



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

MAR 18 1996

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

Gentlemen:

In the Matter of the) Docket Nos. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 - FACILITY OPERATING
LICENSE NPF-90 - LICENSEE EVENT REPORT (LER) 50-390/96005

Enclosed is LER 50-390/96005 which details the improper
installation of a turbine impulse pressure transmitter.
Submittal of this report is in accordance with
10 CFR 50.73(a)(2)(i).

Sincerely,

D. V. Kehoe
Nuclear Assurance
and Licensing Manager

Enclosures
cc: See page 2

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U.S. Nuclear Regulatory Commission
Page 2

MAR 18 1996

cc (Enclosures):

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LICENSEE EVENT REPORT (LER)

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

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-8 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 20803.

FACILITY NAME (1) Watts Bar Nuclear Plant - Unit 1	DOCKET NUMBER (2) 05000390	PAGE (3) 1 OF 7
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TITLE (4)
Turbine impulse pressure pressure transmitter installed incorrectly.

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
02	17	96	96	005	00	03	18	96		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11) 20.2201(b) <input type="checkbox"/> 20.2203(a)(2)(v) <input checked="" type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(viii) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 73.71 <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> OTHER <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> Specify in Abstract below <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> or in NRC Form 366A <input type="checkbox"/>
POWER LEVEL (10) 015	

LICENSEE CONTACT FOR THIS LER (12)

NAME Jerry Bushnell, Compliance Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (423)-365-8048
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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	SB	PT	F180	N					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO						

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

The turbine impulse pressure interlock, the P-13 interlock, is actuated when the pressure in the first stage of the high pressure (HP) turbine is greater than approximately 10 percent of the rated full load pressure. This is determined by one-out-of-two pressure transmitters (PTs), 1-PT-1-72 or 1-PT-1-73 (EIS PT, SB). The low power reactor trips block, the P-7 interlock, is actuated by input from either the power range neutron flux interlock, the P-10 interlock, or the turbine impulse pressure interlock, the P-13 interlock. On February 17, 1996, at approximately 1743 hours (EST), Operations personnel declared 1-PT-1-73 inoperable when it failed to respond to increasing pressure. At this time, Unit 1 was in Mode 1 at approximately 15 percent power. The investigation of this event established that the sense line for 1-PT-1-73 was improperly connected to a thermowell on the HP turbine casing. This installation error is reportable under 10 CFR 50.73(a)(2)(i), since the PT was not operable when Unit 1 first entered Mode 1. LCO 3.3.1 requires two channels of turbine impulse pressure to be operable in Mode 1. Action "S" for LCO 3.3.1 was entered, which requires the verification that the P-7 interlock is in the required state for the condition of the plant. The P-7 interlock was verified and the action was exited. The connection of the PT to the turbine was installed during the initial construction phase. However, the error in connecting to the thermowell was not discovered until the turbine was placed online on February 17, 1996. The corrective action reworked the supply for the sense line for 1-PT-1-73.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				2 OF 7
	05000390	96	005	00	

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

I. PLANT CONDITIONS:

At approximately 1743 hours (EST) on February 17, 1996, Pressure Transmitter (PT) 1-PT-1-73 (Energy Industry Identification System (EIS) codes PT, SB) was determined to be inoperable. This PT senses high pressure turbine impulse pressure. At this time, Watts Bar Nuclear Plant Unit 1 was in Mode 1. Plant parameters at this time were: reactor power level 15 percent, reactor coolant system (RCS) (EIS AB), temperature - 562 degrees F.

II. DESCRIPTION OF EVENT

A. Event

The turbine impulse pressure interlock, the P-13 interlock, is actuated when the pressure in the first stage of the high pressure turbine is greater than approximately 10 percent of the rated full load pressure. This is determined by one-out-of-two pressure transmitters (PTs), 1-PT-1-72 or 1-PT-1-73 (EIS PT, SB). The low power reactor trips block interlock, the P-7 interlock, is actuated by input from either the power range neutron flux interlock, the P-10 interlock, or the turbine impulse pressure, the P-13 interlock. On February 17, 1996, at approximately 1743 hours (EST), Operations personnel declared 1-PT-1-73 inoperable when it failed to respond to increasing pressure. At this time, Unit 1 was in Mode 1 at approximately 15 percent power. LCO 3.3.1 requires two channels of turbine impulse pressure, the P-13 interlock, to be operable in Mode 1. Action "S" for LCO 3.3.1 was entered, which requires the verification that the P-7 interlock is in the required state for the condition of the plant. The P-7 interlock was verified and the action was exited.

The condition described above existed from the time of the initial installation of the PT, during the early construction phase of the plant, until the turbine was first placed online on February 17, 1996. Revision 1 of the second draft of NUREG 1022, "Event Reporting Guidelines, 10 CFR 50.72 and 50.73," provides guidelines for compliance with the reporting requirements of 10 CFR 50.73(a)(2)(i)(B). This section of the CFR requires licensees to report "any operation or condition prohibited by the plant's technical specifications." NUREG 1022 clarifies the reporting requirements by stating the following and based on this clarification of the CFR, the inoperability of 1-PT-1-73 was reportable as of the time WBN Unit 1 first entered Mode 1 on February 8, 1996:

"If a condition existed for a time period longer than permitted by the technical specifications, it must be reported even if the condition was not discovered until after the allowable time had elapsed and the condition was rectified immediately upon discovery."

Problem Evaluation Report WBPER960050 was initiated to document this event in the TVA Corrective Action Program.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				3 OF 7
	05000390	96	005	00	

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

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

1-PT-1-73 was the only inoperable component associated with this event. The inoperability of this component did not render the main steam system (EIS SB) inoperable.

C. Dates and Approximate Times of Major Occurrences

Late 1970's or early 1980's - 1-PT-1-73 was initially installed incorrectly.

May 31, 1995 - Surveillance Instruction (SI) 1-SI-1-73, "18 Month Channel Calibration Turbine Impulse Chamber Pressure Channel I," was performed with the acceptance criteria for the test being met. (Note: the method of testing this component could not have identified the installation deficiency.)

February 8, 1996, approximately 1228 hours (EST) - WBN Unit 1 entered Mode 1.

February 16, 1996, approximately 1737 hours (EST) - WBN Unit 1 entered Mode 1.

February 17, 1996, approximately 1743 hours (EST) - Operations personnel declared 1-PT-1-73 inoperable when it failed to respond to increasing pressure. Action "S" for LCO 3.3.1 was entered, which requires the verification that the P-7 interlock is in the required state for the condition of the plant. The P-7 interlock was verified and the action exited.

D. Other Systems or Secondary Functions Affected

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

E. Method of Discovery

1-PT-1-73 failed to respond to increasing system pressure. This was observed by Operations personnel using a pressure indicator associated with the pressure transmitter.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				4 OF 7
	05000390	96	005	00	

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

F. Operator Actions

The actions taken by Operations personnel related to this event are discussed in Section V, Corrective Actions, Item 1, Immediate Corrective Actions.

G. Automatic and manual safety system responses

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

III. CAUSE OF EVENT

A. Immediate Cause

This event is due to an error made in the initial construction phase of the plant and is an isolated incident. The cause for the event is discussed in item B of this section, Root Cause.

B. Root Cause

The investigation for this event established that the sense line for 1-PT-1-73 was connected to a thermowell on the high pressure turbine casing. Although the connection was installed early in the construction period, the error in connecting to the thermowell was not discovered until the turbine was placed online on February 17, 1996.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

In order to ensure operation is within defined safety limits, the power level trips are established via P-7. To establish P-7, an input must exist from either P-10, power range monitor greater than 10 percent, or P-13, turbine impulse pressure greater than 10 percent. For P-13 to allow arming of the power level trips either 1-PT-1-72 or 1-PT-1-73 must indicate turbine pressure greater than 10 percent. During this event 1-PT-1-72 was operable. In addition, P-10 was available through the power range monitors to allow P-7 and arm the power level trips. Considering the redundancy provided in this logic for the arming of the power level trips, 1-PT-1-73 being inoperable would not have significantly impacted the placement of the plant in a safe condition for operation.

A review of all safety-related turbine trips utilizing TVA and Westinghouse documentation was completed to bound the scope of this event. The trips reviewed included: manual trip, turbine trip due to a reactor trip, closure of any turbine stop valve, tripping of any of the three turbine auto stop oil line pressure switches, turbine trip due to steam generator high-high water level, turbine impulse chamber to the reactor coolant system (RCS) (EIS AB) protection system, and safety injection (EIS BQ) turbine trip.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				5 OF 7
	05000390	96	005	00	

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

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

In addition, other pressure and temperature parameters, including impulse pressure transmitter 1-PT-1-72, for the high pressure turbine were trended for the period the unit was on line. All other indications were appropriate for the conditions present. No other abnormal indications were observed by Operations or Engineering personnel during this timeframe.

The improper installation of the turbine impulse chamber pressure sense line appears to be an isolated case. Furthermore, as the unit is brought up to higher power levels the power ascension test (PAT) program will confirm that turbine controls and responses are working properly.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Upon observing that 1-PT-1-73 failed to respond to increasing pressure, Operations personnel declared the pressure transmitter inoperable. Action "S" for LCO 3.3.1 was entered, which requires the verification that the P-7 interlock is in the required state for the condition of the plant. The P-7 interlock was verified by Operations and the action was exited. Work Orders were initiated to rework the supply for the sense line for 1-PT-1-73. Implementation of the work orders was completed on February 20, 1996.

B. Corrective Actions to Prevent Recurrence

Based on the review performed to bound the scope of this event, it was established that the error in installation of the sense line for the pressure transmitter was an isolated error which occurred during the initial construction phase of the plant. Considering this, and the numerous enhancements made since the time of the initial installation to strengthen WBN's work control program, no actions other than those taken are required.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				6 OF 7
	05000390	96	005	00	

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

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

The turbine impulse pressure interlock, the P-13 interlock, is actuated when the pressure in the first stage of the high pressure turbine is greater than approximately 10 percent of the rated full load pressure. This is determined by one-out-of-two pressure transmitters (PTs), 1-PT-1-72 or 1-PT-1-73 (EIS PT, SB). The low power reactor trips block, the P-7 interlock, is actuated by input from either the power range neutron flux interlock, the P-10 interlock, or the turbine impulse pressure interlock, the P-13 interlock. On February 17, 1996, at approximately 1743 hours (EST), Operations personnel declared 1-PT-1-73 inoperable when it failed to respond to increasing pressure. At this time, Unit 1 was in Mode 1 at approximately 15 percent power. LCO 3.3.1 requires two channels of turbine impulse pressure, the P-13 interlock, to be operable in Mode 1. Action "S" for LCO 3.3.1 was entered, which requires the verification that the P-7 interlock is in the required state for the condition of the plant. The P-7 interlock was verified and the action was exited.

2. Component/System Failure Information

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

1-PT-1-73 failed to respond to increasing system pressure. This was observed by Operations personnel in the main control room using the pressure indicator associated with 1-PT-1-73.

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

The turbine impulse pressure, the P-13 interlock, must be operable when the turbine generator is operating and is actuated when the pressure in the first stage of the high pressure turbine is greater than approximately 10 percent of the rated full load pressure. This is determined by one-out-of-two pressure detectors, 1-PT-1-72 or 1-PT-1-73.

The low power reactor trips block, the P-7 interlock, is actuated by input from either the power range neutron flux interlock, the P-10 interlock, or the turbine impulse pressure interlock, the P-13 interlock. On increasing power, the P-7 interlock automatically enables reactor trips on the following functions; pressurizer pressure-low, pressurizer water level-high, reactor coolant flow-low (two loops), reactor coolant pump (RCP) undervoltage, and RCP underfrequency.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant, Unit 1	05000				7 OF 7
	05000390	96	005	00	

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

VI. ADDITIONAL INFORMATION (continued)

These reactor trips are only required when operating above the P-7 setpoint (approximately 10 percent power). The reactor trips provide protection against violating the departure from nucleate boiling ratio (DNBR) limit. Below the P-7 setpoint, the reactor coolant system (RCS) (EIS AB) is capable of providing sufficient natural circulation without any RCP running.

c. Root Cause of Failure:

The investigation for this event established that the sense line for 1-PT-1-73 was connected to a thermowell on the high pressure turbine casing. Although the connection was installed early in the construction period, the error in connecting to the thermowell was not discovered until the turbine was placed online on February 17, 1996.

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

The function of pressure transmitter (PT) 1-PT-1-73 as it relates to the control of the protection of the reactor by enabling reactor trips, is discussed in item "b" above, Failure Mode, Mechanism, and Effect of Each Failed Component.

e. Manufacturer and Model Number of Each Failed Component:

Pressure transmitter 1-PT-1-73:
 Manufacturer: Foxboro
 Model Number: E11GMHSAD1

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

The actions committed to be implemented in response to this event are tabulated in Section V, Corrective Actions.