



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

December 16, 2013

10 CFR 50.73

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

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

Subject: **Licensee Event Report 50-259/2013-007-00**

The enclosed Licensee Event Report provides details of the High Pressure Coolant Injection System being declared inoperable due to an inadvertent actuation of the Primary Containment Isolation System. The Tennessee Valley Authority is submitting this report in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.73(a)(2)(v)(B) and 10 CFR 50.73(a)(2)(v)(D).

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact J. L. Paul, Nuclear Site Licensing Manager, at (256) 729-2636.

Respectfully,

K. J. Polson
Vice President

Enclosure: Licensee Event Report 50-259/2013-007-00 – High Pressure Coolant Injection System Declared Inoperable Due to an Inadvertent Actuation of the Primary Containment Isolation System

cc (w/ Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

JE22
NRK

ENCLOSURE

**Browns Ferry Nuclear Plant
Unit 1**

Licensee Event Report 50-259/2013-007-00

**High Pressure Coolant Injection System Declared Inoperable Due to an Inadvertent
Actuation of the Primary Containment Isolation System**

See Enclosed

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104		EXPIRES 10/31/2013													
LICENSEE EVENT REPORT (LER)										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 FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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 Nuclear Plant, Unit 1					2. DOCKET NUMBER 05000259			3. PAGE 1 of 7												
4. TITLE: High Pressure Coolant Injection System Declared Inoperable Due to an Inadvertent Actuation of the Primary Containment Isolation System																				
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 N/A						DOCKET NUMBER 05000					
10	16	2013	2013 - 007 - 00			12	16	2013	FACILITY NAME N/A						DOCKET NUMBER 05000					
9. OPERATING MODE <div style="text-align: center; font-size: 2em;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>																	
			<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)				<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B)				<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)				<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER <small>Specify in Abstract below or in NRC Form 366A</small>					
10. POWER LEVEL <div style="text-align: center; font-size: 1.5em;">100</div>																				
12. LICENSEE CONTACT FOR THIS LER																				
FACILITY NAME Christopher Bennett, Licensing Engineer										TELEPHONE NUMBER <i>(Include Area Code)</i> 256-729-2475										
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											
14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO										15. EXPECTED SUBMISSION DATE <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; text-align: center;">MONTH</td> <td style="width:33%; text-align: center;">DAY</td> <td style="width:33%; text-align: center;">YEAR</td> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> </tr> </table>					MONTH	DAY	YEAR	N/A	N/A	N/A
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ABSTRACT <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i> <p>On October 16, 2013, at 1032 hours Central Daylight Time, the Browns Ferry Nuclear Plant, Unit 1, High Pressure Coolant Injection (HPCI) System unexpectedly received a Group 4, Primary Containment Isolation System (PCIS) signal during the performance of surveillance procedure 1-SR-3.3.5.1.2(ATU D), Core and Containment Cooling Systems Analog Trip Unit Functional Test. Operations personnel declared the HPCI System inoperable and entered Technical Specification 3.5.1, Emergency Core Cooling System-Operating, Condition C.</p> <p>The Group 4, PCIS signal isolated the steam flow path to the HPCI turbine, resulting in the HPCI System being unavailable for approximately 14 minutes. The HPCI System isolation and unavailability is considered a safety system functional failure of a single-train system preventing accident mitigation and residual heat removal.</p> <p>The root cause of this event was determined to be the workers not applying human error reduction tools appropriately, resulting in a procedure step not being completed as written.</p> <p>The corrective action to prevent recurrence was to perform appropriate disciplinary action with the workers involved in the HPCI isolation in accordance with Human Resource process and procedures.</p>																				

LICENSEE EVENT REPORT (LER)
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NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of the event, Browns Ferry Nuclear Plant (BFN), Unit 1, was in Mode 1 at approximately 100 percent rated thermal power.

II. Description of Events

A. Event:

On October 16, 2013, at 1032 hours Central Daylight Time (CDT), BFN, Unit 1, High Pressure Coolant Injection (HPCI) [BJ] System unexpectedly received a Group 4, Primary Containment Isolation System (PCIS)[BD] signal during the performance of surveillance procedure 1-SR-3.3.5.1.2(ATU D), Core and Containment Cooling Systems Analog Trip Unit Functional Test. Due to the Group 4 isolation, which provides isolation of the HPCI System, operations personnel declared the HPCI System inoperable and entered Technical Specification (TS) 3.5.1, Emergency Core Cooling System (ECCS)-Operating, Condition C and Abnormal Operating Instruction 1-AOI-64-2B, Group 4 High Pressure Coolant Injection Isolation.

Upon investigation of the isolation, it was discovered that the current input to the Analog Trip Unit (ATU) was incorrect. The step in the procedure that required the stable current amplitude on the calibration unit to be set to between 3.9 mADC and 4.1 mADC had not been completed as required. When the HPCI Steam Line Flow - HPCI Isolation Instrument Loop was removed from service for test, the input current for the ATU was still set at approximately 20 mADC. As a result of the incorrect current input, Unit 1 HPCI steam flow isolated; thereby rendering it unavailable for approximately 14 minutes. On October 16, 2013, at approximately 1046 hours CDT, the HPCI System was made available for service, but Operations personnel decided that the HPCI System would remain inoperable until satisfactory completion of the surveillance procedure.

LCO 3.5.1 requires each Emergency Core Cooling System (ECCS) [BJ] [BM] [BO] injection/spray subsystem and the Automatic Depressurization System (ADS) [SB] function of six safety/relief valves [V] to be Operable in Mode 1 and Modes 2 and 3, except HPCI and ADS valves are not required to be Operable with reactor steam dome pressure less than or equal to 150 psig. Condition C of TS 3.5.1 was entered due to the Group 4, PCIS isolation. Required Action C.1 of TS 3.5.1 requires that the Reactor Core Isolation Cooling (RCIC) System [BN] be verified Operable immediately and Required Action C.2 of TS 3.5.1 requires that the HPCI System be restored to Operable status within 14 days.

On October 16, 2013, at 1032 hours CDT, operations personnel verified the RCIC System to be Operable. On October 16, 2013, at 1503 hours CDT, following successful completion of surveillance procedure 1-SR-3.3.5.1.2(ATU D), operations personnel declared the HPCI System Operable and exited TS 3.5.1, Condition C.

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NARRATIVE

B. Status of structures, components, or systems that were inoperable at the start of the event and that contributed to the event:

There were no structures, components, or systems that were inoperable at the start of the event that contributed to the event.

C. Dates and approximate times of occurrences:

October 16, 2013, at 0835 hours CDT	Maintenance personnel began work on surveillance procedure 1-SR-3.3.5.1.2(ATU D).
October 16, 2013, at 1032 hours CDT	BFN, Unit 1, HPCI System unexpectedly received a Group 4, PCIS signal. Operation personnel declared the HPCI System inoperable in accordance with TS 3.5.1, Condition C.
October 16, 2013, at 1036 hours CDT	The Group 4 isolation was reset.
October 16, 2013, at 1046 hours CDT	The HPCI System was made available, but remained inoperable until satisfactory completion of the surveillance procedure.
October 16, 2013, at 1503 hours CDT	Surveillance procedure 1-SR-3.3.5.1.2(ATU D) was successfully completed, and operations personnel declared the HPCI System Operable and exited TS 3.5.1, Condition C.
October 16, 2013, at 1608 hours CDT	BFN reported the event to the NRC in accordance with 50.72(b)(3)(v)(D).

D. Manufacturer and model number (or other identification) of each component that failed during the event:

There was no failure of a component for this event.

E. Other systems or secondary functions affected:

There were no other systems or secondary functions affected.

F. Method of discovery of each component or system failure or procedural error:

This event was self revealing during the performance of surveillance procedure 1-SR-3.3.5.1.2(ATU D) when an inadvertent Group 4, PCIS signal was received.

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G. The failure mode, mechanism, and effect of each failed component, if known:

There was no failure of a component. The problem was the failure to complete a surveillance procedure step to adjust the current input to the ATU which resulted in the Group 4 isolation, entry into TS 3.5.1, Condition C, and the unplanned HPCI System inoperability.

H. Operator actions:

Operations personnel entered 1-AOI-64-2B, declared the HPCI System inoperable, entered TS 3.5.1, Condition C, and verified that the RCIC System was Operable by administrative means.

I. Automatically and manually initiated safety system responses:

There were no automatically or manually initiated safety system responses.

III. Cause of the event

A. The cause of each component or system failure or personnel error, if known:

Immediate Cause

The immediate cause of this event was failure to adjust the stable current amplitude on the calibration unit to the ATU.

Root Cause

The root cause of this event was determined to be failure to complete a step in surveillance procedure 1-SR-3.3.5.1.2(ATU D).

B. The cause(s) and circumstances for each human performance related root cause:

During the performance of the surveillance procedure on October 16, 2013, the instrument mechanics failed to use three way communication and placekeeping adequately. By not applying human error reduction tools appropriately, the workers allowed themselves to become complacent, resulting in a procedure step not being completed as written.

IV. Analysis of the event:

The Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(v)(B) and 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 remove residual heat and mitigate the consequences of an accident.

This event was the result of a failure to complete a surveillance procedure step to adjust the current input to the ATU which resulted in the HPCI System isolation and inoperability. When the ATU channel was removed from service, the logic actuated as designed, resulting in a HPCI System isolation on high amplitude. All systems and components functioned as designed.

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The pre-job briefing for the surveillance identified that use of the 2-minute rule and procedure compliance would mitigate risk and prevent adverse consequences. Workers indicated that they were aware of the risk to the system, but no special precautions were taken to mitigate the risk. The workers utilized the reader/performer methodology during the performance of the surveillance. Workers stated that at the start of the surveillance, they were utilizing human error reduction tools effectively, but as they became more comfortable in the performance of the surveillance, standards relaxed and the workers became complacent. Prior to the missed surveillance step, associated tasks required the reader to divert his attention from the task allowing focus to be lost on the actual surveillance performance. The reader stated that he never heard the performer repeat the surveillance step to set the stable current amplitude of the calibration unit to between 3.9 mADC and 4.1 mADC, but initialed the step as complete anyway. The performer stated that he never heard the surveillance step read and took no action as a result.

Analysis of the event concluded that the HPCI System isolation was the result of an isolated human error in which workers did not complete a surveillance procedure step as written. The identified weakness was worker practices, in that the human error reduction tools; three-way communication, procedure use and adherence, and place keeping were not applied adequately.

V. Assessment of Safety Consequences

The HPCI System consists of a steam turbine-driven system driving a constant-flow pump assembly to inject either Condensate Storage Tank [KA] water or Suppression Pool [BT] water into the reactor under emergency conditions. The HPCI System provides adequate core cooling for all break sizes which do not result in rapid depressurization of the reactor vessel and functions independent of off-site power sources and Emergency Diesel Generators [EK].

The Safety Consequences Evaluation concluded that there was a minimal reduction in the defense in depth to Nuclear Safety and no reduction in the defense in depth to Industrial Safety, Radiological Safety, or Environmental Safety.

A. Availability of systems or components that could have performed the same function as the components and systems that failed during the event:

This event resulted in the HPCI System being inoperable. The RCIC System and all other ECCS Systems remained Operable to maintain adequate core cooling during the period of HPCI System inoperability.

B. For events that occurred when the reactor was shut down, availability of systems or components needed to shutdown the reactor and maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident:

The BFN, Unit 1, was not shut down during this event.

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C. For failure that rendered a train of a safety system inoperable, an estimate of the elapsed time from discovery of the failure until the train was returned to service:

The HPCI System was declared inoperable on October 16, 2013, at 1032 hours CDT, and made available for service 14 minutes later on October 16, 2013, at 1046 hours CDT. However, the HPCI System remained inoperable until successful completion of the surveillance on October 16, 2013, at 1503 hours CDT.

VI. Corrective Actions

Corrective Actions are being managed by TVA's corrective action program under Problem Evaluation Report (PER) 794807.

Immediate Corrective Actions

Removed the task qualifications for the workers involved in the performance of surveillance procedure 1-SR-3.3.5.1.2(ATU D) and conducted a briefing to the Instrument Maintenance shop to communicate the lessons learned from the HPCI System isolation event.

Corrective Actions to Prevent Recurrence or to Reduce Probability of Similar Events Occurring in the Future

Perform appropriate disciplinary action, in accordance with Human Resource process and procedures, with the workers involved in the HPCI System isolation.

VII. Additional Information:

A. Previous similar events at the same plant:

A search of BFN Licensee Event Reports (LERs) for Units 1, 2, and 3 for the last five years identified the following similar LERs:

LER 50-260/2009-009-00, Inadvertent Isolation of the High Pressure Coolant Injection System During Testing Activities. This LER identified a similar condition concerning a HPCI System isolation during testing; however, the isolation was due to a faulty test connector.

LER 50-260/2010-004-00, Inadvertent Isolation of the High Pressure Coolant Injection System During Testing Activities. This LER identified a similar condition concerning a HPCI System isolation during testing; however, the isolation was due to failure of relay contact protective boots.

LER 50-260/2010-005-00, High Pressure Coolant Injection System Isolation Experienced During Performance of HPCI Steam Supply Low Pressure Functional Test. This LER identified a similar condition concerning a HPCI System isolation during testing; however, the isolation was due to lack of clear procedure guidance with regards to usage of multiple volt ohm meters.

LER 50-260/2012-004-00, High Pressure Coolant Injection System Rendered Inoperable Due to an Inadvertent Actuation of Primary Containment Isolation. This

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LER identified a similar condition concerning a HPCI System isolation during testing; however, the isolation was due to incorrect wire bending practices to assemble steam line space high temperature switches.

The reasons for these HPCI System isolations and the corrective actions reported in these LERs do not directly relate to this event and would not have prevented this event from occurring.

A search was performed on the BFN corrective action program. The previous problem evaluation reports (PERs) associated with the above similar LERs are PERs 208627, 235338, 239313, and 596706.

Additional similar PERs related to the condition reported in this LER are PERs 368764, 660862, and 695846. These PERs involve conditions related to inadvertent system actuations.

A review of the corrective actions for these PERs concluded that the corrective actions associated with these PERs would not have prevented this event from occurring.

B. Additional Information:

There is no additional information.

C. Safety System Functional Failure Consideration:

In accordance with Nuclear Energy Institute 99-02, this event is considered a safety system functional failure.

D. Scram with Complications Consideration:

This event did not result in an unplanned scram with complications.

VIII. COMMITMENTS

There are no commitments.