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

APR 3 0 1996

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 - FACILITY OPERATING LICENSE NPF-90 - LICENSEE EVENT REPORT (LER) 50-390/96012

Enclosed is LER 50-390/96012 which details a manual subcritical reactor trip resulting from compliance with a technical requirement action statement. Submittal of this report is in accordance with 10 CFR 50.73(a)(iv).

Sincerely,

D. V. Kehoe
Nuclear Assurance
and Licensing Manager

Enclosure
cc: See page 2

U70043

50-390

APR 30 1996

cc (Enclosure):
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Enclosure
LER 50-390/96012

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20603.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Watts Bar Nuclear Plant - Unit 1	05000390	1 OF 5

TITLE (4)

MANUAL SUBCRITICAL REACTOR TRIP DUE TO GROUP DEMAND POSITION INDICATOR DEVIATION

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
03	31	96	96	012	00	04	25	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Walt Lewellyn, Compliance Licensing Engineer	(423)-365-8048

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	AA	CTR	W157	N						

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

Prior to and leading up to the reported event, the rod control pulse-to-analog (P-A) converter for Control Bank 'D' indicated 35 steps when the bank was actually at 16 during WBN Unit 1 Mode 3 approach to criticality. As a result, control room operators terminated plant startup.

On March 31, 1996, operators began inserting control banks while troubleshooting the P-A converter. During this insertion, operators identified that the step counters for Control Bank A, Groups 1 and 2, deviated by 4 steps (Technical Requirement 3.1.7, "Position Indication System," requires ±2 steps). As a result of the step deviation, the Unit 1 reactor was manually tripped at 0435 EST in accordance with the required actions of the Technical Requirement. All rods inserted normally.

The cause of the P-A converter false indication was determined to be an induced bias voltage of unknown origin due to a surge during the Loss Of Offsite Power (LOOP) Test performed on March 28. The cause of the step counter malfunction was determined to be mechanical failure.

Corrective action for the event included the replacement of the malfunctioning step counter and a procedural change to require checking the rod insertion limit (RIL) recorder prior to initial rod withdrawal. The P-A converter card for Control Bank D was also replaced.

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

I. PLANT CONDITIONS:

WBN Unit 1 was in Mode 3 (Hot Standby) at 0% power operation, with the Reactor Coolant System temperature and pressure of 557 degrees F and 2235 psi, respectively.

II. DESCRIPTION OF EVENT

A. Event

On March 31, 1996, at 0406 EST, in Mode 3, during the performance of reactor startup, the rod control P-A converter indicated 35 steps for Control Bank D while Control Bank D was actually at 16 steps, based on the Bank Demand Position Indication System and the Analog Rod Position Indication System. The operator terminated rod withdrawal when annunciator 87D, "Rods at Bottom," indicator light came on. Rod insertion was then initiated in order to troubleshoot the P-A converter.

Control Banks D, C, and B were fully inserted with Bank A insertion in progress when the step counter for Control Bank A, Group 1, deviated from the step counter for Group 2 by 4 steps. Technical Requirement 3.1.7 requires that the group demand position indicators be within ± 2 steps for this mode of operation or immediately open the reactor trip breakers.

At 0435 EST, March 31, 1996, control room operators initiated a manual reactor trip. The reactor trip breakers opened, all rods inserted completely, and the plant remained stable in Mode 3.

B. INOPERABLE STRUCTURES, COMPONENTS, OR SYSTEMS THAT CONTRIBUTED TO THE EVENT

1. The P-A converter had an induced bias voltage equivalent to 20 steps. The induced bias voltage in the P-A converter appeared to be from the LOOP Test. Troubleshooting of the converter included a review of the time history of the input signals. A surge of unknown origin and equivalent to the 20 steps was identified to have occurred at the time of the LOOP test.

2. A mechanical malfunction occurred in Control Bank A, Group 2, step counter.

C. Dates and Approximate Times of Major Occurrence

March 28, 1996:

- 1735 EST -to 1910 EST - Loss of Offsite Power Test performed

March 31, 1996:

- 0406 EST - Bank D was held at 16 steps due to problem with the P-A converter for Control Bank D indicating 35 steps along with an annunciator "Rods at Bottom" alarm.
- 0420 EST - Start to re-insert control rods
- 0435 EST - Operators observed that the Control Bank A step counters were not consistent and opened the reactor trip breakers.

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

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

No other systems or secondary functions were affected by this event.

E. **Method of Discovery**

The operator observed step counters for Control Bank A, Groups 1 and 2, deviating by four steps.

F. **Operator Actions**

Manual insertion of the control rods was terminated when the operator noticed that Control Bank A2 mechanical step counter had stopped counting at 93 steps. The A1 step counter was indicating 89 steps.

To prevent a feedwater transient, the feedwater isolation signal was manually blocked by holding the switches momentarily in reset at the time of the manual reactor trip.

G. **Automatic and manual safety system responses**

There were no automatic responses. A manual reactor trip was initiated by the operators.

III. CAUSE OF EVENT

A. **Immediate Cause**

The immediate cause of the initiation of the manual reactor trip was a deviation in indicators of control rod position by the control bank step counters.

B. **Root Cause**

The step counter for Control Bank A, Group 2 rods was skipping (performing intermittently).

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

There were no safety implications to the public related to the event. The rods were in the correct position, although the step counter failed to function properly.

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

V. CORRECTIVE ACTIONS

1. Immediate Corrective Actions

A manual reactor trip was initiated; trip breakers opened, and the crew entered Procedure E-O (Reactor Trip Response).

2. Corrective Actions to Prevent Recurrence

During troubleshooting of the step counter circuitry, the counter functioned properly. However, this component was also replaced for reliability.

System Operating Instruction (SOI)-85.01, "Control Rod Drive and Indication System," was revised to require checking the rod insertion limit (RIL) recorder prior to initial rod withdrawal during reactor startup.

Although not a corrective action for the reportable event, the P-A converter card for Control Bank D was initially recalibrated. For increased reliability, this card was later replaced and calibrated.

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

There were no failures that rendered a train or a safety system inoperable.

2. Component/System Failure Information

a. Method of Discovery of Each Component or System Failure:

When the step counter stopped counting, there was an audible change in the step counter count rate in the control room.

b. Failure Mode, Mechanism, and Effect of Each Failed Component:

A mechanical intermittent failure of the step counter caused it not to step properly.

c. Root Cause of Failure:

The step counter for Control Bank A, Group 2 rods (step counter) was skipping (performing intermittently). The exact cause of the skipping could not be determined, since, during troubleshooting, the counter functioned properly.

d. For Failed Components With Multiple Functions, List of Systems or Secondary Functions Affected:

There were no secondary functions affected.

e. Manufacturer and Model Number of Each Failed Component:

Step Counter - Electronics Resource Division, Whitaker Corporation, Model Number 127FD10085/3

B. Previous Similar Events

For Watts Bar Nuclear Plant, no events similar to the events described in this report have been previously reported under 10 CFR 50.72 or 10 CFR 50.73.

VII. COMMITMENTS

All actions are complete; there are no commitments.