



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

SAFETY EVALUATION REPORT BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT 222.6(B)

"AISC MINIMUM WELD CRITERIA"

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 (22200)
Element: AISC Minimum Weld Criteria (22206)

The basis for Element Report 222.6(B) Revision 1, dated January 14, 1987 is Element Concern IN-85-109-003 which states:

"AISC minimum weld criteria is violated by Memo E44011-01. Names are known."

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

II. SUMMARY OF ISSUES

The licensee identified the issue as "American Institute of Steel Construction (AISC) minimum weld criteria were not always followed.

III. EVALUATION

The basis for the employee concern is paragraph one of an internal licensee letter dated January 20, 1984, "Watts Bar Nuclear Plant - Clarification of Welding Requirements" which states:

"TVA has performed qualification tests to the requirements of Reference 2, which serve to qualify the use of fillet welds smaller than the minimum sizes as given in Table 2.7 of Reference 2. On the basis of this qualification, fillet welds of any size necessary to carry calculated loads may be used for joining materials listed in Group i, Table 4.1.1 of Reference 2 when such welds are made by the shielded metal arc welding (SMAW) process, using low hydrogen electrodes."

Reference 2 is the Structural Welding Code published by the American Welding Society which is incorporated into the design through the seventh edition of AISC in par. 1.17.1. Provisions for the qualification of fillet welds are contained in par. 1.17.2, "Qualification of Weld and Joint Details." These provisions permit the qualification of welds smaller than those listed in par. 1.17.5, "Minimum Size of Fillet Welds." The licensee remains responsible for assuring that these smaller welds are capable of carrying the design loads.

According to the licensee's evaluation team, the qualification tests are documented in memorandum no. NEB-840120-275 dated January 20, 1984, "Clarification of Welding Requirement." The evaluation team did not show that these small-weld qualification tests were performed prior to their use in the 1970's.

The FSAR commitment in par. 3.8.4.5.2, "Structural Steel" is to design in accordance with the seventh edition of the AISC rules. The licensee reviewed 34 pipe supports selected from the safety-related plant systems and found 4 in Unit 1 and 8 in Unit 2 with welds detailed smaller than AISC requirements of par. 1.17.5. The difference varied from 20% to 40% of fillet weld leg size. In addition, the calculations for the discrepant supports could not be found. The evaluation team introduced an American Society of Mechanical Engineering nuclear code case into the discussion, but it is irrelevant.

The licensee calculated the minimum weld size for the Unit 2 supports using the original AISC design criteria supplemented by the licensee's factors of safety. Seven were satisfactory and the eighth met AISC criteria and the licensee's short term criteria, but not their long term criteria and it will be replaced after restart. The licensee committed in post restart corrective action plans to revise the FSAR and design criteria and perform analytical verification for the 4 supports in Unit 1. The qualification tests performed by the licensee in 1984 showed that the smaller sizes used earlier will be adequate for the design criteria. The resolution of the employee concern is acceptable to the NPC staff.

IV. CONCLUSIONS

The employee concern is substantiated and it does not appear that the licensee qualified the small welds until long after they were completed. The NRC staff has reviewed the licensee's element report 222.6(B) revision 1 dated January 14, 1987 "AISC Minimum Weld Criteria" and the conclusions and corrective actions are acceptable.