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

December 5, 2011

10 CFR 50.73

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

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

Subject: **Licensee Event Report 50-259/2011-009-00**

The enclosed Licensee Event Report (LER) provides details of the as-found undervoltage trip for the reactor protection system 1A1 relay that did not meet acceptance criteria during several surveillances. The Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by the plant's Technical Specifications.

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

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,

K. J. Polson
Vice President

Enclosure: Licensee Event Report 259/2011-009-00 - As-Found Undervoltage Trip for the Reactor Protection System 1A1 Relay that Did Not Meet Acceptance Criteria During Several Surveillances

cc: See Page 2

IE22
NRR

cc (w/ Enclosure):

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

ENCLOSURE

Browns Ferry Nuclear Plant
Unit 1

Licensee Event Report 259/2011-009-00

As-Found Undervoltage Trip for the Reactor Protection System 1A1 Relay that Did Not Meet Acceptance Criteria During Several Surveillances

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See Attached

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 10/31/2013

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.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE: As-Found Undervoltage Trip for the Reactor Protection System 1A1 Relay that Did Not Meet Acceptance Criteria During Several Surveillances

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
10	05	11	2011	009	00	12	05	2011	FACILITY NAME: N/A	DOCKET NUMBER: 05000

9. OPERATING MODE

1

10. POWER LEVEL

100

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)*
Eric Bates, Licensing Engineer	256-614-7180

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
E	JC	RLY	X000	N					

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
01	31	12

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

On October 5, 2011, while performing a functional evaluation on the reactor protection system (RPS) 1A1 relay undervoltage trips, BFN determined that the as-found undervoltage trip for the RPS 1A1 relay was less than the required acceptance criteria during several Technical Specification surveillances performed from September 2010 to August 2011. Therefore, the RPS 1A1 relay was inoperable for an indeterminate period of time between these surveillances.

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.

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NARRATIVE

I. PLANT CONDITION(S)

At the time of discovery, Browns Ferry Nuclear Plant (BFN) Unit 1 was at approximately 100 percent power and unaffected by the event.

II. DESCRIPTION OF EVENT

A. Event

On October 5, 2011, while performing a functional evaluation (FE) on the Reactor Protection System (RPS) [JC] 1A1 relay [RLY] undervoltage trips, BFN determined that the as-found undervoltage trip for the RPS 1A1 relay was less than the required acceptance criteria (AC) during several Technical Specification (TS) Surveillances performed from September 2010 to August 2011. Thus, the RPS 1A1 relay was inoperable for an indeterminate period of time between these surveillances. BFN Unit 1 TS Limiting Condition for Operation 3.3.8.2 requires that two RPS electric power monitoring assemblies be operable in Modes 1, 2, and 3; and in Modes 4 and 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies for each inservice RPS motor generator (MG) [MG] set or alternate power supply. If one or both inservice power supplies with one electric power monitoring assembly were inoperable, the associated inservice power supply(s) are required to be removed from service in 72 hours. If this TS 3.3.8.2 Required Action is not met within 72 hours, the unit is required to be in Mode 3 within 12 hours and in Mode 4 within 36 hours. Since the as-found undervoltage trip for the RPS 1A1 relay was less than the required AC during several surveillances, it is probable that BFN Unit 1 operated with an inoperable RPS electrical power monitoring assembly longer than allowed by the TS.

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

There were no inoperable structures, components, or systems that contributed to this event.

C. Dates and Approximate Times of Major Occurrences

September 3, 2010	As-found undervoltage trip for the RPS 1A1 relay was less than the required AC during the performance of surveillance 1-SR-3.3.8.2.1(A), RPS Circuit Protector Calibration/Functional Test for 1A1 and 1A2.
February 1, 2011	As-found undervoltage trip for the RPS 1A1 relay was less than the required AC during the performance of 1-SR-3.3.8.2.1(A).

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August 7, 2011	As-found undervoltage trip for the RPS 1A1 relay was less than the required AC during the performance of 1-SR-3.3.8.2.1(A).
October 5, 2011	The RPS 1A1 relay was replaced.

D. Other Systems or Secondary Functions Affected

There were no other systems or secondary functions affected.

E. Method of Discovery

The event was discovered during the preparation of the FE for the RPS 1A1 relay undervoltage trips.

F. Operator Actions

There were no operator actions.

G. Safety System Responses

There were no safety system responses.

III. CAUSE OF THE EVENT

A. Immediate Cause

The immediate cause of this event was the as-found undervoltage trip for the RPS 1A1 relay was less than the required AC during several TS surveillances performed from September 2010 to August 2011.

B. Root Cause

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) with the root cause.

C. Contributing Factors

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

IV. ANALYSIS OF THE EVENT

TVA is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by the plant's TS.

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

The RPS electric power monitoring system is provided to isolate the RPS bus from the MG set or an alternate power supply in the event of overvoltage, undervoltage, or underfrequency. This system protects the loads connected to the RPS bus against

NARRATIVE

unacceptable voltage and frequency conditions and forms an important part of the primary success path of the essential safety circuits.

This event involves the as-found undervoltage trip of the RPS 1A1 relay. The required TS AC for undervoltage is ≥ 108.5 volts. In the event of an undervoltage condition for an extended period of time, the scram solenoids can chatter and potentially lose their pneumatic control capacity, resulting in a loss of a primary scram action.

The past performances of 1-SR-3.3.8.2.1(A) from April 2007 to the present were evaluated as seen in the RPS 1A1 Relay Calibration Data table below. There were six different performances of 1-SR-3.3.8.2.1(A) that were in violation of the required AC. In each case, the as-found condition was documented in the work order to perform 1-SR-3.3.8.2.1(A), which demonstrates proper use of the procedure and understanding of the expectations regarding out of tolerance conditions. In all cases except for the February 1, 2011 performance of 1-SR-3.3.8.2.1(A), a problem evaluation report (PER) was generated and the control room was notified. For this event, preliminary determination for the past inoperability began on September 3, 2010, when the RPS 1A1 relay as-found undervoltage trip reading started a trend of 3 consecutive failures to meet the required TS AC of ≥ 108.5 volts, and ended on October 5, 2011, when the RPS 1A1 relay was replaced.

RPS 1A1 Relay Calibration Data

Date	RPS 1A1 Relay As-found	PER
04/30/2007	109.7	N/A
10/03/2007	106.3(1)	131365
03/18/2008	109.7	N/A
09/03/2008	107.79	151812
03/19/2009	110.1	N/A
08/05/2009	107.6	178286
02/04/2010	110.1	N/A
09/03/2010	107.6	248513
02/01/2011	107.2	None
08/07/2011	106.4	413140

(1) The shaded values indicate as-found undervoltage below required AC.

Extent of Condition

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

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Extent of Cause

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

V. ASSESSMENT OF SAFETY CONSEQUENCES

The RPS provides timely protection against the onset and consequences of conditions that threaten the integrity of the fuel barrier and the nuclear system process barrier. The system is designed such that no single failure can prevent a reactor scram. The RPS includes the MG power supplies with associated control and indicating equipment, sensors, relays, bypass circuitry, and switches that supply a signal to the control rod drive system to cause rapid insertion of the control rods to shut down the reactor. Based on parameters that deviate from normal, the RPS is designed to automatically shutdown the reactor. With one RPS electric power monitoring assembly (RPS 1A1 relay) for an inservice RPS power supply is inoperable, the remaining operable RPS electric power monitoring assembly will still provide protection to the RPS bus powered components under degraded voltage or frequency conditions.

Therefore, TVA concluded that there was no significant reduction to the health and safety of the public for this event.

VI. CORRECTIVE ACTIONS - The corrective actions are being managed by TVA's corrective action program.

A. Immediate Corrective Actions

Standing order 174 was issued to establish Operations department expectations when as-found data is found outside of acceptable regulatory guidelines.

B. Corrective Actions

The RPS 1A1 relay was replaced.

C. Corrective Actions to Prevent Recurrence

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

VII. ADDITIONAL INFORMATION

A. Failed Components

The failed component was the RPS 1A1 relay (original equipment manufacturer was indeterminate).

B. Previous Similar Events

Previous similar events occurred during the earlier performances of 1-SR-3.3.8.2.1(A) that were documented by PERs 131365, 151812, 178286, and 248513.

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C. Additional Information

The corrective action documents for this report are PERs 413140 and 442914.

D. Safety System Functional Failure Consideration

This event was 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

There are no commitments.