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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 24200

INADEQUATE ELECTRICAL AND PHYSICAL

SEPARATION BETWEEN REDUNDANT WIRING,

CABLING, EQUIPMENT AND COMPONENTS

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

I. SUBJECT

Category: Engineering (20000)

Subcategory: Electrical Separation (24200)

Element: Inadequate electrical and physical separation between redundant wiring, cabling, equipment and components (24200)

Employee Concerns: WI-85 100-004, XX-85-122-011, 012, 013, IN 86-254-004, IN-86-259-006, IN-86-314-004

The basis for Element Report 24200, Rev 1 dated April 6, 1987 is a number of concerns addressing the adequacy of electrical and physical separation between redundant wiring, cabling, and equipment. In addition, the required separation of safety-related (1E) and non-safety (non-1E) cables was stated to be inadequate. A separate Watts Bar concern with cable tray overfilling was shown to be not applicable to Sequoyah.

II. SUMMARY OF ISSUE

The adequacy of TVA Sequoyah electrical separation criteria and the installation of cables in cable trays and conduits has been questioned. The TVA analysis stated Sequoyah's commitment to IEEE std. 279-1971 and IEEE Std. 308-1971 are sufficient for a commitment to independency and redundance. Sequoyah did not commit to IEEE Std. 384-1974 or NRC Regulatory Guide 1.75 however, the plant design criteria for separation reflect the fundamental requirements imposed by IEEE std 384-1974 and R.G. 1.75.

III. EVALUATION

TVA has determined that the design criteria document did not provide a technical justification for the 12 inch vertical separation of cable trays in the auxiliary instrument room, but concluded that this distance could be adequately justified if solid bottom and top cable tray covers were installed. We agree with TVA's technical assessment and their plan to clarify the design criteria.

TVA investigations into this concern also identified trays in the auxiliary instrument room and the cable spreading room that lacked solid tray bottoms and tray covers which are required by the design criteria, and plans to prepare an ECN to correct this problem.

The TVA investigation showed one instance of close proximity between safety and non-safety cable trays. Crossover and close proximity of a non-safety cable from one safety-related cable tray to a redundant tray has been prohibited by the TVA design criteria. However, two TVA studies were identified which showed the acceptability of circuits for safe shutdown and non-safety circuits located in close proximity when fire retardant materials are used. This close proximity case was found to be satisfactory because of the fire retardant material and a TVA failure mode and effects analysis.

The TVA investigation also noted that separation criteria applied to the Westinghouse supplied panels was not applied to other safety-related panels; however, the report did not identify any specific separation violations within these latter panels. TVA committed to review and assess the technical adequacy of separation between horizontal trays of one separation group relative to vertical tray risers of a redundant separation group. Where needed, Corrective Action Qualify Requests will be generated to resolve specific deficiencies. At least four TVA walkdowns have been completed to date which reviewed separation adequacy. Only minor exceptions have been found.

The TVA investigation report noted that the currently installed status of cables in raceways had not been verified, but is being reviewed in Sequoyah Element Report 239,000.

As noted in the report, the Sequoyah SER accepted several individual deviations from the separation design criteria on the basis that plant safety was not compromised. The report also noted a number of instances where separation provisions (e.g., isolation devices) installed for plant modifications had not been reflected in the design criteria; however, the TVA review believes that the design criteria were intended to reflect only the original licensing basis of the plant. Nevertheless, TVA is committed to review electrical separation at Sequoyah on a continuing basis.

IV. CONCLUSION

Based on our review we have concluded that TVA's corrective action plans, when implemented, would close the issue of electrical separation. The small number or deviations relative to the design criteria identified in this report confirms the overall adequacy of Sequoyah's electrical separation.

In addition, the TVA separation design criteria were extensively reviewed by an NRC inspection team in early 1986, and were found to be technically adequate relative to other plants designed and constructed during the 1972-1982 period. Internal wiring separation with a number of safety-related panels was also reviewed, and was found acceptable.

The Watts Bar issue of overfilling of cables trays was not found to be applicable to Sequoyah, and was not related to the issue of electrical separation.

We conclude that TVA's investigation, evaluation and corrective action plan for the concerns as described in EN-24200-SQN Rev 3 are adequate. We further believe that implementation of these corrective actions will close the issue of electrical separation. Verification of corrective actions which TVA has identified as a restart item, should be verified by NRC inspectors in a future inspection.