UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
TEXAS UTILITIES ELECTRIC COMPANY, et al.	)	Docket Nos. 50-445 and 50-446 OL
	)	
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	(Application for Operating Licenses)

APPLICANTS' MOTION FOR SUMMARY DISPOSITION OF CERTAIN CASE ALLEGATIONS REGARDING AWS AND ASME CODE PROVISIONS RELATED TO DESIGN ISSUES

Pursuant to 10 C.F.R. §2.749, Texas Utilities Generating Company, et al. ("Applicants") hereby move the Atomic Safety and Licensing Board ("Board") for summary disposition of the Citizens Association for Sound Energy's ("CASE") allegations regarding AWS and ASME Code provisions relating to design issues, i.e., that alleged AWS Code provisions concerning "Multiplication factor and reduction factor for skewed "T" weld joints," "Limitations on angularity for skewed "T" joints," "Calculations for punching (actually a reduction factor for the weld) shear on step tube joints," and "Design procedure for joint of tube to tube with Beta equal to 1.0," were not adequately considered by the ASME Code or in the CPSES design. As demonstrated in the accompanying affidavit (Attachment 1) and statement of material facts (Attachment 2), 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 these issues in this proceeding.

I. BACKGROUND

In August, 1982, intervenor CASE deposed Mr. Jack Doyle, a former employee of Applicants, with respect to certain allegations Mr. Doyle had regarding the design of pipe supports at Comanche Peak. Mr. Doyle's deposition was subsequently admitted into the record in this proceeding as his testimony (CASE Exhibit 669; Tr. 3631). At the September, 1982, hearing session Applicants presented a panel of witnesses to respond to Mr. Doyle's allegations (Applicants' Exhibit 142F). One allegation made by Mr. Doyle was that certain portions of the AWS Code should be employed at Comanche Peak in the design of welds on pipe supports (CASE Exhibit 669 at 111-118). Applicants' witnesses testified that welding on safety-related pipe supports at Comanche Peak was performed in accordance with the provisions of the ASME Code, and that the particular provisions of the AWS Code referenced by Mr. Doyle not only were inapplicable to the welding of pipe supports at Comanche Peak, but the effects addressed by those provisions had nonetheless been properly considered at Comanche Peak (Applicants' Exhibit 142F at 3, 7-8).

In May, 1983, the NRC Staff also presented a panel of witnesses to respond to Mr. Doyle's allegations, including the applicability of the AWS Code to welding at Comanche Peak. The Staff's witnesses testified that Mr. Doyle's allegations regarding the applicability of the provisions of the AWS Code to welding on pipe supports at Comanche Peak were in error (NRC Staff Exhibit 207 at pp. 49-51).

Following litigation of the pipe support design allegations, each of the parties submitted proposed findings addressing, inter alia, the issues regarding the applicability of the AWS Code (see Applicants' Proposed Findings of Fact Concerning Pipe Support Design Questions (August 5, 1983) at 68-71; NRC Staff Proposed Findings of Fact (August 30, 1983) at 77-82; and CASE Proposed Findings of Fact and Conclusions of Law (August 22, 1983), Section V.) In CASE's Proposed Findings 10 specific AWS Code provisions alleged not to be included in the ASME Code were raised, i.e., (1) "Preheat requirements for welds on plates over 3/4-inch thick," (2) "Drag angle and work angles (which limit the space allowed for the welder to function)," (3) "Beta factor for tube-to-tube welds," (4) "Multiplication factor and reduction factors for skewed "T" weld joints," (5) "Limitations on angularity for skewed "T" joints," (6) "Calculations for punching (actually a reduction factor for the weld) shear on step tube joints," (7) "Lap joint requirements," (8) "Design procedure for joint of tube to tube with Beta equal to 1.0," (9) "Limitation on

weld sizes relative to plate thickness," and (10) "Calculation for effective throat of flare bevel welds."[1] By Memorandum and Order of December 28, 1983, at pp. 43-46, the Board left open nine of the ten items (closing out the allegation concerning "calculation for effective throat of flare bevel welds.") On April 5, 1984, Applicants filed a Motion for Summary Disposition regarding five of the remaining nine items, dealing primarily with welding.

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). We incorporate that discussion herein, by reference.

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[1] Each of the parties also filed, in response to a request by the Board, briefs regarding the applicability of the AWS and ASME Codes to welding on pipe supports at Comanche Peak (see NRC Staff Response to Board Question Regarding Applicable Welding Codes at CPSES (October 28, 1983); Applicants' Brief Regarding Board Inquiry Into Applicability of AWS and ASME Codes to Welding on Pipe Supports at Comanche Peak (October 28, 1983); and CASE Response to Applicants' and Staff's Briefs (November 12, 1983)).

B. CASE's Allegations Regarding the Inadequacy of the ASME Code Should Be Summarily Dismissed

CASE alleges that the ASME Code (and welding and weld joint designs associated therewith) are inadequate in that the ASME Code does not take into consideration certain provisions of the AWS Code, specifically AWS Code provisions related to (1) "Preheat requirements for welds on plates over 3/4-inch thick," (2) "Drag angle and work angles (which limit the space allowed for the welder to function)," (3) "Beta factor for tube-to-tube welds," (4) "Multiplication factor and reduction factors for skewed "T" weld joints," (5) "Limitations on angularity for skewed "T" joints," (6) "Calculations for punching (actually a reduction factor for the weld) shear on step tube joints," (7) "Lap joint requirements," (8) "Design procedure for joint of tube to tube with Beta equal to 1.0," (9) "Limitation on weld sizes relative to plate thickness," and (10) "Calculation for effective throat of flare bevel welds" (Board Memorandum and Order of December 28, 1983 at pp. 43-46). (This last item was closed out by the Board's Memorandum and Order of December 28, 1983 at p. 46.) Of the nine items noted above which are still open, five items (1, 2, 3, 7 and 9) deal primarily with welding and were the subject of a previous Motion for Summary Disposition (April 5, 1984).

The instant motion relates to the four remaining open items (4, 5, 6 and 8) which relate primarily to weld joint design. As to those items, Applicants have conducted an evaluation of each item which includes (1) examination of the applicable AWS Code to determine if there were any AWS Code provisions related to the item, (2) an examination of the applicable ASME Code provisions to determine if and how the corresponding AWS Code provision (if any) had been taken into consideration, and (3) an examination of applicable design practice at CPSES. The results of these evaluations are set forth in the Attached Affidavit of J.C. Finneran, R.C. Iotti, and J.D. Stevenson Regarding Allegations Involving AWS and ASME Code Provisions ("Code Affidavit") (Attachment 1).

As set forth more fully below, each of the four open items related to weld joint design, as noted above (i.e., items 4, 5, 6 and 8) is adequately addressed in either the ASME Code and/or applicable design practices used at CPSES. Accordingly, no genuine issue of material fact exists with respect to these issues, and the Board should find that the Applicants are entitled to judgement as a matter of law. In support of Applicants' Motion, attached hereto is a Statement of Material Facts as to Which There Is No Genuine Issue (Attachment 2).

1. General

Design of structural steel including welded connections or joints should consider not only the detailed welding provisions of applicable codes such as ASME Section IX or AWS D1.1, but also the complementary requirements of other Codes (e.g., ASME Section III in the case of ASME component supports). Code Affidavit at p. 3. In addition, a properly designed welded connection also requires the training, experience and skill of the design engineer to provide structural design adequacy. Id. See for example the Forward to the Comentary to the AWS D1.1 Code which states in pertinent part that "It should be recognized that the fundamental premise of the Code is to provide general stipulations applicable to any situation and to leave sufficient latitude for the exercise of engineering judgement." Id. Considering the infinite variety and combination of welded joints or connection configurations together with types of welds possible, no published standard can possibly cover all possibilities. Id. at pp. 3-4. In the final analysis, the engineer designing the weld joint must be relied upon to assure the structural adequacy of the design. Code Affidavit at p. 4.

2. Multiplication Factor and Reduction Factors for Skewed "T" Weld Joints

AWS Code requirements regarding multiplication and reduction factors for skewed T-weld joints are contained in Appendix B of the AWS Code, which sets forth limitations on effective throat thickness for fillet welds in skewed T-joints designed in accordance with the AWS Code. Id. at p. 4. This is but one of the parameters effecting the load capacity of the joint. While the ASME Code does not have explicit requirements governing this area, compensatory requirements have provided assurance of acceptable load carrying capacity. Id.

For example, Appendix XVII (paragraph 2211(c)) of Section III of the 1974 ASME Code required that T-joint basemetal thru thickness allowable tensile stresses be limited to half the normal tensile allowable. Id. This assured that a welded skewed T-joint designed in accordance with this provision would be more conservative than a similar welded joint designed in accordance with the above noted provisions of the AWS Code. Id.

In addition, documentation to the QA Group in August 1982 reflects that weld designers at CPSES were using considerations virtually identical to that noted in Appendix B of AWS D1.1. Id. at p. 6.

To verify the adequacy of CPSES design measures regarding these weld joints, an evaluation of 13 skewed T-joint designs selected at random was performed. Id. In all cases these joints met or exceeded the load capacities requires by AWS. Id. Indeed, the evaluation reflected that the highest stressed weld was only stressed to 39 percent of AWS allowables. Id.

It should be noted that the SIT Report at p. 51, after an analysis of skewed T-joints, also concluded that "the design procedures being utilized by the three pipe support design groups for skewed joints are based on sound engineering practice." Id. at p. 7.

In conclusion, the allegation of CASE that design practice at CPSES regarding skewed T-joints is flawed because it does not consider AWS requirements regarding fillet weld throat thickness is without merit. Id. at p. 7.

3. Limitations on Angularity for Skewed "T" Joints

The AWS Code requirement regarding this issue is set forth in Section 2.7.1.4 of AWS D1.1. Id. This Section establishes angle limitations for fillet welds used in skewed T-joints. Id. These limitations do not apply to welds qualified by test. See Appendix E, Table E-2, to AWS D1.1. Both the AWS D1.1 and ASME Codes permit weld procedures without such limitations provided the weld procedure used is qualified by test. Code Affidavit at p. 7.

Applicants' practices as set forth in CPPA-22,616 (attached to the Code Affidavit) are virtually identical to those set forth in the AWS Code regarding this issue. Id. In addition, as previously noted, ASME Code provisions provided measures to assure the adequacy of skewed T-joint welds. See Appendix XVII (paragraph 2211(c)) of Section III of the 1974 ASME Code. Evaluations of randomly selected skewed T-joint welds (as noted above) provide assurance that AWS allowables were not exceeded. Id. at pp. 7-8. This conclusion is reinforced by the SIT Report at p. 51.

In sum, CASE's allegations that CPSES' design practice is flawed because it does not consider AWS requirements regarding angularity limitations on skewed T-joints are without merit. Id. at p. 8.

4. Calculations for Punching (Actually a Reduction Factor for the Weld) Shear on Step Tube Joints

The AWS Code provisions regarding punching shear are part of empirically derived equations which take into consideration numerous other factors (e.g., axial and bending stresses in the main member). See Section 10.5.1 of the AWS Code. It should be noted that AWS punching shear analysis requirements were introduced to deal with large tubular structures (e.g., offshore platform supports) with relatively large flange width to flange thickness ratios. Code Affidavit at p. 8. These conditions do not apply to relativley small tubular members used in pipe

supports at CPSES. Id. Accordingly, punching shear is not a significant problem at CPSES. Id. However, on a case by case basis, when the CPSES designer believes it may be appropriate, punching shear is calcualted for a given weld joint. Id.

To provide assurance that punching shear was not a problem, a punching shear evaluation was performed on 12 tubular pipe supports (both stepped and matched connections) selected from the worst cases provided in Case Exhibit 669B. Id. at p. 9. The results reflected that in no instance was punching shear a problem, and the highest ratio of actual stress from punching shear to the AWS allowable was .57. Id. It should be noted that the adequacy of Applicants' designs regarding local stress effects (e.g., punching shear) was evaluated by the SIT, and based on a sample of 100 vendor certified supports, were found to be acceptable. (See SIT Report at pp. 54-58, item 4.)

In sum, Applicants' design process reflects adequate consideration of the effects of punching shear, and CASE's allegations are without merit. Code Affidavit at p. 9.

5. Design Procedure for Joint of Tube to Tube with Beta Equal to 1.0

The AWS requirements regarding design of tube-to-tube joints with beta equal to 1.0 are set forth in Section 10.5.1.1 of AWS D1.1. Id. at p. 9. This section has two equations for determining the allowble capacity for loads normal to the main members. Id. The capacity of tube-to-tube connections with beta

equal to one is also addressed in a substantially similar manner in the ASME Code in NF Appendix XVII (paragraph 2261.2) of Section III. Id. at p. 11.

In sum, the ASME Code contains specific requirements regarding tube-to-tube connections which provide results which are substantially similar to those set forth in the AWS Code. These provisions of the ASME Code are requirements for applicable welding at CPSES. Accordingly, CASE's allegations regarding this issue are without merit.

IV. CONCLUSION

For the reasons set forth above, Applicants request that the Board grant Applicants' motion for summary disposition.

Respectfully submitted,

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