Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

September 25, 2017

10 CFR 50.73

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

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Licensee Event Report 391/2017-004-00, Manual Reactor Trip Due to Inoperable Rod Position Indication**

This submittal provides Licensee Event Report (LER) 390/2017-004-00. This LER provides details concerning a manual reactor trip that occurred when rod position indication was determined to be inoperable. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no regulatory commitments contained in this letter. Please direct any questions concerning this matter to Kim Hulvey, WBN Licensing Manager, at (423) 365-7720.

Respectfully,

Paul Simmons
Site Vice President
Watts Bar Nuclear Plant

Enclosure
cc: See Page 2

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant

NRC FORM 366 (04-2017) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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
Watts Bar Nuclear Plant, Unit 2	05000391	1 OF 4

4. TITLE

Manual Reactor Trip Due to Inoperable Rod Position Indication

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
07	25	2017	2017	- 004	- 00	09	25	2017	N/A	05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
3	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
0	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Dean Baker, Licensing Engineer	423-452-4589

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
X	AA	CARD	WES	Y					

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On July 25, 2017, at 0428 Eastern Daylight Time (EDT) Watts Bar Nuclear Plant (WBN) Unit 2 was in Mode 3, commencing a Reactor Startup. While in the initial phase of withdrawing the first of four Control Banks, the two associated group demand position indicators deviated greater than 2 steps from each other. In accordance with Technical Requirement 3.1.7, Position Indication System, Shutdown, with one or more group demand position indicators inoperable, the reactor trip breakers are to be opened immediately. Operations personnel opened the reactor trip breakers immediately by initiating a manual trip of the Reactor Protection System. The Auxiliary Feedwater system was in service and controlling Steam Generator water levels at the time of the event and did not receive any valid actuation signals. No other system actuations occurred as a result of this reactor trip and all systems operated as designed.

The rod demand indication deviation was determined to be caused by a failed logic card, which was replaced.

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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Watts Bar Nuclear Plant, Unit 2	05000391	2017	- 004	- 00

NARRATIVE

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

Watts Bar Nuclear Plant (WBN) Unit 2 was in Mode 3.

II. DESCRIPTION OF EVENT

A. Event Summary

On July 25, 2017, at 0428 Eastern Daylight Time (EDT) Watts Bar Nuclear Plant (WBN) Unit 2 was in Mode 3, commencing a Reactor Startup. While in the initial phase of withdrawing the first of four Control Banks, the two associated group demand position indicators deviated greater than 2 steps from each other. In accordance with Technical Requirement (TR) 3.1.7, Position Indication System, Shutdown, {EIIS:AA} with one or more group demand position indicators inoperable, the reactor trip breakers are to be opened immediately. Operations personnel opened the reactor trip breakers immediately by initiating a manual trip of the Reactor Protection System (RPS){EIIS:JC}. The Auxiliary Feedwater (AFW) system {EIIS:BA} was in service and controlling Steam Generator water levels at the time of the event and did not receive any valid actuation signals. No other system actuations occurred as a result of this reactor trip and all systems operated as designed.

These events are being reported to the Nuclear Regulatory Commission (NRC) under 10 CFR 50.73(a)(2)(iv)(A) for initiation of a manual reactor trip.

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

Slave cycler logic card {EIIS:CARD} in rod control system had failed.

C. Dates and Approximate Times of Occurrences

Date	Time (EDT)	Event
7/25/17	0426	Initiated Reactor Startup in accordance with procedure 2-GO-2, Reactor Startup.
7/25/17	0427	Observed Control Bank A1 group demand indicates 0 steps. Control Bank A2 group demand indicates 3 steps
7/25/17	0428	Entered TR 3.1.7 Condition A. Reactor trip breakers (RTBs) are opened.
7/25/17	0428	Entered 2-E-0, Reactor Trip of Safety Injection, due to manually opening RTBs by inserting a Manual Reactor Trip.
7/25/17	0432	Transitioned to 2-ES-0.1, Reactor Trip Response.
7/25/17	0449	Transitioned to 2-GO-5, Unit Shutdown from 30 percent Reactor Power to Hot Standby.

D. Manufacturer and Model Number of Components that Failed During the Event

The card that failed was an A406 slave cycler logic card provided by Westinghouse Electric Corporation, Style 2D82868G01.

E. Other Systems or Secondary Functions Affected

All safety systems and secondary functions operated as designed.

F. Method of discovery of each Component or System Failure or Procedural Error

An investigation following the manual reactor trip identified the failed logic card.

G. Failure Mode and Effect of Each Failed Component

The cause of the logic card failure is under investigation by Westinghouse.

H. Operator Actions

Upon determining a group demand indication variance of greater than two steps, the reactor trip breakers were opened by inserting a Manual Reactor Trip. Operations personnel promptly worked through the emergency procedures and reentered normal plant operating procedures for this condition.

I. Automatically and Manually Initiated Safety System Responses

The reactor trip breakers were opened by manually tripping the reactor. No automatic actuations of safety equipment were required or occurred.

III. CAUSE OF THE EVENT

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

The failed logic card was shipped to the vendor for testing and failure analysis.

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

No human performance issues are related to this trip.

IV. ANALYSIS OF THE EVENT

During a normal start up at WBN, operations personnel commenced withdrawing Control Bank A. Within 3 steps, operations personnel determined a rod position deviation occurred and opened the reactor trip breakers in accordance with requirements. During the event the reactor was not critical, and cooling was being provided by the AFW system. The reactor trip was uncomplicated. After extensive troubleshooting and analysis by the vendor, the slave cycler card failure was identified.

V. ASSESSMENT OF SAFETY CONSEQUENCES

This event is bounded by a rod cluster control assembly misalignment, which is an anticipated operational occurrence described in the Final Safety Analysis Report (FSAR).

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

All safety systems operated as designed during this event.

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

All safety systems operated as designed during this event.

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

Not applicable.

VI. CORRECTIVE ACTIONS

This event was entered into the Tennessee Valley Authority (TVA) Corrective Action Program and is being tracked under Condition Report (CR) 1320840.

A. Immediate Corrective Actions

When the rod position deviation was identified, the reactor trip breakers were opened. Subsequent investigation determined that a logic card had failed, and the card was replaced.

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

Additional logic cards associated with the rod control system will be tested in accordance with the preventative maintenance strategy.

VII. PREVIOUS SIMILAR EVENTS AT THE SAME SITE

An automatic reactor trip due to actuation of the Over Temperature Delta temperature bistables was reported to the NRC in LER 390/2016-004 dated May 23, 2016. This event was caused by a failure of a Valve Position Limit up/down counter circuit card in the Analog Electro-Hydraulic Turbine Control System which resulted in the closure of the turbine high pressure governor valves, resulting in an automatic reactor trip and turbine trip on WBN1. The event described in this LER is different in that it involves a component failure in an unrelated plant system.

VIII. ADDITIONAL INFORMATION

None.

IX. COMMITMENTS

None.