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John A. Scalice
Site Vice President, Watts Bar Nuclear Plant

JUL 2 6 1996

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) - UNIT 1 FACILITY OPERATING LICENSE NPF-90 - LICENSEE EVENT REPORT (LER) 50-390/96020 - RESIDUAL HEAT REMOVAL (RHR) SYSTEM OPERABILITY ISSUE - VOLUNTARY REPORT

The purpose of this letter is to provide the subject report. The enclosed report provides details concerning a condition involving the operability of the RHR system. Although this condition did not meet the reporting criteria, TVA determined that a voluntary report would be appropriate.

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

Sincerely,

J. A. Scalice

Enclosure
cc: See page 2

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cc (Enclosure):
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ENCLOSURE

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 7

TITLE (4)

Residual Heat Removal (RHR) System Operability Issue

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
06	27	96	96	020	00	07	26	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

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)	50.73(a)(2)(iv)	OTHER -Voluntary Report
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)
Rickey Stockton, Compliance Licensing Engineer	(423)-365-1818

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
X	BP	ISV	A415	NO					

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)

On June 27, 1996, with Unit 1 operating in Mode 1 at 100 percent rated thermal power (RTP), high side manifold valve, 1-ISIV-74-102 D/H, was discovered in the closed position. This valve controls pressure input to flow indicating switch 1-FIS-74-12-A, which senses residual heat removal pump 1A-A discharge flow and controls the pump's mini-flow valves while the pump is running. Zero flow had been indicated earlier when the RHR pump was started and investigation of this problem led to the discovery of the manifold valve in the closed position.

A subsequent thorough investigation could not identify the cause nor when the valve was placed in the closed position. Since no firm evidence was found of when the valve was closed, TVA fulfilled action A of Technical Specification 3.5.2 from the time of discovery of the closed valve.

Recurrence control action included discussions with Maintenance and Operations personnel to relate the events of this LER and the importance of valve positions and verifying their proper alignment.

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

I. PLANT CONDITIONS

Watts Bar Nuclear Plant Unit 1 was operating in Mode 1 at 100 percent RTP.

II. DESCRIPTION OF EVENT

A. Event

On June 27, 1996, with Unit 1 operating in Mode 1 at 100 percent RTP, the residual heat removal (RHR) (Energy Industry Identification System (EIIS) code BP) high side manifold valve (EIIS code BV), 1-ISIV-74-102 D/H, was discovered in the closed position. This valve isolates one side of the differential pressure to flow indicating switch (EIIS code FIS), 1-FIS-74-12-A, which indicates RHR 1A-A pump (EIIS code BP/P) discharge flow and controls the pump's mini-flow valve (EIIS code FCV) while pump 1A-A is running. With the valve closed, the forward flow indicated zero which resulted in full opening of the miniflow valve. This switch had indicated zero flow earlier when the RHR pump was started and the investigation of this zero flow condition led to the discovery of the manifold valve in the closed position. This condition was corrected by opening the manifold valve which established a flow reading of 700 gpm at 1-FIS-74-12A.

Subsequent evaluation by TVA engineering and Westinghouse personnel determined that had this condition remained uncorrected, a shortfall of approximately 70 gpm of RHR supply during a large break loss of coolant accident would have occurred. Investigation of this condition also revealed the last date that the manifold was confirmed open was June 1, 1996. A review of the work performed since June 1, 1996, did not reveal when the valve was placed in the closed position. A cause for the manifold valve misposition was not determined. Further, review of the operator logs since June 1, 1996, revealed that on June 14, 1996, B train RHR was out of service for three minutes. Since TVA did not find firm evidence of when the A train manifold valve was closed rendering A train RHR inoperable, TVA determined action A of Technical Specification 3.5.2 was applicable from the time of discovery of the closed valve. Due to the nature of this condition, TVA determined a voluntary report was appropriate in this instance.

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

Other than the inoperability of train A RHR, there were no other inoperable structures, components, or systems that contributed to this event.

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

C. Dates and Approximate Times of Major Occurrences

DATE	TIME	EVENT
6/26/96	2223	Started RHR Pump 1A on mini-flow and obtained no indication of flow on 1-FIS-74-12.
6/27/96	0054	Investigation found manifold valve 1-ISIV-74-102D/H closed and correctly placed in the open position.

D. Other Systems or Secondary Functions Affected

See the Analysis of the Event section for discussion of other systems or secondary functions affected.

E. Method of Discovery

As described above, the manifold valve, 1-ISIV-74-102 D/H was discovered in the closed position through the investigation of why no flow indication was received on 1-FIS-74-12-A when RHR pump 1A-A was started.

F. Operator Actions

Investigative personnel opened the valve to establish flow indication to 1-FIS-74-12-A.

G. Automatic and Manual Safety System Response

There were no automatic or manual safety system responses due to this condition.

III. CAUSE OF EVENT

The root cause of this condition could not be determined. The last known work package to have manipulated this valve, occurred on June 1, 1996. The investigation determined, based on interviews and documentation, that the manifold valve was left in the open position with second party verification. TVA's review of the maintenance work orders performed since June 1, 1996, did not identify any work orders which would have closed the valve. A review of equipment hold orders issued during this period did not reveal any work associated with this valve. No other valve mispositions were identified when a sample of 60 other valves were inspected. Sixteen valves were also inspected which require calibration equipment to be attached to plant equipment. None of these valves were found in the improper position.

IV. ANALYSIS OF EVENT - ASSESSMENT OF SAFETY CONSEQUENCES

A. Evaluation of Plant Systems/Components

The normal safety-related functions of the RHR system include the transfer of Reactor Coolant System (RCS) (EIIS Code AB) heat to the Component Cooling System (CCS) (EIIS code CC) when RCS pressure and temperature are below RHR design conditions, and to maintain adequate RCS flow with the Reactor Coolant Pumps (RCPs) off to ensure adequate chemical mixing. Normal non-safety-related functions include the transfer of water between the refueling cavity, RCS, and the Refueling Water Storage Tank (RWST) (EIIS code BP/TK) during refueling operations or reduced inventory operations, and RCS water cleanup via a connection to the Chemical and Volume Control System (CVCS) (EIIS code CB).

The RHR system post-accident safety-related functions as an Emergency Core Cooling System (ECCS) (EIIS code BQ) subsystem, as a subsystem of the Containment Spray System (CSS) and to provide a flow path to the RCS from the Spent Fuel Pool Cooling and Cleaning System (EIIS code DA) during flood mode when the reactor vessel head is removed.

RHR mini-flow valves FCV-74-12 and -24 have a safety requirement to 1) open for pump protection during low flow operation or when RCS pressure is above RHR pump shutoff head, and 2) close to allow the RHR system to meet its accident flow requirement. Local indicating switches FIS-74-12 and -24 on the RHR pump discharge and orifice plate FE-74-12 and -24 indicate pump discharge flow and control the pump's miniflow valves. When RHR pump discharge flow decreases to the low setpoint, the mini-flow valve opens and when the flow increases to the high setpoint, the mini-flow valve closes. The mini-flow valves close when their associated RHR pump is not running. However, with the discovery of the subject manifold valve closed, the flow indicating switch FIS-74-12 would not function to close the mini-flow valve at the high flow setpoint. This would allow mini-flow operation to continue and potentially create a shortfall of RHR supply during a large break loss of coolant accident.

B. Evaluation of Personnel Performance

Upon discovery of the no flow reading at the time the RHR pump 1A was started, an investigation revealed that the manifold valve was closed. The valve was placed into the correct position and a flow reading was obtained. Personnel took the appropriate actions to respond to this condition.

C. Safety Significance

A large break loss of coolant accident (LBLOCA) is the postulated double-ended guillotine of one of the RCS primary coolant pipes. The analysis for the LBLOCA captures the injection flows that are used for the ECCS pumps which are based on the Final Safety Analysis Report (FSAR) minimum pump curves for the Centrifugal Charging Pumps (CCPs) (EIIS code CB/P), Safety Injection Pumps (SIPs), (EIIS code BQ/P) and RHR pumps.

For the case of a single RHR Pump injecting into 4 intact cold leg RCS loops, the flow that must be achieved is 3844 gpm. Meeting this flow will ensure that the injection flows required for the RHR pump with "0" RCS backpressure, the most limiting spilling line, and the FSAR pump curve will be met. In order to assess the actual plant condition, an initial determination by TVA was made by hand calculations using Westinghouse design documents, TVA pre-operational test data, and the recent RHR pump surveillance data. Review of the test data from the Pre-operational Tests (PTIs) and the recent Surveillance Instruction (SI) tests indicated that there had been no degradation in the RHR pump head/flow relationship. The TVA evaluation determined that the RHR Pump 1A-A injection flow, for the actual plant condition, would have been about 70-80 gpm short of the required 3844 gpm.

Since the ECCS injection flow analysis by Westinghouse was based on a sophisticated flow distribution code, they were contacted to conduct a re-analysis duplicating the conditions described in this LER to confirm the degree of injection shortfall. Westinghouse determined that the injection flow would have been about 3777 gpm, or approximately 67 gpm below the required 3844 gpm.

However, in order to fully assess a peak clad temperature (PCT) penalty, Westinghouse analyzed the RHR flow that would result from the miniflow open, "0" RCS backpressure, and the most limiting spilling line case, and the actual plant test data which fell on the maximum composite RHR pump curve. The results remain within the 10CFR50.46 limit of 2200 degrees F. It is also expected that the RHR injection shortfall would be recognized by Operations personnel prior to the need for RHR flow to be diverted from cold leg injection to supply the containment spray system during a LOCA event.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions

As previously discussed, once the manifold valve was found to be in the closed position, plant personnel took steps to place the valve into the open position.

TVA has reviewed maintenance work orders performed since June 1, 1996, but did not identify any work orders which would have affected the manifold valve position. A review of equipment hold orders issued during this period was conducted, but also did not reveal any work associated with this valve. In addition, no valve mispositions were identified when a sample of 60 other valves were inspected. Sixteen valves were also inspected which require calibration equipment to be attached to plant equipment. None of these valves were found in the improper position.

The extent of condition for SIs requiring enhancement for instrument valve verification is limited to those used by Operations personnel to connect Measuring and Test Equipment (M&TE) to differential pressure instruments. As a result, TVA will clarify Site Standard Practice (SSP) - 12.06, "Verification Program," regarding differential pressure instruments.

B. Corrective Actions to Prevent Recurrence

Discussions were held with Maintenance and Operations personnel to relate the events of this LER and the importance of valve positions and verifying their proper alignment.

VI. ADDITIONAL INFORMATION

A. Failed Components

1. Safety Train Inoperability

Train A RHR was potentially inoperable for a period of time between June 1, 1996, and June 27, 1996. As previously discussed, this exact time could not be established and action was taken once discovered to return the equipment to operable status.

2. Component/System Failure Information

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

As previously discussed, the component was discovered in the wrong position while investigating the no flow reading when RHR pump 1A was started.

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

The manifold valve was in the wrong position which resulted in allowing mini-flow operation to continue and potentially create a shortfall of RHR supply during a large break loss of coolant accident.

c. **Root Cause of Failure:**

The root cause of the valve being in the improper position could not be determined.

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

See the analysis of the event section for this information.

e. **Manufacturer and Model Number of Each Failed Component:**

Anderson, Greenwood, & Company - Model No. N02-8257-660

B. **Previous Similar Events**

LER 390/96009, submitted April 11, 1996, involved mispositioned valves as the cause of that event. However, in this case no exact cause was determined for comparison with the previous LER.

VII. COMMITMENTS

The actions described in Section V have been completed except the clarification to SSP-12.06 scheduled to be completed by September 9, 1996.