



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

JUN 28 1991

WBRD-50-390/91-17  
WBRD-50-391/91-17

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 - TUF-LOC SLEEVE BEARINGS  
FOUND IN GENERAL ELECTRIC 6900 VOLT BREAKER OPERATING MECHANISMS -  
WBRD-50-390/91-17 AND WBRD-50-391/91-17 - FINAL REPORT

The subject deficiency was initially reported to NRC Region II on April 2, 1991, in accordance with 10 CFR 50.55(e) and 10 CFR 21 as Problem Evaluation Report (PER) WPER 910130. This PER has since been upgraded to Significant Corrective Action Report CHSCA 910002. An interim report was submitted to NRC on May 3, 1991. Enclosure 1 is TVA's final report on this subject.

The commitment made in this report is provided in Enclosure 2.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager  
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Enclosures

cc: See page 2

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WATTS BAR NUCLEAR PLANT (WBN)  
TUF-LOC SLEEVE BEARINGS FOUND IN GENERAL ELECTRIC (GE)  
6900 VOLT BREAKER OPERATING MECHANISMS  
SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) CHSCA 910002  
WBRD-50-390/91-17 AND WBRD-50-391/91-17

FINAL REPORT

DESCRIPTION OF DEFICIENCY

During the performance of TVA's 5-year circuit breaker inspection program, Tuf-Loc sleeve bearings were found in the ML-13 operating mechanism of three GE 6900 volt circuit breakers (Model No. AM-7.2-500-6HB). The most recent identification was made on March 21, 1991. These Tuf-Loc sleeve bearings should have been replaced with aluminum-bronze sleeve bearings by GE as corrective action to resolve a previously reported 10 CFR 50.55(e) construction deficiency.

By GE Service Advise Letter (SAL) 073-318.1, dated April 4, 1979, TVA was notified that some applications of Tuf-Loc sleeve bearings in certain GE circuit breakers (including Model No. AM-7.2-500-6HB) had been upgraded to aluminum-bronze sleeve bearings to ensure a design service life of 10,000 cycles. Upon verifying applicability to the Watts Bar Nuclear Plant, TVA reported the condition to NRC in accordance with 10 CFR 50.55(e). In the final 10 CFR 50.55(e) report to NRC, dated February 7, 1980, TVA committed to replacing all the Tuf-Loc sleeve bearings in GE circuit breaker ML-13 operating mechanisms with aluminum-bronze sleeve bearings. Approximately 190 circuit breakers, 68 of which are used in Class 1E applications, were sent to GE under contract to replace all Tuf-Loc sleeve bearings. The three GE 6900 volt circuit breaker operating mechanisms found to have Tuf-Loc sleeve bearings were included in this population of 190 circuit breakers.

Although not specifically required to inspect the 6900 volt circuit breakers for existence of Tuf-Loc sleeve bearings, most electrical maintenance personnel performing the 5-year circuit breaker inspections were familiar with the issue. After the first Tuf-Loc sleeve bearing was identified and replaced in 1987, care was taken to inspect for their presence. Few Tuf-Loc sleeve bearings are expected to remain installed in the 6900 volt circuit breakers.

SAFETY IMPLICATIONS

Tuf-Loc sleeve bearings are subject to wear over a number of circuit breaker operating cycles. The wear is evidenced by excessive play in linkages, pawls, etc., and difficulty in obtaining and holding required wipe adjustments. The worst case for this condition would be failure of the circuit breakers to operate. The 68 Class 1E breakers located in the 6900 volt shutdown boards supply power to safety-related components. Two of the three GE 6900 volt circuit breaker ML-13 operating mechanisms found to have Tuf-Loc sleeve bearings supply power to safety-related components. Therefore, a failure could adversely affect the safety of operations of the plant.

CORRECTIVE ACTIONS

1. A review of plant maintenance records verified that the Tuf-Loc sleeve bearings had not been installed by TVA personnel since receipt of the modified GE circuit breakers.
2. The 190 GE 6900 volt circuit breakers were sent to the GE facility in Philadelphia, Pennsylvania, to resolve TVA Nonconformance Report (NCR) 36-2 (Tuf-Loc sleeve bearings) and NCR 36-3 (impulse level testing). From September 29, 1981 to October 27, 1982, TVA conducted 14 visits to the GE facility to perform source surveillances. The source surveillances included inspection of a representative sample of circuit breakers being repaired in-process and review of GE documentation before final release. More than 15 percent of the circuit breakers were inspected in-process during disassembly, rework, and reassembly. GE documentation certifying the Tuf-Loc sleeve bearings had been replaced with aluminum-bronze sleeve bearings was reviewed by TVA prior to final release.

The cause for the Tuf-Loc sleeve bearings not being replaced with aluminum-bronze sleeve bearings was due to a breakdown in the GE quality program. Prior to approximately 1985, circuit breaker repair activities at GE's Philadelphia, Pennsylvania, location were not adequately documented. Repair activities to resolve NCR 36-2 were only documented as a sentence on the compliance certifications stating that disposition of the NCR was performed. No other documentation existed for NCR 36-2. The extent of this condition appears to be limited to NCR 36-2. GE circuit breaker test reports provide adequate assurance that work activities required for the disposition of NCR 36-3 were satisfactorily completed.

During disposition of NCRs 36-2 and 36-3, GE was in the process of phasing down operations at the Philadelphia, Pennsylvania, facilities. This factor may have contributed to deterioration in the quality of GE workmanship.

Based on a conversation with the Quality Manager at GE's Chamblee, Georgia, facility, GE has an improved quality program that requires the disassembly, repair/overhaul, and reassembly of circuit breakers to be documented on approved instructions. Accomplishment of each step of the activity is documented as performed. These GE activities are now performed at the Chamblee, Georgia, location rather than at the Philadelphia, Pennsylvania, location.

TVA considers the above condition to be reportable under 10 CFR 21. Failure to replace all Tuf-Loc sleeve bearings in the Class 1E 6900 volt circuit breakers represents a defect in a basic component (vendor services) which could create a substantial safety hazard.

3. Based on conversations with GE representatives, a minimum threshold of 2000 cycles was established for inspecting the 6900 volt circuit breakers for compliance with GE SAL 073-318.1.
4. To provide assurance that the 6900 volt circuit breakers comply with GE SAL 073-318.1, Maintenance Instruction (MI) 57.1, "6900 Volt Circuit Breaker Inspection," will be revised by July 31, 1991, to require breaker teardown and inspection for Tuf-Loc sleeve bearings after 1800 breaker operations. Sleeve bearing replacements will be made as necessary.

ENCLOSURE 2

LIST OF COMMITMENTS

Maintenance Instruction (MI) 57.1, "6900 Volt Circuit Breaker Inspection," will be revised by July 31, 1991, to require breaker teardown and inspection for Tuf-Loc sleeve bearings after 1800 breaker operations. Tuf-Loc sleeve bearing applications will be compared to GE Service Advice Letter (SAL) 073-318.1. Sleeve bearing replacements will be made as necessary.