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William R. Lagergren, Jr.
Site Vice President, Watts Bar Nuclear Plant

NOV 1 8 2004

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

Gentlemen:

In the Matter of) Docket No.50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - DOCKET NO. 50-390 - FACILITY OPERATING LICENSE NPF-90 - LICENSEE EVENT REPORT (LER) 50-390/2004-002

This submittal provides Licensee Event Report 390/2004-002. This LER addresses an event that occurred on September 19, 2004, which resulted in an actuation of engineered safety features, which included the Reactor Protection and Auxiliary Feedwater Systems. This event is being reported under 10 CFR 50.73 (a)(2)(iv)(A). There are no Regulatory commitments identified in this submittal.

If you have any questions about this LER, please contact P. L. Pace at (423) 365-1824.

Sincerely,

W. R. Lagergren

IE22

NOV 1 8 2004

Enclosure
cc (Enclosure):
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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 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)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Manual Reactor Trip Due to Dropped Rods

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
										05000
09	19	2004	2004	- 002 -	00	11	18	2004	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

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)*
Rickey Stockton, Licensing Engineer	(423) 365-1818

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
B	AA	Transistor	W351						

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 September 19, 2004, at approximately 0452 hours Eastern Daylight Savings Time (EDT), Unit 1 was in Mode 1, steady state operation at 100 percent power when the operators received simultaneously Control Rod Urgent Failure, RPI Trouble, and rods at bottom alarms. Four control rods, F14, B6, K2, P10, in control bank B group 2, fell to bottom of core and initiated the rods at bottom alarm. This event resulted in a rapid power drop to about 67 percent which then stabilized at approximately 85 percent.

During this transient, operators took manual control of the main feedwater regulating valves. Operators responded to the rods at bottom indications by manually tripping the reactor at approximately 0456 EDT. Systems functioned as expected in automatic with the exception of the loop number 1 Reactor Coolant Pump which failed to transfer to its respective start bus on generator lockout. The remaining control rods inserted properly in response to the reactor trip. The Auxiliary Feedwater (AFW) System actuated in response to the trip, as expected.

The root cause of the reactor trip was a malfunction of a rod control power cabinet circuit (i.e., a failed transistor on the phase control circuit card). Corrective actions included the replacement of three circuit board cards in the rod control power cabinet and stand down meetings to brief the oncoming crews of this event.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

I. PLANT CONDITION(S)

On September 19, 2004, at approximately 0452 Eastern Daylight Savings Time (EDT) hours, Unit 1 was in Mode 1, steady state operation at 100 percent power. The Reactor Coolant System (RCS) (Energy Industry Identification System (EIIS) Code AB) pressure was approximately 2235 psig and RCS Tavg was approximately 588 degrees F.

II. DESCRIPTION OF EVENT

A. Event

On September 19, 2004, at approximately 0452 hours, Unit 1 was in Mode 1, steady state operation at 100 percent power when the operators received simultaneously Control Rod Urgent Failure, Rod Position Indication (RPI) Trouble, and rods at bottom alarms. Four control rods (EIIS Code BA), F14, B6, K2, P10, in control bank B group 2, fell to bottom of core and initiated the rods at bottom alarm. This event resulted in a rapid power drop to about 67 percent which then stabilized at approximately 85 percent.

During this transient, operators took manual control of the main feedwater regulating valves (EIIS Code V). Operators responded to the rods at bottom indications by manually tripping the reactor at approximately 0456 EDT. Systems functioned as expected in automatic with the exception of the loop number 1 Reactor Coolant Pump (EIIS Code AB/P) which failed to transfer to its respective start bus (EIIS Code BU) on generator (EIIS Code GEN) lockout. The remaining control rods inserted properly in response to the reactor trip. The Auxiliary Feedwater (AFW) System (EIIS Code BA) actuated in response to the trip, as expected.

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:

Date	Time	Event
09/19/04	04:52:44	Unit 1 Reactor at full power – all conditions normal
09/19/04	04:52:45	Main Control Room (MCR) received a "Control Rod Urgent Failure" alarm.
09/19/04	04:52:46	MCR received a "Control RPI Trouble" alarm.
09/19/04	04:52:47	Four Control Rods Dropped in Control Bank Group B Group 2. MCR receives a "Rods at Bottom" alarm.
09/19/04	04:52:48	Computer Enhanced Rod Position Indication (CERPI) (EIIS Code AA/ZI) Panel in MCR shows K2 Control Rod as invalid – B6 and P10 indicated as valid
09/19/04	04:52:52	CERPI Panel in MCR shows K2, B6, and P10 control rods as invalid
09/19/04	04:52:53	CERPI panel in MCR shows K2, B6, F14, and P10 control rods as invalid.
09/19/04	04:52:54	CERPI Panel in MCR shows B6 and P10 control rods as invalid
09/19/04	04:52:55	CERPI Panel in MCR shows K2, B6, F14, and P10 Control rods as valid.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

C. Dates and Approximate Times of Major Occurrences: (Continued)

Date	Time	Event
09/19/04	04:56	MCR crew alarm response
09/19/04	04:56	Unit 1 Reactor was manually tripped

D. Other Systems or Secondary Functions Affected:

The four dropped rods prompted sudden reactor downpower which caused a secondary side transient.

E. Method of Discovery:

This condition caused a number of alarms in the main control room.

F. Operator Actions:

Operations responded to the plant transient in accordance with appropriate plant procedures. Based on these actions, the unit was placed in a stable condition in Mode 3. However, there was an area of crew performance that did not meet management expectations. This issue was identified as the 3 minutes and 34 seconds time span between the dropping of the Bank 2 rods and crew initiation of the reactor trip. This condition has been placed into TVA's corrective action program.

G. Safety System Responses:

Upon manual trip of the reactor, the Auxiliary Feedwater System started as expected. See Section IV for further details and analysis of this event.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause for this event was the dropping of the four control rods into the reactor core. This event promptly caused a reactor downpower which stabilized at approximately 85 percent and caused a secondary side transient.

B. Root Cause:

The root cause of the reactor trip was a malfunction of a rod control power cabinet circuit. TVA performed a Kepner Tregoe (KT) analysis of this dropped rod event and determined that the cause could have been the failure of one of three cards (Regulator Card-most probable, Phase Control Card-probable, and a Firing Board Card-least probable) which provide power and control functions for Rod Control Bank B, Group 2 that contained the four rods that dropped. All three cards were shipped to Westinghouse to perform "post-mortem" testing to determine the exact cause. The Westinghouse test report revealed that a transistor (Q7) had failed on the Phase Control Card. The report also stated that this transistor failure would have caused the dropped group that was seen in this event.

C. Contributing Factors

There were no contributing factors for this event that were identified.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

IV. ANALYSIS OF THE EVENT

Dropped Rod Cluster Control Assemblies (RCCA) are discussed in Section 15.2.3 of the Updated Final Safety Analysis Report (UFSAR). As described in this UFSAR section, a dropped RCCA can be detected by one of the following ways, 1) a sudden drop in the core power level as seen by the nuclear instrumentation system, 2) an asymetric power distribution as seen on out of core neutron detectors or core exit thermocouples, 3) rod at bottom signal, 4) rod deviation alarm (control banks only), and 5) rod position indicators. This UFSAR section also evaluates the effect on core reactivity which concludes that for cases of dropped RCCAs or dropped banks the Departure from Nucleate Boiling (DNB) remains greater that the limit value and therefore DNB design basis is met. Analysis of this event reveals that when the four rods dropped during this event, the plant responded as would be expected and within the bounds of the UFSAR analysis described above. Therefore, it can be concluded that there was no safety significance as a result of this event.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the discussion in Section IV above, there was no safety significance to this event.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Since a Kepner Tregoe (KT) analysis of the dropped rod event determined that the cause could have been the failure of one of three cards (Regulator Card-most probable, Phase Control Card-probable, and a Firing Board Card-least probable), TVA conservatively replaced all three cards.

For the number 1 RCP failure to transfer issue, TVA found that a fuse had been blown in the Potential Transformer (PT) portion of the transfer circuit which prevented this transfer. TVA subsequently replaced this fuse.

B. Corrective Actions to Prevent Recurrence

The circuit boards were shipped to Westinhouse to perform "post mortem" testing on each of the cards to determine the exact cause of the failure. Results of this testing concluded that a transistor had failed on the Phase Control Card. No further action is required by TVA at this time.

To address the crew performance issues, stand down meetings were conducted with each crew, prior to assuming shift, where this event was discussed along with information related to CERPI response involving how screens change while updating.

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VII. ADDITIONAL INFORMATION

A. Failed Components:

The Westinghouse test report revealed that transistor, Q7, had failed on the Phase Control Card in the Rod Control System.

B. Previous LERs on Similar Events:

A review of previous WBN LERs reveals that there have been no other events associated with dropped rods.

C. Additional Information:

None.

D. Safety System Functional Failure Consideration:

This event is not considered a safety system functional failure in accordance with NEI 99-02 in that the principal plant safety systems operated as designed. Therefore, the functional capability of the overall system was not jeopardized.

E. Loss Of Normal Heat Removal Consideration:

This event is not considered a scram with loss of normal heat removal.

VIII. COMMITMENTS

None.