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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 222.2(B)

"BOX ANCHORS WITH EXCESSIVE WELDING"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Engineering (20000)
Subcategory: Pipe Support Weld Design (22000)
Element: Box Anchors with Excessive Welding (22202)

The basis for employee conceren element report 222.2(B) Revision 1, dated January 27, 1987 is Employee Concern OW-85-003-001 which states:

> "The box anchors on the 3/4 in. and 1 in. stainless pipe (no further location details known) are over-engineered. CI is concerned that when all that metal is welded on, the pipe has to get so hot that it would adversely affect the pipe material. CI has no further information."

This concern was evaluated by the licensee as potentially nuclear safety-related and potentially applicable to Sequoyah (generic).

II. SUMMARY OF ISSUES

Two issues were identified by the licensee as applicable to this evaluation:

1. Welding on box anchors for 3/4 in. and 1 in. diameter stainless steel piping is over-engineered.

2. The overheating due to the large weld size will affect the pipe material (addressed in Generic Employee concern Report WP-15-SQN).

III. EVALUATION

The licensee reviewed drawings, design criteria and calculations for welds joining the stainless steel pipe to the box anchor and concluded that these circular attachment welds were the proper size. The size of the weld is governed by the thickness of the attachment plate and may be thicker than the pipe. However, the criterion does not consider the metallurgical effects of high heat input and slow cooling on the stainless steel pipe. This heating and cooling combination has often caused the stainless steel piping adjacent to a weld to become susceptible to stress corrosion cracking.

The licensee's Element Report WP-15-SQN discusses the effect of oversize welds on fatigue strength and residual stress, but does not address the potential changes in the pipe material.

The NRC staff discussed the employee concern with the licensee's Office of Engineering. The shielded metal arc welding procedure specifications limit the heat input for stainless steel welding to 60 kilojoules/inch and the maximum surface temperature prior to welding to 350°F. These limits will prevent the stainless steel pipe from becoming sensitized and susceptible to stress corrosion cracking.

Finally, the NRC staff reviewed the statements of the concerned individual and determined the probable location of the anchor weld in Watts Bar Unit 2. After an extensive search, a 1 in. stainless steel pipe to box anchor fillet weld was found. The box anchor was welded in a single pass with shielded metal arc electrodes at room temperature using a heat input about two-thirds of the 60 kilojoiles/inch allowed. The size of weld was approximately 3/16 in. and the concern was not substantiated.

IV. CONCLUSIONS

The licensee's evaluation did not fully address the concern. The NRC staff investigated the employee concern through interviews, reviews of procedures and reports and a physical examination of the component and found the concern to be unsubstantiated. No further action is necessary.