

ENCLOSURE

SEQUOYAH NUCLEAR PLANT - UNITS 1 AND 2
HIGH PRESSURE FIRE PROTECTION
PUMP FAILURES
NCR 962
REVISED FINAL REPORT

Description of Deficiency

The deficiency is the separation of the impeller from the pump shafts after a period of use. In several instances, the high pressure fire protection (HPFP) pumps and motors have been heavily damaged following separation of the impeller from the shaft.

Safety Implications

If this deficiency had remained uncorrected, the possibility exists that coincident, multiple HPFP pump failures may have led to the inability of the plant to combat potential fires in safety-related areas. If fires occurred in safety-related areas that could not be controlled, equipment necessary for safe shutdown of the plant may have been damaged or destroyed.

Corrective Action

Upon discovery of the deficiency, pressure signature tests were performed on the pumps to aid in determining the cause of the pump failures. The tests revealed a slight momentary pressure spike during HPFP coastdown before the upstream backflow check valve closed. However, this pressure spike was not significant enough to create a hazard to the equipment. The separation of the impeller was apparently due to the method of attaching the impeller to the pump shaft. The impellers were initially attached by means of a lock collet construction which permitted them to come loose due to a shock on the impeller. The pumps are being repaired by reattaching the impellers by the thrust ring construction method which will prevent the impeller from becoming loose from the pump shaft in future operation.

TVA has reviewed all the vertical turbine type pumps in Sequoyah and Watts Bar and has found no other pumps with the lock collet construction at either plant. For plants after Watts Bar, the plant fire protection system (FPS) design criteria will be revised to require testing for water hammer on any fire pump having this lock collet construction. This testing will be done before the FPS being used for construction or preoperational testing.

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