

U.S. Nuclear Regulatory Commission
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DEC 19 2006

Enclosure

cc (Enclosure):

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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 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.

1. FACILITY NAME Watts Bar Nuclear Plant, Unit 1	2. DOCKET NUMBER 05000 390	3. PAGE 1 OF 4
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4. TITLE
Auxiliary Feedwater Auto-Start Function Upon Loss of Main Feedwater Pumps

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
10	27	2006	2006	- 008 -	00	12	19	2006	FACILITY NAME	DOCKET NUMBER
										05000
										05000

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

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Rickey Stockton, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (423) 365-1818
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

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

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

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

On October 27, 2006, with WBN Unit 1 in a core empty period, NRC issued Inspection Report 390, 391/2006004 which identified a non-cited violation of Technical Specification (TS) 3.0.4 for entering Modes 1 and 2 with the automatic auxiliary feedwater start signal for a loss of normal feedwater (TS 3.3.2.6.e) inoperable. Since initial startup in 1996, WBN has concluded this function was operable when a turbine-driven main feedwater pump trip bus was energized even though the pump was not running and supplying feedwater to the steam generators. This condition is being reported under 10 CFR 50.73(a)(2)(i)(B), "Operation or Condition Prohibited by Technical Specifications."

The cause was determined to be a misunderstanding of the Technical Specification due to a disconnect between the design of Watts Bar and the assumed generic design in the standard Technical Specifications. The need for the AFW pumps to start on the loss of the Standby Main Feedwater Pump appears to have not been considered during the development of WBN's Technical Specifications. Procedure changes have been made to address the use of LCO 3.0.4.b for the startup of the unit utilizing the standby main feed pump or the use of the Auxiliary Feedwater System.

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		2006	-- 008	-- 00	

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

I. Plant Conditions:

On October 27 2006, WBN was in a core empty period with the core in the spent fuel pool while replacing steam generators (Energy Industry Identification System (EIIIS) Code SG) during the Unit 1 Cycle 7 outage.

II. Description of Event:

A. Event:

On October 27, 2006, NRC issued Inspection Report 390, 391/2006004 which identified a non-cited violation of Technical Specification (TS) 3.0.4 for entering Modes 1 and 2 with the automatic auxiliary feedwater (AFW) (EIIIS Code BA) start signal for a loss of normal feedwater (EIIIS Code SJ) (TS 3.3.2.6.e) inoperable. Since initial startup in 1996, WBN has concluded this function was operable when a turbine-driven main feedwater pump (TDMFW) (EIIIS Code SJ/P) trip bus (EIIIS Code BU) was energized even though the pump was not running and supplying feedwater to the steam generators.

This condition is being reported under 10 CFR 50.73(a)(2)(i)(B), "Operation or Condition Prohibited by Technical Specifications."

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

There were no additional structures, components or systems inoperable at the start of the event that contributed to the event.

C. Dates and Approximate Times of Major Occurrences

Date	Time	Event
01/17/1996	2345	Initial Mode 2 entry
10/26/2006		NRC Inspection Report 390, 391/2006-004 Issued.

D. Other Systems or Secondary Functions Affected

There are no other systems or secondary functions affected.

E. Method of Discovery

This condition was first identified during NRC's review of License Amendment Request 04-013, which proposed moving the operability requirement for TS Function 3.3.2.6.e from just prior to Mode 2 to upon start of a TDMFW pump.

F. Operator Actions

Not Applicable

G. Safety System Responses

There were no safety system responses as a result of this condition.

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III. CAUSE OF EVENT

The cause was determined to be a misunderstanding of the Technical Specification due to a disconnect between the design of Watts Bar and the assumed generic design in the standard Technical Specifications. The need for the AFW pumps (EIS Code BAVP) to start on the loss of the Standby Main Feedwater (SBMFW) Pump appears to have not been considered during the development of WBN's Technical Specifications.

IV. ANALYSIS OF THE EVENT

The safety-related AFW system supplies feedwater to the steam generators in the event of a loss of MFW to remove reactor decay heat and avoid reactor coolant system (EIS code AB) over pressurization. Since initial startup at WBN, a motor driven SBMFW pump has been used primarily for plant startup. In addition, the SBMFW pump was available to supplement the two TDMFW pumps designed for normal operation.

WBN's design configuration is such that each TDMFW pump is equipped with one pressure switch on the control oil line for the speed control system. A low pressure signal from this pressure switch indicates a trip of that pump and a trip of both TDMFW pumps starts the motor driven and TDAFW pumps. WBN TS LCO function 3.3.2.6.e requires the automatic start of the AFW system on trip of all MFW pumps to be operable during modes 1 and 2. Although the Standard Technical Specification Bases also describe a trip feature for a standby pump, WBN's SBMFW pump has never had this trip feature to auto start the AFW pumps nor has this feature for the SBMFW pump ever been described in the WBN Technical Specifications. WBN Technical Specification Bases issued in 1996 stated that an indication of a loss of MFW was a trip of both turbine main feedwater pumps. Thus, due to this configuration, WBN concluded upon initial startup that LCO function 3.3.2.6.e was operable when a TDMFW pump trip bus was energized even though the pump was not running and supplying feedwater to the steam generators. This misinterpretation has been carried forth during each subsequent plant startup until this condition was identified.

V. ASSESSMENT OF SAFETY CONSEQUENCES

LCO 3.3.2.6.e is an anticipatory function which provides early actuation of the AFW system but it is not a safety-related function. Steam generator low-low level or a safety injection (SI) (EIS Code BQ) signal are the safety related signals credited for actuating the AFW system during an accident. The TDMFW pump oil pressure switches, which indicate a trip of their respective pump, are non-quality related and there is no redundancy for this function (i.e., only one switch per pump).

During startup, with power less than 20 percent and SBMFP running, the plant is monitored very closely and the immediate need for AFW following loss of normal feedwater is less than at full power. If the SBMFP had tripped during this time, the AFW system would have started automatically by a low-low steam generator level signal or by operator manual initiation in accordance with plant procedures. The loss of one TDMFW pump during normal operation (100 percent power) would have caused automatic start of the SBMFP, isolation of the condensate flow through the tripped main feed pump turbine's condenser, and main turbine runback to below 85 percent unit load. This would have resulted in feedwater flow being restored to the steam generators within 20 seconds of the loss of one TDMFW Pump which would have prevented a reactor trip due to low steam generator level. During this scenario, the auto start circuit for the AFW system is half made up and should the other TDMFW Pump trip, the AFW system will actuate. The design basis events, which impose AFW safety function requirements, are a loss of normal MFW, a main feedline or main steamline break, a loss of offsite power, a loss of coolant accident, and a small break loss of coolant accident. These accident evaluations assume actuation of AFW occurring due to low-low steam generator level or a safety injection signal. Start of AFW due to trip of the TDMFW pumps has not been credited in either the transient or accident analyses.

Based upon the above, the condition had no impact on the health and safety of the public.

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VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

WBN has implemented changes to plant procedures to address the use of LCO 3.0.4.b for the startup of the unit utilizing the standby main feed pump or the use of the Auxiliary Feedwater System.

A comparison of each function listed in WBN Technical Specification 3.3.2 to the improved Technical Specifications and Bases was performed. Based upon this comparison and considering the length of operating time at Watts Bar, this issue is judged to be an isolated condition.

B. Corrective Actions to Prevent Recurrence

WBN has issued a lessons learned regarding this subject to the appropriate Licensing, Operation, and Engineering personnel.

VII. ADDITIONAL INFORMATION

A. Failed Components

There were no failed components due to this condition.

B. Previous LERs on Similar Events

A search of previous LERS identified no reportable conditions similar to this condition.

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 4.

E. Loss of Normal Heat Removal Consideration

There was no loss of normal heat removal due to this condition.

VIII. COMMITMENTS

None