



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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

FOR EMPLOYEE CONCERNS ELEMENT REPORT EN 232.8

"CRITERIA FOR MINIMUM PIPE WALL THICKNESS"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. SUBJECT

Category: Engineering
Subcategory: Piping and Valve Design
Element: Criteria for Minimum Pipe Wall Thickness
Concern: IN-85-545-X06: "12-1/2% was the criteria established by Engineer Design for minimum wall thickness since 1978. One Engineer was found to be using the less stringent formula contained in Code Section NB. The above applies to QA Class 2, and some Class 1, stainless steel pipe in Units 1 and 2.

II. SUMMARY OF ISSUE (as stated by TVA)

The ASME Section III code formula for calculating required minimum wall thickness of stainless steel Class 1 and 2 piping may be less conservative than the 12-1/2 percent criterion established for WBN Units 1 and 2 in 1978.

III. EVALUATION

The employee concern as expressed in the K Form is confusing. The 12-1/2% minimum wall thickness is a manufacturing tolerance and not a criterion or specification for the design of pipe minimum wall thickness. The formulas contained in the ASME Code, Section NB for Class 1, Section NC for Class 2, and ASME B31.1, paragraph 104.1 are for calculating the minimum pipe wall thickness required for containing a fluid at a given temperature, pressure, material, diameter. After these calculations are performed, the code defines how piping is to be specified to assure that the minimum design wall thickness is present by consideration of pipe manufacturing pipe wall thickness tolerances.

The concern does not express how the ASME Code formulas were misapplied. That an engineer had used the ASME code formulas to compute pipe wall thickness is the regulatory requirement. The use of the 12-1/2% wall thickness manufacturing tolerance is a subordinate and supplemental requirement compared to the pressure design calculations in determining the code required pipe wall thickness.

The evaluation by TVA's Employee Concern Task Group as presented in Element Report 232.2(B) consisted of a review of TVA's Division of Engineering design criteria established for the Sequoyah site, comparison with the ASME Boiler and Pressure Vessel Code (B&PV) for minimum pipe wall thickness calculation requirements, review of the FSAR sections pertaining to piping classifications and design, and review of draft Sequoyah site carbon steel piping wall thickness calculations to verify conformance with the code. The TVA reviewer confirmed, for items procured after April 2, 1973 at the Sequoyah site, the ASME B&VP Code had been used; and prior to this date, the ASME Power Piping Code, B31.1 was used. TVA's internal documents for piping design at the Sequoyah site (Sequoyah Plant Design Criteria SQN-DC-V-3.0, "General Design Criteria for the Classification of Piping, Pumps, Valves and Vessels") were reviewed and were found to meet the applicable code requirements for determining minimum wall thickness, including addressing the wall thickness manufacturing tolerances.

TVA has confirmed to the staff by copy of a letter from Bechtel Western Power Company to TVA, dated January 29, 1988, that in addition to the carbon steel piping calculations that were reviewed and documented in the Element Report 232.8(B), stainless steel pipe wall thickness calculations were reviewed for proper calculation of wall thicknesses.

The concern also mentions a time frame of 1978, well after the design of Class 1 and 2 piping systems were completed and construction of these systems was also completed at the Sequoyah site. We believe that this concern has little probability of being applicable to the Sequoyah site, and the limited review of stainless steel Class 1 and 2 piping systems demonstrates stainless steel piping systems have correct minimum wall thickness calculations. The staff believes that the investigations described above are sufficient to confirm that this concern does not appear applicable to the Sequoyah site.

IV. CONCLUSIONS

We concur with TVA's conclusion that this concern is not valid for safety class piping systems installed at the Sequoyah site.