



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMS NO. 3150-0104  
EXPIRES 8/31/86

FACILITY NAME (1)  Peach Bottom Atomic Power Station - Unit 2	DOCKET NUMBER (2)  0 5 0 0 0 2 7 7 8 5 - 0 0 3 - 0 1 0 2 OF 0 6	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			

TEXT (If more space is required, use additional NRC Form 365a) (17)

Description of the Event:

This revision to LER 2-85-03 provides additional information regarding the valve failure and clearly identifies its cause based on an investigation performed since the submittal of the original report. Additionally, the revised report corrects some of the terminology used for valve parts. The terminology incorrectly used in the original report was "drive sleeve", a Limitorque operator part. However, the failed parts were supplied by the valve manufacturer, Walworth. The Walworth part which was mistaken by the report preparers as the Limitorque "drive sleeve" is the yoke nut.

On June 1, 1985 with the Unit 2 Hydrostatic test in progress, the "A" loop Residual Heat Removal (RHR) system outboard injection valve, MO-2-10-154A, was closed to permit maintenance testing of packing adjustments made to the inboard injection valve, MO-2-10-25A, by measuring that valves motor running current. During the test, the inboard injection valve was opened and reclosed. When an attempt was made to return the outboard injection valve, MO-2-10-154A, to its normally open position it stopped somewhere in a mid-stroke position.

On June 3, 1985 at approximately 8:50 p.m., with Unit No.2 in the refuel mode, the valve would not stroke open from the control room during surveillance testing and was declared inoperable. Upon inspection the valve was discovered to be approximately one inch off its seat and could not be stroked electrically or manually. The yoke nut was noticed to be screwed down on the stem.

This failure rendered one subsystem of the Low Pressure Coolant Injection (LPCI) system unavailable through normal system flow paths. The reactor mode switch was placed in the shutdown position at 8:50 p.m., the valve thrust assembly was rebuilt, and the valve was returned to service. The reactor mode switch was returned to the "Refuel" position at 10:00 p.m. on June 6, 1985.

The EIIS code for the affected system is BO and for the affected component is INV.

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TEXT (If more space is required, use additional NRC Form 386A s/ (17))

Consequences of the Event:

One subsystem of the LPCI system was unavailable for injection into the reactor vessel via the normal system flow paths. However, this LPCI subsystem, with the exception of the MO-2-10-154A valve, was operable and available for injection into the reactor vessel via an alternate system flow path through a cross-tie valve into the discharge of the remaining operable LPCI subsystem. Therefore, adequate LPCI injection capacity was available and could have been maintained utilizing the cross-tie valve to mitigate the consequences of a loss-of-coolant accident. Additionally, both Core Spray systems were operable. The reactor had been shutdown for thirteen months and decay heat was minimal.

Cause of the Event:

On May 29, 1985 while in the refuel mode, the Unit 2 Operational Hydrostatic Test (Hydro) of the reactor pressure vessel and class 1 piping was in progress. Rated Hydro test pressure was reached at 6:45 p.m. A minor packing leak was noticed on the "A" loop RHR system inboard injection valve MO-2-10-25A. Maintenance personnel pulled up on the packing to stop the leak. After pulling up on packing or repacking any motor operated valve, standard maintenance practice is to request operations personnel to electrically stroke the valve so that motor running current may be checked. This request was made on June 1, 1985 with the reactor still at rated Hydro test pressure, approximately 1050 psig. Electrical interlocks prevent opening this normally closed valve with reactor pressure greater than 450 psig and the outboard injection valve, MO-2-10-154A, open. The MO-2-10-154A valve was therefore closed, allowing the MO-2-10-25A valve to be successfully stroked at Maintenance's request. To restore these valves to their normal positions, the inboard injection valve, MO-2-10-25A, was reclosed. An attempt was then made to return the MO-2-10-154A valve to its normally open position. The "System I Injection Overcurrent" alarm was received and valve position indication lights in the control room showed that the valve had stopped somewhere in mid-stroke.

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TEXT (If more space is required, use additional NRC Form 366a) (17)

The M0-2-10-154A valve is designed to operate against a maximum differential pressure of 350 psi. During reactor power operation, these valves are stroked in accordance with surveillance test procedures which properly equalize the pressure across them prior to stroking them open. However, following the maintenance performed during the Hydro, no surveillance test procedure was in effect and the pressure was not equalized. A differential pressure of approximately 1050 psi was across the M0-2-10-154A valve when the operator attempted to open it.

The M0-2-10-154A valve is a 24" pressure seal right angle globe valve manufactured by the Walworth Company. Its Limitorque operator's torque drive sleeve is keyed to the yoke nut. The yoke nut is supported within the valve yoke between two sets of tapered roller thrust bearings (upper and lower). The yoke nut, upper and lower thrust bearings, and a locknut constitute the thrust assembly, which is supplied by Walworth as part of the valve (see attachment). With the locknut in place above the upper thrust bearing, downward motion of the yoke nut during valve opening is prevented. The locknut is threaded onto external threads on the yoke nut and is equipped with two setscrews 90 degrees apart. The locknut rotates with the yoke nut during operation.

After removing the Limitorque operator from the valve yoke, it was observed that the locknut had been forced completely off of the yoke nut. The external threads of the yoke nut and the mating threads of the locknut were damaged. With the locknut off, the yoke nut was free to travel down the valve stem until the yoke nut key became jammed between the top of its slot in the yoke nut and the top surface of loose locknut. This resulted in the mechanical binding of the yoke nut to the extent that the valve could not be stroked. The excessive thrust as a result of attempting to open this valve against a differential pressure much greater than the design pressure, 350 psi, caused the locknut and external yoke nut threads to fail. In addition to the damaged yoke nut and locknut, the upper thrust bearing cone was cracked and rollers were out of their cage. Rollers were also out of their cage on the lower thrust bearing. No damage occurred to the valve's Limitorque operator.

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Corrective Actions:

The reactor mode switch was changed from the "Refuel" to the "Shutdown" position at 8:50 p.m. The valve thrust assembly was rebuilt with new parts from the storeroom which were purchased from the manufacturer. The yoke nut, locknut, upper and lower thrust bearings and yoke nut key were replaced. The valve was verified as operable and returned to service and the reactor mode switch was returned to the "Refuel" position at 10:00 p.m. on June 6, 1985.

A pressure gauge has been installed between the MO-2-10-154 and MO-2-10-25 valves on both the "A" and "B" RHR loops of Unit 2. This will also be done on Unit 3 prior to the end of the current refuel outage. This should reduce the probability of the MO-2-10-154 valves being stroked under excessive differential pressure during surveillance tests, and otherwise in the future.

The Unit 2 and Unit 3 Hydro test procedures will be revised prior to the next Unit 3 Hydro test to incorporate steps for equalizing pressure across the MO-2-10-154 valves, if one must be stroked during the test. Furthermore, tags will be attached to the control room switches for valves which must be closed during the Hydro test. This will include the MO-2-10-25 valves. The operator would be alerted to consult the Hydro test procedure prior to stroking the MO-2-10-25 valves, which would require stroking the associated MO-2-10-154 valve due to electrical interlocks. These tags will be used during the next Unit 3 Hydro test and subsequent Unit 2 and Unit 3 Hydro tests.

A potential always exists for stroking valves against excessive differential pressure in unique situations when no procedure is in effect, as was the case on June 1, 1985 when the MO-2-10-154A valve was stroked following maintenance work. To reduce the probability of such an occurrence, all control room operators will be instructed on the proper operation of safety related motor operated valves, emphasizing the LPCI injection valves, MO-154 and MO-25 valves, and the Core Spray injection valves, MO-11 and MO-12 valves. The operators will be reminded that failure to perform the basic steps of equalizing pressure prior to stroking can damage these valves.



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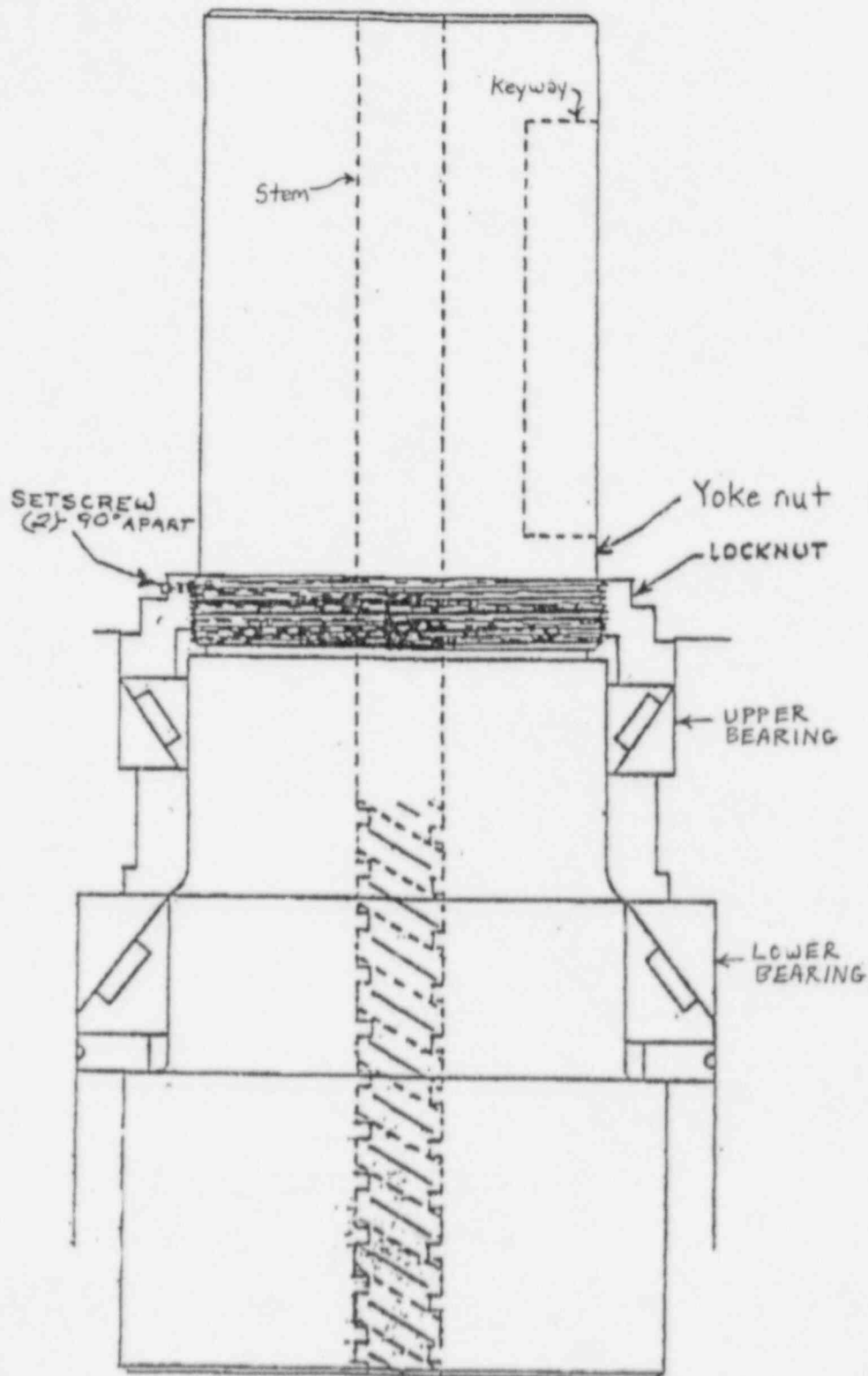
TEXT (If more space is required, use additional NRC Form 366A) (17)

Because of subsequent failures of this valve in August 1985 (see LER 2-85-13), an investigation will be performed on the parts supplier for this model valve to determine what controls are necessary to ensure the procurement of proper replacement parts.

Previous Similar Occurrences:

3-78-22/3L.

# YOKE NUT AND THRUST ASSEMBLY



Not to scale

PHILADELPHIA ELECTRIC COMPANY

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PHILADELPHIA, PA. 19101

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October 23, 1985

Docket No. 50-277

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: Licensee Event Report  
Peach Bottom Atomic Power Station - Unit 2

This revised LER (Rev. 1) deals with the failure of the "A" loop Residual Heat Removal system outboard injection valve, M0-2-10-154A. This revision provides additional information and corrects some terminology. Revisions are indicated by a vertical bar.

Reference:	Docket No. 50-277
Report Number:	2-85-03
Revision Number:	01
Event Date:	June 01, 1985
Discovery Date:	June 03, 1985
Report Date:	October 23, 1985
Facility:	Peach Bottom Atomic Power Station RD 1, Box 208, Delta, PA 17314

This LER is submitted pursuant to the requirements of 10 CFR 50.73 (a)(2)(v) and (vii).

Very truly yours,



W. T. Ullrich  
Superintendent  
Nuclear Generation Division

cc: Dr. Thomas E. Murley, Administrator, Region I, USNRC  
T. P. Johnson, Resident Inspector

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