



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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 23702

"400 TO 500 BREAKERS UNACCEPTABLE SET, NATIONAL ELECTRICAL

CODE AND GOOD ENGINEERING PRACTICES VIOLATED

LIMITORQUE VALVE OPERATORS INADEQUATELY FUSED"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Engineering (20,000)
Subcategory: Electrical Protection Design (23700)
Element: Electrical Breakers Unacceptably Set. NEC and Good
Engineering Practices Violated. Limitorque Valve Operators
Inadequately Fused (23702)
Employee Concern: WI-85-100-021 and IN-85-332-001

Element Report 23702, Revision 2, dated January 20, 1987, involves two employee concerns. The first concern states that, "Between 400 and 500 breakers were unacceptable set. EN DES practices and attitudes concerning these breakers were poor. The National Electrical Code and good engineering practices were violated." The second concern states, "Limitorque valve operators are found without enough margin to provide for emergency operation. They are fused to protect motor, not the circuit. Example: ERCW valves in 5th diesel generator building are fused at 5.2 amps while running current is 4 amps. Generic to both units."

II. SUMMARY OF ISSUE

TVA reviewed these concerns and found that circuit breaker setting problems were identified at Watts Bar in 1982. In 1983, TVA determined that the problem did not exist at Sequoyah. In 1986, TVA again revisited the circuit breaker settings for Sequoyah. This time TVA could not locate the documentation which was used to originally specify and select the Sequoyah circuit breakers. TVA therefore prepared new calculations to predict the short circuit currents for 480 V loads. However, the new calculations (still preliminary) predict that a number of breaker trip ratings are unsatisfactory.

III. EVALUATION

NRC and its consultant, SAIC, reviewed the TVA employee concern and during a recent visit to the TVA Knoxville offices, the staff and its consultant reviewed and discussed the 480 V short circuit calculations with TVA. The NRC staff has determined that the new calculational methods used by TVA for predicting short circuit fault currents in the 480 V system are reasonable and are consistent with industry practice. However, the new calculations contain unconservative assumptions. Moreover, even with the unconservative assumptions the results show unsatisfactory circuit breaker applications in the 480 V system. TVA has committed to (1) revise the 480 V short circuit calculation to correct the assumptions; (2) review design criteria, design standards and design guides to verify proper delineation of requirements for circuit breakers or alternative means for the fault protection of small motors; and (3) replace protective devices found to be inadequate by the above reviews. TVA has since revised the calculations, and NRC with its consultant has reviewed this during a June, 1987 audit in Knoxville and found the calculations acceptable.

TVA has also investigated the problem with the fuse size for Sequoyah and has determined that fuses have been used only for the fifth diesel ERCW valve operators. Since the fifth diesel is not required for Sequoyah Unit 2 restart, calculations are not required at this time. However, the issue of fuse size selection will be revisited prior to the need for fifth diesel operability. The staff agrees with the TVA's conclusion for this issue.

IV. CONCLUSION

The NRC staff concludes that the employee concerns were valid and that TVA's investigation, evaluation and corrective action plan for the concerns, as described in element report EN-23900 SQN, Rev. 2, are adequate. The NRC staff concludes that the current 480 volt calculations are reasonable, consistent with industry practice and that appropriate protection of small motors is provided.