

TENNESSEE VALLEY AUTHORITY

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JAN 23 1991

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

Gentlemen:

In the Matter of)
Tennessee Valley Authority) Docket No. 50-260

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 2 - BRAND REX CABLE

Reference: TVA's letter to NRC dated October 4, 1990, "Resolution of Cable Installation Issues Supplemental Report - Corrective Actions"

The purpose of this letter is to inform NRC that BFN has completed an engineering evaluation for cables installed in 10 CFR 50.49 circuits that were manufactured by Brand Rex under contract 80K6-825419. This evaluation concludes that the cables are capable of performing their intended safety functions for at least one cycle.

BACKGROUND

During high voltage dc testing at BFN to resolve cable installation concerns, one Brand Rex cable failed. This is discussed in the referenced letter. Subsequent to the BFN testing, cables from the same contract at Watts Bar Nuclear Plant experienced similar failures. TVA contracted the University of Connecticut's Electrical Insulation Research Center (EIRC) to perform tests on these failed cables to determine the cause of the hi-pot testing anomalies. The testing performed at EIRC indicated that the anomalies were due to atypically large inorganic particles within the insulation system. In order to assess the operability of the Brand Rex cables in question, BFN performed an engineering evaluation.

ENGINEERING EVALUATION RESULTS

The engineering evaluation concluded that the cables are capable of performing their intended safety function for at least one cycle. This conclusion is based on the following four major factors:

1. Breakdown of the cable insulation occurred at 2500-4900V dc during hi-pot testing. The maximum applied system voltage for the cables installed at BFN is 120V ac. These breakdown voltages are approximately an order of magnitude above the normal system operation voltages.

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2. The particles that were identified during testing at EIRC are normal components of the insulation system or manufacturing process and since they are inorganic, they are more thermally stable than the base polymer. Therefore, the presence of the inhomogeneities is not expected to alter the rate at which the insulation ages.
3. The subject cables are rated for 600V ac at 90 degrees C. The maximum applied system voltage for the cables installed at BFN is 120V ac and a maximum current of 1 ampere. The maximum normal ambient temperature for the cables is 52 degrees C. Since there is negligible ohmic heating associated with the these loads, the cables will remain at ambient, well below their rated temperature and will be in an "as-new" condition (having experienced insignificant degradation) at the onset of any harsh environment event.
4. The combined normal and accident radiation dose in the areas where this cable is installed is approximately eight percent of the value for which the cables have been qualified. The worst accident temperature peaks at 116 degrees C but drops to 54 degrees C after six minutes and 40 seconds. Therefore, the environmental conditions of a 10 CFR 50.49 event will have no adverse effect on these cables.

The environmental qualification of this cable is based upon generic IEEE 383 1974 parameters. TVA is performing additional tests to verify the qualification of the Brand Rex cable for life of plant. Environmental parameters have been chosen to bound the BFN applications for these cables.

In summary, based on the engineering evaluation results, the ability of the cables to perform their intended safety function for at least one cycle is unaffected by the anomalies identified. The complete evaluation is available on site for review. This closes the remaining open issue for cable installation at BFN.

If you have any questions, please telephone me at BFN, Site Licensing, (205) 729-3566.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

Patrick P. Carrier
Patrick P. Carrier, Manager
of Site Licensing

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