

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
ORIFICE FLANGES NOT MEETING SPECIFICATIONS
NCR WB-M-79-06
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

During hydrostatic testing of the residual heat removal system, two stainless steel orifice flanges were found to leak due to failures in the area of three of four instrument ports. (There are two ports per flange.) Subsequent investigation of these failures revealed two nonconforming conditions existed which required resolution:

1. Examination of the failed flanges revealed that inserts had been used for repair of the four flange ports. In addition, weld repair was found to have been performed on the three ports which leaked. This use of inserts and weld repair was done without TVA's knowledge or approval and was not recorded in the vendor's documentation.
2. An audit of the stainless steel flanges not yet installed in the plant revealed the wall thickness between the flange face and the port on several flanges was not adequate to meet Code fillet weld criteria.

The minimum wall thickness problem resulted from poor workmanship by the vendor in locating the socket weld recess. The three-fourths-inch port was an option available from the vendor and was chosen by TVA to avoid the necessity for using expanders to accommodate the three-fourths-inch pipe values supplied by Westinghouse.

Safety Implications

At this time, deficient stainless steel flanges having either inserts or below acceptable minimum wall criteria have been found only in the safety injection system and the residual heat removal system. If the deficiency had remained uncorrected, any of these flanges may have failed. Such a failure would have led to a leak of either reactor coolant (in the case of RHR) or borated water (in the case of SIS). However, the leak as described above would most likely be of a seepage type and would not have exceeded system design allowables. The estimated amounts of leakage would not have prevented the SIS or RHR from performance of their safety functions.

Corrective Action

The following actions were taken to correct the deficiency:

1. The two flanges which contained inserts were manufactured by AFCo Company of Long Island City, New York, and were supplied by Taylor Forge. AFCo supplies only stainless steel flanges. All 42

AFCo flanges sent to the Watts Bar site were examined and an additional 8 (4 pairs) flanges were found to have inserts (10 total). Approximately 50 stainless steel flanges from vendors other than AFCo were also inspected for inserts and none were found. Therefore, the insert problem is considered limited to AFCo flanges.

2. Engineering Design has performed a stress analysis and has determined the minimum ligament (wall thickness) and fillet weld required for the intended service pressure-temperature conditions of the particular flange. This analysis was performed for determining minimum wall and fillet weld thicknesses for the enlarged instrument ports on stainless steel flanges. This data has been supplied to the site. Flanges not meeting this minimum wall criteria will be reviewed on a case-by-case basis. Those found unacceptable will be replaced. This criteria will be used to establish new inspection requirements for flanges of this type. In the future, TVA will not request flanges to be modified to the larger port. This should eliminate the minimum wall thickness problem on future flange purchases.

All AFCo flanges for Sequoyah units 1 and 2 have been examined for inserts and for minimum wall thickness. No deficiencies were found. The larger port design was not specified for any of TVA's plants other than Sequoyah and Watts Bar. Therefore, no other TVA plant is affected by the nonconformance.