May 20, 1984



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION



BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

| | | |
|---|---|---|
| IN THE MATTER OF | ) | |
| | ) | Docket Nos. 50-445 and 50-446 |
| TEXAS UTILITIES ELECTRIC COMPANY, ET AL. | ) | |
| | ) | (Application for Operating Licenses) |
| (Comanche Peak Steam Electric Station, Units 1 and 2) | ) | |

APPLICANTS' MOTION FOR SUMMARY
DISPOSITION REGARDING
UPPER LATERAL RESTRAINT BEAM

Pursuant to 10 C.F.R. §2.749, Texas Utilities Electric Company ("Applicants") hereby move the Atomic Safety and Licensing Board for summary disposition of the Citizens Association for Sound Energy's ("CASE") allegations regarding the adequacy of the upper lateral restraint beam. As demonstrated in the accompanying affidavit and statement of material facts, there is no genuine issue of fact to be heard regarding these issues. Applicants urge the Board to so find, to conclude that Applicants are entitled to a favorable decision as a matter of law, and to dismiss this issue from the proceeding.

## I. BACKGROUND

The primary purpose of the upper (as well as the lower) lateral restraint beam is to provide restraint to the steam generator during a design basis accident resulting from a postulated break in the primary coolant loop or a main steam line. CASE has challenged the adequacy of the upper lateral restraint beam (see CASE Proposed Findings at XIX-6). In particular, CASE alleges that the Applicants have not presented an analysis sufficient to demonstrate the adequacy of the upper lateral restraint beams and the associated reinforced concrete supporting walls. CASE has raised concerns as to (1) whether the upper lateral restraint beams are adequately designed, and (2) whether the stresses in the steam generator compartment wall caused by the thermal expansion of the lateral restraint beams under design basis accident conditions are within allowable stress limits.

In the December 28, 1983 Memorandum and Order (Quality Assurance for Design), at 50-56, the Board, after reviewing the original analysis performed by Applicants, the objections thereto presented by CASE, and the analysis undertaken by the Staff at the Board's request, concluded as follows (at 56):

> In the face of the possibly conflicting engineering viewpoints of three different parties, we conclude that applicant has not demonstrated the adequacy of its analysis of the upper lateral restraint beam.

In response to the Board Order, Applicants undertook to resolve this matter by performing further analyses which would:

> Provide evidence that the design for the upper lateral restraint and adjacent walls is adequate to withstand mechanical and thermal loads in a LOCA environment. This will include the performance of an analysis to confirm that the forces transmitted to the concrete by the expanding restraint are well within the capacity of the concrete to permit the continued performance by the concrete and the support of their intended functions. This also will include the performance of analyses of the time differential between the peak mechanical and thermal loads and of realistic stiffness values for the walls.[1]

These analyses and their results are described in the accompanying affidavit of Dr. Robert C. Iotti.

## II. APPLICANTS' MOTION FOR SUMMARY DISPOSITION

### A. General

Applicants have previously discussed the legal requirements applicable to motions for summary disposition in their "Motion for Summary Disposition of Certain CASE Allegations Regarding AWS and ASME Code Provisions Related to Welding," filed April 15, 1984 (at 5-8). Accordingly, we incorporate that discussion herein by reference.

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1 Applicants' Plan To Respond to Memorandum and Order (Quality Assurance for Design), submitted February 3, 1984, at 6, Item 8.

B. CASE's Allegations Regarding the Adequacy of the Upper Lateral Restraint Beam Should Be Summarily Dismissed.

The analyses described in the accompanying affidavit resolve all concerns with the adequacy of the upper lateral restraint beam and the associated reinforced concrete supporting walls. The Applicants have performed extensive analyses to determine the effects of a LOCA and main steam line break on the upper and lower lateral steam generator restraints and the associated steam generator compartment walls.[2] The effects analyzed were those produced by the thermal expansion of the restraint, as well as those produced by concurrent loads and other environmental effects that would occur during a postulated accident. The model used by Applicants to perform their analyses properly accounted for all stiffness contributions to the restraining walls from adjacent floors and walls (Iotti Affidavit at 3).

The assumptions underlying the analyses were quite conservative (id. at 5-10). First, it was assumed that compartment pressure and temperature effects produced by a LOCA would occur simultaneously and in combination with seismic loads (id. at 5 and 14). Second, mechanical loads such as jet impingement were postulated at their maximum values in

2 Although the concerns addressed during these proceedings have centered on the effects of a LOCA on the upper lateral restraint, Applicants examined the lower lateral restraint as well, and included within their analyses the effects of a main steam line break.

combination with maximum thermal and differential pressure effects, though this is not required in view of their time histories (id. at 5 and 7). Third, the maximum actual temperature in the lower restraint was assumed to occur simultaneously with the maximum in the upper restraint, while in fact the respective maximum temperatures occur at different times (id. at 8, n. 4). Fourth, for purposes of the main steam line break analysis, Applicants used a split break at 30% power at the steam generator outlet nozzle, since this results in the highest temperature in the compartment out of all the breaks considered (id. at 9). Fifth, 450 psi was used to represent the absolute upper-bound estimate of the tensile strength of concrete at Comanche Peak even though a more appropriate value would have been 400 psi; this insured the conservatism of the reaction loads produced by constraint of the thermal expansion of the restraint beams. (id. at 11-12).

With respect to the reinforced concrete structures, the results of the analyses show that the stresses in the concrete and reinforcing steel are well below the conservatively established allowable for mechanical loads (id. at 12, and Table 1). That is to say, the stresses in the steam generator compartment walls produced by the maximum thermal expansion of the upper and lower lateral restraints are within the allowable stress limits of the walls.

As for the lateral restraint beams, Applicants analyzed the stresses in the beams at three different stages: (1) at 0.2 seconds when the mechanical loads from the assumed breaks are at their peak, (2) at the point in time when the temperature of the beam reaches the peak during a LOCA, and (3) at the point in time when the temperature of the beam reaches its peak during a main steam line break. (id. at 14). The conditions assumed for the analysis (i.e., simultaneous occurrence of maximum effects of mechanical, thermal and differential pressure loads) were extremely conservative, inasmuch as the mechanical loads from the postulated breaks exist for less than 0.5 seconds, while the thermal expansion builds up to its maximum over two to four minutes (id. at 13). Thus, during the time the thermal expansion builds up to its maximum, the restraint has already served its primary function of resisting the mechanical loads produced by the postulated break (id. at 13).

Moreover, Table 2 shows the stresses in the beam and demonstrates that, even though the beam has already performed its function and is no longer required when the temperature reaches its peak, the stresses in the beam due to the peak temperatures are well within the allowables. It is therefore evident that the lateral restraint beams are adequately designed.

## III. CONCLUSION

For the foregoing reasons, Applicants' motion for summary disposition on the issue relating to upper lateral restraints should be granted.

Respectfully submitted,

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APPLICANTS' STATEMENT OF MATERIAL FACTS AS
TO WHICH THERE IS NO GENUINE ISSUE
REGARDING THE UPPER LATERAL RESTRAINT BEAM

1. The primary purpose of the upper, as well as the lower, lateral restraint beams is to provide restraint to the steam generator during a design basis accident caused by postulated breaks in the primary coolant loop and the main steam line (Affidavit of Dr. Robert C. Iotti, at 13).

2. In response to the Board's December 28, 1983, Memorandum and Order (Quality Assurance for Design), Applicants performed extensive analyses to demonstrate the adequacy of the upper lateral restraint beams and of the associated reinforced concrete supporting walls (*id.* at 2). Although the discussion of this issue has centered on the effects of a LOCA on the upper lateral restraint and the supporting walls, Applicants' analyses were performed to examine the effects of both a LOCA and a main steam

line break on both the upper and lower lateral restraints and associated steam generator compartment walls (id. at 2-3). The analyses measured the effects produced by the thermal expansion of the restraints, as well as the effects produced by concurrent mechanical pressure and seismic (for LOCA only) loads which were postulated to occur (id., at 2, 5-10, 13, Tables 1 and 2). Further, the model used by Applicants in their analyses properly accounted for all stiffness contributions to the restraining walls from adjacent floors and walls (id. at 3).

3. The assumptions underlying the analyses were conservative. First, it was assumed that compartment pressure and temperature effects due to a LOCA would occur in combination with seismic loads (id. at 5 and 14), though an earthquake was not assumed to occur coincident with the postulated main steam line break, which is in accordance with the NRC Staff position (id. at 5-6). Second, mechanical loads such as jet impingement were postulated at their maximum values in combination with maximum thermal and differential pressure effects, though this is not required in view of their time histories (id. at 5 and 7). Third, the maximum actual temperature in the lower restraint was assumed to occur simultaneously with the maximum in the upper restraint, while in fact the respective maximum temperatures occur at different times

(id. at 8, n. 4). Fourth, for purposes of the main steam line break analysis, Applicants used a split break at 30% power at the steam generator outlet nozzle, since this results in the highest temperature in the compartment out of all the breaks considered (id at 9). Fifth, 450 psi was used to represent the absolute upper-bound estimate of the tensile strength of concrete at Comanche Peak even though a more appropriate value would have been 400 psi; this insured the conservatism of the reaction loads produced by constraint of the thermal expansion of the restraint beams (id. at 11-12).

4. The results of the analyses of the reinforced concrete walls show that the stresses in the concrete and reinforcing steel produced by the maximum thermal expansion of the upper and lower lateral restraints are within the allowable stress limits of the walls (id. at 12 and Table 1).

5. With respect to the lateral restraint beams, the mechanical loads from the assumed breaks occur at 0.2 seconds and exist for less than 0.5 seconds. The thermal expansion builds up to its maximum over the next few minutes (id. at 13). Therefore, during the time the thermal expansion builds up to its maximum, the restraint has already served its primary function of resisting the mechanical loads produced by the postulated accident (id. at 13).

6. Table 2, showing the stresses in the beams, demonstrates that, even though the beam has already performed its function by the time the temperature reaches its peak, the stresses in the beam due to the peak temperature are well within the allowable limits.