

RELATED CORRESPONDENCE
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

TEXAS UTILITIES GENERATING
COMPANY, et al.

(Comanche Peak Steam Electric Station
Station, Units 1 and 2)

Docket Nos. 50-445-1
and 50-446-1

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

Pursuant to 10 CFR 2.749, CASE (Citizens Association for Sound Energy), Intervenor herein, files this, its Answer to Applicants' 4/5/84 Motion for Summary Disposition of Certain CASE Allegations Regarding AWS and ASME Code Provisions Related to Welding Issues (received by CASE on 4/6/84 /1/), i.e., "that in general welding procedures qualified under the ASME Code are flawed in that the ASME Code may not explicitly include AWS provisions; (2) that alleged AWS Code provisions concerning 'Preheat requirements for welds on plates over 3/4-inch thick,' 'Drag angle and work angle (which limit the space allowed for the welder to function,' 'Beta factor for tube-to-tube welds,' 'Lap joint requirements,' and 'Limitation on weld sizes relative to plate thickness,' were not adequately considered by

/1/ In accordance with the Board's previous rulings that time spent in hearings and the weekends prior to hearings are excluded when counting the time allowed for responses to Motions, etc., our Answer would have been mailed on 5/9/84; however, the NRC Staff sought and was granted (to CASE as well) an additional two days to respond (based on the Staff's representation that Applicants had no objections). Then, by mutual agreement between Applicants, NRC Staff, and CASE, it was decided that CASE should postpone its Answer until 5/14/84 to enable CASE to devote its full time to its counterproposal to Applicants' proposed settlement regarding certain design and design QA issues (see CASE's 5/10/84 and 5/11/84 letters to Applicants in this regard).

the ASME Code or its CPSES welding procedures; and (3) that AWS and ASME Code requirements concerning weave welding, downhill welding, preheat and cap welding were not adequately considered."

As was discussed previously during a telephone conference call, CASE believes that Applicants will probably want to respond to our Answer. It may well be that the Board will be able to make its findings on these issues after having read our Answer, and that hearings will not be necessary. If the Board is able to do this, CASE believes that it would be appropriate for the Board to do so; however, as discussed previously, we believe that the Board should decide on this after it has reviewed our Answer.

It should be noted that the following SUMMARY and the attached CASE'S ANSWER TO APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE OF FACT were both prepared under the direction of CASE Witness Jack Doyle, as indicated in his attached Affidavit, and should be so considered.

SUMMARY

On page 3 of the Affidavit of W. E. Baker, M. D. Muscente, J. D. Stevenson, and R. E. Lorentz, Jr. Regarding Allegations Involving AWS and ASME Code Provisions, the statement is made:

"With regard to design of the weld, both the AWS and ASME Codes contain some requirements in this area (e.g., AWS D1.1 Code Section 2, Design of Welded Connections, and ASME Code, Appendix XVII). However, neither code provides all the details necessary to design a weld joint, and both codes rely on the designer to assure that the weld joint is designed to meet the design and operating loads. To do this, the designer uses numerous reference sources and his skill as an

engineer to provide a proper design which, pursuant to Appendix B to 10 CFR Part 50 and other regulatory requirements, goes through several review and approval stages before acceptance. It must be understood that the AWS Code is primarily a fabrication code and not a design code. However, specific and complete design details are not included in either code."

This is precisely what CASE has contended from the beginning.

Specifically, CASE argues that the design guides at Comanche Peak lack the material for guidance of the designers, particularly the "somewhat knowledgeable" designers who were responsible for the design of a large portion of the supports.

The Orwellian principles utilized by Applicants at Comanche Peak to defend their position are to attempt to establish as an acceptable fact that the codes per se are irrelevant and that testing after the fact is the only criteria for establishing the acceptability of welds both from a design as well as fabrication basis. This may be noted from items 2, 4, 5, 6, 7, 8, and 9 of Applicants' Statement of Material Facts As to Which There Is No Genuine Issue, which will be covered later on a case-by-case basis.

The failure of tests to produce accurate results may be noted in the following two examples:

- (1) Support No. CC-1-107-008-E23R (see CASE Exhibit 763H, attachment to 5/4/83 Supplementary Surrebuttal Testimony of CASE Witness Jack Doyle, Tr. 6877 and 7042) was alleged by CASE to be improperly designed, and in fact had deflections in excess of the 1/16" design criteria. In an effort to prove there was no problem, and that the support was indeed safe, Applicants performed a finite element analysis which produced a deflection of .0608 inches, which was extremely close to the .0625 inch allowable. Therefore, this calculation was followed by a test

which shows that the deflection was .055, and the conclusion was drawn by the Applicants that the support was O.K. (see CASE's 8/22/83 Proposed Findings of Fact and Conclusions of Law (Walsh/Doyle Allegations), Pages IX-4 and IX-5). Later, as a result of the generic stiffness study ordered by the NRC to determine the validity of the 1/16" deflection criteria as opposed to stiffness criteria, it was found that this support suffered a load increase of 660%. The result was that the support was removed and replaced by a proper design.

- (2) At the Fast Flux Test Facility, Hanford Engineering and Development Laboratories, Richland Washington (at which I worked), a type of mechanical snubber was used throughout the plant. This component manufactured by International Nuclear Safeguards Corporation of Connecticut was tested by an independent laboratory and was rated for allowable loadings relative to the results of those tests.

As a result of rough hand calculations, I challenged the laboratory test results. The result was that the Department of Energy (DOE) ordered further testing at their own facility (300 Area of H.E.D.L.). These new tests resulted in findings which were contradictory of the independent laboratory tests by a wide margin on the non-conservative side. One size of snubber which was one of the major sizes used in the plant failed (total collapse) at a test load close to the manufacturer's advertised allowable.

The results of the DOE tests was that thousands of this

manufacturer's snubbers were removed and scrapped, and replaced with proper snubbers or more accurately designed snubbers.

This all goes to prove that tests are only as valid as the procedures used in evaluating the components under consideration. Approaching tests anticipating a desired result does not encourage unbiased precision procedures.

The rationale of code restrictions is not to indicate that every failure to follow a restriction will result in a failure, but rather that the unpredictability is sufficient to warrant avoidance of problems by avoiding the cause.

The purpose of tests is to show that a particular procedure or configuration will produce a component or element which is capable of sustaining load applications to a specific limit (but this limit does not become an allowable for design). If this limit qualified by tests as required is equal to or greater than the limits assumed in the establishment of the code in question, then the provisions of the design code when applied to such components are valid. If, on the other hand, the limits determined by testing are less than the design code assumption, then the design code provisions must be modified as applies to this component, and this in all cases is the reality of tests. (See: NRC Staff Witness Collins' testimony, Tr. 12177/15-21, regardless of conservatism, you must meet the code; NRC Staff Witness Taylor's testimony, Tr. 12,263/1-23, in reference to its being a natural tendency to make things work; Mr. Collins' testimony, Tr. 12,186/8-11, it is the welder's capability, not the code, which protects you.)

Applicants' contempt for the codes is best exemplified by their

experts' rush to perform tests to prove that the code provisions are really irrelevant.

For example:

- (1) At Tr. 10016, lines 3-8, Mr. Baker addresses a test which shows that even when many parameters are violated, the weld is acceptable. At tr. 10071, lines 9-12, Mr. Baker stated that a downhill weld which was ground down and could pass a visual inspection would be considered a good weld, even though downhill welds are illegal for work at Comanche Peak performed by Brown & Root. (NRC Staff Witness Taylor estimated that 75% of the welds at Comanche Peak have been ground down, about 10 to 15% of them to the point where it can no longer even be told whether stringer or weave beads were used; see Tr. 12,156/16-12,157/3 and 12,157/4-7.) The biggest problem with illegal downhill welds may be found at the root of the weld, which traps slag and lacks sufficient penetration, and these cannot be evaluated by visual inspection (see NRC Staff's Collins, Tr. 12,159).
- (2) A test was performed for misdrilled holes which were repaired by plugging with a purposely botched up procedure to prove that weld inclusions (slag, etc.) presented no adverse problems. No test was performed using 1/16 inch thick welds after grinding on both faces of the plate and a gap between the two welds.
- (3) A test was performed to show that a weld was acceptable on tube/tube with a Beta equal to 1 to prove that the maximum gap concern (AWS 3.3.1, 3.3.2, etc.) was irrelevant (see CASE Exhibit 912, attached, showing origin of gap; .134" gap shown for this

case).

One must keep in mind that every code used in construction can be shown to be conservative in itself (without considering the interaction or structural life cycle, etc.). For example, the provisions of the AISC provide an allowance of 24 ksi for bending stress in compact A36 sections. If, for some reason, one were to exceed this code requirement to, say, 27 ksi, one could prove by tests or in fact by simple mathematics that this would not have an adverse effect on the element in question. However, this procedure, which can be applied to any of the FSAR, AISC or other code provisions, is not only not an industry practice, it was unthinkable until Applicants had to qualify supports at Comanche Peak to conditions which were neglected in the first instance.

In addition, in the rebuttal to the testimony of Henry and Darlene Stiner, the Applicants followed almost every rebuttal with this statement: If the facts were as stated by Henry or Darlene, would this have an adverse effect on the safety of the plant? The answer would always be negative. For example /2/:

Q27. "Mr. Baker, even if a welder was (sic) using unauthorized downhill welding, would this have any structural impact on the components welded?"

A27. (Baker) "Even if there had been some unauthorized downhill welding, the probability that it would have had an adverse impact on plant safety is virtually zero." etc.

/2/ See Rebuttal Testimony of W. E. Baker, C. T. Brandt, M. D. Muscente, F. E. Coleman, C. R. Brown, J. D. Green, J. E. Hallford, I. Pickett, A. M. Braumuller, and S. Fernandez Regarding Allegations of D. Stiner and H. Stiner Concerning Weave Welding, Welding of Misdrilled Holes, Downhill Welding, and Weld Rod Control, (Applicants' Exhibit No. 177, bound in following Tr. 9976), pages 19, 42, and 45.

- . Q50. "Mr. Baker, assuming that Darlene and Henry Stiner's allegations are (sic) true and they did welding of misdrilled holes without a QC inspection, would this have a significant safety impact at CPSES?"
- . A50. (Baker) "No. . . I conclude that even if QC inspections were not performed on some of these holes, in all likelihood the welds themselves would have been acceptable." etc.
- . Q52. "Panel, is anyone aware of any deficiency in the plant which is contrary to procedures or could adversely impact safe operations of the plant?"
- . A52. (Panel) "No."

The fact that the Applicants' experts have overlooked, sidetracked, or otherwise failed to consider code requirements can best be noted in two areas:

- (1) The provisions of AWS apply to a substantial portion of the safety systems at CP; the cable trays for example (consider the problems at Browns Ferry due to cable failures during the sequence of events following the fire); also, most class 5 and BOP (balance of plant). Therefore the restrictions to the indiscriminate use or misuse of procedures as outlined in the AWS code apply directly for this portion of the plant.
- (2) The provisions of AWS which have similar impact on welds regardless of application or procedure are not included in ASME weld design guides.

Some examples of code negligence to be noted more fully in the material which follows are outlined below:

- (1) At tr. 10071/9-19, Mr. Baker states that if a downhill weld is ground out and is visually O.K., then that weld is O.K., although it is in violation of procedures. This statement indicates that if one can circumvent the code and pass a visual inspection, then no problem existed.
- (2) At tr. 11344, at lines 2-9, Mr. Brandt states that bead width is not controlled by AWS. However, the fact is that the bead width for flat, horizontal, overhead, vertical and root passes are controlled by AWS 4.10.6 et seq. and these criteria are less than the four core wire diameter allowed in weave bead welding, with the exception of the vertical weld. (See NRC Staff Witness Collins, Tr. 12,215/7-25 and 12,216/1-5.) The purpose of this restriction is to prevent weld cracking. (See NRC Staff Witness Smith, Tr. 12,216/7-21.) This purpose for a code restriction on bead width is of more concern with weave welding than it is for stringer bead welding due to the higher heat input. But Applicants' experts appear to be unaware of this problem since they are convinced that any fillet bead width is O.K. so long as it does not exceed four core wire diameters. (Among others, see Applicants' Witness Brandt, Tr. 11,227/9-16, 11,235/7-11 and 16-25, 11,245/17-11,246/1, and 11,250/3-10 and 24.)

However, in all cases for fillet and groove welds (which are the vast majority of welds for supports at Comanche Peak), the code allowable is less than the 8 core wire diameter industry practice mentioned by Mr. Baker in the last sentence on page 17 of his affidavit.

The Beta factor for tube/tube welds involves three code considerations (only one of which belatedly was introduced at Comanche Peak; see CASE Exhibit 716, attached):

- (a) Correction factor for effective throat based on included open angle of the weld;
 - (b) A second correction factor is for gaps greater than 1/16 of an inch but less than 3/16 inch at the mating point of the joints (see NRC Staff Witness Collins, Tr. 12,227/17-25 and 12,228/1-8). (In reference to the gap of 3/16 inch, see CASE Exhibits 910 and 912, both attached; also, see notes in Appendix B, Table B, page 194, CASE Exhibit 908, attached);
 - (c) Limitation of the Beta ratio to 2/3, which means that all welds outside of a Beta factor of 2/3 are not included in any calculations.
- (3) At page 18, all affidants state that neither ASME nor AWS exclude the use of downhill welding, and that only their direction of travel is required. This is not completely true. AWS 4.10.7 requires vertical welds to be made with an uphill progression. There is a qualifier in section 5; however, since Comanche Peak requires qualification for downhill welding and such qualification is unavailable to those working on pipe supports and cable tray supports, Section 5 of AWS does not apply.
- (4) Minimum weld violations cannot be corrected by adding material to the finished weld. The purpose of the minimum weld requirement is to prevent cracking. Some of this cracking can occur at the

weld root, internally in the bead, or laminar. In any event, most of the cracks do not appear on the surface. A visual inspection, therefore, does not prove that cracks are not present. If a proper inspection could prove that the weld was sound, capping would not be required. Therefore, if weld material is indiscriminately added without meeting the minimum heat requirements of AWS (see Commentary, AWS 2.7.1, CASE Exhibit 909, attached), this could cause cracking to an otherwise sound weld.

- (5) Applicants assume that since a test was performed, the revision to the 1982 AWS code for restoration of unacceptable holes by plug welding (Section 3.7.7) is not applicable under the provisions of 10 CFR Part 50, Appendix A, Criterion 1.

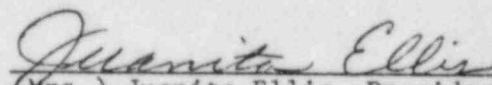
Testing is not an acceptable method of negating this prohibition, since the revision resulted from the random effects involved in perhaps hundreds of thousands of such repairs. In short, the repair is unpredictable; therefore, there is no way to reverse the prohibition added to the code. Because the concern involves the characteristics to be found through the repaired area (weld covering one side and a second weld covering the opposite side with a gap between the welds, among other problems) which cannot be checked visually, the only method for checking this gross violation of procedures is by ultrasonic or radiographic methods. (See NRC Staff Witnesses: Smith and Collins, Tr. 12,234/22-25 and 12,235/1-2; Collins, Tr. 12,240/12-22 and 12,250/7-11; plug welds with internal slag cannot be

qualified visually. See also NRC Staff Witness Gilbert, Tr. 12,260/8-19, where he admits, regarding plug welds which had been made with no documentation, that he and NRC Staff Witness Taylor were unable to conclude that the areas identified contain no plug welds which have been done in an unacceptable manner and that they were only able to identify that plug welds have been made.) Beyond this, it has now been acknowledged that "plug welds" have been proven to exist which were performed clandestinely (see NRC Staff Testimony of Mr. Gilbert, Addendum to Page 27 of NRC Staff Testimony on Welding Fabrication Concerns Raised by Mr. and Mrs. Stiner, bound in following Tr. 12,146; also Tr. 12,260/819).

In conclusion, as is demonstrated herein by the preceding SUMMARY and CASE'S ANSWER TO APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE OF FACT (which both are part of the attached Affidavit of CASE Witness Jack Doyle), contrary to Applicants' assertions, there are many genuine issues of fact which must be considered.

Therefore, for the reasons set forth herein, CASE moves that the Board deny in its entirety Applicants' 4/5/84 Motion for Summary Disposition of Certain CASE Allegations Regarding AWS and ASME Code Provisions Related to Welding Issues.

Respectfully submitted,


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