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

April 12, 2013

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Unit 3
Facility Operating License No. DPR-68
NRC Docket No. 50-296

Subject: **Licensee Event Report 50-296/2013-002-00**

The enclosed Licensee Event Report provides details of the manual actuation of the Reactor Core Isolation Cooling system during a planned reactor shutdown. 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)(iv)(A).

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

Respectfully,

for K.J. Polson

K. J. Polson
Vice President

Enclosure: Licensee Event Report 50-296/2013-002-00 – Manual Actuation of Reactor Core Isolation Cooling System During Reactor Shutdown

cc (w/ Enclosure):

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

IE22
NRR

ENCLOSURE

Browns Ferry Nuclear Plant
Unit 3

Licensee Event Report 50-296/2013-002-00

Manual Actuation of Reactor Core Isolation Cooling System During Reactor Shutdown

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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	2. DOCKET NUMBER	3. PAGE
Browns Ferry Nuclear Plant, Unit 3	05000296	1 of 5

4. TITLE: Manual Actuation of Reactor Core Isolation Cooling System During Reactor Shutdown

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
									N/A	05000
02	11	2013	2013	- 002 -	00	04	12	2013	N/A	05000

9. OPERATING MODE: 3

10. POWER LEVEL: 000

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Mark Acker, Licensing Engineer	256-729-7533

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		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)*	☐ NO		06	10	2013

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

On February 11, 2013, at 0613 hours Central Standard Time (CST), the Reactor Core Isolation Cooling (RCIC) system was manually started during a planned Browns Ferry Nuclear Plant, Unit 3, reactor shutdown. A Reactor Feedwater recirculation piping separation resulted in the loss of condenser vacuum and subsequent unavailability of the Main Turbine Bypass Valves. The RCIC system was manually started to control reactor water level in anticipation of loss of Reactor Feedwater Pumps tripping on low vacuum. Safety Relief Valves were manually operated to maintain reactor pressure. No Emergency Core Cooling System or RCIC system reactor water level initiation set points were reached. The RCIC system was removed from service on February 11, 2013, at 1449 CST.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the Tennessee Valley Authority will submit a supplement to this Licensee Event Report.

NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of the event, Browns Ferry Nuclear Plant (BFN), Unit 3, was in Mode 3 at zero percent rated thermal power during a planned reactor shutdown.

II. Description of Events

A. Event:

On February 11, 2013, at 0613 hours Central Standard Time (CST), the Reactor Core Isolation Cooling (RCIC) system [BN] was manually started during a planned BFN, Unit 3, reactor shutdown. A Reactor Feedwater [SJ] recirculation piping separation resulted in the loss of condenser vacuum and subsequent unavailability of the Main Turbine Bypass Valves [V] [JI]. The RCIC system was manually started to control reactor water level in anticipation of loss of Reactor Feedwater Pumps (RFPs) [P] tripping on low vacuum. Safety Relief Valves (SRVs) [SB] were manually operated to maintain reactor pressure. No Emergency Core Cooling System (ECCS) [BJ][BO][BM] or RCIC system reactor water level initiation set points were reached. The RCIC system was removed from service on February 11, 2013, at 1449 CST.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the Tennessee Valley Authority (TVA) will submit a supplement to this Licensee Event Report (LER).

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 inoperable structures, components, or systems that contributed to this event.

C. Dates and approximate times of occurrences:

February 11, 2013 at 0424 CST	Operations initiated a planned reactor manual scram.
February 11, 2013 at 0613 CST	The RCIC system was manually started to control reactor water level.
February 11, 2013 at 1449 CST	The RCIC system was removed from service.

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

A section of Reactor Feedwater recirculation piping, BFN-3-MISC-003, separated resulting is a loss of condenser vacuum.

E. Other systems or secondary functions affected:

There were no other systems or secondary functions affected.

NARRATIVE

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

Operations received indication of decreasing condenser vacuum in the reactor feedwater recirculation system [AD].

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

A section of Reactor Feedwater recirculation piping separated resulting in a loss of condenser vacuum.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

H. Operator actions:

Operations manually operated the RCIC system and SRVs to control reactor water level and pressure during the planned BFN, Unit 3, reactor shutdown.

I. Automatically and manually initiated safety system responses:

Operations manually operated the RCIC system and SRVs to control reactor water level and pressure during the planned BFN, Unit 3, reactor shutdown.

III. Cause of the event

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

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

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

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

IV. Analysis of the event:

The TVA is submitting this report in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.73(a)(2)(iv)(A) as any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B), which includes the RCIC system.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

In late December 2012, BFN, Unit 3, experienced an unusual rise in water in-leakage to the Radwaste building [NE], concurrent with a higher than normal river water level. The amount of in-leakage challenged the capacity of the Radwaste system [WD]. The source of in-leakage was determined to be the BFN, Unit 3, Condenser Circulating Water (CCW) [SG] conduit and the decision was made to conduct a planned outage in February 2013, to allow repairs to the CCW conduit. A manual scram was initiated on February 11, 2013 at 0424 CST to start the planned outage.

NARRATIVE

On February 11, 2013, at 0613 hours CST, the RCIC system was manually started to control reactor water level because a Reactor Feedwater recirculation piping separation resulted in the loss of condenser vacuum and subsequent unavailability of the Main Turbine Bypass Valves. The RCIC system was manually started to control reactor water level in anticipation of loss of RFPs tripping on low vacuum. The SRVs were manually operated to maintain reactor pressure. No ECCS or RCIC system reactor water level initiation set points were reached. The RCIC system was removed from service on February 11, 2013, at 1449 CST.

V. Assessment of Safety Consequences

The RCIC system is designed to operate either automatically or manually following reactor pressure vessel (RPV) isolation accompanied by a loss of coolant flow from the feedwater system to provide adequate core cooling and control of the RPV water level. The RCIC system was manually initiated during this event to control reactor water level.

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

The RCIC system was manually initiated to control reactor water level and the SRVs were manually operated to control reactor pressure. The RCIC system maintained reactor water level in the prescribed band during this event. In addition to the RCIC system, the ECCS and Automatic Depressurization System were operable and available to provide core cooling if needed.

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 causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

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 causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

VI. Corrective Actions

Corrective Actions are being managed by TVA's corrective action program under Problem Evaluation Report (PER) 710206.

The causal analysis for this event is ongoing. Upon completion of the causal analysis, the TVA will submit a supplement to this LER.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Nuclear Plant, Unit 3	05000296	2013	-- 002	-- 00	5 of 5

NARRATIVE

VII. Additional Information:

A. Previous similar events at the same plant:

A search of BFN LERs for Units 1, 2, and 3 for the last several years did not identify any similar events.

A search was performed on the BFN corrective action program. There were no similar PERs identified.

B. Additional Information:

There is no additional information.

C. Safety System Functional Failure Consideration:

In accordance with Nuclear Energy Institute (NEI) 99-02, this condition is not 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.