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Mike Skaggs
Site Vice President, Watts Bar Nuclear Plant

DEC 19 2006

10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

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

**WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - LICENSEE EVENT REPORT
390/2006-009 - CONTAINMENT SPRAY VALVE INTERLOCK**

This submittal provides LER 390/2006-009. This LER documents a condition identified involving a containment spray valve interlock issue. The report regarding this condition is provided in accordance with 10 CFR 50.73(a)(2)(i)(B) and 50.73(a)(2)(v)(D).

Should there be questions regarding this submittal, please contact J. D. Smith at (423) 365-1824.

Sincerely,



Mike Skaggs

Enclosure

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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 5
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4. TITLE
Containment Spray Valve Interlock Inoperable

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	26	2006	2006	- 009 -	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)			
10. POWER LEVEL 0%	<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)
	<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 checked="" 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
D	BE	IEL	L200	Y					

14. SUPPLEMENTAL REPORT EXPECTED <input type="radio"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="radio"/> NO	15. EXPECTED SUBMISSION DATE MONTH: DAY: YEAR:
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 26, 2006, with WBN Unit 1 in a core empty period, WBN personnel concluded that a condition that had been identified earlier in the U1C7 refueling outage performance of Surveillance Instruction 1-SI-63-915A, Appendix P, "Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train A)," had existed since the U1C6 refueling outage (March 22, 2005). Specifically, on September 20, 2006, Valve 1-FCV-72-45-B, "Train B - Containment Sump Suction Valve," would not stroke electrically during the above surveillance performance. Subsequently, during the corrective action investigation, it was determined through review of maintenance records that Rotor 2 (Contact 6) on 1-MVOP-72-21-B (interlocked with valve 1-FCV-72-45-B) had been set incorrectly during the U1C6 refueling outage. The rotor was reset and a post maintenance test was successfully completed that demonstrated the misadjustment of the rotor was the cause for above 1-FCV-72-45-B condition. Further investigation found the opposite train check valves 1-CKV-72-562-A and -548-A were inoperable due to surveillance instruction inspection/disassembly during portions of the same period. Since this condition existed beyond the allotted TS outage time, it is being reported under 10 CFR 50.73(a)(2)(i)(B), "Operation or Condition Prohibited by Technical Specifications." In addition, since the opposite train valve has been also found to have been inoperable, it is also reportable under 10 CFR 50.73(a)(2)(v)(D).

The issue was determined to stem from two causes. The first cause is a lack of procedural guidance and control during a motor-operated valve analysis and test system (MOVATS) test. The second cause was determined to be a lack of attention to detail during post maintenance testing (PMT) development and approval.

Corrective actions include a revision to plant procedures to provide additional guidance on the performance of testing and limit switch development, and coaching of the individuals involved with the inadequate PMT development and approval.

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Watts Bar Nuclear Plant, Unit 1	05000 390	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		2006	-- 009	-- 00	

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

I. Plant Conditions:

On October 26 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 26, 2006, WBN personnel concluded that a condition that had been identified earlier in the U1C7 refueling outage performance of Surveillance Instruction 1-SI-63-915A, Appendix P, "Safety Injection System - Valve Position Indication Verification and Full-Stroke Exercising (Train A)," (EIIIS Code BQ) had existed since the U1C6 refueling outage (March 22, 2005). Specifically, on September 20, 2006, valve 1-FCV-72-45-B, "Train B - Containment Sump Suction Valve," would not stroke electrically during the above surveillance performance. Subsequently, during the corrective action investigation, it was determined through review of maintenance records that Rotor 2 (Contact 6) on Motor Operator, 1-MVOP-72-21-B, "Refueling Water Storage Tank to Containment Spray System Pump isolation valve," (EIIIS Code BE/P/V) (interlocked with valve 1-FCV-72-45-B) had been set incorrectly during the U1C6 refueling outage. The rotor was reset and a post maintenance test was successfully completed that demonstrated the mis-set rotor was the cause for above 1-FCV-72-45-B condition. Further investigation found the opposite train check valves 1-CKV-72-562-A and -548-A were inoperable due to surveillance instruction inspection/disassembly during portions of the same period.

Since this condition existed beyond the allotted TS outage time, it is being reported under 10 CFR 50.73(a)(2)(i)(B), "Operation or Condition Prohibited by Technical Specifications." In addition, since the opposite train valve has been also found to have been unavailable, it is also reportable under 10 CFR 50.73(a)(2)(v)(D).

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	Event
03/21/05	Suveillance Instruction 1-SI-63-915A successfully performed on 1-FCV-72-0045-B
03/22/05	Performed Work Order (WO) 03-019058-000 on 1-MVOP-72-21-B to reset the closing limit switch. WO did not include post maintenance testing (PMT) for the interlock.
09/20/06	1-FCV-72-0045-B failed to stroke during performance of 1-SI-63-915A.
09/21/06 thru 10/23/06	Trouble shooting plan initiated, and on 10/23/2006, a review determined possibly Rotor 2 (Contact 6) on 1-MVOP-72-21-B had been set incorrectly. Rotor was reset per WO 06-819802-000.
10/26/06	Completed Post Maintenance Testing per WO 06-819802-000 which demonstrated conclusively that rotor 2 had been set incorrectly during work performed via work order 03-019058-000 on 3/22/05.

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

D. Other Systems or Secondary Functions Affected

Since Rotor 2 (Contact 6) on 1-MVOP-72-21-B had been set incorrectly this caused interlocked valve 1-FCV-72-45-B not to function correctly.

E. Method of Discovery

This incorrect set condition was found during review of maintenance records associated with motor operator 1-MVOP-72-21-B while investigating the cause of why valve 1-FCV-72-45-B would not stroke.

F. Operator Actions

There were not operator actions associated with this event.

G. Safety System Responses

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

III. CAUSE OF EVENT

The issue was determined to stem from two causes. The first cause is a lack of procedural guidance and control during a motor-operated valve analysis and test system (MOVATS) test. Maintenance Instruction, MI-0.006, "MOVATS Testing of Motor Operated Valves," was written to a level of detail which relied on very experienced workers familiar with the aspects of control switch set-up and testing. The MI does not have the barriers in place which ensure the redundant rotor switch adjustments have been made following the initial switch adjustments. Review of the work orders 03-019058-000 and 06-819802-000 determined that rotor 2 had not been adjusted following the adjustment to rotor 4 which prevented actuation of rotor 2. The MI does not require verification of the redundant rotors after adjustment are made.

The second cause was determined to be a lack of attention to detail during PMT development and approval. The PMT did not verify the interlock located on Valve 1-FCV-72-0021-B, rotor 2, contact 6 was set correctly. This contact must be closed to allow, 1-FCV-72-45-B to open. The PMT only tested 1-FCV-72-21-B. This level of detail was not reviewed during PMT development or during the review and approval of the PMT.

IV. ANALYSIS OF THE EVENT

The Refueling Water Storage Tank (RWST) suction valve 1-FCV-72-21-B (Train B) has no provision for automatic operation. The valve is normally open to allow its Containment Spray pump to take suction from the RWST. Valves 1-FCV-72-21-B and 1-FCV-72-45-B are interlocked to prevent inadvertent draining of RWST to Containment Sump. There is no automatic switching of the containment spray (CS) pump suction from the RWST to the containment sump. Switching of the system suction must be manually executed from the MCR when RWST low low alarm is annunciated and/or when RWST level indicators indicate low-low RWST level. The manual switch over will be executed as follows:

- a) Reset the containment spray actuation signal via respective handswitches.
- b) Stop the CS pumps via main control room handswitches.
- c) Close RWST suction valves FCV-72-21-B and FCV-72-22-A through their respective control switches.
- d) Open Essential Raw Cooling Water (ERCW) inlet and outlet valves of CS heat exchangers through control switches.
- e) Open Containment Sump isolation valves FCV-72-44-A and FCV-72-45-B.
- f) Start the CS pump. This must be accomplished within 120 seconds after the CS pump stop (step b above.)

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Since Rotor 2 (Contact 6) on 1-MVOP-72-21-B had been set incorrectly this caused interlocked valve 1-FCV-72-45-B not to function correctly. Therefore, step e above could not have been totally performed. Also, if the recirculation operation needed to be accomplished at the same time that the opposite train was out of service, then step e would not have been performed.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Train B Containment Spray recirculation was unavailable from March 2005 to September 2006 (not required after Mode 5 entry on 9/11). This affected the recirculation function of one train of the Containment Spray system. The injection function was available for both trains of Containment Spray except during brief periods of maintenance. Also, at WBN there are separate sump suction lines for the Containment Spray and Residual Heat Removal (RHR) Systems. Both trains of RHR injection, RHR containment sump recirculation, and RHR spray were available except for brief periods of maintenance on one train. If WBN were to experience a loss of both trains of the RHR sump recirculation function, plant procedures and the WBN PSA credit using one train of CS to recirculate water from the containment sump back to the Refueling Water Storage Tank (RWST) through the containment spray test line. This action to refill the RWST allows injection capability to be restored. In order for significant core damage to occur, both trains of RHR recirculation and both trains of CS recirculation would need to be unavailable. If core damage occurred, then both trains of CS spray and RHR spray, air return fans and hydrogen igniters would need to be unavailable before there was a significant impact on the Large Early Release Frequency (LERF).

A review of maintenance rule program records during this period indicate that each train of Containment Spray was required for a total of approximately 12,830 hours. During the period that train B containment spray recirculation was unavailable, train A was unavailable for a total of approximately 113 hours. The longest period of unavailability was 38.5 hours in July, 2005 and was due to draining the ERCW side of CSHX 1A-A and refilling it with demineralized water to restore layup conditions after maintenance during RFO6. The probability of an event occurring during the periods when both trains of containment spray recirculation were unavailable is considered low, therefore, the safety significance of this event is considered low.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

Rotor 2 (Contact 6) on 1-MVOP-72-21-B was subsequently set correctly and Post Maintenance Testing was completed per Work Order 06-819802-000.

B. Corrective Actions to Prevent Recurrence (TVA does not consider this item to constitute a regulatory commitment. TVA's corrective action program tracks completion of these actions.)

- 1) WBN has revised MI-0.006 to provide additional guidance on the performance of testing and limit switch development.
- 2) WBN has revised TI-126, "Post Maintenance Testing Matrices providing additional guidance on PMTs for interlocks.
- 3) WBN has coached the individuals involved with the inadequate PMT development and approval on proper PMTs specifically dealing with interlocks.

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

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 due to a rotor misadjustment.

C. Additional Information:

None.

D. Safety System Functional Failure

This event involves a safety system functional failure as defined in NEI 99 02, Revision 4. A review of the maintenance rule program records during the period March 2005 to October 2006, each CS train was required for a total of approximately 12,830 hours. During that period that this condition existed on train B, train A was not available for approximately 113 hours.

E. Loss of Normal Heat Removal Consideration

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

VIII. COMMITMENTS

None