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' STATEMENT OF MATERIAL FACTS
AS TO WHICH THERE IS NO GENUINE ISSUE REGARDING
CERTAIN CASE ALLEGATIONS REGARDING AWS AND ASME
CODE PROVISIONS RELATED TO DESIGN ISSUES

in the form of

AFFIDAVIT OF CASE WITNESS MARK WALSH

1. Applicants state:

"A properly designed welded connection also requires the training, experience and skill of the design engineer to provide structural design adequacy.

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.

In the final analysis, the engineer designing the weld joint must be relied upon to assure the structural adequacy of the design.

Affidavit of J. C. Finneran, R. C. Iotti And J. D. Stevenson Regarding Allegations Involving AWS vs. ASME Code Provisions from ('Code Affidavit') at pp. 3-4."

Although I generally agree with first and second sentences, the problem that I see is that the Applicants have in effect argued in the past that the welded connections in question were part of preliminary designs and therefore could be faulty, and that that was acceptable

8408090471 840806
PDR ADOCK 05000445
G PDR

because an evaluation would be made later for the capacity of the weld. (See Applicants' 8/5/83 Proposed Findings of Fact in the Form of a Partial Initial Decision, pages 19-21; Applicants' Witness Reedy, Tr. 5185; and Applicants' Witness Finneran, Tr. 5186.)

An evaluation that is performed after the structure is built can not be considered design but is just an evaluation of the as-built condition. Designing a weld occurs prior to construction. It should be noted that Applicants have submitted no documentation which justified the original construction.

In addition, there is already testimony in the record that some of the designs were done in the field by "somewhat knowledgeable," "somewhat inexperienced," and "less than competent" engineers. (See Tr. 7167-69, Applicants' Vega and Finneran; Tr. 4962-4965, Finneran; Tr. 6403, 6405-6406, NRC Staff's Taylor; and Tr. 6669, NRC Staff's Tapia. See also discussion on page 30, middle paragraph, in Board's 12/28/83 Memorandum and Order (Quality Assurance for Design) regarding the Board's concerns about relying on the engineers who were in charge of these "somewhat knowledgeable" engineers "to correct problems that have arisen under their supervision and control.")

With regard to Applicants' second sentence, because of the infinite variety and combination of welded joints or connection configurations together with types of welds possible, and the fact that no published standard can possibly cover all possibilities, the "somewhat knowledgeable" engineers referenced above have no place in designing the welded joints.

I disagree with Applicants' third sentence, that "In the final analysis, the engineer designing the weld joint must be relied upon to assure the structural adequacy of the design."

To begin with, Applicants should not just blindly rely upon the engineer designing the weld joint to assure the structural adequacy of the design without evaluating established code provisions and without checking his calculations and design assumptions. There is supposed to be in place a QA/QC program which checks the design as well as construction at a nuclear plant. (See 10 CFR Part 50, Appendix B; see also discussion on pages 2-7 in Board's 12/28/83 Memorandum and Order (Quality Assurance for Design).)

Further, I believe that Applicants' use of the phrase "the engineer designing" is an attempt by Applicants to infer that a joint is designed before being constructed. But this is not the case at CPSES. In the final analysis, the joint will be evaluated; since the item is already constructed it no longer is a design but an evaluation to see if the weld is acceptable -- after the fact.

2. Applicants state:

"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.

This is but one of the parameters effecting the load capacity of the joint.

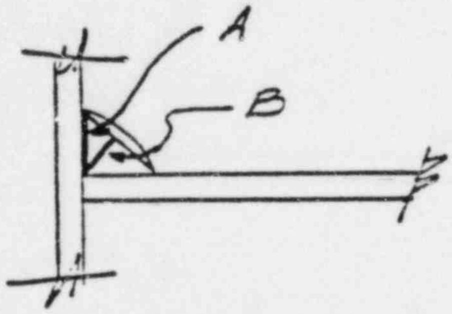
While the ASME Code does not have explicit requirements governing this area, compensatory requirements provide assurance of acceptable design conditions regarding load carrying capacity. Id. at p. 4."

I agree with the first and second sentences.

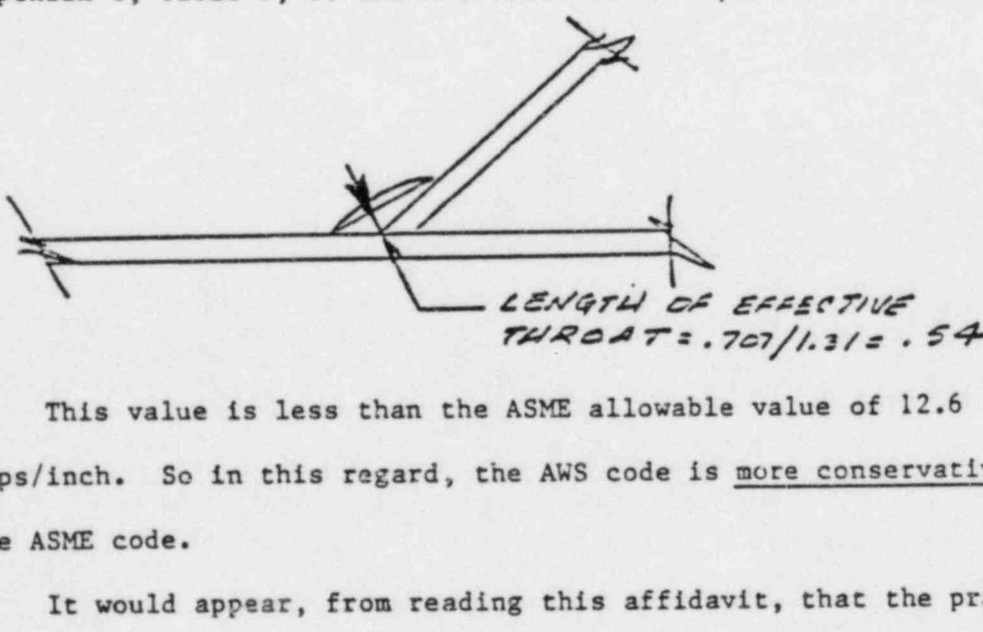
I do not agree with the third sentence. In the affidavit attached to Applicants' Motion for Summary Disposition (Affidavit of J. C. Finneran, R. C. Iotti and J. D. Stevenson Regarding Allegations Involving AWS vs. ASME Code Provisions), beginning on page 4, Applicants attempt to persuade the Board that the design equations utilized by ASME are more strict than that of the AWS code. I do not agree.

The Applicants' conclusion is based on an allowable of .3 times yield strength with no reduction for the skewed T-joint (affidavit at p. 6) which is from ASME Appendix XVII (paragraph 2211(c) vs. .3 times tensile strength used in the AWS code times the coefficient set forth in Appendix B of the AWS Code for the skewed T-joint.

It is because of this .3 times yield strength provision that the ASME allowable appears to be more conservative. The reason it appears the ASME provision is more conservative is because it is based on yield strength; i.e., .3 times 42 ksi = 12.6 ksi, with no consideration for the effective throat. When the Applicants used the AWS procedure, it was based on tensile strength; that is, .3 times 70 ksi times .707 for the effective throat times a reduction for the skewed T-joint = 14.8 ksi, which would indicate that the capacity using the ASME procedure provides for a weaker or more conservative weld capacity. It should be noted that the example used by the Applicants did not consider the effective throat when using the ASME procedure, but was actually only evaluating the weld at the interface between the base metal and the weld (shown as line A in the diagram below). In the example for the AWS procedure, the Applicants are looking at the capacity of the weld (shown as line B in the diagram below).



For a member that is skewed and welded on only one side of the skewed joint, as shown in the diagram below, the capacity of the joint using the AWS procedure for the angle shown is equal to .3 times 70 ksi times .707 for the effective throat times 1.31 the coefficient set forth in Appendix B, Table B, of the AWS Code = 11.3 kips/inch.



This value is less than the ASME allowable value of 12.6 kips/inch. So in this regard, the AWS code is <u>more conservative</u> than the ASME code.

It would appear, from reading this affidavit, that the practice at Comanche Peak at the present time is to use .3 times the yield strength. But at a meeting in Bethesda between the NRC Staff and the Applicants on June 8, 1984 (see Tr. page 100, line 11, continuing through page 101, line 5), Mr. Finneran states that they do not currently design the supports or evaluate the welds to .3 times the yield strength, due to a revision in a later code, possibly 1978. Mr. Finneran did not make any such statements regarding the revision of the code in his affidavit, <u>which is very misleading</u>; because of this, any conclusions drawn from the comparison shown in the affidavit are meaningless and without technical merit, since they no longer use it.

If Applicants were using the ASME code which Applicants claim they changed to in 1978, the value they would be using is .4 times the yield strength of the base metal. Using the value of .4 times the yield strength of 42 ksi, the capacity of the weld is 16.8 kips/inch, which is considerably higher than the 11.3 kips/inch calculated using the AWS procedure, but this evalution is comparing two different items (i.e., lines A and B).

The Applicants have also stated that they do not need to look at the <u>effective throat</u> because it is not an ASME code requirement. (Applicants' Affidavit, pages 4-6.) During the 6/8/84 Staff/Applicants Bethesda meeting (Tr. page 101, line 16, through page 103, line 12), Applicants' Mr. Finneran claimed that the use of the effective throat in the ASME Code is not a requirement, and that it was not analyzed. I challenge Applicants' position in this regard. The ASME Code of record, 1974 Edition, is <u>explicit</u> where it states in Appendix XVII:

"**XVII-2452.4 Effective Throat Thickness of Fillet Welds.** The effective throat thickness of a fillet weld shall be the shortest distance from the root to the face of the diagrammatic weld, except that for fillet welds made by the submerged arc process the effective throat thickness shall be taken equal to the leg size for 3/8 in. and smaller fillet welds and equal to the theoretical throat plus 0.11 in. for fillet welds over 3/8 in."

Although the ASME Code does not have specific numbers in regards to skewed T-joint fillet welds, it does require that calculation of an effective throat (which may or may not have been specifically included in the original designs at CPSES, as was discussed by Mr. Finneran during the 6/8/84 Applicants/Staff meeting, Tr. page 102, lines 17-23.)

3. Applicants state:

"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 regarding effective throat thickness for skewed T-joint welds. Id. at p. 6."

I disagree with this statement. In the first place, the type of information which should be considered to be "documentation" is such as that contained in the PSE Manual. As shown by the attached pages from the PSE Manual (cover page, pages 1 and 2, and Figure 3, of Section XI, Weld Calculations, from CASE Exhibit 716, which was provided to the Board and parties but never officially accepted into evidence), in the procedures being used as of 5/11/82, Applicants did not include information as to how to calculate the effective throat. This appears to be in violation of 10 CFR Part 50, Appendix A, Criterion 1, in that Applicants should have incorporated Appendix B, Table B, of AWS D1.1 into their procedures to calculate the effective throat of a skewed fillet weld, since ASME does not contain such a table and is therefore not sufficient.

What Applicants have provided as "documentation" is actually an inter-office memorandum (CCPA-22,616, Attachment 1 to Applicants' affidavit). This does not constitute proper documentation, and there is still no <u>documentation</u> that this was in fact the practice at Comanche Peak. During the 6/6/84 Applicants/Staff/CASE conference call, CASE asked for some form of written documentation to show that this was incorporated into the design manual for PSE, ITT Grinnell, and NPSI (whatever exists on it -- procedure or whatever); if not proceduralized, we requested documentation to prove that they knew to do this and were in fact doing it. (See 6/6/84 Transcript pages 19-21.) We have received no additional documentation and it is our understanding that it does not exist.

As indicated in the CPPA-22,616 memorandum, the welds in question are those welds which are greater than 90 degrees but still less than 135 degrees. In diagram B of Attachment 1 to CPPA-22,616, the diagram indicates that the size of weld (not the effective throat that engineering was using) was a value S, but does not state how the effective throat is calculated. If engineering is using the value S as the effective throat, they are grossly in error. As shown in Table B of Appendix B of the AWS Code, when a 1" weld is sized when the members are perpendicular to one another, the size of fillet weld required to provide the same capacity increases to 1.31" when the members are at 135 degrees to one another.

This above information is not contained in any of the information provided by the Applicants. Therefore, any conclusions that the Applicants have attempted to provide indicating the present designs are equal to or compatible with the AWS requirements is unsubstantiated. Further, there is no substantiation for the statement that what was being used was "virtually identical to that noted in Appendix B of AWS D1.1 regarding effective throat thickness for skewed T-joint welds."

4. Applicants state:

"An evaluation was conducted by Applicants to verify the adequacy of design measures regarding skewed T-joint welds.

The evaluation reflected that in all cases these joints met or exceeded the load capacities required by AWS. Indeed, the highest stressed weld evaluated was only stressed to 39 percent of AWS allowables. Id."

I do not disagree with the first sentence.

Regarding the second and third sentences, although the Applicants claim (page 6 of Affidavit) that "we performed an evaluation of 13 skewed T-joint designs at CPSES selected at random," I question the validity of any results due to the misinformation Mr. Finneran provided to the NRC Staff in regards to this subject (as discussed in item 2 above). Methodology is a key factor regarding any such evaluation. The method the Applicants used for this "random" sample could have been to select, for example, 14 specific supports with the highest stressed weld at 39% of the AWS allowable, and then (from those 14 especially selected supports) randomly selected 13. In addition, the technique

Applicants used for a sampling process appears not to consider the worst case basis, which should be considered.

5. Applicants state:

"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."

To begin with, obviously any such statements by the NRC Staff's Special Inspection Team are not binding on me, Mr. Doyle, or CASE. I do not disagree that the SIT made the statement; however, since it appears that Applicants are attempting to use this SIT statement to bolster their argument, I believe further comments are in order.

During the 6/6/84 Applicants/Staff/CASE telephone conference call, I asked for the "design procedures being utilized" which were referenced in the SIT statement. The Staff later advised that this was the information contained in the same CPPA-22,616 which is Attachment 1 to Applicants' affidavit, and stated that the SIT received this via a memo from John Finneran (which CASE does not have and has not officially requested). The same comments apply here as contained in our answer 3 preceding.

6. Applicants state:

"The AWS Code requirement regarding the limitation on angularity for skewed 'T' joints is set forth in Section 2.7.1.4 of AWS D1.1.

This Section establishes angle limitations for fillet welds used in skewed T-joints.

These limitations do not apply to welds qualified by test.

Both the AWS D1.1 and ASME Codes permit weld procedures without such limitations provided the weld procedure used is qualified by test. Id."

I agree with the first and second sentences.

Regarding the third and fourth sentences, however, it should be pointed out that Applicants are not discussing the design of the welds, but the fabrication and testing of the welds.

Also, there has been no documentation provided by the Applicants to show that the effective throat of a skewed joint is permitted to be qualified by a test, nor is such a procedure contained in either the AWS or the ASME codes. To be more specific, the AWS section and the ASME code permit welding procedures to be evaluated by test, but do not discuss evaluation procedures qualified by test.

7. Applicants state:

"Applicants' design practices regarding limitation on angularity for skewed T-joint welds, as set forth in CPPA-22,616, are virtually identical to those set forth in the AWS Code regarding this issue. Id."

I disagree with this statement. The same comments as stated in answer 3 preceding apply here.

8. Applicants state:

"ASME Code provisions provided compensatory measures to assure the adequacy of skewed T-joint welds. Id."

During the 6/6/84 Applicants/Staff/CASE telephone conference call, Applicants clarified that the "compensatory measures" referred to are the same as in item 2. The same comments apply here as were provided in answer 2. preceding.

9. Applicants state:

"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."

I agree with this statement, as far as it goes. AWS code provisions are also intended to take into account the flexibility or rigidity of the main member, as stated in AWS 10.5 **Limitations of the Strength of Welded Tubular Connections.**

> "10.5.1 **Local Failure.** Where a STEPPED BOX or CIRCULAR T-, Y-, or K-connection is made by simply welding the branch member to the main member, local stresses at a potential failure surface through the main member wall may limit the usable strength of the welded joint. The shear stress at which such failure occurs depends not only upon the strength of the main member steel, but also on the geometry of the connection." (Emphasis added.)

Although ASME does not have a similar specific requirement, ASME does have implicit similar requirements. As stated in NF-1121, Rules for Supports:

> "(a) The rules of Subsection NF provide requirements for new construction and include consideration of mechanical stresses and effects which result from the constraint of free-end displacements, designated at Pe in NF-3222.3 but not thermal or peak stresses.
>
> "(b) They do not cover deterioration which may occur in service as a result of corrosion, erosion, radiation effects, or instability of the materials (NA-1130)."

Therefore, the stresses within the weld still do exist and must be evaluated, either by the AWS code or in some other technical manner. Applicants have not provided any method or criteria for the evaluation of the stresses referenced in AWS 10.5.1.

As discussed by the NRC Staff's Mr. Terao (7/3/84 Bethesda meeting NRC Staff/Cygna, Tr. pages 53 and 54), one has to keep in mind that the ASME and the AISC codes were really developed on a concensus of design which did not include tube steel at the time the codes were developed. The use of tube steel is first mentioned in the AISC code in the 7th Edition and what the 7th Edition basically says is that tube steel was starting to be used at that time. And of course the ASME Section III, Appendix XVII, excerpted the pertinent portions of the AISC code for its design, but the concern with tube steel with punching shear one cannot find in either AISC or ASME. So that would be another design consideration that would have to be considered and AWS does fill that design consideration. I agree with Mr. Terao's comments as discussed in the preceding. However, I differ with Mr. Terao's conclusion that another method could be used, since another method has not been shown acceptable in any established code. The use of the AWS code would fill the gap in the AISC and ASME codes in this regard and would fulfill the requirements of 10 CFR Part 50, Appendix A, Criterion 1, which states in pertinent part:

> "Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function."

10. Applicants state:

"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.

These conditions do not apply to relatively small tubular members used in pipe supports at CPSES.

Accordingly, punching shear is not a significant problem at CPSES. Code Affidavit at p. 8."

I do not agree with Applicants' first sentence. To begin with, the offshore platforms were not necessarily large tubular structures but were welded tubular structures. During the 6/6/84 Applicants/Staff/CASE telephone conference call, I requested documentation for Applicants' statement that the AWS punching shear analysis was required or is incorporated because it deals with large tubular structures with relatively large flange width to flange thickness ratios. There is no indication from the document the Applicants supplied to CASE on discovery (AWS D1.1-82, page 299, Section 10. Tubular Structures, specifically Paragraph 10.1 -- copy attached) that indicates that these requirements are confined only to large flange width to flange thickness ratios. In particular (and I quote from 10.1 Application):

> "The requirements of Section 10 are intended to be generally applicable to a wide variety of tubular structures. However, welded tubular construction involves new terminology and a sufficient number of unique requirements for design, detailing, workmanship, and inspection to fill a separate section of the Code."

Therefore, I must disagree with Applicants' statement in the second sentence that "These conditions do not apply to relatively small tubular members used in pipe supports at CPSES;" this statement is not consistent with the above AWS citation.

Obviously, since the underpinnings for Applicants' third statement are not substantiated, I also disagree with Applicants' third statement. For these reasons, Applicants' second and third sentences are without merit and the documentation provided does not substantiate Applicants' claims that punching shear is not a significant problem at CPSES.

In a related matter, during the 6/8/84 Bethesda meeting, the NRC Staff questioned the Applicants on the chord (incorrectly spelled "cord" in the 6/8/84 transcript) to thinness ratio; i.e., depth of member to thickness of web (beginning on p. 106, line 18, through p. 118, line 10, of the 6/8/84 transcript of the Bethesda Staff/Applicants meeting). In a paper by a Mr. Marshall referenced in AWS Commentary (Tr. p. 110, line 4), the depth of member to thickness of web is discussed; in addition, it was stated that the purpose of the paper is so that people other than offshore drilling platform engineers can evaluate whether or not the section of AWS should be applicable to their design. When the depth over two times the thickness is less than 7%, the joints are said to have 100% punching shear efficiency in the sense that the shear strength of the material is fully mobilized. When a chord to thinness ratio is of a value 8, there is a 10% reduction in shear capacity. (Tr. 111, line 15, through 112, line 2.) The typical support as discussed at Tr. 111, is a 4x4x1/4" which has a chord thinness ratio value of 8.

Mr. Tereo of the NRC Staff expressed his concern that, in reviewing a graph, when you get to a ratio of 10, you could be reducing the shear capacity by half. Mr. Finneran attempted to persuade the NRC Staff that there is no problem at CPSES since <u>their largest chord thinness ratio is 9.6</u>. (Tr. page 111, line 20, through page 114, line 10.) More explicitly, he states at line 3, p. 114, "<u>Ten was our largest ratio</u>." (Emphasis added.) Throughout the transcript, <u>there is no indication of chord thinness ratios greater than 10</u>.

However, when CASE requested discovery regarding Applicants' generic stiffness study, the Applicants provided CASE with drawings that were utilized in determining support stiffnesses, as well as sample calculations. In this group of drawings, there were 32 supports that utilized tube steel members in bending, which I have reviewed for the thinness ratio for punching shear. Of these 32 supports, there were 6 cases (5 supports, with two examples on one support) where the thinness ratio was 10 or above; 5 cases <u>exceeded</u> <u>10</u> -- see attached drawings of Support Nos.:

CC-2-011-711-A53R, 6x6x1/4" = 12

CC-2-011-712-A53R, 6x6x1/4" = 12

CT-1-013-015-S32K, 6x6x1/4" = 12

MS-1-01-001-C72S, 8x6x3/8" = 10.7

MS-1-01-005-C72K, 10x6x1/2" = 10
MS-1-01-005-C72K, 12x8x1/2" = 12

This means that of the 32 supports which were in bending, 21 were equal to 8 or greater = 66%; and 5 of the 32 supports were equal to 10 or above = 16% which would have their shear capacity reduced by up to one-half. <u>Five instances (four supports) were contained in these 32 supports where the chord thinness ratio was greater than the 10 which Applicants stated emphatically was the largest ratio which exists at CPSES.</u> Although (I assume) that this statement by Applicants was not made under oath, it appears at a minimum to be an attempt to mislead the NRC Staff in its evaluation regarding this matter.

11. Applicants state:

> "To provide assurance that punching shear was not a problem, Applicants performed a punching shear evaluation of twelve tubular pipe supports (both stepped and matched connections) selected from the worst cases provided in Case (sic) Exhibit 669B.
>
> The evaluation 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. <u>Id</u>. at p. 9."

Since I have not reviewed all of the drawings contained in CASE Exhibit 669B in this regard and do not know which 12 cases Applicants selected, I cannot state whether the first and second sentences are technically correct. However, whether they are correct or not is immaterial, since the particular items contained in CASE Exhibit 669B may not represent the worst cases of punching shear problems at CPSES. Applicants have certainly provided no documentation or basis to conclude that they are the worst cases.

12. Applicants state:

"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.)

I do not disagree that the SIT made this evaluation and came to the erroneous conclusion that it was acceptable. Obviously, this is not binding on me, Mr. Doyle, or CASE. Since Applicants' reference to the SIT's statements appear to be an effort to bolster Applicants' position, I believe additional comment is appropriate.

I do not agree with the SIT's conclusion, for the following reasons. When the SIT did its evaluation, the sample supports it looked at, which had been vendor certified, contained very few supports where there were tube steel members that would exhibit punching shear effects. This can be substantiated by comparing the 100 supports that the SIT looked at to the 130 supports which Cygna reviewed as part of its Phase 3 independent assessment program. Although CASE has not yet reviewed these 130 supports in detail, I am aware that they were substantially more complex than the 100 supports reviewed by the SIT.

This can also be substantiated by comparing the 100 supports that the SIT looked at to the 60 support drawings CASE received for the generic stiffness study, where 32 out of 60 supports were candidates for punching shear evaluation, according to AWS. As can be seen from the results of my rather cursory review of those support drawings, there is little to substantiate the position of either Applicants or NRC's SIT that there is no problem with punching shear. (See full discussion of this under answer 10 preceding.)

13. Applicants state:

"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. Code Affidavit at p. 9."

I agree with this statement, as far as it goes.

14. Applicants state:

"The capacity of tube-to-tube connections with beta equal to one is also addressed in the ASME Code in NF Appendix XVII (paragraph 2261.2) of Section III in a manner substantially similar to the AWS Code. Id. at p. 11."

I do not agree with this statement. While Beta is not defined or addressed in NF Appendix XVII (paragraph 2261.2) of Section III of the ASME code of record, AWS has a special section on these tube-to-tube connections for beta equal to 1 (Section 10.5.1.1 of AWS D1.1, as stated by Applicants in item 13. preceding).

If Beta were defined as it is in the AWS Code, I would agree that the AWS Code and ASME are similar only in this condition of Beta equal to 1. The ASME Code provision which the Applicants referenced was intended for the web crippling effects on "beams and welded plate girders." These structural shapes have been commonly used prior to the application of tube steel as the Applicants use it. For this reason, ASME requires bearing stiffeners to be provided when the concentrated load exceeds the allowable capacity of the member. (See ASME XVII-2261.2.) Bearing stiffeners are not used inside a tube steel member to increase its capacity. To increase the capacity of a member "Such connections may be reinforced by increasing the main member thickness, or by the use of diaphragms, rings, or collars." (See AWS D1.1, 10.5.2.1.) It should be kept in mind that the ASME and AISC codes were really developed on a concensus of design which did not include tube steel at the time the codes were developed (see discussion under item 9. preceding). Therefore, the Applicants' position (i.e., ASME did address the capacity of tube-to-tube connections with beta equal to one in a manner substantially similar to the AWS Code) is not correct.

It should also be pointed out that when the AWS Code addresses a Beta equal to one, it is referring only to those connections where the branch member and the main member have the same width, and this is the only condition the Applicants are addressing in their Motion for Summary Disposition. For example, referring to attached drawing CC-2-011-711-A53R, the connection for members 7 and 8 will have a Beta equal to 1, since they are both 4" tube steel members.

It should be noted that the connection for members 8 and 9 have a Beta of .75, and this is known as a stepped connection. The connection for members 8 and 9 is not addressed in ASME XVII-2261.2 in any way, shape, or form, but this is a common connection at CPSES, and it is addressed in AWS D1.1, at 10.5.1. In addition, the connection between item 5 and tube steel member item 6, shown in drawing CT-1-013-015-S32K, is not considered in the ASME code on how to handle the punching shear stresses for that connection. The portion of this issue which Applicants have addressed in their Motion for Summary Disposition should not be construed to address all of our concerns in this regard.

15. Applicants state:

"The ASME Code provision regarding tube-to-tube connections are requirements for applicable welding at CPSES. Id."

In this statement, Applicants have expanded considerably from what was stated in item 14. preceding. After admitting in item 13. preceding that there are specific requirements regarding design of tube-to-tube joints with Beta equal to 1.0, in item 14. preceding Applicants have attempted to establish (erroneously) that ASME addresses the capacity of tube-to-tube connections with beta equal to one in a manner substantially similar to the AWS Code, with the implication being that therefore Applicants' use of ASME and ignoring of AWS is all right. The statement made in item 15. is even more misleading, since it implies that all provisions for tube-to-tube connections are requirements for applicable welding at CPSES. As discussed in answer 14. preceding, this is not correct, since the ASME code provision Applicants referenced was intended for the web crippling effects on beams and welded base girders.

Attachments:

PSE Manual, Section XI, Weld Calculations, Rev. 4, 5/11/82, cover page, pages 1 and 2, and Figure 3 (see answer 3, page 7)
AWS D1.1-? (cannot read date; however, no such page exists in the AWS code of record, AWS D1.1-75, nor does 10.1 Application contain the same statements) (see answer 10, page 14)
Drawing Nos.: CT-1-013-015-S32K, Rev. 2 (sheet 1 of 1)
MS-1-01-001-C72S, Rev. 5 (sheets 1, 2, and 3 of 5)
MS-1-01-005-C72K, Rev. 8 (sheets 1 and 2 of 3)
CC-2-011-711-A53R, Rev. 1 (sheet 1 of 1)
CC-2-011-712-A53R, Rev. 1 (sheet 1 of 1)
(see answer 10, page 16)

The preceding CASE's Answer to Applicants' Statement of Material Facts As To Which There Is No Genuine Issue was prepared under the personal direction of the undersigned, CASE Witness Mark Walsh. I can be contacted through CASE President, Mrs. Juanita Ellis, 1426 S. Polk, Dallas, Texas 75224, 214/946-9446.

My qualifications and background are already a part of the record in these proceedings. (See CASE Exhibit 841, Revision to Resume of Mark Walsh, accepted into evidence at Tr. 7278; see also Board's 12/28/83 Memorandum and Order (Quality Assurance for Design), pages 14-16.)

I have read the statements therein, and they are true and correct to the best of my knowledge and belief. I do not consider that Applicants have, in their Motion for Summary Disposition, adequately responded to the issues raised by CASE Witness Jack Doyle and me; however, I have attempted to comply with the Licensing Board's directive to answer only the specific statements made by Applicants.

Mark Walsh
(Signed) Mark Walsh

STATE OF TEXAS

On this, the 4th day of August, 1984, personally appeared Mark Walsh, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes therein expressed.

Subscribed and sworn before me on the 4th day of August, 1984.

Paul G. Grasso
Notary Public in and for the
State of Texas

My Commission Expires: 12/31/84

CASE EXHIBIT 716

TEXAS UTILITIES SERVICES INC.		REV.	ISSUE DATE	PAGE
ENGINEERING GUIDELINE TITLE	COVER SHEET FOR GUIDELINE REVISIONS	4	5-11-82	1 OF 1
SECTION XI WELD CALCULATIONS		APPROVED: John C. Finneran Jr. PSE PROJ. ENGR.		

I. INSTRUCTIONS FOR FILING GUIDELINE PAGES

1. Replace the existing sheets 1 thru 7 with the enclosed sheets 1 thru 17.

2. Replace the existing cover sheet, Rev. 3 with this cover sheet, Rev. 4.

II. STATUS OF GUIDELINE PAGES

PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV
1	5	10	0								
2	4	11	0								
3 wal 6-8-82	0 ~~4~~	12	0								
4	4	13	0								
5	4	14	0								
6 wal 6-8-82	4 ~~6~~	15	0								
7	6 ~~5~~	16	0								
8	5 ~~0~~	17	0								
9	0										

SECTION XI: WELD CALCULATIONS

1.0 GENERAL

This section supplements weld size requirements as addressed in reference "C".

2.0 REFERENCES

A. Design of Welded Structures, Blodgett

B. AISC Handbook (7th Edition)

C. ASME Section III Division 1 1974 Edition with Winter 1974 Addendum.

D. American Welding Society Code D1.1

3.0 PROPERTIES OF WELDS

For analysis of a weld, the weld will be considered as a line.

Some general configurations based upon this assumption with their corresponding properties are indicated in figure 1.

3.1 Weld Size Selection

The calculated weld size is found by determining the actual resultant force on the weld and comparing it to the allowable force for that weld size.

The largest loads are to be used when determining the required weld size.

The allowable stress for linear component support welds shall be in accordance with Table NF-3292.1-1.

The minimum weld based upon structural member thickness is as inidcated in figure 2.

3.2 Skewed Joints

Fillet welds may be used at skewed joints where the angle is equal or greater than 60^{0} but less than or equal to 135^{0}. (Figure 3)

SECTION XI

If a member is to be joined at an angle greater than 30^{o} or less than 60^{o}, a bevel groove weld is to be used. (See Figure 3). The effective throat is indicated in parentheses.

If a member is to be attached at an angle greater than 135^{o}, the member should be machined to yield an angle less that 135^{o} but greater than 60^{o}. (See Figure 3.)

3.3 Welding of Structural Tubes

When two tubes of equal size are welded together, a flare bevel weld should be specified. The effective throat is as shown in Figure 4.

When two tubes of unequal size are welded together, a fillet weld shall be specified in all cases. The effective throat is indicated in Figure 5.

For combined fillet and flare bevel welds the effective throat is as indicated in Figure 6.

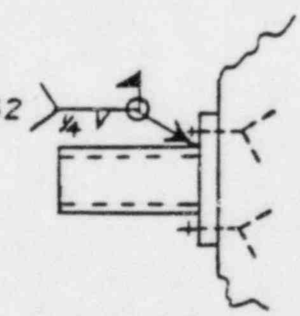
3.4 Weld Symbols

Subsection NF weld inspection procedure paragraphs must be specified in the tail of the weld symbol using the following codes:

52 "A" "B"

ASME CLASS	"A"
1	1
2 & MC	2
3	3

NF-5232

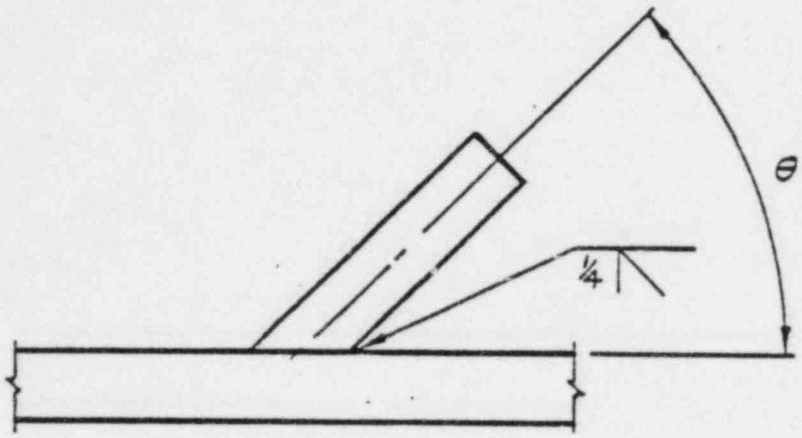


SUPPORT TYPE	"B"
Plate & Shell	1
Linear	2
Component Std.	3

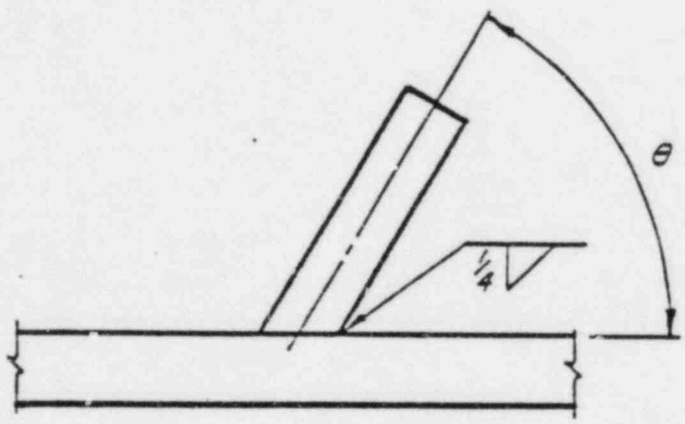
No NF weld symbols are required for class 5 supports or for welds to the pipe.

Only welds that connect two plate and shell elements shall be designated as plate and shell.

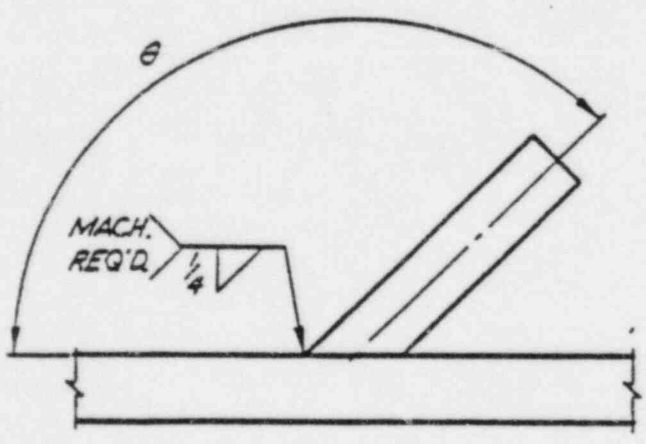
FIGURE 3



$60° > \theta > 30°$



$135° \geq \theta \geq 60°$



$\theta > 135°$

For CASE

Item 4

10. Tubular Structures

Part A
General Requirements

10.1 Application

Section 10 originally evolved from a background of practices and experience with fixed offshore platforms of welded tubular construction. Like bridges, these are subject to a moderate amount of cyclic loading. Like conventional building structures, they are redundant to a degree which keeps isolated joint failures from being catastrophic. The requirements of Section 10 are intended to be generally applicable to a wide variety of tubular structures. However, welded tubular construction involves new terminology and a sufficient number of unique requirements for design, detailing, workmanship, and inspection to fill a separate section of the Code.

10.2 Base Metal

The steels listed as approved in 10.2 of the Code include those considered suitable for welded bridges and buildings as well as tubular structures. Also listed are other ASTM specifications, American Bureau of Shipping (ABS) specifications, and American Petroleum Institute (API) specifications that cover types of materials that have use in tubular structures. All of the steels approved are considered weldable by the procedures specified in this Code. Every Code approved steel is listed in 10.2.

The ASTM specifications for grades of structural steel used in building construction for which welding procedures are well established are listed in 8.2 together with other ASTM specifications covering other types of material having infrequent application but which are suitable for use in buildings. The ASTM A242, A588, A514, and A517 specifications contain grades with chemistries that are considered suitable for use in the unpainted or weathered condition. ASTM A618 is available with enhanced corrosion resistance.

Structural steels that are generally considered applicable for use in welded steel bridges are listed in 9.2 as approved steels. Other ASTM specifications for other types of steel having infrequent applications, but suitable for use in bridges, are also listed as approved steels. Steels conforming to these additional ASTM specifications, A500,[15] A501, and A618, covering structural tubing, and A516 and A517 pressure vessel plates are considered weldable and are included in the list of approved steels for bridges.

The complete listing of approved steels in 10.2 provides the designer with a group of weldable steels having a minimum specified yield strength range from 30 ksi to 100 ksi (205 MPa to 690 MPa), and in the case of some of the materials, notch toughness characteristics which make them suitable for low temperature application. Other steels may be used when their weldability has been established according to the qualification procedure required by 5.2.

The Code restricts the use of steels to those whose specified minimum yield strength does not exceed 100 ksi (690 MPa). Some provisions of 10.5.1 rely upon the ability of steel to strain harden.

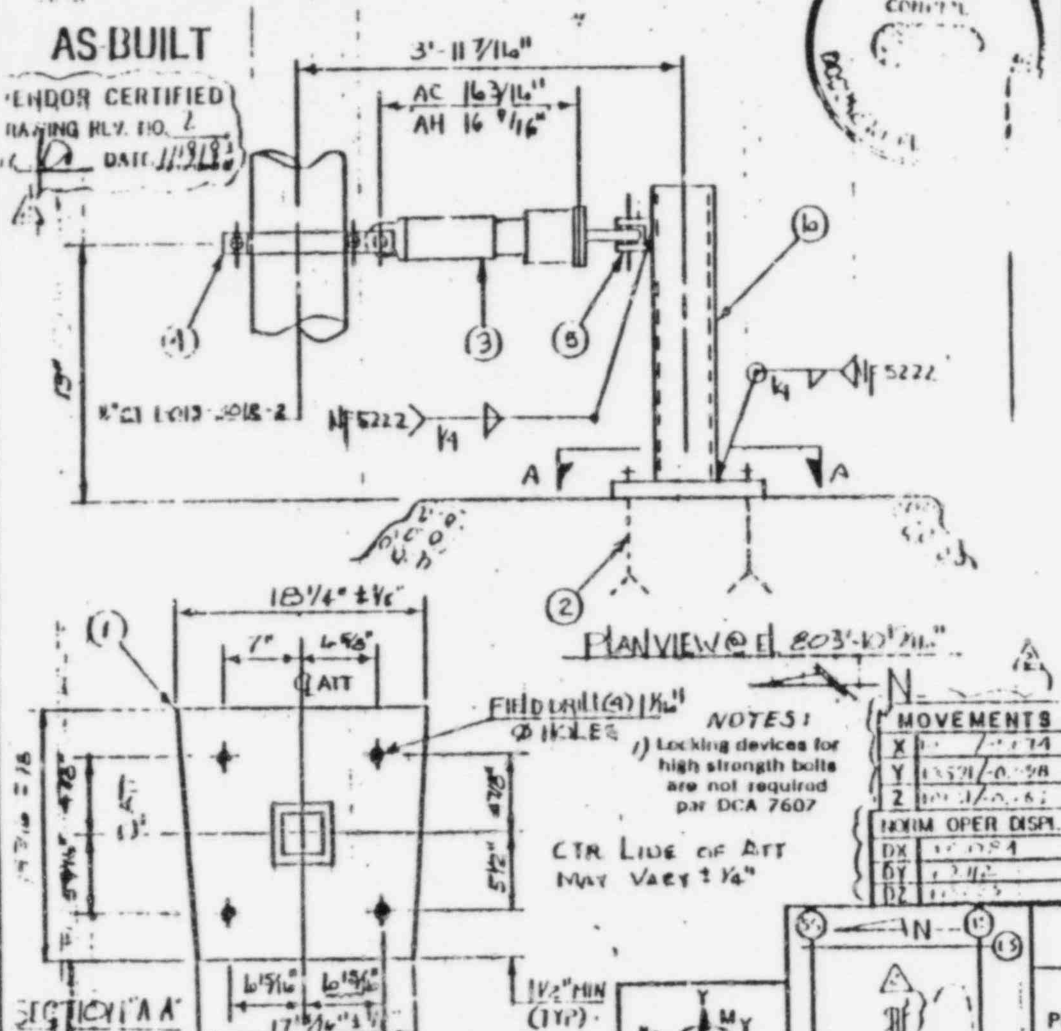
10.2.2 The Code includes a new ASTM specification: Structural Steel for Bridges, A709. This specification is an attempt by ASTM to consolidate in one specification all of the structural steels: i.e., carbon and low alloy steels for structural shapes, plates, and bars and quenched and tempered alloy steel plates intended for use in bridges. Grade 36, 50, 50W, 100 and 100W are equivalent to ASTM A36, A572 Grade 50, A588, and A514, respectively. The A709 specification includes supplementary requirements, for impact strength tests, ultrasonic examination, etc., which may be specified by the purchaser. The A709 specification is listed as an approved steel for Grades 36, 50, 50W, 100, and 100W where the requirements are equivalent to A36, A572 Grade 50, A588, and A514, respectively. Otherwise, the steel must be considered under the provisions of 10.2.3.

15. Products manufactured to this standard may not be suitable for those applications where low temperature notch toughness may be important, such as dynamically loaded elements in welded structures.

BLUELINE 12-18-81

AS-BUILT

VENDOR CERTIFIED
DRAWING REV. NO. 2
DATE 11/19/81



NOTES:
1) Locking devices for high strength bolts are not required per DCA 7607

CTR LINE OF ATT MAY VARY ± 1/4"

MOVEMENTS	
X	[illegible]
Y	[illegible]
Z	[illegible]
NORM OPER DISPL.	
DX	[illegible]
DY	[illegible]
DZ	[illegible]

ITEM NO.	MATERIALS & OPERATIONS	QUAN	SHIP
1	3/4" C.S. PL. PER SECT. "A-A" (SA36/SA516 GR.65)	1	
2	1"x4" HILTI KWIK BOLTS (6" MIN EMBED)	4	
3	SMB-1-30 SNUBBER CC:3' 3/16"	1	
4	SPC-10-160 PIPE CLAMP (3A-36)	1	
5	XRB-10 REAR BRACKET (A-668D/A36)	1	
6	TS 4"x3 1/2"x1/2" x1'8" LG (A-500 GR.B)	1	

MARK # CT-1-015-015-S33R
PAINT: CARBO ZINC # 11

FOR ENGINEERING & OFFICE USE ONLY

INFORMATION COPY
THIS DOCUMENT IS FOR INFORMATION ONLY. CONTACT DOCUMENT CONTROL FOR CURRENT STATUS AND REVISION.

CT-1-015 SP-1... CONTROL

Bldg. Iso. CT-1-SB-008 R.1
BRP Iso. CT-1-SB-8 R-3
Data Point 125W/PROB. AB-1-32 R.0
Pipe Mat'l. SA 358 CL1 TP304
Insul. ______ Bldg. SP
TOT 1302

THIRD PARTY INSPECTION
CODE CLASS: ASME III-2

LOCATION PLAN

FOR MATERIALS AND OPERATIONS SEE SKETCH NO. SHEET OF

BROWN & ROOT, INC.
ENGINEERS & CONSTRUCTORS

REF. DRAWING NUMBERS
PIPE: CH-0604 R14 ELECT: EI-0601-01
STEEL: SI-0602 R12 HV.A.C.: HI-0631-R1

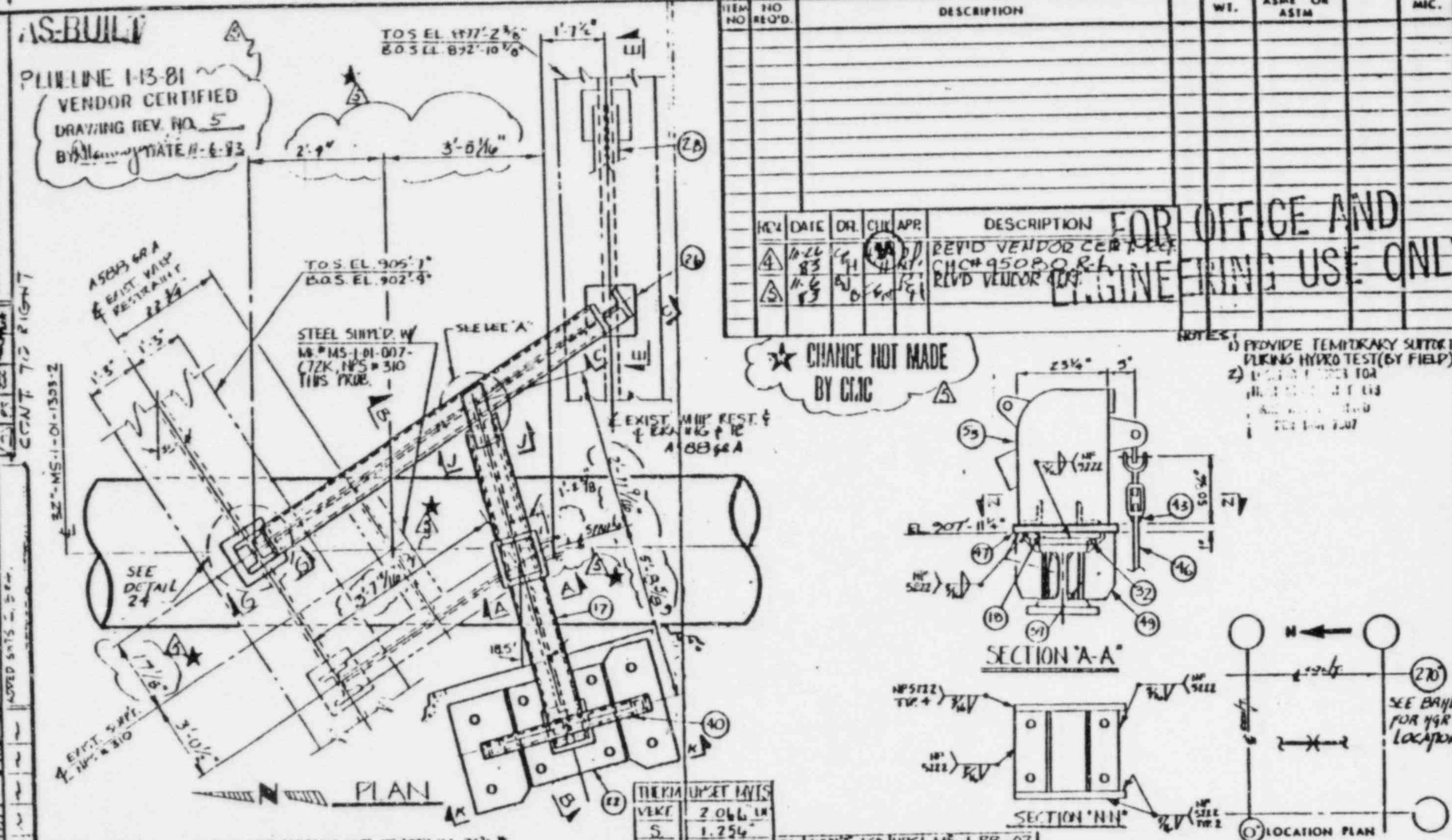
CONDITIONS	Fx	Fy	Fz	Mx	My	Mz
DESIGN						
NORMAL & UPSET	990					
EMERGENCY	1545					
FAULTED						

REV	DATE	DWN	CHK	APP	DESCRIPTION
0		AN			ISSUE FOR CONSTRUCTION
1					REV. PER REV. 1 THIS
2					REV'D AS NOTED. REF. ... SEE NT (1) (MC) ... AS-BUILT VENDOR CERTIFICATION, REF. GTN # 63726

CUSTOMER Texas Utilities Services Inc.
ORDER OR CONT. NO. CP-0046
JOB NAME Comanche Peak 1&2
MARK NO. CT-1-015-015-S33R
SKETCH NO. ______
SHEET 1 OF 1 REV. 2

FOR OFFICE AND ENGINEERING ...

FOR OFFICE AND ENGINEERING USE ONLY



ITEM NO	NO REQ'D.	DESCRIPTION	WT.	ASME OR ASTM	MIC.

REV	DATE	DR.	CHK	APR.	DESCRIPTION
4	11-26-83				REV'D VENDOR CERT. REF. CHC # 9508 O R-1
5	11-6-83				REV'D VENDOR CERT.

NOTES:
1) PROVIDE TEMPORARY SUPPORT DURING HYDRO TEST (BY FIELD)
2)

REV	DATE	DWN	CHK	APP	DESCRIPTION
					ISSUE FOR CONST.
					AS NOTED
5					REV. VENDOR CERTIFICATION

THERMAL	UPSET MVTS
VERT	2.066"
S	1.256"
W	.035"

SUPP'T. 150 NPSI-MS-1-RB-02

REFERENCE DRAWINGS		REV		REV		REV	
BRHL ISOMETRIC			PIPING		ELECTRICAL		CODE/CLASS III/2
13-1-AB-07		2	2323-MI-0505	Z	2323-EI-0502	B	PAINT
FAB. ISOMETRIC		REV	STRUCTURAL	REV	H.V.A.C.	REV	ZONE
MS-1-RB-02		8	2323-SI-0554	Z	2323-MI-0552	5	

OWNER TEXAS UTILITIES SERVICES INC.
PROJECT COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER GIBBS & HILL INC.

Brown & Root, Inc. HOUSTON, TEXAS

P.O. NO. CP-0046A-1

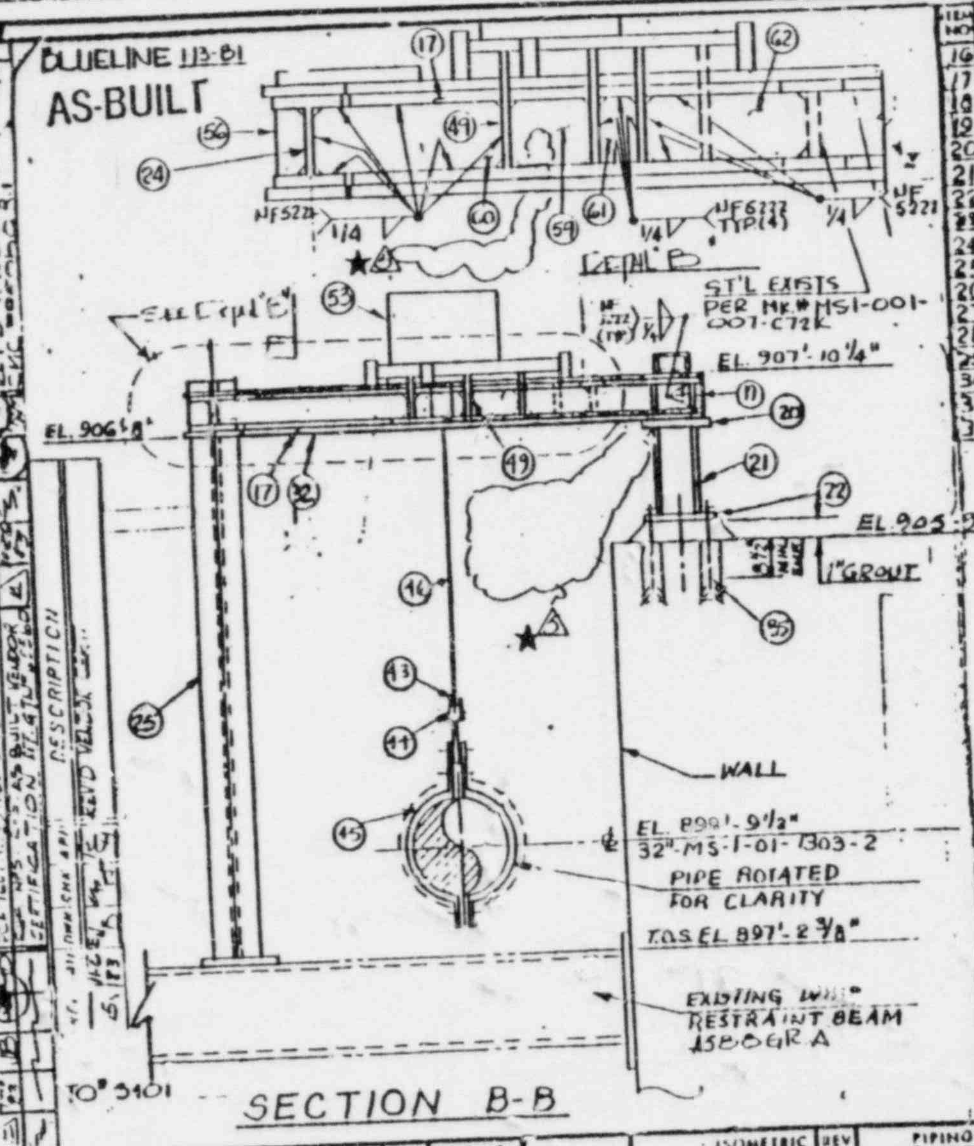
MK. NO. MS-1-01-001-C72S REV. 5 SHEET 1 of 5

137

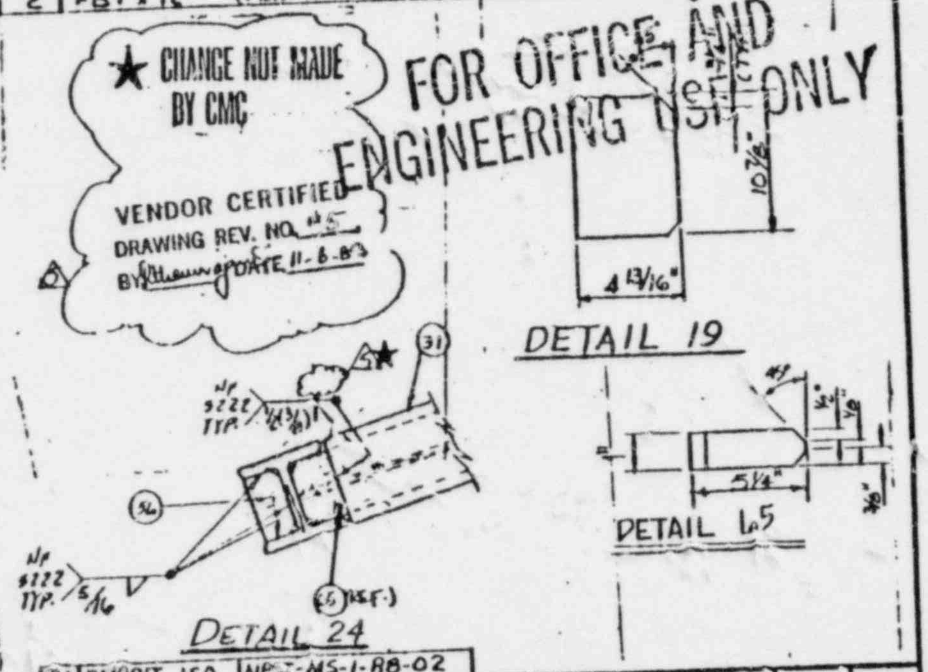
FOR OFFICE AND ENGINEERING USE ONLY

BLUELINE 11-3-81

AS-BUILT



ITEM NO.	NO. REQ'D	DESCRIPTION	WT.	ASME OR ASTM		MK.
16	1	W12×58		SA-36	L	
17	1	W12×58 (FIELD TRIM TO SUIT)		SA-36	L	
18	1	FP 1"×18"×2'-0" LG.		SA-36	MS	
19	4	FB 4 13/16"×1/2"×10 7/8" LG (SEE DETAIL 19)		SA-36	MS	
20	2	FP 1"×14"×1'-2"		SA-36	L	
21	1	W12×58		SA-36	MS	
22	1	1½" C.S.P. SECT. "0-0"		[illegible]		
23	4	1" Ø×13" SUPER-HILTI				
24	1	W12×58		SA-36	L	
25	1	W12×58		SA-36	MS	
26	1	FP 1"×17"×1'-5"		SA-36	MS	
27	1	FP 3/4"×8 1/2"×2'-1"		SA-36	L	
28	1	W8×48		SA-36	MS	
29	1	FP 3/4"×10"×10"		SA-36	L	
30	2	L 4×4"×3/8"×8" LG.		SA-36	MS	
31	2	FP 1"×12"		SA-36	MS	
32	2	FB 1"×12" (FIELD TRIM TO SUIT)				



SUPP'T. ISO. NPS-MS-1-RB-02

DRAWN	DATE 5-4-78	CHK'D	DATE 5-15-78
APP'V'D	DATE 5-15-78		

REFERENCE DRAWINGS: FAB. ISOMETRIC MS-1-RB-02 REV. B

OWNER: TEXAS UTILITIES SERVICES INC.

PROJECT: COMANCHE PEAK UNITS NO. 1 & 2

Brown & Root, Inc. Houston, Texas

MK. NO. MS-1-01-001-C72S Rev. 5 SHEET 2 of 5

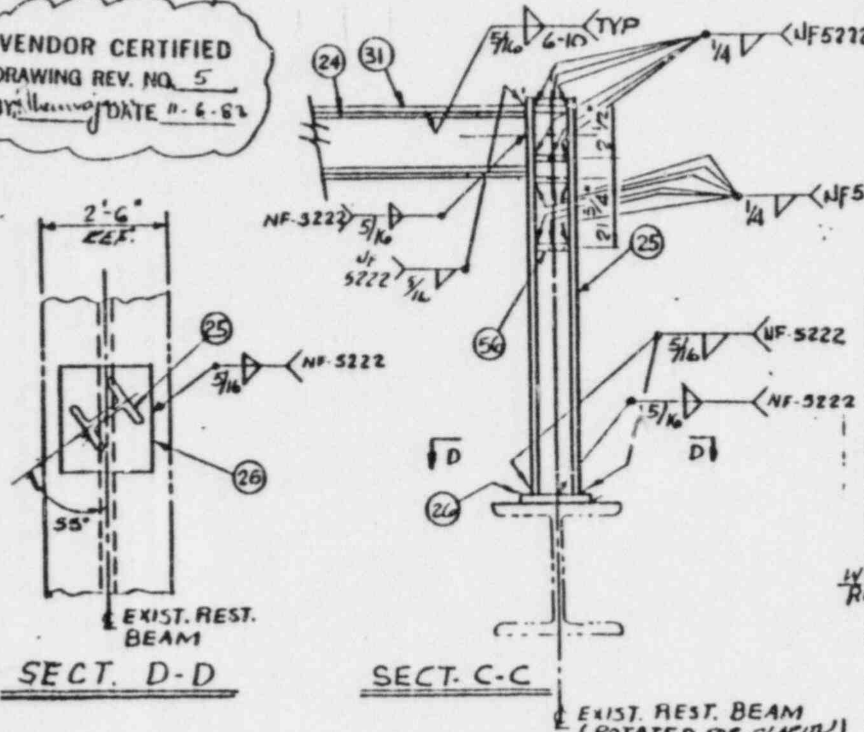
FOR OFFICE AND ENGINEERING USE ONLY

BLUELINE 1-13-81

AS-BUILT

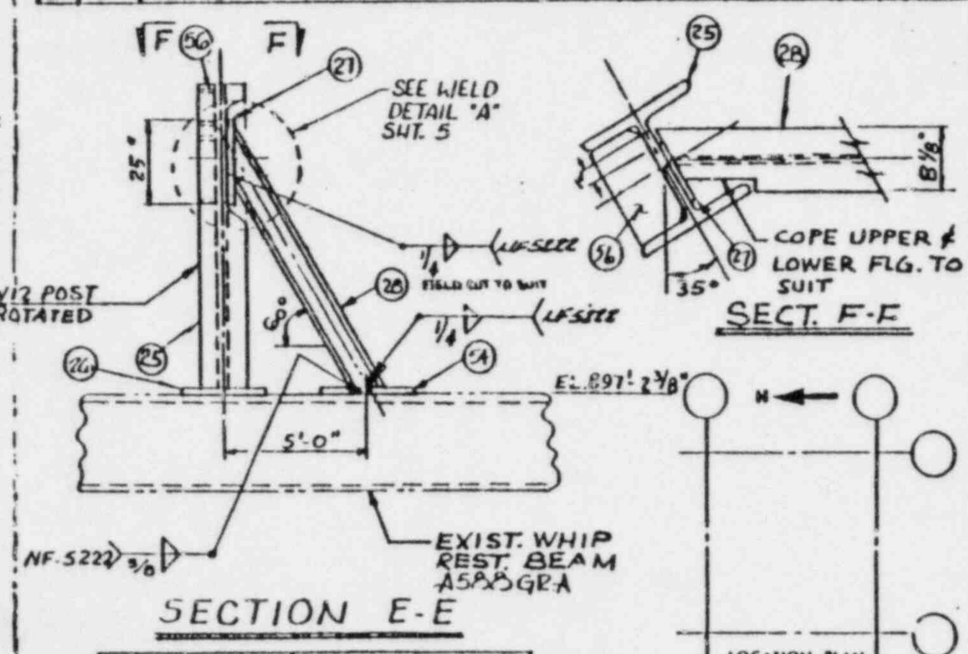
VENDOR CERTIFIED
DRAWING REV. NO. 5
BY: [illegible] DATE 11-6-82

ITEM NO	NO REQ'D.	DESCRIPTION		WT.	ASME OR ASTM			MIC.
31	6	FP 1/2" x 8 13/16" x 12 1/2" (SEE DETAIL-31)			SA-36	NS		
35	4	1 1/4" SUPER HILTIS 13" LG						
36	2	CS PL 13" x 10 1/4" x 3/4"			SA-36			
37	1	CS PL 1 1/2" PER SECTION "L-L"			SA-36			
38	2	T.S. 6" x 8" x 3/8" x 2'-3" LG. (FIELD TRIM TO SUIT)			A500 Gr. B			
39	2	T.S. 6" x 8" x 3/8" x 7" LG. (FIELD TRIM TO SUIT)			A500 Gr. B			
40	1	T.S. 6" x 8" x 3/8" x 4'-6" LG. (FIELD TRIM TO SUIT)			A500 Gr. B			
41	4	1 1/4" SUPER HILTIS 13" LG.						
42	1	PL 1 1/2" PER SECTION "L-L"			SA-36			
43	2	FHN 2 1/2" ⌀ HVY. HEX NUTS			SA307 Gr. B			
44	1	WEN-20 WELDLESS EYENUT			AE68 Gr. C			
45	1	PTC-320-1232 THREE BOLT PIPE CLAMP			SA-36			
46	1	RET-20 8'-2" LG, TL=12" (FIELD CUT TO SUIT)			SA-36			
47	1	CS PL 1" x 25" x 7 1/2"			SA 36			
48	2	CS PL 3/4" x 2 1/2" x 25"			SA 36			
49	7	CS PL 1/2" (SEE DETAIL 49) (FIELD TRIM TO SUIT)			SA 36			
50	1	CS PL 1" x 25" x 5 3/4" LG.			SA 36			



SECT. D-D

SECT. C-C



SECTION E-E

SECT. F-F

T.O. # 3401

81	SUPP'T. ISO.	NPSI-MS-1-RB-02

REFERENCE DRAWINGS	ISOMETRIC	REV	PIPING	REV	ELECTRICAL	REV	CODE/CLASS: III/2
			2323-M		2323-F		PAINT CARBOZINC 11
	FAB. ISOMETRIC	REV	STRUCTURAL	REV	H.V.A.C.	REV	
	MS-1-RB-02	8	2323-S		2323-M		ZONE ~

DRAWN	DATE	CHK'D	DATE	APPV'D	DATE
JE	5-4-78	JM	5-15-78	UD	5-15-78
P.O. NO. CP-0046A.1		MFG. REL.			

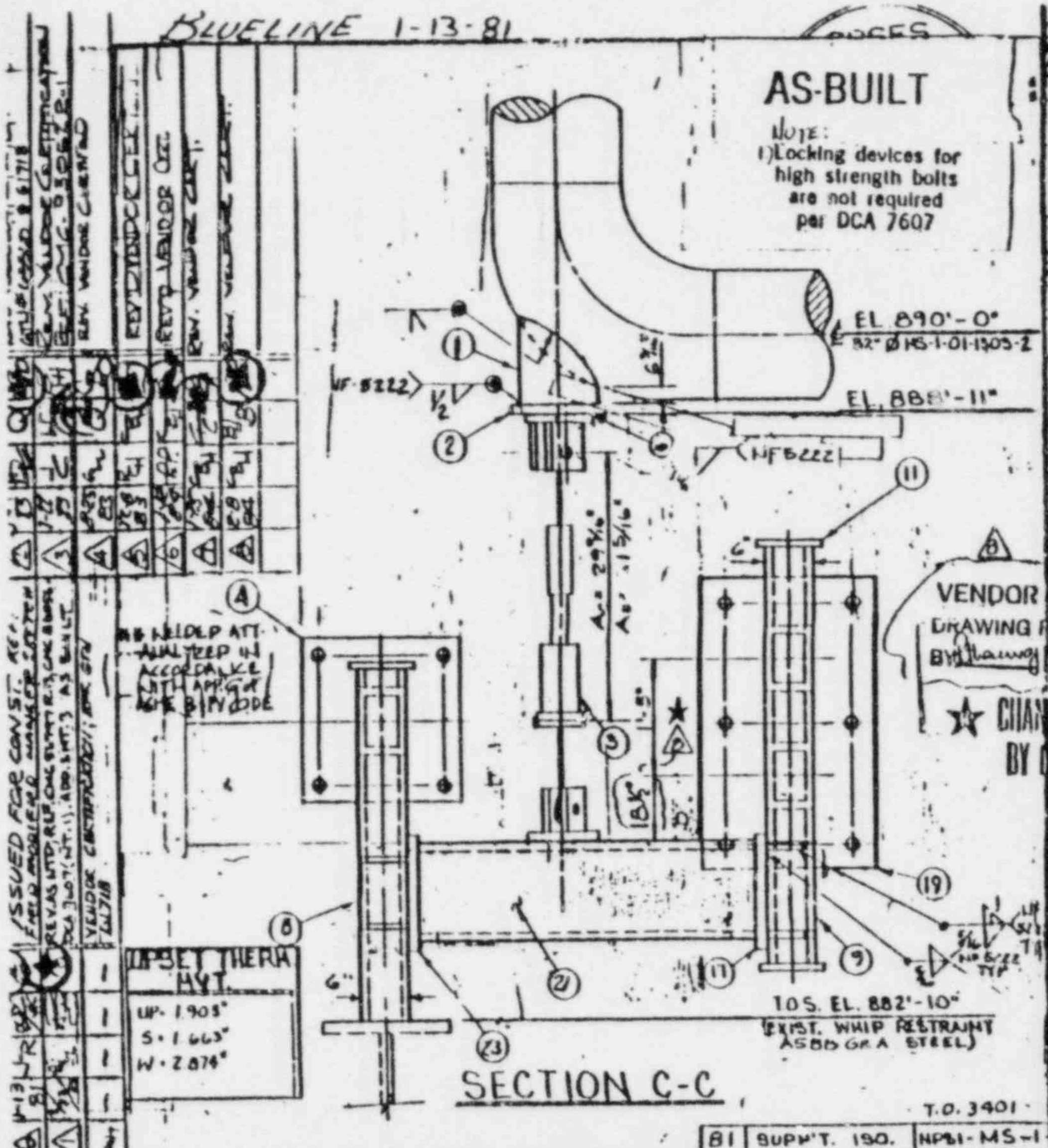
PRODUCTION ORDER	SERIAL NUMBER	SHEET
		3 OF 5
137	MK. NO. MS-1-01-001-C72S	REV. 5

OWNER	TEXAS UTILITIES SERVICES INC.
PROJECT	COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER	GIBBS & HILL INC.

SEISMIC: AB 1-001 R1; 120; SC24-1

CPSES 35-1195 — Brown & Root, Inc. ENGINEERS AND CONSTRUCTORS, HOUSTON, TEXAS

FOR OFFICE AND ENGINEERING USE ONLY



ITEM NO	NO REQ'D	DESCRIPTION	WT.	ASME OR ASTM		MK.
1	1	PE4 SCH 60		SA106-B	L	
2	1	FP 1¼" X 26" X 2'-2"		SA-36		
3	1	SMF-100-BA MECH. SNUBBER		~		
4	1	1¼" CS. PL (SEE DET. A)		SA-36		
5	1	TS 10 X 6 X .500"		A500 Gr B	L	
6	1	FP 1" X 12" X 1'-2"		SA-36		
7	2	FP ¾" X 11" X 4'-0" CUT TO SUIT		SA-36		
8	2	FP ¾" X 8" X 4'-0" CUT TO SUIT		SA-36		
9	1	TS 10 X 6 X .500" X 5'-0" LG. FLD. CUT TO SUIT		A500 Gr B	L	
10	1	FP 1¼" X 12" X 3'-3" BY FIELD		SA-36		
11	3	FP ½" X 7" X 11"		SA-36		
12	1	TS 10 X 6 X .500" FIELD TRIM TO SUIT		A-500 Gr B	L	
13	2	FB 4" X ¼" X 6"		SA-36		
14	2	TS 10 X 6 X .500"			L	
15	6	1¼" Ø X 12" SUPER HILTI (BY FIELD)				CSS
16	4	1" Ø X 12" SUPER HILTI (BY FIELD)				CSS

LOAD	DESIGN LOADS	MVTS (IN.)	SEISMIC
UP	5212		
DN	5210		
	4101 / 5210 / 5328		

B1 SUPP'T. ISO. NPBI-MS-1-RB-02

REFERENCE DRAWINGS		REV		REV		REV
BRIIL ISOMETRIC: MS-1-RB-02		2	PIPING: 2323-MI-05[illegible]	6	ELECTRICAL: 2323-EI-0002	5
FAB. ISOMETRIC: HS-1-RB-02		8	STRUCTURAL: 2323-S1-0550	2	H.V.A.C.: 2323-MI-0852	5

CODE/CLASS: III/2
PAINT: CARBOZINC
ZONE: ~

OWNER: TEXAS UTILITIES SERVICES INC.
PROJECT: COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER: GIBBS & HILL INC.

Brown & Root, Inc.
HOUSTON, TEXAS

DRAWN	DATE	CHK'D	DATE	APPV'D	DATE
DL BS	11-18-80		11-26-80		12-6-80

P.O. NO. CP-0046 A.1
MFG. REL.
PRODUCTION ORDER
SERIAL NUMBER
SHEET 1 of 3
308
MK. NO. HS-1-01-005-C72K
REV. 8

FOR OFFICE AND ENGINEERING USE ONLY

ITEM NO	NO REQ'D	DESCRIPTION	WT.	ASME OR ASTM			MIC.
17	1	FP 11" X 14" X 1'-5"		SA-36			
~~18~~	~~1~~	~~ASME III NAME PLATE~~					
14	1	C.S. PL 1½" THK. (SEE DET B)		SA-515GR70			
~~20~~	~~1~~	~~T.S. 12"x8"x½"x4'-0" LG. HD CUT TO SUIT~~		SA-500GR B			
21	1	T.S. 12"x8x½"		A500GrB			
22	2	1" C.S.PL. (Det #22)		SA36			
23	1	1" C.S.PL. X 14" X 15" LG.		SA36			

REV.	DATE	DR.	CHK	APR	DESCRIPTION
1	1-23-81				REV. VENDOR CERT.
8	2-8-84				REV. VENDOR CERT.

FOR OFFICE AND ENGINEERING USE ONLY

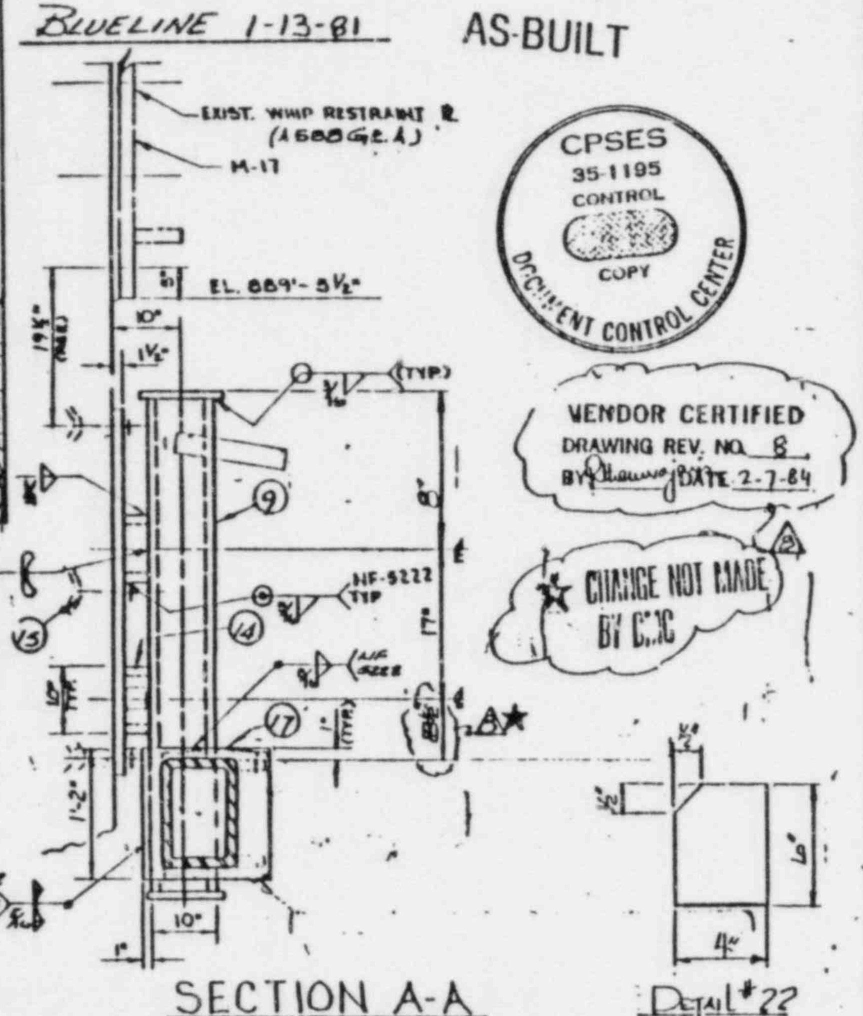
BLUELINE 1-13-81

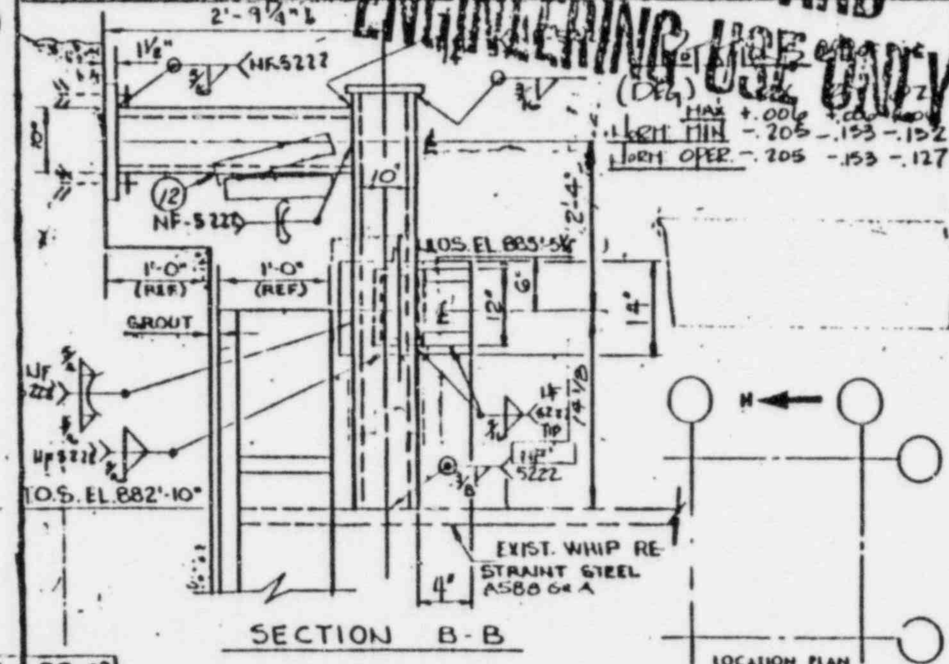
AS-BUILT

CPSES 35-1195 CONTROL COPY DOCUMENT CONTROL CENTER

VENDOR CERTIFIED
DRAWING REV. NO. 8
BY [signature] DATE 2-7-84

CHANGE NOT MADE BY C&C





81	SUPP'T ISO.	NPS1-MS-1-RB-02	

REFERENCE DRAWINGS — ISOMETRIC; FAB. ISOMETRIC MS-1-RB-02 REV 8; PIPING 2323-M1-0; STRUCTURAL 2323-S1-0; ELECTRICAL 2323-E; H.V.A.C.; 2323-M

DESIGN LOADS / MVTS / THER / SEISMIC: AB-1-001/E1; 10

CODE/CLASS: III/2; PAINT CARBOZINC; ZONE

DRAWN	DATE	CHK'D	DATE	APPV'D	DATE
DLBS	11-18-80		11-25-80		11-26-80

P.O. NO. CP-0046A.1 — MFG. REL. — PRODUCTION ORDER — SERIAL NUMBER — SHEET

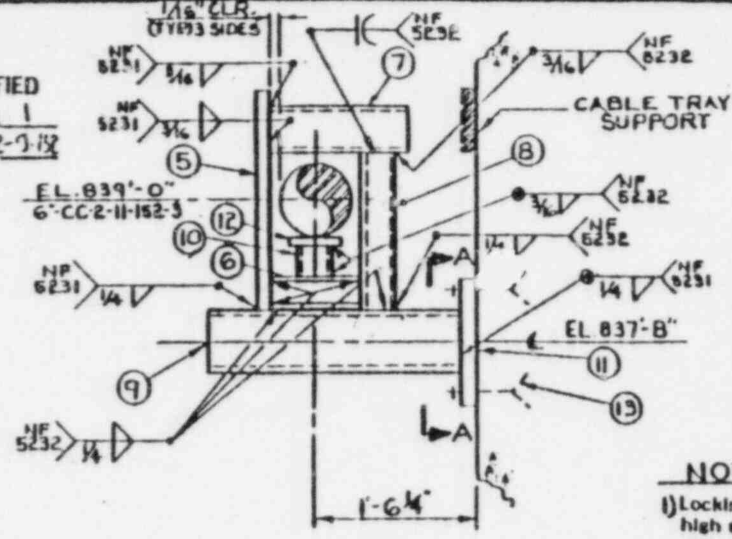
OWNER TEXAS UTILITIES SERVICES INC.
PROJECT COMANCHE PEAK UNITS NO. 1 & 2
ENGINEER GIBBS & HILL INC.

Brown & Root, Inc. HOUSTON, TEXAS

MS-1-RB-02 REV 8

AS BUILT

VENDOR CERTIFIED
DRAWING REV. NO. 1
BY [illegible] DATE 12-9-82

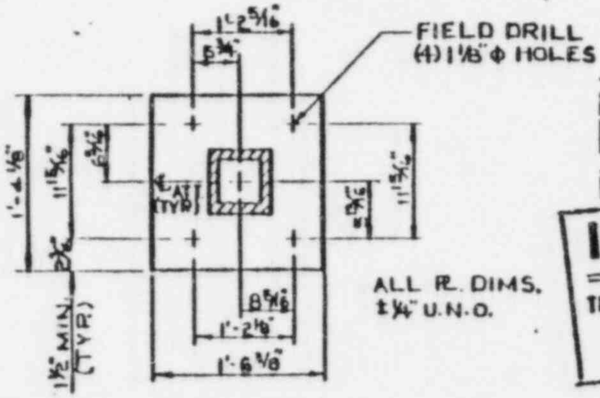


ELEV. LKG NORTH

NOTES

1) Locking devices for high strength bolts are not required per DCA 7607

T.C. 21100



SECTION A-A

ITEM NO	QTY REQ'D	MATERIAL DESCRIPTION	PBS	L	CBS	WPIN	SEC	AISC
5	1	1"x 4 1/2"x 1'-8 1/8" LG. C.S. PL. (SA-36 OR SA-515, GR.65)	X			X		
6	1	W6 x 12 x 0'-6 3/4" LG. (SA-36)		X		X		
7	1	T.S. 1/4"x4"x4"x0'-11" LG. (A-500, GR. B)		X		X		
8	1	T.S. 1/4"x4"x4"x1'-4 1/8" LG. (A-500, GR.B)		X		X		
9	1	T.S. 1/4"x6"x6"x 2'-0 1/2" LG. (A-500, GR.B)		X		X		
10	1	T.S. 1/4"x3"x3"x0'-2 1/16" LG. (A-500, GR.B)		X		X		
11	1	1" THK. C.S. PL. /SECT. A-A (SA-36 OR SA-515, GR.65)	X			X		
12	1	1"x4"x4" LG. C.S. PL. (SA-36 OR SA-515, GR.65)	X			X		
13	4	1" Φ x 9" LG. HILTI KWIK CONCRETE ANCHORS			X			

APPLY ONE COAT OF CARBO ZINC 311 TO ABOVE MAT'L EXCEPT THREADS WHICH SHALL BE TREATED WITH A RUST PREVENTATIVE.

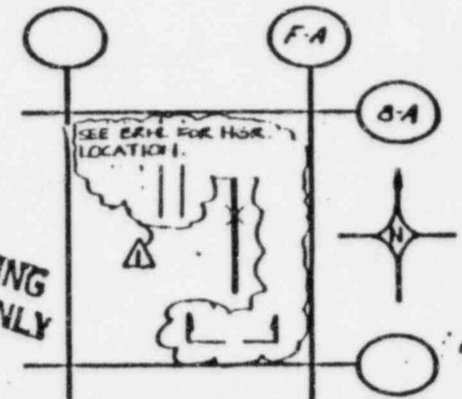
REV	DESCRIPTION	DATE	DWN.	CHKD.	APVD.
	VENDOR CERT. REF. GTN # 59790	~	~	~	~

(PROB. # AB-1-66C, R-0) 1

ASME CODE EDITION: 1974
ADDENDA: WINTER
DESIGN SPEC: HS-46A

PE. CERTIFICATION

FOR ENGINEERING & OFFICE USE ONLY



LOCATION PLAN

DATA PT 8101	SUPPORT LOADS (LBS) SERVICE LEVEL LIMITS DESIGN	A	B	C	D	PIPE MVTS (INCHES)
VERT	—	[illegible]	[illegible]	[illegible]	—	—
N-S	—	—	—	—	—	[illegible]
E-W	—	[illegible]	[illegible]	[illegible]	—	—

NOTE +N,E,UP −S,W,DN

AUTHORIZED NUCL. INSP. YES ☑ NO ☐
ASME CODE CLASS 3

REF. DWGS	PRIM. ISO.	REV	MECHANICAL	REV	ELECTRICAL	REV
	CC-2-AB-032	1	M1-0702	4	E1-0711	0
	FAB. ISO.	REV	STRUCTURAL	REV	H.V.A.C.	REV
	CC-2-AB-032	1	S-0721	4	M1-0756	5

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPVD.
1	REV. AS NOTED, REF CMC-32943R5 (DCA NOT SEEN-KAS BUILT)	3/18/82	F.W.	Q	CBD
0	I.F.C.	12-10-79	C.A.T.	[illegible]	MYA

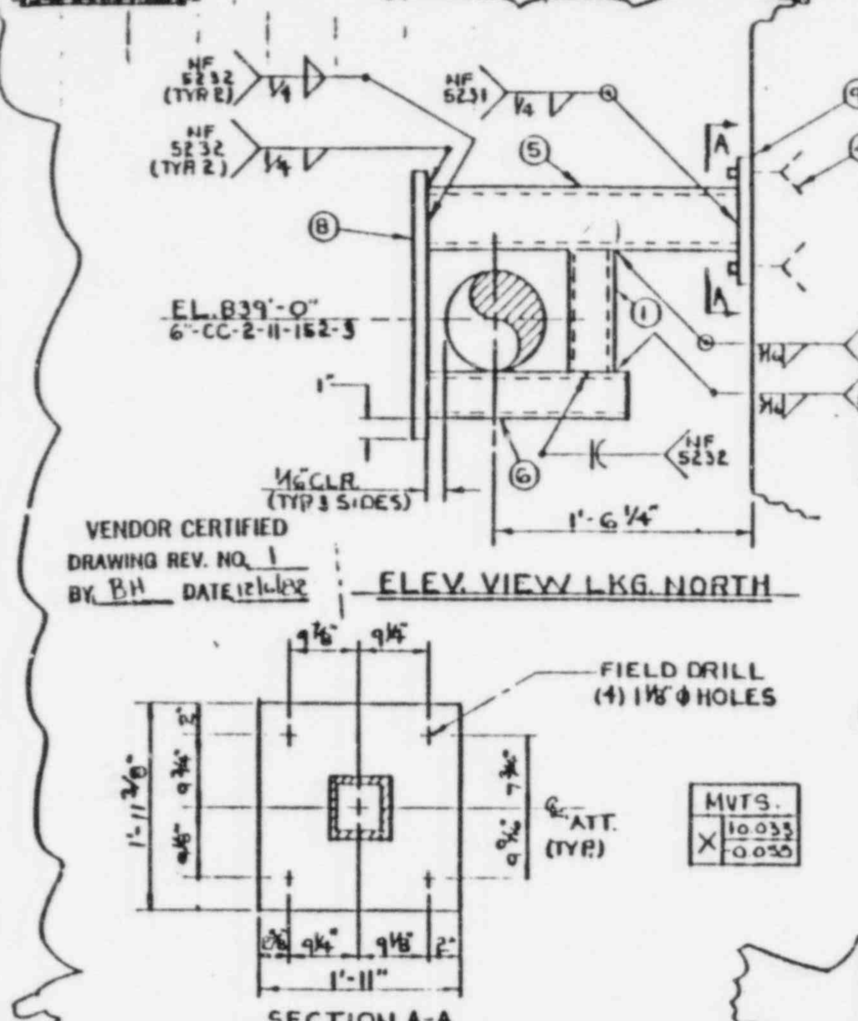
CPSES 35-1195

Brown & Root, Inc.
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

CLIENT T.U.S.I.
PLANT COMANCHE PEAK
JOB NO. 35-1195

SUPPORT NO. CC-2-011-711-A33R
SHEET 1 OF 1 REV. 1

AS BUILT



ITEM NO	QTY REQ'D	MATERIAL DESCRIPTION
1	1	T.S. 1/4"x3"x3"x0'-6 1/16" (A-500, GR. B)
4	4	1"x9" HILTI KWIK CONCRETE ANCHORS
5	1	T.S. 1/4"x6"x6" x 2'-0" LG. (A-500, GR. B) FIELD TRIM TO SUIT
6	1	T.S. 1/4"x3"x3"x1'-2" LG. (A-500, GR. B) FIELD TRIM TO SUIT
8	1	PL. 1"x8"x1'-5 11/16" LG. (SA-516 GR.65 OR SA-36)
9	1	PL. 1"x1'-11"x1'-11 3/8" LG. (SA-516 GR.65 OR SA-36)

APPLY ONE COAT OF CARBO ZINC 11 TO ABOVE MAT'L EXCEPT THREADS WHICH SHALL BE TREATED WITH A RUST PREVENTATIVE.

INFORMATION ONLY — THIS DOCUMENT IS FOR INFORMATION ONLY. CONTACT DOCUMENT CONTROL FOR CURRENT STATUS AND REVISION.

VENDOR CERTIFIED
DRAWING REV. NO. 1
BY BH DATE 12/16/82

NOTES:
1) Locking devices for high strength bolts are not required per DCA 7607

MVTS.: ☒ 0.033 / 0.033

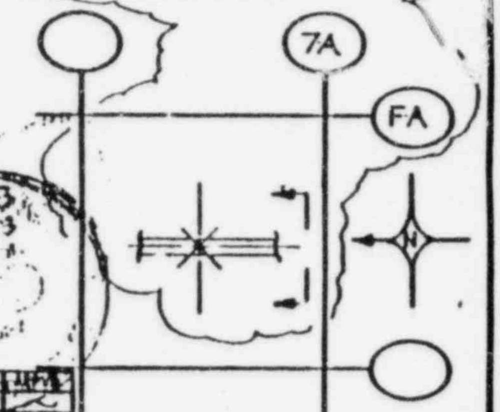
T.O. 21100

PROBLEM # AB-1-66C/R0
SEE BRHL FOR HGR LOCATION

ASME CODE EDITION: 1974
ADDENDA: WINTER
DESIGN SPEC: MS-46A

RE. CERTIFICATION

CPSES



LOCATION PLAN

REV	DESCRIPTION	DATE	DWN	CHKD	APPVD
COM	GTN # 29790, AS BUILT	~	~		

DATA PT		SUPPORT LOADS (LBS)				PIPE MVTS INCHES
2099	DESIGN					
VERT		-510				
N-S						
E-W		1185	1217	1231		

NOTE +N, E, UP -S, W, DN

AUTHORIZED NUCL. INSP. YES ☑ NO ☐
ASME CODE CLASS 3

REF DWGS	BRHL ISO	REV	MECHANICAL	REV	ELECTRICAL	REV
	CC-2-AB-032	~	M1-0702	8	E1-0711	9
	FAB. ISO	REV	STRUCTURAL	REV	H.V.A.C.	REV
	CC-2-AB-032	1	S-0721	4	M1-0756	5

REV	DESCRIPTION	DATE	DWN	CHKD	APPVD
1	REV AS NTD REF CMC 9794 R4 & DCA 7607	12/16/82			
	SEE NT VENDOR CERTIFICATION CHT ABOVE				
0	IFC	12 19 79	C.A.T.		

CPSES 35-1195

Brown & Root, Inc
ENGINEERS AND CONSTRUCTORS
HOUSTON, TEXAS

CLIENT T.U.S.I.
PLANT COMANCHE PEAK
JOB NO. 2323

SUPPORT NO. CC-2-011-712-A53R
SHEET 1 OF 1 REV. 1