TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

March 15, 1985

WBRD-50-390/85-03
WBRD-50-391/85-02

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - FAILURE OF ELECTRO THERMAL LINKS TO FUNCTION PROPERLY - WBRD-50-390/85-03 AND WBRD-50-391/85-02 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Al Ignatonis on December 17, 1984 in accordance with 10 CFR 50.55(e) as NCR W-210-P. Our first interim report was submitted on January 17, 1985. A similar condition was later documented on NCR W-220-P; thus, we shall report on both NCRs simultaneously. Enclosed is our final report. Contrary to our first report, subsequent investigation failed to confirm the applicability of 10 CFR 21.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

for J. W. Hufham, Manager
Licensing and Regulations

Enclosure
cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
FAILURE OF ELECTRO THERMAL LINKS TO FUNCTION PROPERLY
WBRD-50-390/85-03, WBRD-50-391/85-02
10 CFR 50.55(e)
NCRs W-210-P AND W-220-P
FINAL REPORT

Description of Deficiency

During the initial performance of surveillance instruction (SI) L601 at Watts Bar Nuclear Plant (WBN), 14 of the 47 fire/smoke dampers tested under this procedure failed to close. TVA's first report on this deficiency identified the failure of Electro Thermal Links (ETL) to melt open as the initiating event of the failure of the dampers to close. Subsequent investigations by TVA and the damper vendor failed to confirm that the ETLs did not perform their intended function (i.e., energize).

TVA and the vendor have since determined that some of the dampers failed to close due to improper installation which resulted in inadequate tension (less than the 2 lbs specified by the vendor) applied to the ETL. Consequently, the ETL links so affected failed to separate when the ETL was energized.

In addition, TVA has determined that improper orientation of S-hooks which are used to mount ETLs and fusible links could contribute to the failure of a damper to close. It should be noted, however, that the only such failures documented are those involving ETLs. If the open end of an S-hook is turned toward the damper, the S-hook could engage the damper blade as it moves into place, thus impeding its movement.

Finally, another condition which could contribute to the failure of an ETL-activated damper to close is the failure of the ETL to energize. TVA has not established that this event actually occurred but the possibility cannot be discounted either. Failure of an ETL to energize could result from damage to the electrical loads which could occur during handling, shipping, and/or installation.

Safety Implications

The subject dampers are required to maintain compartmentation requirements for dampers installed in fire-rated barriers as specified in 10CFR50 Appendix R. Failure of such a fire barrier could result in a loss of both trains of safety-related redundant equipment from a single failure. This could be a condition adverse to the safe operations of the plant.

Corrective Action

TVA has analyzed the functional requirements for all dampers included in the scope of the nonconformance report (NCR). The following breakdown identifies the affected dampers and the corrective actions required for each case.

1. O-XFD-31-74, -168, -181, and -182 are not required for fire or smoke functions. These dampers shall be locked open by replacing the ETLs with S-hooks or aircraft cable.

2. O-XFD-31-78A, -78B, -79, -92A, -92B, -159, -233, -234, -235, -236, -237, -238, -239, and -248 shall be modified to single function fire dampers. The ETLs and jamb seals will be removed and standard 160-165°F fusible links installed per vendor-supplied procedures.

3. O-XFD-31-75, -76, -83, -86, -98, -99, and -153 are not required to perform a safety function but are being retained for both fire and smoke functions. No equipment modifications are required on these dampers except as detailed in 4 below.

4. O-XFD-31-76, and -99: The conduits to these damper ETLs shall be reinstalled such that they are approximately level and straight (free of bends) to avoid mechanical obstruction with the blade package and to avoid external forces which would prevent separation of the ETL.

The corrective actions detailed above will be completed by April 1, 1985. In order to prevent recurrence of the cited deficiency, surveillance instruction (SI) L601 has been revised to add resistance check every six months for replacement ETLs to assure that ETLs are functional when installed. (The surveillance test will now establish continued functionability of the damper by firing the ETL every 18 months. This demonstrates that the damper properly closes after the ETL has fired. Checking the resistance of replacement ETLs demonstrates continued functionability of the new replacement ETL component.)

In addition, S-hooks used for future installation of all ETLs (and fusible links) will be installed in accordance with Ruskin Procedures E511 and E512 from contract 84K71-834574 to prevent improper orientation of the S-hooks.