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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

EMPLOYEE CONCERN 23100 FIRE PROTECTION DESIGN

BROWNS FERRY UNITS, 1, 2, AND 3

TENNESSEE VALLEY AUTHORITY

DOCKET NOS. 50-259/260/296

1.0 STATEMENT OF EMPLOYEE CONCERN

The employee concern 23100, Fire Protection Design was made up of the following elements.

231.1 Undersized distribution headers
231.2 Electrical panels not protected from sprinklers
231.3 Sprinkler head spray pattern interference
231.4 Lack of fire dampers in additional diesel generator building
231.5 Adequacy of battery room ventilation system design
231.6 Fire protection QA designation

2.0 SUMMARY AND EVALUATION

Of the six elements under employee concern 23100, TVA determined that only three were applicable to Brown's Ferry Units 1, 2 and 3. These elements are:

231.1 Undersized Distribution headers
231.5 Adequacy of battery room ventilation system design
231.6 Fire protection QA designation

The other three elements represented concerns that identified specific plant components at Watts Bar or Sequoyah, and therefore, were not considered generic by TVA. The staff agrees with this assessment.

Element 231.1 is composed of the following issues:

a) Welding small pipes to large pipes could result in flow restrictions

b) Review of such piping by an independent authority is recommended (all plants)

c) At Sequoyah and Watts Bar, high pressure fire protection system piping, sizing and configuration are not in accordance with National Fire Protection Association (NFPA)

In regard to (a) and (b) which may be applicable to Brown's Ferry, TVA has concluded that an independent review of NFPA code deviations would answer the concern.

TVA has completed the review and issued the report on NFPA code deviations. It was submitted to NRC in August 1988. The staff evaluated the report and found some deviations to be allowable for restart and others to require a more definitive completion or modification schedule. The staff position on NFPA code deviations at BFN was transmitted to TVA and TVA responded by letter to staff concerns on February 3, 1989, R. L. Gridley to NRC.

Element 231.5 Adequacy of battery room ventilation is composed of the following issues:

a) The design of the battery room heating and ventilating system is inadequate.
b) Hydrogen could accumulate, especially if battery room fans failed.
c) Electric heaters could ignite hydrogen

The TVA investigation of battery room HVAC design showed that the battery rooms are environmentally controlled to maintain an average annual temperature of about 77°F. The ventilation requirements result in a minimum of 2 air changes per hour in winter which results in a maximum hydrogen concentration of 2 percent. The redundant fans in the battery rooms are supplied from the Class 1E power bus. Flow indicators or alarms are provided locally or in the main control room. There are no electric heaters in the plant battery rooms.

The diesel generator battery ventilation hoods do not have redundant fans and flow alarms or indicators; however, there are no dampers in the exhaust ducts, thus allowing natural ventilation to keep the hydrogen concentration in the hoods below 2 percent should the fans fail. Standard practice for conduct of operations requires that local control panels, meters, indicators, pressures, and motors be checked every shift (8 hours). This includes ventilation and charging systems. Although there are electric heaters in the DG room ceilings the limitations on hydrogen concentration within the hoods effectively preclude ignition.

The staff believes that TVA has adequately addressed this concern.

Element 231.6 is composed of the following issues:

a) Requirements for limited QA (quality assurance) for fire protection systems were contradicted by engineering drawings.

b) At Bellefonte, such requirements were improperly implied

This concern was raised at Bellefonte Nuclear Plant in regard to TVA's general construction specification G-73, "Inspection, Testing and Documentation Requirements for Fire Protection Systems and Features." The concern was that TVA engineering did not establish the Quality Assurance (QA) requirements for fire protection features consistent with the requirements of specification G-73.

General construction specification G-73 establishes minimum inspection, testing and documentation requirements for fire protection systems and features for TVA nuclear power plants to assure compliance with quality assurance requirements set forth by the NRC. Fire protection systems are generally installed under a "limited QA program" and fall under the requirements of G-73 for construction documentation. The "limited QA program" provides a full documentation program for the construction and installation of fire protection features, but is of reduced scope from the traditional QA requirements of 10 CFR 50, Appendix B. This program was developed to meet the NRC fire protection guidelines. Fire protection systems which interact with nuclear safety systems such as those in which seismic supports are needed, must confrom to the QA requirements of 10 CFR 50, Appendix B.

The staff concludes that TVA's quality assurance program for fire protection systems and components is in accordance with US NRC SRP 9.5.1 (NUREG 0800) in regard to the scope and application of general construction specification G-73.

3.0 CONCLUSION

The staff concludes that of the six elements under employee concern 23100 "Fire Protection Design" only three are applicable to Browns Ferry Nuclear Plant. These three are:

231.1	Undersized Distribution Header
231.6	Adequacy of battery room ventilation system design
231.6	Fire Protection QA designation

The staff concludes that concern 231.1 "Undersized Distribution Headers" has been adequately addressed by the TVA study and report on NFPA code deviations.

The staff concludes that concern 231.5 "Adequacy of battery room ventilation system design" has been adequately addressed from a technical standpoint.

The staff concludes that concern 231.6 "Fire Protection QA Designation" will not be a concern at Browns Ferry Nuclear Plant because the application of QA in regard to Fire Protection Systems at BFN is in accordance with SRP 9.5.1 requirements.