



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

January 4, 1992

Docket No. 50-446

LICENSEE: Texas Utilities Electric Company (TU Electric)  
FACILITY: Comanche Peak Steam Electric Station, Unit 2 (CPSES)  
SUBJECT: SUMMARY OF MEETING ON PRESSURIZER SURGE LINE LEAK-BEFORE-BREAK ANALYSIS

BACKGROUND

TU Electric has proposed the use of the leak-before-break (LBB) methodology to justify elimination of pipe rupture as the design basis for a number of piping runs within the reactor coolant pressure boundary, including the pressurizer surge line (PSL). The requirement to postulate pipe rupture as the design basis of the PSL results in the need for additional plant hardware (i.e., pipe whip restraints, jet shields) to mitigate the consequences of postulated pipe breaks. Demonstrating that the PSL meets LBB criteria would allow the applicant to eliminate the requirement for this additional hardware.

The use of LBB methodology was allowed by a revision to the general design criteria contained in 10 CFR 50 Appendix A. Proposed LBB evaluation criteria were published in draft Standard Review Plan (SRP) Section 3.6.3. The LBB analysis requires determination of the limiting location of the piping run in question, followed by demonstration that there is adequate margin between the leakage size flaw and the critical size flaw to ensure detection of the postulated flaw prior to rupture of the line.

Following the applicant's submittal of their LBB analysis for the PSL (WCAP-13100 (proprietary) and WCAP-13101 (non-proprietary)), the staff performed independent flaw size calculations which resulted in a significantly larger leakage size flaw than was calculated by the applicant's contractor (Westinghouse). When this greater size leakage flaw was factored into the applicant's LBB analysis, it resulted in a reduction of margin which was not considered acceptable by the staff.

DISCUSSION

The applicant requested a meeting to discuss the differences in the calculated leakage size flaws and to present justification for acceptance of the applicant's calculated flaw size. The meeting was held on November 4, 1992.

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Westinghouse representatives summarized the analysis, emphasizing the extensive conservatism used in determining the leakage flow size and the very low probability of occurrence of the limiting load case. The staff acknowledged these points; but maintained that these conservative assumptions are important in determining the acceptability of LBB analysis.

The Westinghouse representatives also provided a comparison of the proprietary code used in the applicant's LBB analysis with the industry standard code (PICEP) used by the staff to determine the leakage flow size. The results of both codes were compared to limited experimental data. The staff questioned the data chosen for the comparison, particularly the limited number of points in the data set. In general, the staff expressed the opinion that the Westinghouse leakage flow code required additional benchmarking against experimental data.

The staff noted that the method used by Westinghouse to calculate the critical flow size (a limit-load approach) was highly conservative for this case. The use of more advanced methods acceptable to the NRC for calculating the critical flow size was discussed as an alternative means of obtaining the required margin for acceptance of the leak-before-break analysis for the pressurizer surge line.

In order to perform an independent calculation of the critical flow size using a more advanced elastic-plastic fracture mechanics code (NRCPIPE), the staff requested that the applicant provide material property data (in the form of J-resistance (J-R) curves) for the weld material and the pipe base material at the critical location (node 1020).

The staff also requested Ramberg-Osgood data (i.e., stress-strain data) for the weld and pipe base materials. If actual data are not available, the staff requested that the applicant supply representative data, with justification for its selection. The NRC will review this issue further following additional applicant analysis of flow size calculations.

A list of meeting attendees is provided as an enclosure to this meeting summary. Material distributed at the meeting contained proprietary information and is not enclosed with this meeting summary. A non-proprietary version will be provided by the applicant and placed in the Public Document Rooms.

Original Signed By

Robert G. Schaaf, Project Engineer  
Project Directorate IV-2  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosure:  
Meeting Attendees List

cc w/enclosure:  
See next page

\*See previous concurrence

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Document Name: PSL-LBB.SUM; c:\wp\cpl&2

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Meeting Attendees List

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