TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

JAN 26 1987

WBRD-50-391/84-18

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Dr. J. Nelson Grace

WATTS BAR NUCLEAR PLANT UNIT 2 - CABLE INSULATION FAILS FIRE PROTECTION TEST - WBRD-50-391/84-18 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Bob Carrol on April 5, 1984 in accordance with 10 CFR 50.55(e) as NCR WBN EEB 8408. Interim reports for unit 2 were submitted on May 4, 1984, January 24 and September 18, 1985, and June 6, 1986. Enclosed is our final report for unit 2.

On January 14, 1987, Steve Elrod was notified of the delay in submittal of this report because of temporary manpower shortages.

If there are any questions, please get in touch with R. D. Schulz at (615) 365-8527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

[illegible]. Gridley, Director
Nuclear Safety and Licensing

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

JAN 26 1987

cc (Enclosure):

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ENCLOSURE
WATTS BAR NUCLEAR PLANT UNIT 2
CABLE INSULATION FAILS FIRE PROTECTION TEST
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NCR WBN EEB 8408
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FINAL REPORT

Description of Deficiency

In order to meet the requirements of 10 CFR 50, Appendix R, TVA has installed a one-hour, wrap-on type fire barrier, manufactured by 3M Company, for cable trays, conduits, and junction boxes. The 3M fire barrier material has received Underwriters Laboratories (UL) certification. However, included with that certification is a stipulation that the user (TVA) must ensure that the cable being protected by the fire barrier will perform its function while being exposed to the elevated temperatures measured inside the fire barrier during the UL-qualification test.

Toward this end, TVA performed oven testing of electrical cables at TVA's Central Laboratories (Chattanooga Power Service Center). This testing has shown that polyethylene-insulated cable (TVA types PN, PJ, PNJ, and PJJ manufactured by various vendors) will not perform its required design function when subjected to the temperature observed during testing of the fire barrier at UL. The insulation on the cables will melt, causing cables to fail by shorting.

The root cause of this deficiency is that TVA did not realize that the use of the one-hour fire barriers would result in unacceptably high temperatures for some cables. This is because the temperatures to which the cables would be exposed while in the fire barriers were identified by the barrier vendor (3M Company) only after the barriers were installed.

Safety Implications

Some of the cables involved in this deficiency could be used in safe shutdown circuits. Failure of these cables could cause degradation of an essential system or loss of redundant safe shutdown equipment. This could adversely affect the ability to achieve and maintain a safe plant shutdown. Subsequently, this could adversely affect the safety operations of the plant.

Corrective Action

After our 10 CFR 50, Appendix R, cable separation analysis is completed, any PN, PJ, PNJ, and PJJ type cables identified, which are used for safe shutdown circuits and which pass through a cable tray or conduit to be protected with 3M fire barrier material, will either be relocated to meet Appendix R separation requirements and eliminate the need for a one-hour fire barrier or will be replaced with qualified cable. TVA will complete the 10 CFR 50, Appendix R, cable separation analysis for WBN unit 2 and all work associated with this deficiency before unit 2 fuel load.

TVA's Division of Nuclear Engineering (DNE) has revised WBN design criteria WB-DC-30-5, "Power, Control, and Signal Cables for Use in Category I Structures." These revisions provide specific controls which apply to the use of polyethelene-insulated cables for Appendix R safe shutdown circuits and will prevent recurrence of this deficiency.

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