



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

January 19, 2010

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Unit 2  
Facility Operating License No. DPR-52  
NRC Docket No. 50-260

**Subject: Licensee Event Report 50-260/2009-009**

The enclosed Licensee Event Report (LER) provides details of inadvertent isolation of the high pressure coolant injection system during testing activities. The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There are no new regulatory 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,

A handwritten signature in black ink, appearing to read "Keith J. Polson".

K. J. Polson  
Vice President

cc: See page 2

JL E22  
MLR

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

NRC Regional Administrator - Region II

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

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

<b>1. FACILITY NAME</b> Browns Ferry Nuclear Plant Unit 2	<b>2. DOCKET NUMBER</b> 05000260	<b>3. PAGE</b> 1 of 4
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**4. TITLE:** Inadvertent Isolation of the High Pressure Coolant Injection System During Testing Activities

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
11	17	2009	2009	- 009	- 00	01	19	2010	N/A	N/A
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

<b>9. OPERATING MODE</b>  1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)											
	<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)								
<b>10. POWER LEVEL</b>  100	<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 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)	Specify in Abstract below or in NRC Form 366A									

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> Steve Austin, Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> 256-729-2070
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**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>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	N/A	N/A	N/A

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 17, 2009, at 2034 hours Central Standard Time, the Unit 2 High Pressure Coolant Injection (HPCI) system unexpectedly received a Group 4 Primary Containment Isolation Signal, during the performance of Surveillance Procedure, HPCI Steam Line Space High Temperature Functional Test. Browns Ferry Nuclear Plant Operations personnel entered Abnormal Operating Instruction, Group 4 High Pressure Coolant Injection Isolation, AOI-64-2B. They also entered Technical Specification (TS) Limiting Condition for Operation (LCO) Action 3.5.1, Condition C. TS 3.5.1 Required Actions C.1 and C.2 required the Reactor Core Isolation Cooling (RCIC) system to be immediately verified by administrative means to be operable, and to restore the HPCI system to operable status in 14 days. Operations personnel immediately verified by administrative means the RCIC system was operable. By 2250 hours Operations personnel reset the HPCI isolation signal and using the applicable portions of Operating Instruction, High Pressure Coolant Injection, placed the HPCI system back in standby readiness, exiting AOI-64-2B, and the TS LCO actions. The root cause for HPCI inoperability was a faulty test connector on the HPCI Steam Line Space High Temperature test panel. Disassembly and inspection of the HPCI Steam Line Space High Temperature test panel connector found that the internal portion of the connector body was not insulated and the insulation on several connectors within the assembly was not sufficient to prevent inadvertent short circuit. The test connector was replaced and the surveillance procedure was successfully completed.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Browns Ferry Nuclear Plant Unit 2	05000260	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 of 4
		2009	-- 009	-- 00	

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

**I. PLANT CONDITION(S)**

At the time of discovery, Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3 were at approximately 100 percent power.

**II. DESCRIPTION OF EVENT**

**A. Event:**

On November 17, 2009, at 2034 hours Central Standard Time (CST), the Unit 2 High Pressure Coolant Injection (HPCI) [BJ] system unexpectedly received a Group 4 Primary Containment Isolation Signal (PCIS) [JE], during the performance of Surveillance Procedure, HPCI Steam Line Space High Temperature Functional Test, SR-3.3.6.1.3(3DFT). BFN Operations personnel entered Abnormal Operating Instruction, Group 4 High Pressure Coolant Injection Isolation, AOI-64-2B. They also entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.5.1 Action, Condition C. TS 3.5.1 Required Actions C.1 and C.2 required the Reactor Core Isolation Cooling (RCIC) [BN] system to be immediately verified by administrative means to be operable, and to restore the HPCI system to operable status in 14 days. Operations personnel immediately verified by administrative means the RCIC system was operable.

By 2250 hours Operations personnel reset the HPCI isolation signal and using the applicable portions of Operating Instruction, High Pressure Coolant Injection, 2-OI-73, placed the HPCI system back in standby readiness, exiting AOI-64-2B, and the TS LCO actions.

Subsequent investigation determined that during the functional test of the Channel A1 HPCI steam line space high temperature trip device, Channel B2 HPCI steam line space high temperature trip device also tripped. As a result, relays 2-RYL-073-23A-K34 and 2-RYL-073-23A-K8 actuated, satisfying the logic for HPCI system isolation.

The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

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

None

**C. Dates and Approximate Times of Major Occurrences:**

- November 17, 2009, at 2034 hours CST      Inadvertent HPCI isolation during performance of Surveillance Procedure SR-3.3.6.1.3(3DFT).
- November 17, 2009, at 2250 hours CST.      HPCI system is returned to standby readiness.
- November 18, 2009, at 0219 hours CST      Operations made an Emergency Notification System report in accordance with 10 CFR 50.72(b)(3)(v).

**D. Other Systems or Secondary Functions Affected**

None

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**E. Method of Discovery**

The trip of both the Channel A1 and Channel B2 steam line space high temperature trip devices was identified by the test personnel using BFN Integrated Computer System.

**F. Operator Actions**

Operations personnel immediately verified by administrative means the RCIC system was operable. They performed recovery steps outlined in AOI-64-2B and 2-OI-73, returning the HPCI system to standby readiness.

**G. Safety System Responses**

None.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause**

The immediate cause for HPCI inoperability was a false high temperature signal generated during performance of the surveillance procedure.

**B. Root Cause**

The root cause for HPCI inoperability was a faulty test connector on the HPCI Steam Line Space High Temperature test panel. Disassembly and inspection of the HPCI Steam Line Space High Temperature test panel connector found that the internal portion of the connector body was not insulated and the insulation on several conductors within the assembly was not sufficient to prevent inadvertent short circuit.

**C. Contributing Factors**

None

**IV. ANALYSIS OF THE EVENT**

The HPCI system responded as designed on receipt of redundant channel high temperature actuations. The HPCI system high temperature switches consist of 16 switches divided into four groups. Each switch group contains four temperature switches, each of which feed a trip channel.

A test panel is used to test each switch individually by way of a heater coil. The test panel circuits are designed to prevent the application of heat to more than one sensor at a time. Each test panel has a multiple (twenty-seven) pin connector that is connected at the beginning of each test. Voltage is applied to each heater coil using the test panel to heat the temperature switch to above the setpoint. When the test panel is not in use, the power is removed and the multiple conductor cable is disconnected. The movement of the wires within the plug during the installation and removal of the test plug from the test panel could have caused a short in the test plug.

During the test, due to a short within the multiple pin connector voltage was applied to more than one heater in separate trip circuits causing relays 2-RYL-073-23A-K34 and 2-RYL-073-23A-K8 to simultaneously actuate, resulting in the HPCI system isolation. The investigation found that prior to the start of the test and following the removal of the test equipment the trip signals were cleared.

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

**V. ASSESSMENT OF SAFETY CONSEQUENCES**

The safety consequences of this event were not significant. BFN TSs allow continued power operation for up to 14 days with the HPCI system inoperable provided that the RCIC system is operable. In this condition, the other required Emergency Core Cooling Systems were operable and remained capable of mitigating design basis accidents and transients assumed in the UFSAR. In addition, the RCIC system was verified operable during this time as required by TC LCO 3.3.5.5.1, Action C, and would have automatically provided makeup water to the reactor if required. Therefore, TVA concludes that there was no significant reduction in the protection of the public by this event.

**VI. CORRECTIVE ACTIONS**

**A. Immediate Corrective Actions**

After verification that the HPCI system isolation was the result of the test equipment and not from a valid isolation, the HPCI system was declared operable and the TS 3.5.1 LCO action was exited.

**B. Corrective Actions to Prevent Recurrence - The corrective actions to prevent recurrence are being managed by BFN's corrective action program.**

A new connector was installed on the HPCI Steam Line Space High test panel and SR-3.3.6.1.3(3DFT) was successfully completed.

**VII. ADDITIONAL INFORMATION**

**A. Failed Components**

None

**B. PREVIOUS LERS ON SIMILAR EVENTS**

None

**C. Additional Information**

Corrective action document for this report is Problem Evaluation Report 208627.

**D. Safety System Functional Failure Consideration:**

This event is classified as 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