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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

APPLICANTS' REPLY TO (1) CASE'S ANSWER TO
APPLICANTS' MOTION FOR SUMMARY DISPOSITION REGARDING
THE EFFECTS OF GAPS AND (2) BOARD CHAIRMAN'S
"PRELIMINARY VIEWS" REGARDING ADDITIONAL PLEADINGS

I. INTRODUCTION

Texas Utilities Electric Company, et al. ("Applicants") hereby submit their reply to "CASE's Answer to Applicants' Statement of Material Facts as to Which There is no Genuine Issue Regarding the Effects of Gaps on Structural Behavior Under Seismic Loading Conditions," filed August 13, 1984. Applicants filed their motion for summary disposition on this topic on May 18, 1984. The Board authorized Applicants to submit replies to CASE's answers to Applicants' motions for summary disposition in the August 22, 1984, conference call (Tr. 13,995). As demonstrated below, CASE has failed to demonstrate the existence of a

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genuine issue regarding the material facts set forth in Applicants' motion. Accordingly, the Board should render the decision sought by Applicants.

II. APPLICANTS' REPLY TO CASE'S MOTION AND
BOARD CHAIRMAN'S "PRELIMINARY VIEWS"

A. General

CASE's answer to Applicants' motion fails to demonstrate the existence of a genuine issue regarding any of the material facts set forth in Applicants' motion. Thus, under the usual standard for granting summary disposition Applicants would be entitled to judgment as a matter of law (see 10 C.F.R. §2.749(d)).¹

The Board has, however, established a more lenient standard in this phase of the proceeding for granting summary disposition. As the Board noted in its June 29, 1984, Memorandum and Order², the Board intends to ask questions, request briefs or otherwise seek to clarify matters so as to determine whether sufficient information is available to make a "reasoned decision". As demonstrated below, there clearly is sufficient information before the Board for it to reach a reasoned decision on this issue.

¹ We note that CASE has failed to file a statement of material facts as to which it contends there is a genuine issue to be heard, as required by 10 C.F.R. §2.759(a). We do not stand on this technicality, however, but note that this failure makes it all the more difficult to discern precisely what CASE's assertions are.

² Memorandum and Order (Written-Filing Decisions # 1; Some AWS-ASME Issues) (June 29, 1984) at 2-3 ("Memorandum and Order").

However, as with each of CASE's answers to which we have replied, CASE fails in the instant answer to adhere to the Board's admonition in its Memorandum and Order that CASE demonstrate why its objections are relevant to the issues.³ More importantly, CASE also fails, contrary to the Board's further admonition, to demonstrate that its points of disagreement with Applicants constitute important issues that affect the public safety.⁴ In short, CASE's answer makes it extremely difficult to discern whether, and if so, what additional questions need be answered for the Board to reach a reasoned decision. Indeed, the Board recognized that it needed assistance in resolving these issues when it requested that Applicants respond to CASE's answers (Tr. 13,993). Accordingly, in accordance with the Board's request we address below each of CASE's assertions which we perceive to require clarification and/or rebuttal to assist the Board in reaching a sound decision.

B. Applicants' Reply to "Preliminary Views"

If the process envisioned by the Board in its Memorandum and Order was followed by each of the parties, the issues regarding pipe support design could be efficiently resolved. However, the process for resolving these issues will be hampered by the Board Chairman's recent suggestion that the Board would accept CASE's unsolicited answers to Applicants' replies, on the premise that

³ Memorandum and Order at 6.

⁴ Id. at 7.

CASE may respond to "new material" presented in Applicants' pleadings.⁵ Not only is this fourth round of pleadings, viz., Applicants' motion, CASE's Answer, Applicants' Reply, CASE's Answer, wholly inconsistent with the applicable rules of practice governing summary disposition, but Applicants are placed in an untenable position for assuring the expeditious resolution of these issues. On the one hand, the Board has requested that Applicants respond to CASE's answers to assist the Board in resolving these issues expeditiously. However, to reply adequately to CASE's answers it is virtually impossible to avoid presenting new information or arguments. In fact, CASE often pursues new lines of argument (often, as noted, without any demonstration of relevance or significance) that require a response. Under the Board's "preliminary view" the door would automatically be open for even more pleadings by CASE and further delay. Thus, the process presently envisioned by the Board could be endless. On the other hand, Applicants could ignore CASE's answers and the Board's request for replies. Although we would thereby break the chain of pleadings, we risk leaving unanswered

⁵ Applicants filed a motion to strike CASE's answers to Applicants' replies on October 4, 1984. Therein, we argued that such unsolicited replies should not be accepted by the Board because of the potential for unending litigation. The Board Chairman subsequently contacted Applicants, and CASE, to indicate that the Board was going to defer ruling on Applicants' motion. The Chairman provided his "preliminary view" that CASE would be allowed to submit such pleadings if it addressed only "new information" in Applicants' answers. Applicants also would be allowed to reply (a fifth round) to CASE's pleading based on the same criterion. The Board recently granted CASE and the NRC Staff an extension of time until November 2, 1984, to respond to Applicants' motion.

questions as to which the Board may not be able to discern readily the appropriate answers.⁶ In short, Applicants are confronted with two options, neither of which is likely to lead to the disposition of these issues in the foreseeable future.

In view of the prospect for endless litigation of these issues under the Board's suggested procedure, we suggest a more appropriate approach for the Board to take would be to decline to accept CASE's "fourth round" pleadings. If the Board believes there are issues not resolved by Applicants' replies, additional information may be requested. This approach would be consistent with the Board's original view, memorialized in its Memorandum and Order, that the Board will request additional information if it believes it is necessary to resolve the issues.⁷ This approach is all the more appropriate now with the inclusion of Ms. Johnson in the review process. This should facilitate the Board's capacity to assess the record on these issues and to determine whether further information is necessary to resolve the

⁶ The Board's task is complicated because, as Applicants have demonstrated in our replies to CASE's answers to date, CASE does not hesitate to include in its answers assertions which are either patently false and/or frivolous. CASE also raises questions which, although colorable, are also erroneous. In either case it may be difficult for the Board to recognize the fallacy of such claims. (Indeed, in many instances CASE's arguments are so obviously false and contrary to fundamental engineering principles that we question whether CASE does not itself recognize this potential.)

⁷ Memorandum and Order at 2-3.

issues. Accordingly, we urge that the Board decline to accept rounds of pleadings beyond Applicants' reply unless directly requested by the Board.⁸

C. Applicants Reply to CASE's Answer

Applicants focus here on CASE's assertions which are clearly relevant to the issues at hand. As already noted, CASE generally does not demonstrate why its arguments should be considered to raise important safety questions.⁹ Thus, it is difficult to predict whether the Board might consider any particular argument to raise an important issue. Accordingly, we have addressed each potentially relevant issue regardless of its apparent lack of safety significance.

1. CASE's Interpretation of the AISC Code

The fundamental point of disagreement with CASE on this issue is whether, in the design of anchor bolt connections, all bolts may be assumed to react shear loads. CASE argues they may not, citing various provisions of the AISC Code which it believes demonstrate Applicants' design practice regarding anchor bolts is

⁸ If the Board nonetheless decides to accept CASE's unauthorized pleadings, it should place the burden on CASE to demonstrate clearly that each new argument is not only relevant to the issue at hand and concerns a question important to public safety, but that the argument concerns truly new issues raised for the first time in Applicants' answer which CASE could not have addressed in its original answer.

⁹ CASE's Answer is in the form of an affidavit of Mark Walsh ("Affidavit" or "Answer").

inadequate. In the attached affidavit of Robert C. Iotti and John C. Finneran, Jr.,¹⁰ Applicants demonstrate that CASE's interpretation of the AISC Code is incorrect. The provisions cited by CASE concern steel to steel member connections, not the anchor bolt connections at issue here. The limitations which apply to such steel to steel connections, viz., design as friction or bearing connection with the respective tolerances for bolt holes, simply do not apply to anchor bolt connections. (Iotti, Finneran Affidavit at 2-6.) Applicants address these fundamental points up front because CASE's entire answer is premised on its misunderstanding of the basic principles of bolted connections. In reviewing CASE's pleading, therefore, the Board should be aware of the distinction, which CASE does not acknowledge, between steel to steel member connections and anchor bolt connections and the design considerations applicable to each. When the arguments raised by CASE which are premised on this misinterpretation are properly dispositioned, few points of disagreement remain.

2. Reaction of Imposed Shear Loads

CASE asserts that it is improper to assume that all bolts in bolted connections will share imposed shear loads because individual bolts in anchor bolt connections "may have exceeded

¹⁰ "Affidavit of Robert C. Iotti and John C. Finneran, Jr. In Reply to CASE's Answer to Applicants' Motion for Summary Disposition Regarding the Effects of Gaps" ("Iotti, Finneran Affidavit").

the allowable shear capacity" before all bolts react the imposed shear load (Affidavit at 1). CASE premises its assertion on its interpretation of (1) a text cited by Applicants to illustrate the load sharing capabilities of multi-bolt anchor connections and (2) AISC Code provisions concerning steel to steel bearing and/or friction connections. (Affidavit at 2-6.)

Each of CASE's assertions are in error. CASE's interpretation of the referenced text (Rice and Hoffman) is premised on a misunderstanding of both the type of loads that anchor bolts in pipe supports are subjected to and the particular material employed in those anchor bolts. As explained by Dr. Iotti and Mr. Finneran, CASE's arguments are simply irrelevant to the connections at issue. (Iotti, Finneran Affidavit at 6-11.) Accordingly, the Board should find that there is no basis for disputing Applicants first statement of material fact.

3. Applicants' Bolt Hole Tolerance Specifications

Applicants' second statement of material fact simply identifies what specifications Applicants employ for bolt hole tolerances. CASE does not dispute the accuracy of this statement. Instead, CASE claims that these specifications are unacceptable because they are "oversized" (Affidavit at 6-8). As discussed by Dr. Iotti and Mr. Finneran in their affidavit, CASE identifies for the first time in its answer what it believes constitute "oversize" holes. In any event, Applicants do not employ tolerances of the type generally considered to constitute

oversized holes. More importantly, however, is the fact that the "oversize" distinction drawn by the AISC is not pertinent to anchor bolt connections. That distinction applies to steel to steel (bearing or friction) connections. In fact, when addressing anchor bolt connections the Code expressly allows for tolerances larger than the maximum oversize permitted for steel to steel connections. (Iotti, Finneran Affidavit at 11-13.)

To assist the Board in comparing the various bolt hole tolerances discussed by CASE, Dr. Iotti and Mr. Finneran prepared a table setting forth that data. As that table demonstrates, Applicants' tolerances are smaller than any of the recommended sizes discussed by CASE other than those for AISC standard connections. However, those tolerances are applicable only to steel to steel connections, not anchor bolt connections. Further, Dr. Iotti and Mr. Finneran demonstrate that the text relied upon by CASE (Fisher) to support its position that not all bolts may be counted on to carry shear loads premises its conclusions on hole sizes much larger than those utilized by Applicants. Thus, as explained further with regard to Applicants' fifth statement of material fact, CASE's reliance on Fisher to support that assertion is misplaced. (Iotti, Finneran Affidavit at 13-14.)

Finally, CASE claims that information set forth in two documents demonstrate that bolt hole sizes are not inspected prior to installation (Affidavit at 8-9). In the first instance, neither document used by CASE has been admitted in the record.

In fact, neither document is even relevant to the assertion made by CASE and, thus, is inadmissible.¹¹ The first document, an affidavit by a Mr. Robinson, does not concern the adequacy of inspections as alleged by CASE. Rather, Robinson's allegation concerns only the tolerance for the hole for a particular bolt size. The second document, an investigation report by Applicants' ombudsman, clearly concerns a hole drilled in the concrete and not the base plate as asserted by CASE. (Iotti, Finneran Affidavit at 15.) Thus, CASE's assertions regarding inspections of bolt holes are unfounded.

In sum, none of CASE's claims regarding Applicants' third statement of material fact are valid. Accordingly, the Board should accept that statement.

4. Margins of Safety for Shear Displacements

CASE's claims regarding Applicants' third statement of material fact are not clear. Although CASE states it agrees with this statement it seems to argue that Applicants' use of the margins of safety for shear loads is somehow inappropriate (Affidavit at 11-12). As Dr. Iotti and Mr. Finneran explain, the margins of safety used by Applicants concern only the capacity of the bolts to deflect, without failure, so that other bolts may be engaged to share the load. Applicants' margin of safety is appropriate for this purpose. Further, as Dr. Iotti and Mr.

¹¹ We do not address here, and do not waive our right to do so later if the Board finds they are relevant, other grounds on which the documents should be found to be inadmissible.

Finneran explain, CASE's reference to margins of safety calculated pursuant to IE Bulletin 79-02 is also misplaced. Because CASE does not understand the derivation and purpose of allowables pursuant to IE Bulletin 79-02, CASE incorrectly compares shear displacement capacities (which Applicants used to illustrate the margin of safety for bolts to displace in shear) with allowables calculated using ultimate static test load data as prescribed by IE Bulletin 79-02. (Iotti, Finneran Affidavit at 16-17.) In short, CASE's reliance on IE Bulletin 79-02 is misplaced.

Finally, CASE's interpretation (Affidavit at 12) of a letter from Applicants to Cygna concerning the design of anchor bolts, and CASE's subsequent assertions premised on this interpretation (Affidavit at 13-15), are incorrect. Contrary to CASE's claim, Applicants' position in that letter is consistent with their position taken throughout this proceeding. (Iotti, Finneran Affidavit at 18-19.)

In sum, none of CASE's assertions regarding Applicants' third statement of material fact are accurate. Accordingly, the Board should accept Applicants' statement.

5. Reaction of Shear Loads Through
Inelastic Localized Deformations

CASE presents no arguments regarding Applicants' fourth statement of material fact that are not addressed elsewhere in its answer, and this reply. In that CASE's assertions have been shown to be invalid, the Board should accept Applicants' statement.

6. Safety Factors for Shear
Displacement Under CASE Exhibit 1001

CASE attempts to refute Applicants' fifth statement of material fact concerning the safety factor present in anchor bolt connections designed in accordance with the specifications suggested by Fisher (Affidavit at 16). CASE does not even address, however, whether Fisher's recommendation which CASE adopted (relying on only two anchor bolts in the design of multiple bolt connections) is relevant to the anchor bolt connections used at Comanche Peak. As demonstrated by Dr. Iotti and Mr. Finneran, and as reflected in Applicants' fourth and fifth statements of material fact, that recommendation is premised on an anchor bolt connection design which, unlike Applicants' design (with much smaller holes), has a small margin of safety which warrants such a recommendation. (Iotti, Finneran Affidavit at 20.) Thus, his recommendation is not relevant to the connections used at Comanche Peak. CASE's remaining assertion, regarding the method

of calculating the particular safety factor used by Applicants in their motion was already addressed in conjunction with the third statement of material fact and was shown to be invalid.

In sum, each of CASE's arguments regarding Applicants' fifth statement are unfounded. Accordingly, the Board should accept Applicants' fifth statement of material fact.

7. Engagement of Bolts in Seismic Event

CASE does not dispute Applicants' sixth statement of material fact regarding the method by which all bolts in anchor connections will become engaged in a seismic event (Affidavit at 16). However, CASE contends that other considerations should be taken into account. Specifically, CASE asserts that Regulatory Guide 1.124 should be read to preclude reliance on the ductile behavior of bolts loaded in shear and that a scenario other than that described by Applicants should be considered in assessing the interaction of the bolt and base plate in a seismic event (Affidavit at 17-20). However, as demonstrated by Dr. Iotti and Mr. Finneran, CASE has misapplied Regulatory Guide 1.124. Further, CASE's conclusions regarding its postulated scenario for engaging anchor bolts are unrealistic (Iotti, Finneran Affidavit at 21-23).¹²

¹² CASE also raises another argument premised on a section of the AISC Code which was shown to be inapplicable to anchor bolt connections (Affidavit at 19-20). (Iotti, Finneran Affidavit at 23.)

Accordingly, the Board should find that no valid basis has been put forward to challenge Applicants' sixth statement of material fact. Thus, the Board should accept Applicants' statement.

8. Effect of Gaps in Seismic Analyses

CASE does not disagree with Applicants' seventh statement of material fact which identifies some of the complexities in defining the effects of gaps on seismic analyses (Affidavit at 20). As previously discussed, CASE's continued reliance on portions of the AISC Code concerning steel to steel connections and its arguments regarding the type of bolts Applicants employ is misplaced (Iotti, Finneran Affidavit at 24). Accordingly, the Board should accept Applicants' seventh statement of material fact.

9. Impact Damping

CASE does not disagree with Applicants' eighth statement of material fact, which points out that complex analyses which depart from accepted practices would be required to account for the effects of impact damping. Instead, CASE apparently believes that Applicants have argued that higher damping values should be allowed due to impact damping. (Affidavit at 21.) Contrary to CASE's assertion, Applicants never suggested that a higher damping value should be permitted for seismic analysis, only that realistically greater damping than is ordinarily assumed in the

analyses is likely to occur (Iotti, Finneran Affidavit at 24). Accordingly, the Board should accept Applicants' eighth statement of material fact.

10. Material Damping

Applicants' ninth statement of material fact identifies the existence of material damping and notes that this would produce a beneficial effect for the seismic response of the system. CASE does not disagree that such effects are beneficial. Rather, CASE contends that such effects are not predictable. (Affidavit at 22.) As discussed by Dr. Iotti and Mr. Finneran, CASE is incorrect. These effects not only are beneficial, but are predictable and capable of being bounded. (Iotti, Finneran Affidavit at 25-28.)

11. Linear Response Spectrum Analyses

CASE does not dispute the accuracy of Applicants tenth statement of material fact which notes that the effects of gaps on seismic analyses cannot be accounted for in typical linear response spectrum analyses such as are used at Comanche Peak (Affidavit at 22). CASE's discussion regarding this statement is wholly irrelevant to the point made by the statement (Iotti, Finneran Affidavit at 26). Accordingly, the Board need not address CASE's assertions and should accept Applicants' statement.

12. Comparison of Nonlinear Time History Analyses And Response Spectrum Analyses

CASE also does not disagree with Applicants' eleventh statement, viz., the effects of gaps discussed above can only be accounted for by performing difficult nonlinear time history analyses. Nonetheless, CASE asserts that Applicants should be required to perform such analyses or redesign their anchor bolt connections. (Affidavit at 23-24.) However, CASE does not present any reason to doubt Applicants' conclusion (thirteenth statement of material fact) that the linear response spectrum analyses used by Applicants is conservative compared to the nonlinear analyses CASE suggests Applicants should perform. Similarly, CASE's assertion that the anchor bolt connections should be redesigned is unfounded. Thus, CASE presents no valid reason for performing the nonlinear analyses. (Iotti, Finneran Affidavit at 26-27.) Accordingly, the Board should accept Applicants' eleventh statement of material fact.

13. Identification of Effects from Gaps

CASE does not dispute the accuracy of Applicants' twelfth statement of material fact which shows that identifying the particular effects of gaps is not readily accomplished by comparison of linear (without gaps) and nonlinear (with gaps) analyses. CASE contends instead that this fact supports its conclusion that anchor bolt connections should be designed as friction connections. (Affidavit at 24.) CASE's assertion is

founded on an incorrect premise, viz., CASE does not acknowledge or produce any evidence to discount the fact that the linear analyses Applicants perform produce conservative results. Thus, it is incorrect to assert that Applicants present method of analysis is inadequate. (Iotti, Finneran Affidavit at 27-28.) Accordingly, the Board should also accept Applicants' twelfth statement of material fact.

14. Conservatism of Linear Response Spectrum Analysis

Applicants' thirteenth statement of material fact notes that the response spectrum analysis employed by Applicants is more conservative than the non-linear time history method of analysis which would include the effects of gaps. CASE disagrees with this statement only because it believes the AISC Code would not permit "bearing type connections in dynamically loaded structures and supports" (Affidavit at 25). There is no nexus between Applicants' statement regarding the conservatism of the analysis and the type of connection employed. It has already been demonstrated that CASE's interpretation of the AISC Code is erroneous. More importantly, however, CASE presents no evidence to dispute the appropriateness and conservatism of employing the response spectrum analysis Applicants employ. (Iotti, Finneran Affidavit at 28.) In sum, CASE presents no basis for disputing Applicants thirteenth statement of material fact. Accordingly, the Board should accept Applicants' statement.

15. CASE's Summary

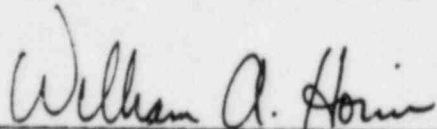
Applicants have already addressed each of the points in CASE's summary of its position (Affidavit at 25-26). There are two assertions, however, which warrant reemphasizing Applicants' position. First, contrary to CASE's statement, Applicants have nowhere utilized damping factors not recognized by the NRC. Further, because Applicants' analytical approach conservatively accounts for the effects of gaps, there is no need to perform the reanalysis or redesign of anchor bolt connections as CASE argues. (Iotti, Finneran Affidavit at 28-29.)

In sum, CASE has not demonstrated that any of Applicants' statements of material fact regarding the effects of gaps, or the principles and evidence underlying those statements, are in any way invalid. In fact, CASE agrees with many of Applicants' statements. Further, CASE's assertions are premised on a misunderstanding of the principles of bolted connections and the type of loads imparted to the connections. Thus, CASE's assertions are unfounded and do not demonstrate that Applicants' design of anchor bolt connections is not appropriate.

III. CONCLUSION

For the foregoing reasons, the Board should find that there is sufficient evidence before it to reach a reasoned decision on CASE's allegations regarding the effects of gaps and that evidence demonstrates that Applicants' practice is appropriate and based on sound engineering principles.

Respectfully submitted,



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