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.

Westinghouse representatives summarized the analysis, emphasizing the extensive conservatism used in determining the leakage flaw 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 flaw 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 flaw code required additional benchmarking against experimental data.

The staff noted that the method used by Westinghouse to calculate the critical flaw 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 flaw 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 flaw 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 flaw 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 concurence

OFFICE	PDIV-2/LA	PDIV-2/PE	PDIV-2/PM	NRR/EMCB*	PDIV-2
NAME	EPeyton	RSchaaf:nb	BHolian	KWichman	SBlack
DATE	1/14/93	1/14/93	1/14/93	12/31/92	1/14/93

Document Name: PSL-LBB.SUM; c:\wp\cp1&2

Westinghouse representatives summarized the analysis, emphasizing the extensive conservatism used in determining the leakage flaw 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 flaw 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 flaw code required additional benchmarking against experimental data.

The staff noted that the method used by Westinghouse to calculate the critical flaw 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 flaw 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 flaw size using a more advanced elastic-plastic fracture mechanics code (~~SQUIRT~~ 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 flaw 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.

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

OFFICE	PDIV-2/LA	PDIV-2/PE	PDIV-2/PM	NRR/EMCB	PDIV-2
NAME	EPeyton	RSchaaf:nb	BHolian	KWichman	SBlack
DATE	12/22/92	12/28/92	12/31/92	12/31/92	/92

Document Name: PSL-LBB.SUM; c:\wp\cp1&2

cc w/enclosure:
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 1029
Granbury, Texas 76048

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Mrs. Juanita Ellis, President
Citizens Association for Sound Energy
1426 South Polk
Dallas, Texas 75224

Owen L. Thero, President
Quality Technology Company
Lakeview Mobile Home Park, Lot 35
4793 East Loop 820 South
Fort Worth, Texas 76119

Mr. Roger D. Walker, Manager
Regulatory Affairs for Nuclear
Engineering Organization
Texas Utilities Electric Company
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Texas Utilities Electric Company
c/o Bethesda Licensing
3 Metro Center, Suite 610
Bethesda, Maryland 20814

William A. Burchette, Esq.
Counsel for Tex-La Electric
Cooperative of Texas
Jorden, Schulte, & Burchette
1025 Thomas Jefferson Street, N.W.
Washington, D.C. 20007

GDS Associates, Inc.
Suite 720
1850 Parkway Place
Marietta, Georgia 30067-8237

Jack R. Newman, Esq.
Newman & Holtzinger
1615 L Street, N.W.
Suite 1000
Washington, D. C. 20036

Chief, Texas Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756

Honorable Dale McPherson
County Judge
P. O. Box 851
Glen Rose, Texas 76043

Mr. William J. Cahill, Jr.
Group Vice President
TU Electric
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Distribution:
Docket File
NRC/PDR
Local PDR
PDIV-2 RF
PDIV-2 PF
JRoe
MVirgilio
EPeyton
BHolian
OGC
EJordan
ACRS(10)
LYandell, RGN-IV
TMurley/FMiraglia
JPartlow
NRC Participants
JMitchell, EDO

ENCLOSURE 1

MEETING ATTENDEES

MEETING WITH TU ELECTRIC

NOVEMBER 4, 1992

TU ELECTRIC

D. Woodlan
C. Corbin
D. Rencher

WESTINGHOUSE

D. Roarty
B. Maurer
C. Benton
J. Schmertz

NRC

R. Schaaf
J. Strosnider
S. Sheng
K. Wichman
A. Hiser
T. Bergman