



Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

October 14, 2009

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

10 CFR 50.73

Dear Sir:

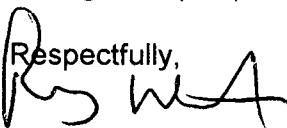
Browns Ferry Nuclear Plant, Unit 1
Facility Operating License No. DPR-33
NRC Docket No. 50-259

Subject: **LICENSEE EVENT REPORT (LER) 50-259/2009-004**

The enclosed report provides details of the High Pressure Coolant Injection (HPCI) system being inoperable due to a tear in the diaphragm of 1-PCV-073-0018C causing an oil leak from the HPCI control oil system.

On July 24, 2009 at 1750 CDT, Browns Ferry Nuclear Plant (BFN) made an eight hour notification (45227) in accordance with 10 CFR 50.72(b)(3)(v). On September 22, 2009 at 1600 CDT, BFN submitted a retraction of the ENS Event Number 45227. BFN Engineering evaluated the oil leak and determined that there was no impact on HPCI operation during its mission time for the Design Basis accidents and transients for which HPCI is credited. The NRC Resident Inspector subsequently identified concerns with the engineering evaluation. While these concerns are being resolved, BFN is submitting the attached report for the HPCI July 24, 2009 event.

TVA is reporting this in accordance with 10 CFR 50.73(a)(2)(v)(B) and (D), as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat and mitigate the consequences of an accident. There are no commitments contained in this letter. Should you have any questions concerning this submittal, please contact F. R. Godwin, Site Licensing and Industry Affairs manager, at (256) 729-2636.

Respectfully,


R. G. West
Vice President

bcc: See page 2

JE22
NRR

U.S. Nuclear Regulatory Commission
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Enclosure
cc (Enclosure):

Regional Administrator - Region II

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

NRC FORM 366 (9-2007)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104		EXPIRES 08/31/2010												
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 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.									
1. FACILITY NAME Browns Ferry Unit 1					2. DOCKET NUMBER 05000259					3. PAGE 1 of 5									
4. TITLE: High Pressure Core Injection Found Inoperable During Compensate Header Level Switch Calibration and Functional Test																			
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 None										
07	24	2009	2009	- 004	- 00	10	14	2009	FACILITY NAME None										
9. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)																
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 checked="" 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 type="checkbox"/> 50.73(a)(2)(i)(B) <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)																
12. LICENSEE CONTACT FOR THIS LER																			
NAME Bob Birchell, Licensing Engineer										TELEPHONE NUMBER (Include Area Code) 423-751-4498									
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										
B	BJ	FCV	R290	Y															
14. SUPPLEMENTAL REPORT EXPECTED										15. EXPECTED SUBMISSION DATE									
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO										MONTH DAY YEAR N/A N/A N/A									
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																			
<p>At 1415 CDT on July 24, 2009, with Unit 1 in Mode 1, at approximately 100 percent of rated thermal power, reactor temperature at 529 degrees Fahrenheit (F), and reactor pressure at 1034 psi, Operations was conducting a surveillance on the High Pressure Coolant Injection System (HPCI), 1-SR-3.5.1.7, "HPCI Main and Booster Pump Set Development Head and Flow Rate Test at Rated Reactor Pressure." At approximately 1415 CDT, during the prerequisite steps of this surveillance, 1-PCV-073-0018C, the HPCI Turbine Stop Valve Mechanical Trip Hold Valve, developed a tear in the diaphragm. This tear caused oil from the HPCI control oil system to spill onto the floor at a rate visually observed to be approximately 0.25 to 0.5 gallons per minute (gpm). The leak was a concern due to the fact that pressurization of the control oil system is the motive force required to open the HPCI stop valve. If oil pressure were to fall low enough, the stop valve would close and the HPCI turbine would decelerate until the valve reopens. In this event, the concern was that a severe oil leak could potentially make it impossible to pressurize the control oil system. If the oil system could not be pressurized the HPCI Stop Valve could not be opened which would render HPCI inoperable.</p> <p>TVA is reporting this in accordance with 10 CFR 50.73(a)(2)(v)(B) and (D), as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to, remove residual heat, and mitigate the consequences of an accident.</p>																			

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Browns Ferry Nuclear Plant Unit 1	05000259	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 of 5
		2009	-- 004	-- 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

I. PLANT CONDITION(S)

Prior to the event, Unit 1 was operating in Mode 1 at approximately 100 percent of rated thermal power (3458 megawatts thermal). Units 2 and 3 were also at 100 percent power (3458 Megawatts thermal) and unaffected by the event.

II. DESCRIPTION OF EVENT**A. Event:**

On July 24, 2009, with Unit 1 in Mode 1, at approximately 100 percent of rated thermal power, reactor temperature at 529 degrees F, and reactor pressure at 1034 psi, Operations was conducting a surveillance on the HPCI [BJ], 1-SR-3.5.1.7, "HPCI Main and Booster Pump Set Development Head and Flow Rate Test at Rated Reactor Pressure." HPCI had been declared inoperable for the performance of the surveillance test. At approximately 1415 CDT, during the prerequisite steps of this surveillance, 1-PCV-073-0018C, the HPCI Turbine Stop Valve Mechanical Trip Hold Valve, developed a tear in the diaphragm. This tear caused oil from the HPCI control oil system to spill onto the floor at a rate visually observed to be approximately 0.25 - 0.5 gpm. The leak was a concern due to the fact that pressurization of the control oil system is the motive force required to open the HPCI stop valve. If oil pressure were to fall low enough, the stop valve would close and the HPCI turbine would decelerate until the valve reopens. In this event, the concern was that a severe oil leak could potentially make it impossible to pressurize the control oil system. If the oil system could not be pressurized, the HPCI Stop Valve could not be opened, which would render HPCI inoperable. On July 24, 2009 at approximately 2100 CDT the torn diaphragm was removed and replaced with a new one. Systems Engineering was with Maintenance at the time of removal and examined the diaphragm. It was at this time that the tear was discovered. The failure was determined to be caused by a manufacturing defect. As such, personnel actions were not a contributor to the failure.

At 1750 CDT on July 24, 2009, BFN made notification 45227. Since there were concerns regarding the ability of HPCI to fulfill its safety function, BFN made the eight hour notification in accordance with 10 CFR 50.72(b)(3)(v)(B) and 10 CFR 50.72(b)(3)(v)(D).

On July 25, 2009, at approximately 0125 CDT, Operations declared HPCI operable after the successful completion of post maintenance testing for Work Order 09-719727-000.

TVA is reporting this in accordance with 10 CFR 50.73(b)(3)(v)(B) and (D) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to, remove residual heat, and mitigate the consequences of an accident.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Nuclear Plant Unit 1	05000259	2009	-- 004	-- 00	3 of 5

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

C. Dates and Approximate Times of Major Occurrences:

July 24, 2009 1415 hours CDT

During the performance of 1-SR-3.5.1.7, valve 1-PCV-073-0018C developed an oil leak.

HPCI was inoperable at the time of discovery due to performance of the surveillance and continued to be inoperable due to the oil leak that developed.

1750 hours CDT

BFN made an eight hour notification (45227) in accordance with 10 CFR 50.72(b)(3)(v)(B) and (D).

2100 hours CDT

The diaphragm was removed and replaced under Work Order (WO)# 09-719727-000. Systems Engineering was with Maintenance at the time of removal and examined the diaphragm. It was at this time that the tear was discovered.

July 25, 2009 0125 hours CDT

Operations declared HPCI operable following successful completion of the post maintenance test for WO #09-719727-000.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

A 0.25 to 0.5 gallon per minute oil leak was visually observed during routine scheduled testing activities.

F. Operator Actions

None.

G. Safety System Responses

None.

III. CAUSE OF THE EVENT**A. Immediate Cause**

The immediate cause of the event was a failed diaphragm in 1-PCV-073-0018C

B. Root Cause

A material defect in the diaphragm of 1-PCV-073-0018C, HPCI Turbine Stop Valve Mechanical Trip Hold Valve, allowed the diaphragm to tear under normal system pressure and operating conditions after being installed for 2 years and 8 months.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Browns Ferry Nuclear Plant Unit 1	05000259	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 of 5
		2009	-- 004	-- 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

C. Contributing Factors

None.

IV. ANALYSIS OF THE EVENT

A material defect in the diaphragm of 1-PCV-073-0018C HPCI, the Turbine Stop Valve Mechanical Trip Hold Valve, allowed the diaphragm to tear under normal system pressure and operating conditions after being installed for 2 years and 8 months.

Once the leak developed on the 1-PCV-073-0018C, the surveillance test of HPCI (1-SR-3.5.1.7) was halted. As an immediate corrective action WO# 09-719727-000 was written, planned, and worked within 12 hours. This WO directly corrected the apparent cause by removing the torn diaphragm and replacing it with a new diaphragm. Systems Engineering retrieved the torn diaphragm from Maintenance immediately after it was removed and had it sent to TVA Central Labs for evaluation. The result of the TVA Central Lab evaluation is that no fibers were present inside of the Buna-N material in the region of the tear. These fibers are required for the diaphragm to perform its intended function. The diaphragm is a two ply, fabric reinforced Buna-N diaphragm. The lack of fibers discovered by the central lab is a material defect. The completion of the work order that replaced the diaphragm allowed the Unit 1 HPCI system to be returned to operable status and allowed satisfactory completion of the surveillance.

BFN will verify that diaphragms from the same lot as the failed diaphragm are not currently installed on Units 1, 2, or 3, PCV-073-0018C, HPCI Turbine Stop Valve Mechanical Trip Hold Valve.

A Preventative Maintenance request currently exists to replace this diaphragm once every 6 years due to known industry failure rates. Researching the most recent replacement of the diaphragm on Unit 1 prior to this event shows that the torn diaphragm had been installed by WO# 06-712568-000 on 12/21/2006. The research also shows that WO# 04-710016-000 installed a new diaphragm on Unit 2 on 04/16/2005 and WO# 03-010776-000 installed a new diaphragm on Unit 3 on 03/22/2004. There are planned maintenance actions to replace the diaphragm on Units 2 and 3 during their next refueling outages. WO# 09-713071 is currently scheduled to replace the diaphragm on Unit 3 during the U3C14 refueling outage scheduled for 3/1/2010 and the Unit 2 diaphragm will be replaced during the U2C16 refueling outage scheduled for 2/28/2011.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The safety consequences of this event were not significant. Emergency Core Cooling System (ECCS) Operation, BFN TS 3.5.1, allows continued power operations for up 14 days with HPCI inoperable as long as the Reactor Core Isolation Cooling System (RCIC) [BN] is operable. RCIC was verified to be operable during this time. During the timeframe that HPCI was inoperable; the other required Emergency Core Cooling Systems were operable and remained capable of mitigating design basis accidents and transients as assumed in the safety analysis. Therefore, TVA concludes that the health and safety of the public were not affected by this event.

VI. CORRECTIVE ACTIONS**A. Immediate Corrective Actions**

The diaphragm on 1-PCV-0073-0018C was replaced.

LICENSEE EVENT REPORT (LER)

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		2009	-- 004	-- 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

B. Corrective Actions to Prevent Recurrence

The corrective actions are being managed by BFN's corrective action program.

1. BFN will verify that spare diaphragms on site are not from the same lot as the diaphragm that failed.
2. If any spare diaphragms on site are found from the same lot as the diaphragm that failed BFN will quarantine them and order new spares to replace them.
3. BFN will verify that diaphragms from the same lot as the failed diaphragm are not currently installed on Units 1, 2, or 3, PCV-073-0018C, HPCI Turbine Stop Valve Mechanical Trip Hold Valve.

VII. ADDITIONAL INFORMATION

A. Failed Components

HPCI Turbine Stop Valve Mechanical Trip Hold Valve, 1-PCV-073-0018C

B. Previous LERs on Similar Events

None.

C. Additional Information

Corrective action document for this report is PER 177206

D. Safety System Functional Failure Consideration:

This event does involve a safety system functional failure according to NEI 99-02.

E. Scram With Complications Consideration:

This event was not a complicated scram according to NEI 99-02.

VIII. COMMITMENTS

None.