



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

William J. Museler
Site Vice President
Watts Bar Nuclear Plant

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WBRD-50-390/92-07
WBRD-50-391/92-07

10 CFR 50.55(e)

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

Gentlemen:

In the Matter of the Application of)
Tennessee Valley Authority)

Docket Nos. 50-390
50-391

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - GENERAL ELECTRIC HFA
RELAY LATCHING MECHANISM LEAF SPRING FOUND IMPROPERLY INSTALLED -
WBRD-50-390/92-07 AND WBRD 50-391/92-07 - FINAL REPORT

The subject deficiency was initially reported to the NRC Operations Center on July 1, 1992, in accordance with 10 CFR 50.55(e)(3) as Problem Evaluation Report (PER) WBPEN920144. This PER was subsequently upgraded to Significant Corrective Action Report (SCAR) WBSA920049. Enclosed is TVA's final report on this subject.

If you have any questions, please telephone P. L. Pace at (615) 365-1824.

Sincerely,

William J. Museler

Enclosure
cc: See page 2

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cc (Enclosure):

NRC Resident Inspector
Watts Bar Nuclear Plant
P.O. Box 700
Spring City, Tennessee 37381

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

Mr. B. A. Wilson, Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE
 WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2
 GENERAL ELECTRIC HFA RELAY LATCHING MECHANISM LEAF SPRING
 FOUND IMPROPERLY INSTALLED
 SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) WBSA920049
 WBRD-50-390/92-07 AND WBRD-50-391/92-07

FINAL REPORT

DESCRIPTION OF THE DEFICIENCY

On May 6, 1992, TVA determined that the leaf spring in the latching mechanism for some 30RX relays may not be properly installed. This deficiency was visually discovered while troubleshooting non-Class 1E alternate feeder breaker 2524 located in Reactor Coolant Pump Board C. However, improper installation of the leaf spring did not prevent the relay latching mechanism from latching during normal breaker operation.

Subsequently, TVA verified that the leaf springs were installed in front of the latching mechanism reset bar rather than behind the reset bar in 30RX relays for 17 Class 1E breakers located in the Unit 1 and Unit 2 6.9KV shutdown boards. The proper orientation for the leaf spring is behind the latching mechanism reset bar. The affected 30RX relay locations are listed below:

<u>BOARD</u>	<u>PANEL</u>	<u>BREAKER DESCRIPTION</u>
6.9KV SD Board 1A-A	8	ERCW PMP A-A, 0-MTR-67-28-A
6.9KV SD Board 1A-A	10	AFW PMP 1A-A, 1-MTR-3-118-A
6.9KV SD Board 1A-A	16	BKR #1716 NOR SUP
6.9KV SD Board 1A-A	20	PZR HTR Backup GP 1A-A, 1-OXF-68-341A-A
6.9KV SD Board 1A-A	21	PZR HTR Control GP 1D, 1-OXF-68-341-F
6.9KV SD Board 1B-B	9	ERCW PMP E-B, 0-MTR-67-47-B
6.9KV SD Board 1B-B	11	BKR #1726 Maint Sup
6.9KV SD Board 1B-B	13	CS PMP 1B-B, 1-MTR-72-10-B
6.9KV SD Board 1B-B	14	RHR PMP 1B-B, 1-MTR-74-20-B
6.9KV SD Board 1B-B	15	SI PMP 1B-B, 1-MTR-63-15-B
6.9KV SD Board 1B-B	18	CC PMP 1B-B, 1-MTR-62-104-B
6.9KV SD Board 2A-A	15	SI PMP 2A-A, 2-MTR-63-10-A
6.9KV SD Board 2A-A	20	PZR HTR Backup GP 2A-A, 2-OXF-68-341A-A
6.9KV SD Board 2A-A	21	PZR HTR Control GP 2D, 2-OXF-68-341-F
6.9KV SD Board 2B-B	9	ERCW PMP G-B, 0-MTR-67-55-B
6.9KV SD Board 2B-B	10	AFW PMP 2B-B, 2-MTR-3-128-B
6.9KV SD Board 2B-B	15	SI PMP 2B-B, 2-MTR-63-15-B

The 30RX relays are latching relays manufactured by the General Electric (GE) Company. Of the 17 affected Class 1E 30RX relays, 16 have a model number of 12HFA154E22F and a date code from 1974 through 1978. The remaining affected Class 1E 30RX relay has a model number of 12HFA54E187F and a date code of 1972. Each of the 17 affected Class 1E 30RX relays was found to operate with the leaf spring improperly installed in the latching mechanism. However, maintaining the latch in position during a seismic event cannot be guaranteed.

SAFETY IMPLICATIONS

The 3ORX relays provide a seal-in function in the breaker control circuit for various plant components. When the associated component is deenergized normally, not by circuit protection devices, the relay "operate" coil is momentarily energized and picks up the moveable armature contacts. The reset lever assembly, with assistance of the leaf spring positioned behind the reset bar, latches the "operate" coil armature in place. The associated component is now available to start on the next automatic, accident, or manual start signal (except the breaker test close switch which bypasses the seal-in).

When positioned behind the reset bar, the leaf spring tension assists in maintaining the position of the reset lever assembly over the "operate" coil armature during a seismic event. The Class 1E 3ORX relays were seismically qualified by testing in the factory configuration (leaf spring behind reset bar). The leaf spring must be installed in accordance with the factory assembly instructions in order to guarantee seismic qualification of the relay. With the leaf spring installed in front of the reset bar, the latch may fail to maintain the "operate" coil armature in the latched position during a seismic event for Class 1E components in a standby configuration.

Below are two substantial safety hazards which could be created if the subject deficiency was left uncorrected. Other substantial safety hazards can be postulated based on the affected Class 1E 3ORX relays.

1. The only actual common mode failure potential (both trains of redundant equipment with the associated 3ORX relay latching mechanism leaf spring in front of the reset bar) during a seismic event on the WBN 6.9KV shutdown boards is the loss of both Unit 2 safety injection pumps. The safety injection portion of emergency core cooling is designed to provide emergency core cooling for loss of coolant accidents (LOCAs). Recovery actions to regain safety injection pump operability may not be achieved in time to mitigate the consequences of a LOCA.
2. The worst case hypothetical common mode failure potential during a seismic event on the WBN 6.9KV shutdown boards is the loss of both Unit 1 containment spray pumps. The primary purpose of the containment heat removal spray system is to maintain the containment pressure below the containment shell design limit. The operator may not be able to recover from the failure of a containment spray pump to automatically start, in conjunction with a single failure of the opposite train containment spray pump. This situation would challenge containment integrity and may result in the release of radioactivity above 10CFR100 limits.

CAUSE

The cause for improperly installing the latching mechanism leaf spring on the 17 Class 1E 3ORX relays was insufficient vendor guidance. Based on a generic investigation of GE Service Advice Letter 721-PSM-152.2 concerning the cracking and embrittlement of Lexan coil spools, and a similar deficiency at Bellefonte Nuclear Plant documented in Nonconformance Report

CAUSE (continued)

(NCR) BLNEEB8101, WBN initiated NCR WBNEEB8206. The final disposition for NCR WBNEEB8206 was to replace the Lexan coil spools with the Century-Series coil spools for those HFA relays having a date code from 1974 through 1978. This work on the Unit 1 and Unit 2 6.9KV shutdown boards was performed under Workplan Number 3068 which used instructions provided in GE Service Information Letter Number 44, Supplement 4, dated July 27, 1982. Insufficient detail was provided on the HFA relay stop arm assembly for latching relays to verify correct reassembly. Additionally, WBN vendor manuals for the 6.9KV shutdown boards did not contain a drawing detail of the HFA relay stop arm assembly for latching relays.

Of the 17 affected Class 1E 30RX relays, 16 relays (12HFA154E22F) had their Lexan coil spools replaced with Century-Series coil spools. TVA believes the remaining relay (12HFA54E187F) was partially disassembled by mistake during the Lexan coil spool replacement task and reassembled using GE Service Information Letter 44, Supplement 4.

CORRECTIVE ACTIONS

1. The leaf springs have been positioned behind the latching mechanism reset bar for the 17 affected Class 1E 30RX relays located in the Unit 1 and Unit 2 6.9KV shutdown boards. Additionally, the same action is complete for those affected non-Class 1E 30RX relays located in the Unit 1 and Unit 2 unit boards and reactor coolant pump boards.
2. A detailed drawing of the 30RX latching mechanism has been incorporated into GE vendor manuals WBN-VTM-G080-0070 (Unit Boards), -0010 (Reactor Coolant Pump Boards), and -0100 (6.9KV Shutdown Boards).