



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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 23900

"CABLE AND RACEWAY PROGRAM INADEQUATE"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Engineering (20,000)
Subcategory: Cable and Raceway Program (23900)
Element: Cable and Raceway Program Inadequate (Routing) (23900)
Employee Concern: IN-85-743-006, WI-85-100-014, and IN-85-743-008

Element Report 23900, Revision 1, dated January 22, 1987, involves three employee concerns. One concern states, "Pull slips relative to cable pulls are generically inaccurate relative to length of pull, which causes delays in production due to craft having to physically walkdown system." A second concern states, "Computer Cable Routing Program is inadequate and its status system is inadequate." The third concern states, "Conduits are generally overfilled and additional cables are routinely scheduled to be added to the conduits. This causes significant expenditures of manpower in attempting to pull cables where there is no more room available."

II. SUMMARY OF ISSUE

TVA reviewed these concerns and found that there was inadequate feedback from construction to engineering which resulted in improperly reporting installed cable lengths. TVA also found that the computerized cable routing program does not have proper verification documentation. Furthermore, this results in cable routing program shortcomings in that the program:

- Does not demonstrate compliance with separation requirements between redundant cables.
- Does not demonstrate compliance with requirements for separating cables of different voltage levels.
- Does not adequately address raceway fills.
- Does not reject erroneous input.

- Does not refuse to route cables in full trays.
- Does not reflect actual installed cable lengths, rather, it records cable pull lengths only.
- Modification/revision to the cable routing program have not been documented.

Additionally, abandoned cables are not tracked by the cable routing program. In fact, abandoned unlabeled cables are no longer considered in the cable tray which can lead to cable tray overfill.

III. EVALUATION

TVA has addressed or is addressing each observed inadequacy. Cable length inaccuracies are being resolved and all calculations are being revised based on cable walkdown verifications. Employee concern report 21301 addresses this issue. The issue of conduit overfill has been addressed in Employee Concern Report 23801.

NRC and its consultant, SAIC, reviewed the employee concern and the TVA findings. The errors and shortcomings of the computerized cable routing system are numerous and widespread. As a result, it is difficult to obtain reliable cable information from the computerized cable routing system. TVA has committed to implement four steps to overcome the shortcomings of the old process.

First, TVA will implement a software Quality Assurance Plan to verify the cable routing program. Then, TVA will verify the cable routing program prior to restart. Third, TVA will perform a manual review of the conduit routing field for all cables to locate the manually routed cables in trays. Lastly, TVA will load all data relative to cable routing in the program which will check for separation, voltage segregation, raceway fill, etc. Any cables which are rejected will be investigated for the cause and the installation reconciled accordingly.

TVA has completed the verification of the program and no discrepancies were found (Memo from Raughley, Chief, Electrical Engineering to Beschler, Acting Chief, Engineering and Computer Methods Branch, dated May 21, 1987). Based on the result of the interim verification program, NRC staff agrees with TVA that rest of the TVA program to close this issue can be completed post restart.

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 EN-23900 SQN, Rev. 1, are adequate. The NRC staff believes that implementation of these corrective actions will close the issue of cable and raceway routing program. However, during a recent audit by the Independent Design Inspection (IDI) team, NRC discovered that two out of ten cables were not routed in accordance with the cable routing program. This finding contradicts the TVA interim verification of the cable routing program. We will resolve this issue in accordance with the IDI finding resolution.