UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

"JUSTIFICATION OF SPLICES IN ANNULUS TRAYS"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

Cable splicing is generally not recommended in cable trays in order to minimize the potential for overheating and fire to circuits within a cable tray or to adjacent cable trays. At Sequoyah, a special enclosure was provided to act as a fire stop for the splices in annulus cable trays. During an inspection, NRC inspectors raised a question regarding cable splices in the annulus trays and requested the Tennessee Valley Authority (TVA) provide justification for the enclosure configuration used. By letter dated April 30, 1987, TVA provided justification for cable splices in the annulus trays. TVA stated that these cable splices are made in special enclosures which are qualified as fire stops and therefore, are suitable for use in Sequoyah Nuclear Plant.

2.0 EVALUATION

We have reviewed TVA's letter of justification dated April 30, 1987, and requested additional information (RAI) by letter dated August 3, 1987, regarding the qualification of the electrical splices. By letter dated September 1, 1987, TVA responded to the RAI stating that its earlier submittal contained an error regarding the number of splices involved. The splices in question are located within the last 5-foot section of the cable tray where it ends at each penetration assembly. This is to allow splicing of the vendor penetrations pigtails to the field cables on the outboard side of the steel containment liner. Hence, the splice configuration is typical for the majority of containment electrical penetration for low voltage power cables, control cables and instrumentation cables, which feed a variety of equipment. TVA has also stated that the splices are performed in accordance with vendor-recommended splicing procedures and fully meet the environmental qualification requirement for this area of the plant. Cable routing also meets the physical separation requirements of the single failure criterion of IEEE 279-1971. TVA has also stated that circuit breakers used to protect these circuits have test frequencies in accordance with Sequoyah Technical Specification 3.8.3.1 which requires a representative sample of circuit breakers be tested every refueling outage with complete inspection and maintenance every 5 years. TVA's enclosure design is based on full scale mockup tests. The test results have previously been reviewed and approved by NRC (Sequoyah Nuclear Plant, Units 1 and 2 SER NUREG-0011 Supplement No. 1 Section 9, dated February 1980). TVA has also made a commitment to revise FSAR Section 8.3.1.2.3 in the next annual update to include a description of the splice enclosure used in the annulus trays.

The NRC staff evaluation of cable splices in the annulus trays at Sequoyah is based on two criteria. The first is that a postulated fire is contained within the affected cable tray and the second is the electrical separation of redundant Class 1E cables. As stated above, NUREG-0011 Supplement 1 states that NRC has evaluated the Sequoyah electrical penetration fire stops for cable and cable trays and has concluded that the design is acceptable with respect to fire resistability and consistent with the guidance of Appendix A to BTP ASB 9.5-1. With regard to cable separation, FSAR Section 8.3.1.4.2 states that the Sequoyah design has ensured cable separation such that no single event, such as a fire, is capable of disabling sufficient equipment to prevent safe shutdown of the reactor, removal of decay heat from the core, or isolation of the primary containment. Therefore, the approved design and the separation of Class 1E cables ensures sufficient equipment will not be disabled from any single event, such as a fire, as discussed above.

3.0 CONCLUSION

Based on our review of the information provided, we conclude that the splices within the containment annulus are consistent with industry practice and in the unlikely event of a fire in a splice area, the fire is contained within the affected tray and therefore, cannot propagate to adjacent trays or electrical equipment and hence are acceptable.

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Dated: