: JC) and automatic actuation of the PCIS which affected containment isolation valves in more than one system.



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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Peach Bottom Atomic Power Station, Unit 2	05000- 277	2021	- 003	- 00

NARRATIVE

Plant Operating Conditions Before the Event

Peach Bottom Atomic Power Station Unit 2 (PB2) was operating at approximately 100 percent power in MODE 1 at the beginning of the event. Reactor power was reduced to 79 percent prior to inserting the manual scram. There were no structures, systems or components (SSC) that were inoperable at the start of the event that contributed to the event.

Failed Component Information

Model Number: Design ES Type
Description: 2" Design ES control valve, 657 Actuator, 3582 Positioner
Manufacturer: Fisher Controls International
Type: Pressure Control Valve

Event Description

On 11/12/2021, an alarm was received in the Main Control Room for high pressure in the Unit 2 Offgas Jet Compressor suction. Adjustments to the pressure controller for the Jet Compressor Bypass Valve were made, but were unsuccessful in lowering pressure, and the pressure setpoint for Offgas System isolation was reached. Operator actions to restore the Offgas System were unsuccessful and reactor power was lowered to control Main Condenser vacuum. In response to continued degradation of Main Condenser vacuum, a manual Reactor scram was inserted from 79 percent power on 11/14/2021 at 05:25 EST. The manual scram occurred with no complications and plant systems responded as expected. The scram resulted in an automatic PCIS Group II/III isolation, reactor water level was maintained with the Feedwater system (EIS: SJ), and reactor pressure was maintained with the Electrohydraulic Control system (EIS: JJ), with the Main Condenser available as the primary heat sink. Unit 3 was unaffected.

This event was reported by Notification EN 55575 in accordance with 10CFR50.72(b)(2)(iv)(B).

Upon initial investigation, it was identified that the valve positioner for the 'A' train Jet Compressor Bypass Valve had a significant air leak which prevented the valve from closing. This air operated valve is designed to close with air pressure and to fail open. The purpose of the valve is to maintain Jet Compressor suction pressure by controlling bypass steam supply to the suction of the Jet Compressors. After the reactor scram, the valve positioner was replaced and post maintenance testing was completed satisfactorily. The plant entered start-up on 11/15/2021 and reached 100% power on 11/16/2021.

The root cause of the failure of the positioner was determined to be the use of low temperature soft parts in a high temperature environment. Analysis identified that the positioner failure was due to a degraded bellows o-ring and subsequent air leakage. The elastomer became embrittled to the point of failure, likely caused by heat/temperature aging. A high temperature environment existed when a steam leak occurred near the failed part in 2019.

A contributing cause to this failure was a misclassification of the equipment as “non-critical” within the equipment reliability vulnerability reduction process, due to a perception that a redundant parallel Offgas train prevented this equipment from creating a single point vulnerability. This misclassification led to longer maintenance intervals and potential missed opportunities for further component failure risk analysis and mitigation. A second contributing cause was a failure to effectively identify and respond to the deteriorating trends of the Offgas system over time, as indicated by equipment maintenance history and system parameters.

Safety Consequences

The manual reactor scram was inserted without complication and resulted in no safety consequences. Plant SSC responded as expected. The reactor scram did not require Emergency Core Cooling System (ECCS) initiation and Main Steam Isolation Valves (MSIVs) remained open, preserving the Main Condenser as the primary heat sink.

Corrective Actions

The valve positioner was replaced at the time of the event, restoring full function to the Offgas system and supporting restart of Unit 2. The elastomers were replaced with higher-temperature rated components. Actions are in place to facilitate replacement of other low temperature soft parts within the system. Actions to address the contributing causes are to re-screen the Offgas system components for criticality to ensure appropriate maintenance, and to include this event as a case study within formal training for trend identification and risk assessment, given to plant leaders and technical staff.

Previous Similar Events

No scrams have occurred to due degrading condenser vacuum or similar valve failures within the last 10 years at Peach Bottom.