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

February 16, 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 (LER) 50-260/2009-006 Revision 1**

The enclosed Licensee Event Report (LER) provides details of an automatic Reactor Protection System scram while shutdown. On October 27, 2009, Tennessee Valley Authority (TVA) submitted Revision 0 of the enclosed LER. Technical errors were identified and therefore, TVA is providing this LER revision.

The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(iv)(A), as an event that resulted in a manual or automatic actuation of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B) (i.e, Reactor Protection System including reactor scram or trip).

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,

K. J. Polson
Site Vice President

cc: See page 2

IE22
NRR

Enclosure
cc (Enclosure):

NRC 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

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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Browns Ferry Unit 2	05000260	1 of 5

4. TITLE: Automatic Reactor Protection System Scram While 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
									None	N/A
05	24	2009	2009	006	01	02	16	2010	FACILITY NAME: None	DOCKET NUMBER: N/A

9. OPERATING MODE

5

10. POWER LEVEL

0

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

NAME	TELEPHONE NUMBER *(Include Area Code)*
Deborah Bentzinger, 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

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	N/A	N/A	N/A

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

On May 24, 2009, at approximately 0232 hours Central Daylight Time (CDT), with Unit 2 in a refueling outage and all rods fully inserted Operations personnel inserted a "B" channel half scram to support a contactor maintenance work activity. At approximately 0247 hours CDT, Operations received an "A" channel half scram and a Reactor Protection System (RPS) actuation (full scram). The RPS actuation occurred when a fuse was removed from the circuit that supplied power to the contact that bypassed a high level scram signal from the scram discharge volume (SDV). At the time of the occurrence, the SDV had been isolated and was full of water due to previously hydrolazing the Scram Discharge Volume Instrument Tank and Headers. As a result, with the bypass removed, a reactor scram signal was generated, which lead to an RPS actuation (full scram).

NARRATIVE

I. PLANT CONDITION(S)

Prior to the event, Unit 2 was in Mode 5 in a refueling outage. Units 1 and 3 were operating in Mode 1 at 100 percent thermal power (approximately 3458 megawatts thermal). Units 1 and 3 were unaffected by the event.

II. DESCRIPTION OF EVENT

A. Event:

On May 24, 2009, at approximately 0232 hours Central Daylight Time (CDT), with Unit 2 in a refueling outage and all rods fully inserted, Operations personnel inserted a "B" channel half scram to support a maintenance work activity on the Reactor Protection System (RPS) Contactor Relay. At approximately 0247 hours CDT, Operations received an "A" channel half scram and a Reactor Protection System [JC] actuation (full scram). A previous clearance was placed to support work on hydrolazing the Scram Discharge Volume (SDV) header which had a caution order placed on the SDV hi level bypass switch to keep the switch in bypass with a warning that unbypassing would result in a full reactor scram. Restoration of the clearance supporting the SDV hydrolazing only removed the caution order from the bypass switch and did not reposition the switch. In preparation for the clearance placement instructions on the emergent work on the RPS relay the clearance preparer called the Unit 2 control room and inquired about the status of the Control Rod Drive (CRD) [AA] system. Operations stated the CRD system was in its normal configuration when in fact the SDV was isolated and full of water along with the high level bypass switch in bypass. The clearance preparer incorporated notes into the RPS clearance instructions stating that if a channel of RPS is deenergized with the other channel SDV level high a full scram would result even if the level bypass switch was in bypass. The clearance preparer wrote the clearance with the misunderstanding that the CRD system was in its normal configuration. The clearance placement instructions inserted a manual half-scram on the RPS "B" channel. Therefore, when the fuse was removed from the circuit that supplied power to the contact that bypassed the high level scram signal, a reactor scram signal was generated, which initiated an RPS actuation (full scram).

The Primary Containment Isolation System (PCIS) [JE] isolations, Group 2 (Residual Heat Removal (RHR) system shutdown cooling) [BO], Group 3 (Reactor Water Cleanup (RWCU) system) [CE], Group 6 (ventilation) [VA], and Group 8 (Traversing In-core Probe (TIP) [IG]) isolations were received as expected, along with the auto start of the Control Room Emergency Ventilation (CREV) system [VI] and the three Standby Gas Treatment (SGT) [BH] system trains. Emergency Core Cooling Systems (ECCS) actuation was not required and ECCS did not actuate.

Operations reset the reactor scram per procedure 2-OI-99, Reactor Protection System, Section 6.1 by 0253 hours CDT.

Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(iv)(A). An event that resulted in a manual or automatic actuation of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B) (i.e., Reactor Protection System including reactor scram or trip).

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

None.

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

May 24, 2009	0232 hours CDT	Operations personnel inserted a Unit 2 "B" channel half scram.
May 24, 2009	0247 hours CDT	Unit 2 reactor automatically scrammed.
May 24, 2009	0253 hours CDT	Operations personnel reset Unit 2 scram.

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

None.

E. **Method of Discovery**

The operations crew received main control room annunciators Reactor Channel "A" scram and Reactor Channel "B" scram.

F. **Operator Actions**

Operators responded in accordance with the alarm response procedures.

G. **Safety System Responses**

The RPS logic responded to the reactor scram. Since the reactor was already in Mode 5 with all control rods inserted, no reactor parameters were changed. PCIS isolations, Group 2 (RHR system shutdown cooling), Group 3 (RWCU system), Group 6 (ventilation), and Group 8 (TIP) isolations, were received as expected, along with the auto start of the CREV system and the three SGT system trains. ECCS actuation was not required and ECCS did not actuate.

III. CAUSE OF THE EVENT

A. **Immediate Cause**

The immediate cause for the event was pulling a fuse associated with bypassing an SDV high level scram signal, in combination with a half scram that had been inserted earlier in support of work on the Reactor Protection System Contactor Relay [RLY].

B. **Root Cause**

The root cause of this event was incomplete restoration of the SDV clearance and lack of awareness of the SDV system configuration. The control room operators were not cognizant of the fact that the SDV was isolated and full of water in combination with the associated SDV high level scram signal being bypassed.

C. **Contributing Factors**

Contributing causes were ineffective communication and ineffective pre-job brief.

IV. ANALYSIS OF THE EVENT

Prior to the event, an outage activity to hydrolaze the SDV Instrument Tank and Headers had been completed. The associated clearance had a caution order on the SDV High Level Bypass switch to keep the switch in "BYPASS" with a warning that taking the switch out of "BYPASS" would result in an RPS actuation (full scram). The hydrolazing was completed

several days before this event, but the restoration of the clearance for that activity was only partially completed and had only removed the caution order from the "BYPASS" switch and did not return the switch to its "NORMAL" (un-bypassed) position. The SDV tank was not drained after hydrolazing and therefore, remained full of water.

Operations had inserted a "B" RPS Channel half-scram, during clearance placement, to support RPS Channel "B" scram contactor maintenance. Subsequently, in the clearance placement activity, when fuse 2-FU1-99-5A/K27B was pulled a full scram signal was generated. The cause of the scram was due to the fact that the SDV vents and drains were closed and the volume had filled above the scram setpoint. Even though the High Level Scram signal for the SDV was in bypass, the pulling of the fuse also opened a contact in the "A" RPS scram circuit. The SDV High Level Scram signal, in conjunction with the open contact, negated the key lock bypass contact and resulted in the receipt of a RPS actuation (full scram).

V. ASSESSMENT OF SAFETY CONSEQUENCES

The safety consequences of this event were not significant. Since the reactor was already in Mode 5 with all control rods inserted, no reactor parameters were changed. The reactor scram was not complicated. TVA concludes that the event did not affect the health and safety of the public.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Immediate corrective action was that Operations personnel reset the scram per procedure 2-OI-99. A stand-down was held in the Unit 2 Main Control Room, which included the entire control room and Work Control Center to discuss all ongoing activities and unit conditions.

B. Corrective Actions to Prevent Recurrence

– The corrective actions are being managed by the Browns Ferry Nuclear Plant corrective action program.

Corrective actions include a training needs analysis of the event for possible inclusion into Licensed Operator Requalification training.

VII. ADDITIONAL INFORMATION

A. Failed Components

None.

B. Previous LERs on Similar Events

LER 50-260/2005-003-00, Reactor Protection System Actuation from Scram Discharge Volume High Level while Shutdown. The corrective actions included that the essential nature of clear, unambiguous communication will be reinforced to site personnel involved in testing activities.

NARRATIVE

C. **Additional Information**

Corrective action documents PER 172053, PER 178146 and PER 206168.

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

This event is not a safety system functional failure in accordance with NEI 99-02.

E. **Scram with Complications Consideration:**

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

VIII. COMMITMENTS

None.