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

Richard T. Purcell
Site Vice President, Watts Bar Nuclear Plant

MAR 2 2 2000

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 - FACILITY OPERATING LICENSE NPF-90 - LICENSEE EVENT REPORT (LER) 50-390/2000-001

The enclosed report provides details regarding a failure to perform required response time testing. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B).

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

Sincerely,

W. R. Lagergren

for R. T. Purcell

Enclosure
cc: See page 2

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MAR 2 2 2000

cc (Enclosure):
NRC Resident Inspector
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

Mr. Robert E. Martin, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, Georgia 30303

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/30/2001

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. In an information collection does not display a currently valid OMB control number, the NRC may no 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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Watts Bar Nuclear Plant - Unit 1	05000390	1 OF 8

TITLE (4)

Response Time Testing of Train B Turbine Trip Solenoid Valve (1-FSV-47-027-B)

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
02	22	00	2000	001	00	03	23	00	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)	X	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)		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)
Jerry L. Bushnell, Licensing Engineer	(423)-365-8048

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

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

On February 22, 2000, with unit 1 in Mode 1 operating at approximately 100 percent reactor power, engineering personnel identified for solenoid valve 1-FSV-47-027-B that required response time testing was not performed when the valve was replaced on April 4, 1999. The testing is required by Surveillance Requirement (SR) 3.3.2.10. The cause of this event was determined to be a lack of knowledge on the part of the personnel that developed the maintenance instruction that was used for the replacement of the valve. Also contributing to the event was that WBN had not developed a matrix or other appropriate documents which identified the components for which response time testing is required. Without a document of this nature, each individual had to interpret the Technical Specifications (TS), the Final Safety Analysis Report (FSAR) and other relevant documents like the System Descriptions, to determine the appropriate scope of a test. The principal corrective actions include; the development of an NOED with subsequent approval by NRC, development of a TS amendment, the planning of a WO which will be implemented when the turbine is next removed from service and perform the required response time testing, and development of a list of components that are part of the response time testing program. This condition is being reported in accordance with 10 CFR 50.73 (a)(2)(i)(B).

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	2 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	2000	- 001	- 00	

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

I. PLANT CONDITIONS:

Watts Bar Nuclear Plant Unit 1 was in Mode 1 operating at approximately 100 percent reactor power when this event occurred.

II. DESCRIPTION OF EVENT

A. Event

On February 22, 2000, at 1700 hours, WBN entered TS SR 3.0.3, following the discovery that the response time testing had not been performed for replaced solenoid valve, 1-FSV-47-027-B (EIIS FSV), the Train B turbine trip solenoid valve. Following preventative maintenance replacement of this solenoid, the circuit was functionally tested but time response was not recorded. Accordingly, the response time testing requirements of Surveillance Requirement (SR) 3.3.2.10 were not met. This condition was discussed with NRC on February 23, 2000, and a Notice of Enforcement Discretion (NOED) was verbally approved by NRC that day. Subsequent to NRC's issuance of the NOED, a Technical Specification (TS) amendment was submitted to NRC on February 25, 2000, requesting approval for the response time test requirement of SR 3.3.2.10 to not be considered applicable to 1-FSV-47-027-B until after the next time the turbine generator is removed from service.

Problem Evaluation Report (PER) 00-004459-000 was initiated to document this event in the TVA Corrective Action Program.

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

There were no inoperable structures, components or systems that contributed to this event. However, the review performed for PER 00-004459-000 to determine the extent of the problem, identified the following number of components for which response time testing was not performed at the conclusion of a maintenance activity. WBN has established, however, that proper testing was performed on each of the components subsequent to the maintenance activity. Therefore, there are no current concerns with the operability of the listed components:

Component Type	Number Not Tested
Pressure transmitter - Steam Generator main header	1
Relay - Auxiliary Feedwater separation	1
Relay - Diesel Generator emergency start	14
Breaker - 6.9 kV	4
Breaker - 480 V	8

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
	05000	YEAR	SEQUENTIAL NUMBER	REVISION	3 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	2000	- 001	- 00	

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

C. Dates and Approximate Times of Major Occurrences

Time (EST)	Occurrences on April 4, 1999
	Revision 1 of Preventative Maintenance (PM) instruction, 1-FSV-047-0027-B, and Work Order 98-009258-000 removed and replaced 1-FSV-47-27-B. Implementation of the PM did not obtain response times for the replaced solenoid valve.
	Occurrences on February 22, 2000
17:00	Surveillance Requirement (SR) 3.0.3 is entered after engineering personnel determined that although functionally tested, the response time testing required by SR 3.3.2.10 was not performed when the solenoid valve was replaced on April 4, 1999.
	Occurrences on February 23, 2000
13:00	A Notice of Enforcement Discretion, (NOED) is developed and coordinated with NRC.
14:00	NRC provides verbal notification that the NOED is approved. The NOED relieves Watts Bar from taking the actions required by LCO 3.0.3 for the function served by 1-FSV-47-027-B. The NOED becomes effective at 17:00 on February 23, 2000, and will allow 30 days for NRC to approve a Technical Specification amendment.
	Occurrences on February 25, 2000
	NRC provides written approval of the NOED and grants relief from compliance with SR 3.3.2.10.
	An exigent Technical Specification amendment (Change Number TVA-WBN-TS-00-005) was submitted to NRC.

D. Other Systems or Secondary Functions Affected

There were no other systems or secondary functions affected by the failure to response time test 1-FSV-47-027-B.

E. Method of Discovery

TVA's engineering staff identified that the required response time testing had not been performed during the preparation of a design change.

F. Operator Actions

After engineering personnel determined that the response time testing required by SR 3.3.2.10 was not performed when the solenoid valve was replaced in April 1999, the Operations staff entered Surveillance Requirement (SR) 3.0.3.

G. Automatic and manual safety system responses

There were no automatic or manual safety system responses and none were required.

III. CAUSE OF EVENT

The principal cause of this LER was a lack of knowledge on the part of the individuals who prepared and performed the technical review of the PM instruction. The lack of knowledge lead to the required response time testing not being included in the post-maintenance test (PMT). Also contributing to the event was that WBN had not developed a matrix or other appropriate documents which identified the components for which response time testing is required. Without a document of this nature, each individual had to interpret the Technical Specifications, the Final Safety Analysis Report (FSAR) and other relevant documents like the System Descriptions, to determine the appropriate scope of a test.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

The WBN turbine-generator unit was manufactured by WBN's Nuclear Steam Safety System supplier, Westinghouse Electric Corporation. The Watts Bar turbine-generator unit consists of a double-flow high pressure turbine and three double-flow low pressure turbines with extraction nozzles arranged for seven stages of feedwater heating. The turbine utilizes a Westinghouse designed electrohydraulic control (EHC) system for control of both speed and load. The EHC system, composed of solid state electronic devices coupled through suitable electrohydraulic transducers to a high-pressure hydraulic fluid system, provides control of the main stop, governing, intercept, and reheat stop valves (EIIS FCV) of the turbine. Overspeed speed protection is provided by a mechanical overspeed trip mechanism, backed up by an electrical overspeed trip circuit.

The turbine trip function consists of two trip buses, Trains A and B. The Train A trip system consists of the solenoid-operated auto-stop oil dump valve (EIIS FSV) actuated by the turbine trip slave relay (EIIS RLY) in the solid state protection system (SSPS). The resulting low auto stop oil pressure operates the interface valve which dumps EHC fluid from the throttle valves. The Train A overspeed protection controller (OPC) solenoid valve (EIIS FSV) is actuated by the SSPS to dump EHC fluid from the governor and intercept valves. In addition the Train A trip bus is actuated by a relay (EIIS RLY) in the Train B trip bus. The Train B trip system consists of the solenoid-operated emergency trip dump valve (EIIS FSV) which is actuated by the SSPS and operates to dump EHC fluid from the throttle valves. The Train B OPC solenoid valve is actuated by the SSPS to dump EHC fluid from the governor and intercept valves. In addition, the Train B trip bus is actuated by a relay in the Train A trip bus.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
	05000				5 OF 8
Watts Bar Nuclear Plant, Unit 1	05000390	2000 - 001 - 00			

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

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES (continued)

During Refueling Outage 2 the Train B solenoid-operated emergency trip dump valve was replaced with a like for like replacement. This replacement valve was then functionally verified on April 15, 1999. During work on a subsequent proposed design change, TVA engineers discovered on February 22, 2000, that the response time for this function had not been verified. Response time testing for other components in the Train B function was still in frequency. Required response time testing of the Train A turbine trip was performed satisfactorily in the last outage.

Technical Specification LCO 3.3.2 requires turbine trip and feedwater isolation for Steam Generator Water Level High-High, Safety Injection, and Valve Vault Room Level High. SR 3.3.2.10 is applicable to Steam Generator Water Level High-High. Technical Requirements Manual (TRM) technical requirement (TR) 3.3.2 specifies that Steam Generator Water Level High-High trip the turbine in ≤2.5 seconds and perform feedwater isolation in 8 seconds. TR 3.3.2 for Safety Injection and Valve Vault Room Level High does not specify a response time for turbine trip, but only for feedwater isolation.

Westinghouse performed a qualitative review of the WBN Feedwater Malfunction analysis, which models turbine trip and feedwater isolation off of the steam generator high-high water level setpoint, with a ≤2.5 second delay on the turbine trip. The event is analyzed primarily to demonstrate that the Departure from Nucleate Boiling (DNB) design basis is satisfied. Even if the turbine trip does not occur, the feedwater isolation signal would cause the steam generator to drain down and the transient would simply behave as a loss-of-normal feedwater/inadvertent emergency core cooling system (ECCS) at power event. The resultant transient would be bounded by the existing Final Safety Analyses Report (FSAR) analyses. Westinghouse's evaluation also indicates that a delayed trip would remain well above the DNBR limit.

For Steam Generator Water Level High-High, turbine trip is primarily an equipment protection function, as described in the Technical Specification Bases. This function prevents possible damage to the turbine due to water in the steam lines. Therefore, from the preceding, WBN has concluded:

- Turbine trips have been functionally verified in accordance with technical specifications and the turbine protection program.
- The Train A response times have been verified per technical specifications.
- Other Train B turbine trip components remain within technical specification surveillance frequency for response time testing.
- Turbine trip response time is not a significant contributor in the accident analysis.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES (continued)

- Even if the turbine trip does not occur, the feedwater isolation signal would cause the steam generator to drain down and the transient would behave as a loss-of-normal feedwater/inadvertent ECCS at power event. The resultant transient would be bounded by the existing FSAR analyses.

- Because of the above, it is reasonable to assume that turbine trip will occur as described in the accident analysis and therefore, failure to obtain response time data for the train B solenoid does not pose an issue of safety significance.

Accordingly, the delay in performing the SR for valve 1-FSV-47-027-B until the next time the turbine generator is removed from service does not represent a threat to plant safety.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

1. WO 00-004854-000 has been planned and will implement the required response time testing of 1-FSV-47-027-B. The approved NOED and the pending exigent Technical Specification change require the testing to be performed when the turbine is next removed from service.

B. Corrective Actions to Prevent Recurrence - (TVA does not consider these items to constitute regulatory commitments. TVA's corrective action program tracks completion of these actions.)

1. A list of components which must be part of the response time testing program has been developed.

2. The list of components requiring response time testing has been added to Technical Instruction (TI) 126, "Post Maintenance Testing Matrices."

3. For breakers in the response time testing program, Maintenance Instruction (MI) 57.002, "Westinghouse DS Circuit Breaker Routine Maintenance, Inspection and Testing," will be revised to require that closing and opening times be obtained during breaker maintenance.

4. Appropriate personnel have been trained on identifying the equipment that is in the scope of the Response Time Test Program and on the proper test for components within the program.

5. Revision 2 of PM instruction I-FSV-047-0027-B, "Removal and Installation of Main Generator Over Speed Trip Solenoid Valves (I-FSV-047-0027-B, I-FSV-047-0026A-A, and I-FSV-047-0026B-B)," has been approved and includes response time testing requirements.

6. The following PM instructions have been revised to require recording of the fast start times for the diesel generators after relay replacement:

PM Number	Instruction Title
1-GEN-082-0001A-A	Replacement and Testing of Diesel Generator 1A-A Alarm Relays
1-GEN-082-0001B-B	Replacement and Testing of Diesel Generator 1B-B Alarm Relays
2-GEN-082-0002A-A	Replacement and Testing of Diesel Generator 2A-A Alarm Relays
2-GEN-082-0002B-B	Replacement and Testing of Diesel Generator 2B-B Alarm Relays

7. WBN's Engineering Support Personnel Training (ESPT) program will be assessed to establish whether the training appropriately addresses response time testing. If required, the ESPT program will be updated.

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

There was no safety train inoperability due to a failed component.

2. Component/System Failure Information

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

This event did not involve a failed component.

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

This event did not involve a failed component.

c. Root Cause of Failure:

This event did not involve a failed component.

VI. ADDITIONAL INFORMATION (continued)

2. Component/System Failure Information (continued)

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

This event did not involve a failed component.

e. Manufacturer and Model Number of Each Failed Component:

This event did not involve a failed component.

B. Previous Similar Events

TVA's letter to NRC dated April 4, 1997, transmitted LER 390/1997-007. This LER addressed a failure to perform response time testing on pressure transmitter (PT, EIIS PT) 1-PT-68-340. This transmitter provides a trip function for high and low pressurizer (EIIS PZR) pressure. The extent of condition and corrective actions established for LER 390/1997-007 should have identified that the required response time testing was not performed on the Steam Generator (EIIS SG) main header pressure transmitter referred to in Item B, "Inoperable Structures, Components, or Systems that Contributed to the Event," of Section II, Description of Event," of this LER. It should also be noted that the recurrence controls for LER 390/1997-007 addressed only transmitters and therefore, would not have affected the instructions used for replacement of 1-FSV-47-027-B. However, the corrective actions for LER 390/2000-001 requires the development of a response time testing matrix which will provide a comprehensive listing of the various types of components which require response time testing. This program should ensure problems with the identification of components which require response time testing do not occur in the future.

C. Additional Information: - None.

D. Safety System Functional Failure:

This event did not involve a safety system functional failure as defined in NEI-99-02, Revision 0.

VII. COMMITMENTS - None.