



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

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT 218.1(B), REVISION 1
"PIPE STRESS CALCULATIONS
THERMAL ANALYSIS OF PIPING
SUBJECTED TO TEMPERATURE LESS THAN 120°

I. Subject

Category: Engineering (20000)
Subcategory: Pipe Stress Calculations (21800)
Element: Thermal Analysis of Piping Subjected to Temperature Less than
120°F (21801)
Concerns: SQN-86-002-03, SQN-86-001-03, IN-85-038-001, IN-85-039-001,
IN-85-039-002

The bases for Element Report 21801, Revision 1 dated December 19, 1986 are Employee Concern Nos. SQN-86-002-001, SQN-86-001-03, IN-85-038-001, IN-85-039-001 and IN-85-039-002, which question the thermal analyses of piping performed by TVA.

II. Summary of Issues

The Employee Concerns Task Group (ECTG) report identified the following six issues from the employee concerns:

- a. Current operating mode drawings were not used for all subsequent analyses.
- b. Site group stress analysts were not allowed to evaluate the significance of the current operating mode definitions in the analysis of record.
- c. The environmental temperature in the annulus area may reach 150°F but site group stress analysts were not allowed to evaluate the effect of the environmental temperature on piping in that area.
- d. The operational mode procedure does not require evaluation of previously performed thermal analyses when thermal conditions change.
- e. Not all stress-analyzed piping included a code-required evaluation of thermal expansion.

- f. Excessive levels of pipe support loads and pipe stress due to thermal expansion have been observed for some piping where the system operating temperatures were between 40°F and 120°F and a thermal expansion evaluation was not performed.

III. Evaluation

A technical review of Employee Concerns Element Report 218.1(B), Revision 1 was performed by NCT Engineering, Inc. under NRC Contract No. 05-86-156. The results of this review are summarized in the attached NCT technical evaluation report dated November 30, 1987 on Employee Concerns Element Report 218.1(B), Revision 1.

Element Report 218.1(B), Revision 1 found that only issue d contained a valid concern for rigorously analyzed piping systems. The report further stated that based on the results of a sampling program at Watts Barr, the thermal operating modes used for Sequoyah were adequate and no corrective actions were required. The report referred to Element Report 218.4(B) for evaluation of issues e and f for alternate analysis piping. The NCT review of Element Report 218.1(B), Revision 1 found that the ECTG evaluations of issues a, b, c and d was acceptable. Based on a finding by the NRC's Integrated Design Inspection (IDI) the NCT report concluded that issues e and f should remain open until the IDI finding is resolved. The staff concurs with the conclusions presented in the NCT technical evaluation report.

The NCT technical evaluation report identified that an additional item has been raised by the ECTG based on a revised version of an employee concern. This new issue has not been transmitted to the NRC and has not been reviewed. The NCT evaluation also identified that TVA committed to issue new operating mode drawings for all Unit 2 piping systems and recommended that this effort be completed in a timely manner. TVA's implementation of this commitment to evaluate operating mode drawings should be reviewed as a post restart item for both Units 1 and 2.

IV. Conclusions

Based on the review of Employee Concerns Element Report 218.1(B), Revision 1 the staff concludes that Employee Concerns SQN-86-002-03, SQN-86-001-03, IN-85-038-001, IN-85-039-001 and IN-85-039-002 have been, in general, adequately addressed for rigorous piping analyses for Sequoyah restart. Final resolution of these concerns is contingent on the resolution of the NRC's Integrated Design Inspection finding on the ERCW thermal analysis. Alternately analyzed piping is addressed in the evaluation of Element Report 218.4(B). In addition, the new issue raised by ECTG should be reviewed by the NRC staff prior to the Sequoyah restart to determine whether the new issue has any impact on the conclusions of this evaluation. TVA's implementation of the commitment to issue new operating drawings should be reviewed by the staff as a post restart item.

V. Addendum

See next page.

V. Addendum (continued)

The safety evaluation report for this element report specified the review of the revised employee concerns report as a restart item. This element report was revised based on the identification of an additional technical concern by the employee concerns task group. The additional issue involved TVA's failure to consider secondary stress range for alternate analysis at Watts Bar. The resolution of this item for Sequoyah as described in Element Report 218.1, Revision 2, is to address the issue in the Phase II alternate analysis program. The Phase II alternate analysis program will be performed after the Sequoyah Unit 2 restart. The resolution of secondary stresses due to stress range considerations in the post restart effort is consistent with the staff safety evaluation on alternately analyzed piping and is acceptable.