



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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 23508

"PVC LIQUID-TIGHT FLEX CONDUIT"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Engineering (20,000)
Subcategory: Electrical Safety (23,500)
Element: PVC Liquid-Tight Flex Conduit (23508)
Employee Concern: IN-85-973-003

Element Report 23508 Revision 1, prepared April 21, 1987, involves an employee concern which stated, "Plastic type flex conduit installed between instruments and for all floor mounted panels (Units 1 and 2) cannot withstand heat generated in containment and valve rooms."

II. SUMMARY OF ISSUE

A concern was expressed by a TVA employee that the plastic type flex conduit may not be able to withstand extreme heat generated in areas such as the containment following an accident. The employee indicated that a friend was aware of this problem in another plant. The employee therefore did not (and could not) provide specific panels or conduit numbers. This concern was considered to be generic to Sequoyah since PVC jacketed conduit is used in the Sequoyah containment and valve room areas. TVA analyzed this concern and found that design basis events will not adversely affect the ability of the conduit to perform intended safety functions.

The TVA response was based on environmental qualification testing conducted at Central Laboratories. This test demonstrated that the PVC jacket would remain intact for two hours at 360°F. This is above the TVA projected conditions for LOCA and the main steam line break. TVA, therefore, found this concern to be unimportant for the safe operation of the Sequoyah plant.

III. EVALUATION

NRC and its consultant, SAIC, reviewed the TVA employee concern. NRC requested a clarification of the Central Laboratory environmental qualification test results. In particular, NRC asked if the Central Laboratory qualification test included the energy contribution resulting from superheated steam during

the steam line break accident. TVA in their October 7, 1987 response stated that the Central Laboratory test did not include the energy contribution resulting from steam during a main steam line break (MSLB). However, test data are available on PVC jacketed cables which envelopes the temperature profile for the MSLB. This testing was done for the Browns Ferry plant by Wyle Laboratories. During this testing the pressure was not recorded. The Wyle Lab test showed no flaking or melting of the PVC jacket. Nevertheless, NRC was concerned that the transient differential pressure from outside to inside the PVC conduit might make the PVC yield and flow and can potentially clog floor sump drains. TVA has stated that the conduits are generally sealed for a differential pressure of six inches of water (approximately 0.25 PSI) and therefore, the differential pressure of approximately 12 PSI will break the conduit seals and equalize the pressure inside and outside of the flexible conduits. TVA further stated that all installed PVC conduits at Sequoyah are PVC over steel and the steel has a minimum differential pressure strength of 12 psi. Based on these reasons, TVA believes that the Wyle test data is applicable for the Sequoyah PVC conduit and is therefore acceptable.

IV. CONCLUSION

Based on our review, we have concluded that TVA has adequately justified the use of PVC liquid-tight flexible conduit for their application at Sequoyah. Hence, this concern is considered to be satisfactorily resolved for Sequoyah.