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 CASE'S ALLEGATIONS REGARDING U-BOLTS ACTING AS TWO-WAY RESTRAINTS

in the form of

AFFIDAVIT OF CASE WITNESS MARK WALSH

1. Applicants state:

"A 1/16 inch gap was designed into each U-bolt restraint on a rigid frame.

"As a first support design effort, it was viewed that this gap would accommodate the thermal and seismic movement of piping.

"(The movement due to a seismic event was preliminarily calculated to be very small, i.e., less than 1/32 inch, for almost all piping.)

"Accordingly, in the initial pipe support design (prior to as-built conditions), all such U-bolts /1/ had been considered as only one-way restraints (because the lateral gap was present). Affidavit at 3."

I challenge Applicants' first and second sentences. During the 6/11/84 Applicants/Staff/CASE telephone conference call, I asked on discovery for documentation of Applicants' statements. I asked specifically for the criteria that would say which U-bolts need to be

/1/ Regarding the fourth sentence, in the 6/11/84 conference call, Applicants clarified that "all such U-bolts" in this sentence referred only to "each U-bolt restraint on a rigid frame" in the first sentence. (Tr. 23.)

cinched up and which ones need not be cinched up and for documentation that there was an original intention that some of the U-bolts should be cinched up and some of them shouldn't, and for documentation to verify how one determined if the U-Bolt was acting as a one-way restraint or a two-way restraint. (Tr. 8-16 and 23.) It is my understanding that on 7/29/84, Applicants' counsel Mr. Horin advised Mrs. Ellis that there is no such documentation (see CASE's 8/13/84 letter to Mr. Horin, Subject: Open Discovery Items for Motions for Summary Disposition, page 9 of attachment). I further asked for documentation showing why NPSI had allowables for both directions (Tr. 16-21). Applicants' 8/4/84 letter (received by CASE on 8/7/84) stated:

> "The question you posed regarding the use of allowables for U-bolts as two-way restraints was already answered by Dr. Iotti at pages 21-23 of the June 11 conference call."

However, in that conference call, Dr. Iotti did not really address documentation at Tr. 21-23. He did state:

> "Well, I believe, if you read the affidavit, which you have found is a sample, which encompasses most of those U-Bolts which were intended to act as one-way, but which could act as two-way restraints. O.K., the affidavit addresses certainly the ones that are most likely to act as two-way restraints, and concludes that the reason was that effect is tolerable. So that is the best information that we can provide you. We went back, searched for all of the instances which the U-Bolts intended to act as one-way, could in fact act as two-way, where we analyze those fresh problems which encompasses some of those U-Bolts, and I say some, because not all were included but most in terms of one's that were most likely to act as a two-way restraint, and presented to you as a conclusion to those studies. That is the best evidence that we can provide at this point." (Tr. 24.)

Regarding documentation, Dr. Iotti stated:

> ". . . I don't know what other documentation we can provide, other than telling you that these particular U-Bolts were intended to have a gap, and never intended to be cinched up." (Tr. 12.)

And Mr. Finneran stated:

> "This information is on the drawing. . . What better criteria could you have than the fact that the drawing shows it to be c_nched up or not?" (Tr. 14.)

The fourth sentence is a conclusion based on the previous three sentences, and the previous three are essentially dealing with the original design. There is no indication that Mr. Finneran and Dr. Iotti worked for the original design organizations, or that they were involved in the original design effort, at the time the original designs occurred, and it is my understanding that they were not so involved at that time. (The original design was circa 1979.) /2/.

Since Mr. Finneran and Dr. Iotti were not involved in the original design and there is no documentation to support their statements, their conclusion is based on nonfactual information, contrary to Applicants' statements above.

NPSI has allowable values for the U-bolts in the lateral direction, as shown in CASE Exhibit 669B, item 13L /3/; the date on the sheet is 1981, which was prior to the vendor certification process. Therefore, NPSI was utlizing those U-bolts as two-way restraints, even though a lateral gap was present. In addition, a lateral gap of 1/16" is generally provided in all directions, including the direction that would put primarily tension in the U-bolt where the nuts are located (referred to hereafter as the normal direction). If the U-bolt could

---

/2/ See their resumes (Mr. Finneran, Applicants Exhibit 142B, accepted into evidence at Tr. 4794; Dr. Iotti, attached to Applicants 5/16/84 letter to the Board attaching Motions for Summary Disposition on Damping Factors for OBE and SSE Loading Conditions, AWS/ASME Code Provisions (Design), and Consideration of Friction Forces).

/3/ Attachment to Doyle Deposition/Testimony, admitted into evidence at Tr. 3630.

not take the lateral load because of a 1/16" gap, it would be reasonable to assume that it could not take the load in the normal direction either. Therefore, Applicants' premise is not logical.

2. Applicants state:

"As the as-built design review and corresponding pipe support reanalyses were being conducted, Applicants determined that the thermal movement of piping associated with some U-bolt supports would exceed the 1/16 inch gap provided and some seismic movement may exceed 1/32 inch. Id."

I disagree with Applicants' statement. It would appear that NPSI and ITT Grinnell did use the U-bolt as a two-way restraint. (See Attachment A, 7/16/82 Gibbs & Hill Interoffice Memorandum from H. W. Mentel to Distribution, Subject: U-Bolt Review Procedure; this was received on discovery, as requested during the 6/11/84 conference call, Tr. 27-28.)

This 7/16/82 Memorandum states:

"To date it has become apparent in reviewing the applicable BRH drawings that both NPSI and ITT Grinnell have used U-Bolts in various supporting configurations. Already the following questions have been posed:

"1) In reviewing the BRH v.s. the BRHL drawing, the BRHL designates a two way support, while the BRH has a U-Bolt with a single design load in the direction of the principle axis. (In some instances this situation has been reversed). What should be modeled?

"2) In some instances the BRHL calls for a one way support and the BRH has a single design load. However the support design consists of the use of a U-Bolt, with the principle axis (U-Bolt in tension) taking the design load. What about the lateral movement indicated in the ADLPIPE analysis? In the past, problems have been issued with the future corrective action sheets requiring the opening up of gaps on the U-Bolt. However, this procedure is not possible since it would affect the structural characteristics of the U-Bolt."

It is apparent from this statement that NPSI and ITT Grinnell originally designed the U-Bolts as two-way restraints in some instances and in other instances lacked the knowledge of the consequences of a U-bolt acting as a two-way restraint. Applicants' statement that "the thermal movement of piping associated with some U-bolt supports would exceed the 1/16 inch gap . . ." and that this prompted the Applicants to consider the U-bolt as a two-way restraint is without substance. As indicated by the two items listed above, the thermal movement of the pipe was not the problem as the Applicants have implied in their statement.

In addition, the Applicants have not provided the specifications or criteria by which the Applicants instruct the pipe support designer or engineer to consider the two-way restraint of a U-bolt. The only documentation which the Applicants have been able to provide is the 7/16/82 interoffice memo, which is not binding as a specification or pipe support design criteria would be. In addition, there is no indication in the memo as to who is included in "Distribution;" and it is unclear whether or not the engineers who analyze these supports are on the list.

The 7/16/82 Gibbs & Hill Memorandum (bottom of page 2 and top of page 3) states:

> "Our purpose with this procedure is to check the adequacy and affect (sic) of the existing design not present new design conditions to the support vendors.
>
> "In closing an effort should be made to minimize any changes in U-Bolt Design hardware. . . " (Emphases added.)

It appears to me that Gibbs & Hill never intended to tell NPSI and ITT Grinnell that they had to do it right, and that their only purpose was to justify what had already erroneously been done -- along with an attempt to keep down costs as much as possible. It also appears that Gibbs & Hill never intended to inform the STRUDL Group about this problem, which was recognized and pointed out by Jack Doyle. As discussed in CASE's 8/22/83 Proposed Findings of Fact and Conclusions of Law (Walsh/Doyle Allegations), at page II-8:

> "The NRC Special Inspection Team (SIT) had the following statements in reference to the allegations by Mr. Doyle (SIT Report, NRC Staff Exhibit 207, page 31):
>
> > "'Relative to the first of Mr. Doyle's concerns, the Special Inspection Team determined that Gibbs & Hill identified the same concern during the Applicants' As-Built Verification Program. This concern was addressed by review procedures established in a Gibbs & Hill inter-office memorandum dated July 16, 1982.'" (Emphasis added.)

This appears to be the same Gibbs & Hill inter-office memorandum discussed previously. Continuing from CASE's Proposed Findings:

> "It is mind-boggling to note the numbers of memos that originated as a result of the allegations of Messrs. Doyle and Walsh. This particular memo came out about four weeks after Mr. Doyle quit because of this U-bolt problem, other problems with U-bolts, etc. At the time of his resignation, Gibbs & Hill wanted to hear no more about U-bolts or LOCA.
>
> "It should also be noted that the SIT was unable to state with certainty exactly when Applicants identified the problem. (See item 66, page 5, CASE Exhibit 848, Stipulations between CASE and NRC Staff, admitted at Tr. 8350-8352). It is reasonable to assume that Applicants identified this problem as a direct result of Mr. Doyle's having raised it."

The Gibbs & Hill memorandum adds further credibility to CASE's statement that it is reasonable to assume that Applicants identified this problem as a direct result of Mr. Doyle's having raised it. And

it appears that Applicants were not going to inform the appropriate groups (i.e., NPSI, ITT Grinnell, or the STRUDL group) of how they were going to resolve this problem. This is contrary to ANSI N45.2.11, 5.1.4 (to which Applicants are committed; see Applicants' Exhibit 148).

3. Applicants state:

"As part of the as-built review program Gibbs & Hill reran the thermal piping analyses at all locations where U-bolts were initially considered as one-way restraints and where the piping thermal movement was equal to or exceeded 1/16 inch.

"Those reanalyses indicated that even assuming the U-bolt acted as a two-way restraint, the piping stresses would remain well within allowable values. Id. at 4."

I disagree with the first sentence. The problem here is (in more precise terms) when a seismic event occurs, which was not considered by the Applicants (as shown in their Affidavit, page 4, first full paragraph), the combined displacement from seismic motion and thermal movement of the pipe exceeding 1/16" will induce a load into the support. Although at the instant the load from the pipe is restrained and stresses decrease within the pipe at that instant, loads increase in the U-bolt. If the U-bolt were intended for restraint in one direction (that is, other than lateral), the combined load due to this new restraint from seismic and its intended direction may fail the bolt. Now the U-bolt does not act in its intended direction and there is a lack of a support there, even though the support did not move more than 1/16" due to thermal movement. The combined thermal and seismic movement can fail the U-bolt and the stresses now within the pipe will increase.

In the Applicants' affidavit at page 4, the Applicants state: ". . . piping movements associated with seismic excitation were believed to be very small and generally less than 1/32 inch." Although the Applicants may have believed this statement, this statement it not realistic. CASE Exhibit 932 (see pertinent portions attached), the page labeled 18 of 18, lists the displacements of support SI-1-075-001-S22R and they are +.619 inches and -.043 inches in the X direction, and +.202 inches and -.026 inches in the Z direction. As can be seen, the seismic movements for these load sheets do exceed 1/32". Therefore, Applicants' statement above does not have merit and is a nonconservative error on their part. Although this particular support did not have a U-bolt, the seismic movement did exist. For a support with a U-bolt that has a seismic displacement greater than 1/32", see Table 3, page 6 of Applicants' attachment, where the seismic displacement for Support CC-1-007-040-A63R is .044 inches, which is greater than 1/32".

In regard to Applicants' second sentence, referencing page 4 of their Affidavit, the stress values in the reanalyses are not within allowables for only a thermal loading condition, as will be shown in answer 5. In addition, the Applicants (as has already been alluded to) did not include the stresses due to seismic and did not mention the stresses due to dead load. If the reanalyses were to be a true model of the actual conditions, this would require analyzing the two-way U-bolt for all possible loading conditions and consideration would be required for those instances where the U-bolt would have exceeded its

yield values and acted no longer as a restraint in either direction (i.e., as if no support were even there). (See CASE's 8/22/83 Proposed Findings, Section II, page 3, last line, through page 7.)

4. Applicants state:

"Applicants decided to replace all U-bolts on rigid frames initially considered as one-way restraints where piping thermal movements were computed to equal or exceed 1/16 inch in the original analysis. Id."

Applicants' statement is correct, but they have not given a reason for not replacing U-bolts when the thermal movements are less than 1/16". If their decision was based on a 1/16" gap between the pipe and the U-bolt, this decision would be an inappropriate one. The construction procedures do not require a 1/16" gap on both sides of the U-bolt. The installation of U-bolts or any frame that requires a 1/16" gap has a tolerance of + or - 1/16". Therefore, one could have a zero inch gap on one side of the pipe and a 1/8" gap on the other side. If the pipe wishes to move 1/16" where there is a zero inch gap, this will induce a load equal to a 1/16" deflection of the U-bolt. This load due to a 1/16" deflection must be added to the normal load (as defined by the Applicants). The PSE Guidelines at Section II, paragraph 2.2, page 2 of 15, Revision 2 (see copy attached) states:

> ". . . Clearances required to allow the pipe to move in the unrestrained direction should be 1/2" over the calculated movement or 1", whichever is greater. In certain limited space configurations, where thermal growth is small, lesser clearances may be acceptable."

Although the PSE Guidelines allow a clearance to be less than the thermal growth of the pipe plus 1/2", there has been no documentation

to show that there is a gap between the pipe and the U-bolt. To this extent, the Applicants are not in compliance with this provision of the PSE Guidelines.

5. Applicants state:

"There are currently seventy Unit 1 and common U-bolts on rigid frames which were originally modeled as one-way restraints.

"While the maximum thermal pipe movement associated with each of the seventy U-bolts would not exceed the 1/16 inch design gap, the maximum thermal plus seismic movement of eight would. Id. at 6."

The Applicants state that they are currently 70 , etc. (emphasis added.) This is not a clear picture of the number of U-bolts existing at the plant in the original design that were assumed to act as one-way restraints. This conclusion is based on the following: On item 3 above, the Applicants stated that as part of the as-built review, all U-bolts were initially considered as one-way restraints and having thermal movements exceeding 1/16 inch were replaced. There are currently (according to Applicants' item 5) no U-bolts where thermal movements exceed 1/16". The combined movements of seismic and thermal of this remaining 70 supports have been evaluated by the Applicants, and 8 supports exceed 1/16" when thermal and seismic displacements are added. This represents 13% of the supports the Applicants currently have where seismic and thermal displacements exceed the 1/16" displacement. The word "currently" indicates that this may not properly represent the design of Comanche Peak. This Motion for Summary Disposition was written May 23, 1984, and that is what is current. On the 22nd, maybe (I don't know) there may have been 700

supports that, had seismic and thermal displacements been included, would have exceeded the 1/16" displacement.

6. Applicants state:

"To assess the impact on piping analyses of a U-bolt installed in the plant acting as a two-way restraint, Applicants conservatively reanalyzed stress problems associated with the two worst case U-bolts (i.e., those with the maximum combined thermal and seismic movement, CC-X-013-012-A43R and CC-1-007-040-A63R) and a representative sample of other U-bolts initially considered as providing one-way restraints. Id. at 6-7.

"The reanalyses reflected that any effects of the U-bolts acting as two-way restraints on piping stresses and associated loads (e.g., nozzle and anchor loads) would be small or negligible and would not result in exceeding allowable stresses or manufacturers' allowable values.

"Further, the analyses reflected that the effects on other associated piping supports are generally decreases in the loads; where there are increases, they are well within allowables. Id. at 8-10."

In regard to the first sentence, Applicants state what they considered to be "conservative"; i.e., "maximum combined thermal and seismic movement." I disagree with their implication that this would be a conservative analysis. If they meant to imply that they were conservative by looking at the U-bolts as two-way restraints, that is not necessarily conservative, but a realistic modelling technique to analyze a piping system and the loads it will impart on the supports.

I disagree with Applicants' second and third sentences. The reanalyses indicate that the pipe stresses increase and the loads on the U-bolts vs. the allowables of the U-bolts increase. As a matter of fact, some U-bolts exceed allowables, which is contrary to the Applicants' statement, as will be shown below.

Referring to the attachment to Applicants' Motion which has a cover page titled "Index of Tables," Applicants' Table 5a (towards the back of the attachment), for Support CC-1-007-035-A63R, the vertical load without U-bolts modelled as two-way restraints, and due to thermal loads only, is 52 lbs. With the U-bolt modelled as a two-way restraint, and due to thermal loads only, the vertical load is 65 lbs. and the lateral load is equal to 1,259 lbs. (square root of 2 times 890 lbs.). According to the PSE Guidelines (Section XII, page 66 of 364, see attached copy), the allowable lateral load for this U-bolt, which is attached to a 6" diameter pipe, is 210 lbs., which is far less than the applied load.

On Table 1 of the same attachment, Support CC-2-126-005-F43R is listed. There is no asterisk by this support where the asterisk indicates two-way action. Its maximum thermal movement is shown to be .008" and maximum seismic movement to be .0261". Referring to Table 4 for stress problem AB-2-63B, on page 3 it lists the support CC2-126-005-F43R with an asterisk. The level B load without the U-bolt modelled as a two-way restraint is 2,904 lbs. in the X direction. When the U-bolt is modelled as a two-way restraint, the load in the X direction is 3,434 lbs. The load now in the U-bolt in the lateral direction (i.e., the Y direction) is 952 lbs. The allowable lateral load for this U-bolt on a 12" diameter pipe is 300 lbs. (PSE Guidelines, Section XII, page 66 of 364, see attached copy). It should be mentioned that this support had a seismic displacement or thermal

movement of less than 1/32", and the allowables were exceeded. It should also be mentioned that in their Table 4, the Applicants neglected to consider the two-way restraint which exists due to thermal movement. This is demonstrated by observing the Table for this support, and noting that the two-way restraint loads listed were for loadings B and C and not A, and loading A would be for dead plus thermal loads only.

Other examples where the U-bolts, when modelled as two-way restraints, exceed allowables (based on Tables 2, 3, and 4 of Applicants' attachment and PSE Guidelines, Section XII, page 66 of 364, see attached copy) are:

CC-X-013-012-A43R

CC-X-025-005-A43R

CC-1-007-040-A63R

CC-2-126-006-F43R

The affidavit of Messrs. Iotti and Finneran at page 8 states that a rerun of the problems with U-bolts input as two-way restraints produced no appreciable change in loads; however, if one studies the tables that resulted from these reruns, the problems become obvious, as discussed in the following:

- Table 3, problem AB-1-62E, second page, support No. CC-1-007-025-A43R, shows that the load increased 29%.
- Page 4 of this Table, for Support No. CC-1-007-039-A43R, shows that the load increased 31%.
- Page 5 of Table 3, for support CC-1-007-704-A43R, shows that the load increased 28%.

- Table 4, problem AB-2-63B, at page 3, support No. CC-2-126-010-F43R, shows the load increased 26%.
- CC-2-126-007-F43R, shows a load increase of 61% (2200 lb. increase).
- **Page 3, CC-2-126-005-F43R, shows a load increase of 21% plus a lateral load not existing before of 952 lbs.**
- Support CC-2-126-006-F43R, shows a load increase of 25% plus a 318 lb. lateral load not existing before.
- CC-2-126-011-F43R shows a load increase of 11% plus a 61 lb. lateral load not existing before.
- On page 4 of Table 4, support CC-2-164-407-A63K, shows a load increase of 27%.

The increases selected above only included those loads that increased 20% or more or where the increase was 10% and lateral loads were indicated that had not existed previously.

Now, since these U-bolts are no longer acting in a predictable manner, one must consider how this will affect the remaining pipe supports and the piping itself, since this U-bolt is not resisting loads in either direction, in a predictable manner.

The Applicants claim that the associated piping supports may have a decrease in loads, but when the U-bolts become nonfunctional because of exceeding the allowables, the adjacent supports will now receive an increase in loads which needs to be evaluated, and the Applicants have neglected to do so.

7. Applicants state:

"If maximum thermal and seismic movement were assumed to occur simultaneously, there would be a lateral load (in addition to the load in the normal direction) acting on eight of the 70 U-bolts, noted above. Id. at 10.

"CASE acknowledges that this lateral load will be small when compared to the load in the normal direction (CASE Findings of Fact at II-3)."

In the first sentence, Applicants are assuming maximum thermal and seismic movement will occur simultaneously. It is a requirement of General Design Criteria, 10 CFR Part 50, Appendix A, I. Overall Requirements, Criterion 4, Environmental and Missile Design Bases, as well as ASME NF-3231.1. Since the Applicants are stating that they must make an assumption, apparently Messrs. Finneran and Iotti are not aware that they are required to perform the simultaneous load combination analysis.

In regard to Applicants' second sentence, Messrs. Finneran and Iotti have again taken CASE's statements out of context. As stated in CASE's Proposed Findings, page II - 3:

> "The SIT concluded that the forces in the lateral direction of the U-bolt is considered negligible (page 31, second paragraph, Staff Exhibit 207). CASE agrees that the forces in the lateral direction are small when compared to the intended vertical direction. But the allowables for U-bolts in the lateral direction are also negligible compared to the intended vertical direction. For a comparison (referring to CASE Exhibit 669B, Attachment to Doyle Deposition/Testimony, page 13N and 13-0), the allowable in the intended vertical direction for a 18" diameter pipe under Level B is 9920 lbs., as shown on page 13N. The allowable in the lateral direction for the same pipe and loading B is 320 lbs., as shown on page 13-0." (Emphasis in the original.)

Although CASE agreed with the SIT at the time CASE's findings were written (based on the information we had at that time), I now disagree

that the loads will be small in the lateral direction when compared to the normal (intended vertical) direction, based on the Applicants' reanalysis.

By observing Table 5a of Applicants' attachment, for Support CC-1-007-035-A63R, the lateral load is 24 times larger than the original intended vertical load. From the same table, Support CC-1-007-040-A63R, the lateral load is 7 times larger than the original intended vertical load. This is just a sample; other supports had lateral loads that were a considerable percentage (rather than a small percentage) of the original intended vertical loads.

8. Applicants state:

"Applicants commissioned ITT Grinnell to carry out a series of tests on U-bolt capability to carry both normal and lateral loads.

"The tests reflected that even for lateral displacements exceeding the maximum that could occur, the lateral load would not impair the capability of the U-bolt to carry its load in the normal direction. For example, the tests reflect that even if the maximum seismic plus thermal lateral displacement were to induce a lateral load equal to fifty percent of the rated normal load, the U-bolt would still have more than a factor of 2.5 margin of safety in its normal direction. Id. at 10-11."

Regarding the first sentence, it should be noted that ITT Grinnell has a vested interest in the outcome, and thus can not be considered to be impartial or independent. Also, during the 6/11/84 telephone conference call between Applicants/NRC Staff/CASE, when asked what criteria was used to have ITT Grinnell do the testing rather than an independent outside laboratory, Dr. Iotti stated (Tr. 32/2-8):

"I guess the prime criterion is expediency in the sense that we have to have this done in a short time; secondly is that the devices employed to test for ultimate capability are essential, universal (sic) and, you know, there is no way you can hide the results of the test, so it's really immaterial who conducts them." (Emphasis added.)

Regarding the second sentence, I do not agree with their method of testing and the conclusions they have drawn. The test results are based on two particular rods where the yield and ultimate tensile strengths exceed the minimum required. This is an advantage to the Applicants because their rod is already known to be stronger than the minimum specified and used at Comanche Peak. Therefore, for those rods that are utilized from those particular test results, the results are accurate; however, for all remaining U-bolts which come from a different batch of steel, the results obtained in this testing is not reflective of the test. If the Applicants were to utilize the test values, the Applicants would have to require the supplier of these U-bolts to have a minimum yield of 51.6 ksi and not 36 ksi, and a minimum tensile strength of 73.4 ksi and not 58 ksi. Since this is not being done, the conclusions which the Applicants have drawn are immaterial and misleading. If the test was properly done, the U-bolts tested would have a yield strength equal to or less than 36 ksi, and a tensile strength equal to or less than 58 ksi.

The test results which the Applicants provided indicate that they are not in compliance with their own stiffness criteria, but this will be discussed in an affidavit in response to Applicants' Motion for Summary Disposition on generic stiffnesses. However, there is one

point which I need to bring to the Board's attention (as well as the Applicants'). It is on page 16 of the Affidavit of Messrs. Finneran and Iotti where they state:

> "The test program has confirmed that deflections in the normal directions, even when the U-bolts are loaded to their full rated loads, would be small. One can see this from the charts on pages 54-56 of Attachment 1. At the normal loadings the stresses are small and deflections are less than .02 inches for the 1/2 inch bolt, and less than .03 inches for the 1 inch bolt."

A review of the test results on pages 54-56 of Attachment 1, indicates that displacements are not measured but strain is measured (strain is change in length over original length). In Figure A-13 on page 54, there is, however, an indication that possibly displacements were measured. If the values shown (i.e., .5, 1.0, and 1.5 inches) are the displacements (which is difficult to determine from the Figure), the load at 1/16" deflection would equal 1,200 lbs. According to the PSE Guidelines (page 65 of 364, Section XII, see copy attached), the allowable load listed is 2,260 lbs. This load of 2,260 lbs. exceeds the 1/16" (.0625") deflection criteria. Therefore, the statement which the Applicants make in their affidavit indicated above is contrary to the test results. It is also noteworthy that the Applicants provide the load vs. displacement for the axial and lateral tests, but not for the load normal to the U-bolt. This is particularly unfortunate since the load vs. displacement in the normal loading direction of a U-bolt is also one of CASE's allegations.

In regard to Applicants' third sentence where they state that they have a factor of 2.5 margin of safety in its normal direction, is

contrary to standard industry practice. Standard industry practice has a factor of safety of 4 in regards to the allowables for standard component supports.

9. Applicants state:

"Using conservative assumptions, it was determined that all of the U-bolts at issue here were well within the manufacturer's interaction formula limits. Id. at 12-15."

I disagree with this statement by the Applicants. First of all, I have not seen where conservative assumptions were employed. In addition, it has been shown above that five of the supports exceeded established code allowables. In addition, it was shown above that the U-bolts do not comply with the Applicants' generic stiffness.

Attachments:

Attachment A 7/16/82 Gibbs & Hill Interoffice Memorandum from H. W. Mentel to Distribution, Subject: U-Bolt Review Procedure (see answer 2, page 4)

Attachment B CASE Exhibit 932 (pertinent portions, Drawing SI-1-075-001-S22R and page 18 of 18) (see answer 3, page 8)

Attachment C PSE Guidelines, Section II, paragraph 2.2, page 2 of 15, Revision 2 (see answer 4, page 9)

Attachment D PSE Guidelines, Section XII, pages 65 and 66 of 364 (see answers 6 and 8, pages 12, 13, and 18)

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 19 day of Aug, 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 19 day of Aug, 1984.

Samuel W. Hestor
Notary Public in and for the
State of Texas

SAMUEL W. HESTOR
My Commission Expires
1-31-85

My Commission Expires: _____

for CASE

ATTACHMENT A

Gibbs & Hill, Inc.

Interoffice Memorandum

TO: Distribution

DATE: July 16, 1982

FROM: H.W. Mentel

JOB NO: 2323

SUBJECT: U-Bolt Review Procedure

REF. NO:

To date it has become apparent in reviewing the applicable BRH drawings that both NPSI and ITT Grinnell have used U-Bolts in various supporting configurations. Already the following questions have been posed:

1) In reviewing the BRH v.s. the BRHL drawing, the BRHL designates a two way support, while the BRH has a U-Bolt with a single design load in the direction of the principle axis. (In some instances this situation has been reversed). What should be modeled?

2) In some instances the BRHL calls for a one way support and the BRH has a single design load. However the support design consists of the use of a U-Bolt, with the principle axis (U-Bolt in tension) taking the design load. What about the lateral movement indicated in the ADLPIPE analysis? In the past, problems have been issued with the future corrective action sheets requiring the opening up of gaps on the U-Bolt. However, this procedure is not possible since it would affect the structural characteristics of the U-Bolt.

In response to these questions and any others which may arise (also to clear past future corrective action statements on U-Bolts) the following procedure is presented.

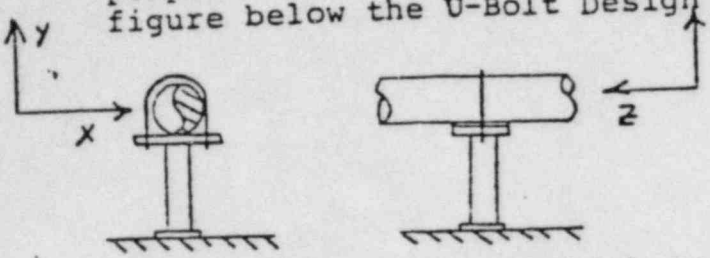
STEP I

Review the applicable BRH and BRHL drawings. For those supports utilizing U-Bolts, check the original design loads, in particular their directions.

In those instances where the BRHL and BRH disagree (ie BRH design load is Fy only; BRHL indicates a two directional guide) report the discrepancy to the GHABC for clarification. The support stiffness values to be used are the G&H applied mechanics standard values.

STEP II

Once an initial run is made, for those supports which have a U-Bolt but only one design load the piping movements in the perpendicular direction must be reviewed. For example in the figure below the U-Bolt Design load was Fy. The piping is essentially free to move in the Z direction. However, the U-Bolt offers resistance in the X Direction.



It is the X movements which must be reviewed. Only the thermal movements need be checked, the reasoning being that the existence of the lateral stiffness of the U-Bolt is an aid in the seismic analysis, improving on the rigidity of the overall system in a seismic event. It is the thermal condition which is in question since the lateral stiffness jeopardizes the flexibility that may be needed to reduce thermal stresses and equipment nozzle loadings. If the lateral thermal movement is not greater than 1/16 inch then it will be deemed that a problem does not exist. For those cases where the 1/16 inch criteria is violated further analysis is required in step III.

STEP III

For lateral thermal movements greater than 1/16 inch an additional ADLPIPE run should be made. This run should consist of only the thermal condition files with a lateral stiffness imposed at the U-Bolt. That stiffness should be from the attached tables, extracted from calculation 2323-550-1-6. In this study run two things must be checked. First the affect on thermal stresses. Second the resulting lateral load on the U-Bolt. If the imposed stiffness creates an overstressed condition or the lateral load on the U-Bolt exceeds the vendor's allowable than a modification to the support will be requested. If neither condition results than the U-Bolt will be deemed not to be a problem. Note: That there is no concern over the seismic lateral load on the U-Bolt since if it exceeds the vendor's allowable. The U-Bolt will yield and the resulting displacements are accounted for in the piping analysis since seismically the piping is free to move. Also note that the reason the lateral stiffness is not modeled right away in step I of this procedure is the fact that this will automatically result in a lateral load not previously identified in the previous designed analysis. Our purpose with this procedure is to check the adequacy and affect of the existing design not present new design conditions to the support vendors.

In closing an effort should be made to minimize any changes in U-Bolt Design hardware. In each instance where it is necessary to proceed to Step III above, both the job engineer and group supervisor should be consulted. This procedure is effective immediately. Past future corrective items will be closed out by the job engineer in his review.

HWM:reb

Gibbs & Hill, Inc. Job No. 2323-001 Client TMI

Subject LATERAL STIFFNESS OF U-BOLT ATTACHMENT

Calculation Number 2323-550-1-G Sheet No. 18

Revision	Originator	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.
Checking Method											
Preparer	HYCH	5/5/82									
Checker											

TABLE 1

MPS U-BOLT STANDARD (PHS): FOR $E/L = 1$

U-BOLT SIZE NO.	PIPE SIZE (IN)	ROD SIZE (IN)	LATERAL STIFFNESS (#/IN) K	* LATERAL DISPLACEMENT LIMITATION (IN) Δ
001	1/2	1/4	5.81×10^{5}	5.91×10^{-4}
006	3/4		1.71×10^{5}	1.24×10^{-3}
010	1		7.27×10^{4}	2.20×10^{-3}
012	1 1/4	3/8	1.88×10^{5}	2.30×10^{-3}
015	1 1/2		1.09×10^{5}	3.30×10^{-3}
020	2		4.61×10^{4}	5.88×10^{-3}
025	2 1/2	1/2	7.45×10^{4}	6.89×10^{-3}
030	3		7.31×10^{4} ✓	9.92×10^{-3}
035	3 1/2		2.71×10^{4}	1.35×10^{-2}
040	4		1.81×10^{4}	1.76×10^{-2}
050	5		9.29×10^{3}	2.76×10^{-2}
060	6	5/8	1.31×10^{4}	3.17×10^{-2}
080	8		5.53×10^{3}	5.64×10^{-2}
100	10	3/4	5.28×10^{3}	7.35×10^{-2}
120	12	7/8	6.30×10^{3}	9.07×10^{-2}
140	14		3.96×10^{3}	1.23×10^{-1}
160	16	1	2.66×10^{3}	1.61×10^{-1}
180	18		3.18×10^{3}	1.79×10^{-1}
200	20		2.31×10^{3}	2.20×10^{-1}
240	24		6.22×10^{2}	3.17×10^{-1}
300	30		4.21×10^{2}	4.96×10^{-1}

* NOTE: THE CORRECTION FACTOR K & Δ CAN BE OBTAINED FROM FIG 1 FOR $L/R > 1$.

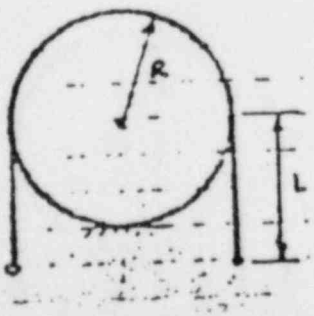


Fig 1.

Gibbs & Hill, Inc. Job No. 2323-001 Client TUSI

Subject LATERAL STIFFNESS OF U-BOLT ATTACHMENT

Variation Number 2323-550-1-6 Sheet No. 19

	Original Issue	Date	Revn	Date	Revn	Date	Revn	Date	Revn	Date	
Revision											
Checking Method											
Preparer	MYCH	5/14/82									
Checker											

TABLE 2

N.P.S.: U-BOLT. HEAVY DUTY. (PUH); FOR $R/L = 1$.

U-BOLT SIZE NO	PIPE SIZE (IN)	ROD SIZE (IN)	LATERAL STIFFNESS (#/IN)	LATERAL DISPLACEMENT LIMITATION (IN)
004	1/2	3/8	2.94×10^6	3.67×10^{-4}
006	3/4		8.72×10^5	8.27×10^{-3}
010	1	5/8	2.84×10^6	8.80×10^{-3}
012	1 1/4		1.45×10^6	1.38×10^{-3}
015	1 1/2		8.41×10^5	1.98×10^{-3}
020	2		3.54×10^5	3.53×10^{-3}
025	2 1/2	3/4	3.76×10^5	4.59×10^{-3}
030	3		2.17×10^5 ✓	6.61×10^{-3}
035	3 1/2		1.37×10^5	9.00×10^{-3}
040	4	7/8	1.71×10^5	1.00×10^{-2}
050	5		8.70×10^4	1.57×10^{-2}
060	6		5.04×10^4	2.26×10^{-2}
080	8		2.12×10^4	4.03×10^{-2}
100	10	1	1.86×10^4	5.51×10^{-2}
120	12		1.01×10^4	7.94×10^{-2}
140	14		6.78×10^3	1.07×10^{-1}
160	16		4.54×10^3	1.40×10^{-1}

NOTE: THE CORRECTION FACTOR FOR $L > R$ CAN BE OBTAINED FROM Fig. 1.

GENERAL REMARK: IF THERE IS GAP BETWEEN U-BOLT & PIPE, THE ABOVE DATA ONLY APPLIED AFTER THE GAP IS CLOSED.

Checking Method # 1. Line-by-line checking 2. Alternative Calculation Results compared

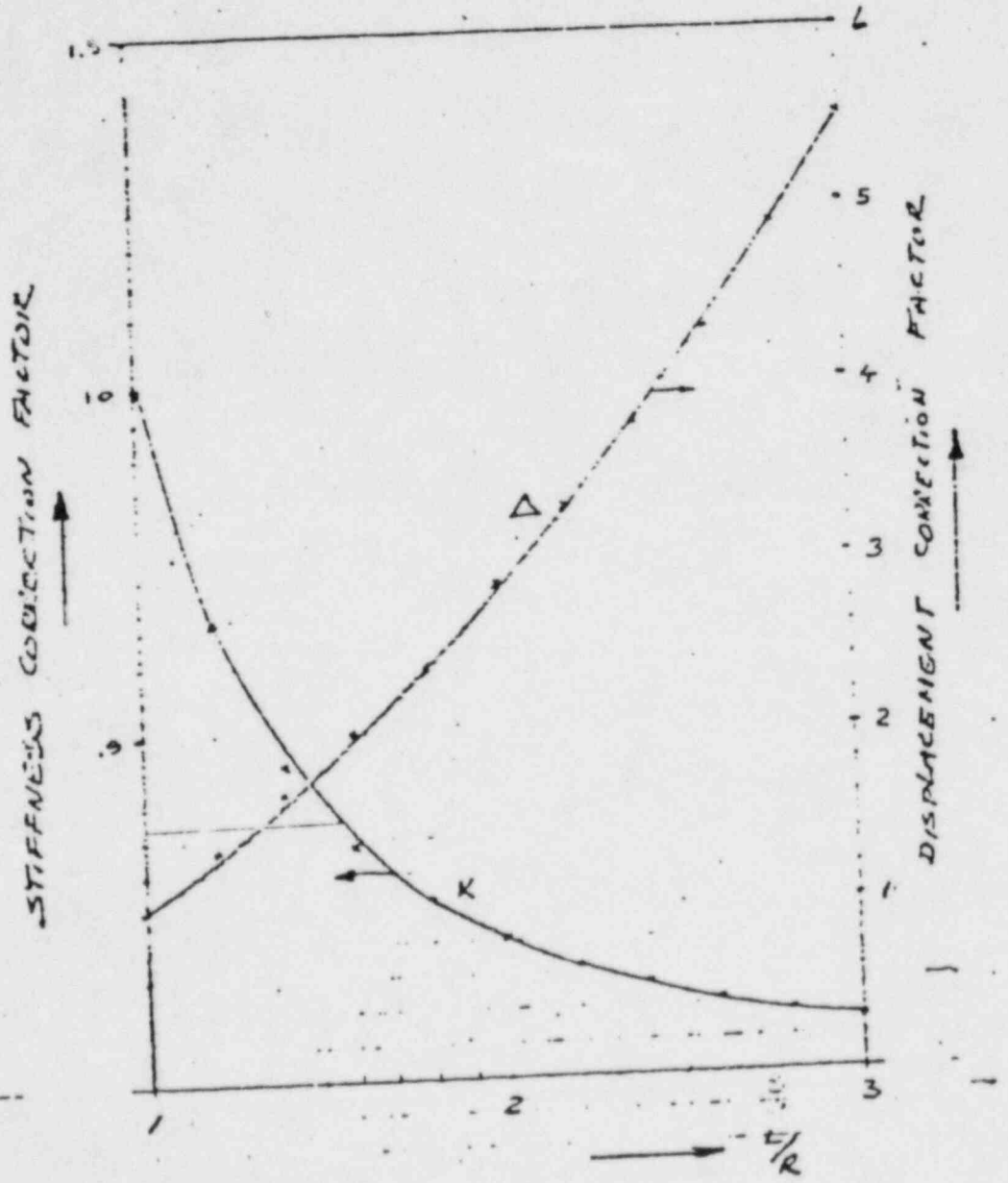
Gibbs & Hill, Inc. Job No. 2323-001 Client TUSI

Subject LOCAL STIFFNESS OF U-BOLT ATTACHMENT

Calculation Number 2323-550-1-C Sheet No. 20

	Original Issue	Date	Rev.	Date	Rev.	Date	Rev.	Date	Rev.	Date	
Revision											
Checking Method											
Preparer	MYCH	5/5/82									
Checker											

CORRECTION FACTOR: CHART 1



F-166, 4-81

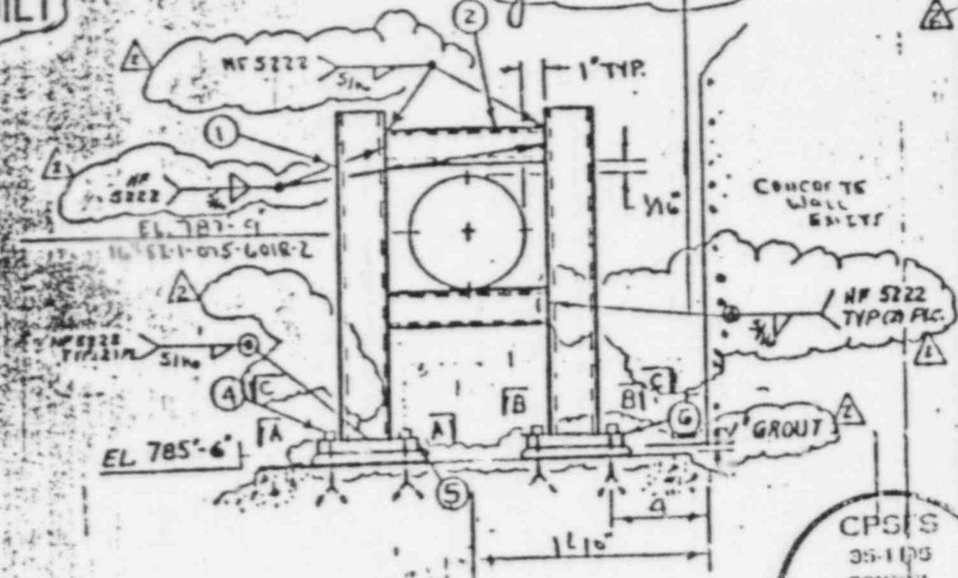
Checking Method #

1. Line-by-line checking
2. Alternative Calculation Results compared
3. Independent Calculation Results compared
4. Previous results and results of computer with corresponding inputs and results of similar codes

BLUELINE - 1-16-81

AS-BUILT

VENDOR CERTIFIED
DRAWING REV. NO. 2
BY [illegible] DATE 2/8/83



ITEM NO.	MATERIALS & OPERATIONS	QUAN.	SHIP.		PBS	L	C33	PRIM.	SEC.	ALIGC.
	SEISMIC PIPE RESTRAINT CONSISTING OF:	ONE								
1	1/2"x6"x6" T.S. (A-500) 3'-2" Long. TW-2198	2				X		X		
2	1/2"x4"x4" T.S. (A-500) 1'-6" Long. TW-638	2				X		X		
3	~~Carbon Steel (SA515 GR.65 or SA-36) Plate/ Section A-A TW-1918~~	~~2~~			X					
4	1"x12" Hilti Kwik Concrete Anchors. TW-238	8					X			
	48" NDE/Par. 2.5.1 of the unit price structure									
	SEISMIC ASSEMBLY SKETCH & ENGINEERING BUNDLE & TAG MARK# SI-1-075-001-S22R	1								
	Apply one coat of Carbo Zinc #11 to above mat'l									
5	C.S. PL. 1 1/2" x 19 1/4" x 20" (SA-36)	1			X			X		
6	C.S. PL. 1 1/2" x 16 3/4" x 16 3/4" (SA-36)	1			X			X		

CPSES 35-1195 CONTROL COPY DOCUMENT CONTROL C

REV	DATE	DWN	CHK	APP	DESCRIPTION
					AS BUILT VENDOR CERTIFICATION REF. GTN 61334

FOR ENGINEERING & OFFICE USE ONLY

FOR OFFICE AND ENGINEERING USE ONLY

INFORMATION COPY

Approved By: DRP
Date: [illegible]

TO-5801

BRHL Iso. SI-1-SB-007 REV
T.P.D. Iso. [illegible] Rev. [illegible]
Data Point [illegible]
Pipe Mat'l. A312 TP 304
Insul. — Bldg. S.B.

FOR MATERIALS AND OPERATIONS SEE SKETCH NO. SHEET OF

Brown & Root, Inc.

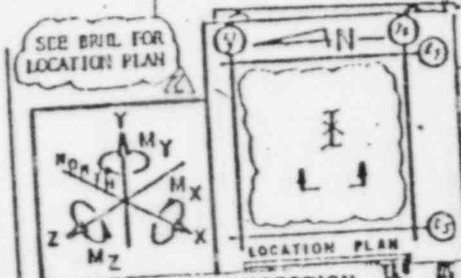
REF. DRAWING NUMBERS

PIPE: BL-606 Rev. 10 ELECT: BL-600 R9
STEEL: BL-640 Rev. 11 H.V.A.C.: BL-650 R3

CONDITIONS	Fx	Fy	Fz	Mx	My	Mz
DESIGN	—	—	—	—	—	—
NORMAL & UPSET	—	[illegible]	—	—	—	—
EMERGENCY	—	[illegible]	—	—	—	—
FAULTED	—	—	—	—	—	—

MOVEMENTS	
X	+0.119; -0.043
Y	—
Z	+0.202; -0.076

SEE BRHL FOR LOCATION PLAN



NOTE:
4) LOCKING DEVICES FOR HIGH STRENGTH BOLTS ARE NOT REQUIRED PER DCA 7607.

THIRD PARTY INSPECTION
CODE CLASS: ASME III -2

REV	DATE	DWN	APP	DESCRIPTION
C	[illegible]	[illegible]		ISSUED FOR CONST. F.W. H4
1	1-16-81	[illegible]		REV'D AS NT'D - REF FIELD MODIFIED HANGER SKETCH, ICN 1471, DELETED NOTES 1-3 & 7 W/1-4 (ALLEGMENT 2) ADDED "R" TO MARK
2	2/8/83	[illegible]	Q	REV AS NOTED; REF CMC 52284 R1 DCA 7607 (SEE NOTE 4) CONT. ABOVE)

CUSTOMER Texas Utilities Service, Inc.
ORDER OR CONT. NO. CP-0016
JOB NAME Comanche Peak 1 & 2
MARK NO. SI-1-075-001-S22R
SKETCH NO.
SHEET 1 OF 2 REV. 2

CASE EXHIBIT ~~895~~ 932

ATTACHMENT B

SUPPORT LOAD TABLE

REV.	CALC./DATE	CHK'D./DATE	DESCRIPTION
0	[illegible] 9-27-82	[illegible] 10/6/82	AS-BUILT LOADS PER AB-1-069/R0

PROBLEM NUMBER/REVISION AB-1-069/R0 ; GTN # 61334

ERHL/REVISION RH-1-SB-002/R1, RH-1-SB-005/R1, SI-1-SB-019/R2, RH-1-RB-001/R1 RH-1-SB-004/R1, SI-1-SB-004/R1, SI-1-SB-061/R0, RH-1-RB-002/R1 RH-1-SB-005/R1, SI-1-SB-007/R1, SI-1-SB-062/R0, SI-1-SB-001/R3

SI-1-073-700-S32R NORMAL (A)

NODE PT. 1773 UPSET (B)

EMERGENCY (C) / ~~FAULTED (D)~~

Fx	Fy	Fz	ΔX	ΔY	ΔZ
-76	-5761	-24	0.0	0.0	0.0
+321	-5093	+103	0.0	0.0	0.0
-6867	-19311	-2200			
+7112	+8457	+2278	Fx	Fy	Fz
-11018	-27892	-3530	—	—	—
+11263	+17038	+3603			

"NORMAL OPERATING MODE" DISPLACEMENTS ΔX= —— ΔY= —— ΔZ= —

SI-1-074-700-S32R NORMAL (A)

NODE PT. 1703 UPSET (B)

EMERGENCY (C) / ~~FAULTED (D)~~

Fx	Fy	Fz	ΔX	ΔY	ΔZ
-428	-4296	-64	0.0	0.0	0.0
+198	-3547	+137	0.0	0.0	0.0
-6067	-11692	-1870			
+5837	+3849	+1944	Fx	Fy	Fz
-8553	-16380	-2667	—	—	—
+8323	+8537	+2740			

"NORMAL OPERATING MODE" DISPLACEMENTS ΔX= —— ΔY= —— ΔZ= —

SI-1-075-001-S22R NORMAL (A)

NODE PT. 1746 UPSET (B)

EMERGENCY (C) / ~~FAULTED (D)~~

Fx	Fy	Fz	ΔX	ΔY	ΔZ
—	-6573	—	+0.619	—	+0.2
	-2845		-0.043		-0.02
—	-10580	—			
	+1161		Fx	Fy	Fz
—	-11809	—	—	—	—
	+2390				

"NORMAL OPERATING MODE" DISPLACEMENTS ΔX= —— ΔY= —— ΔZ= —

SI-1-075-002-S22K NORMAL (A)

NODE PT. 746 UPSET (B)

EMERGENCY (C) / ~~FAULTED (D)~~

Fx	Fy	Fz	ΔX	ΔY	ΔZ
—	—	—	+0.578	+0.021	+0.2
			-0.040	-0.212	-0.0
-3118	—	—			
+3118			Fx	Fy	Fz
-3690	—	—	—	—	—
+3690					

"NORMAL OPERATING MODE" DISPLACEMENTS ΔX= +.578 ΔY= -.212 ΔZ= +.

TEXAS UTILITIES SERVICES INC.		REV.	ISSUE DATE	PAGE
ENGINEERING GUIDELINE TITLE	COVER SHEET FOR GUIDELINE REVISIONS	0	1-15-82	1 OF 1
Section II General Engineering Criteria For Pipe Support Design		APPROVED: John L. Finnerty Jr.		
		PSE PROJ. ENGR.		

I. INSTRUCTIONS FOR FILING GUIDELINE PAGES

1. Remove Section II in its entirety and replace with the enclosed revised Section II, pages 1 through 15.

2. Place this cover sheet in front of page 1, Rev. 2 of Section II.

II. STATUS OF GUIDELINE PAGES

PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV
1	2	15	0								
2	2										
3	2										
4	2										
5	2										
6	2										
7	2										
8	2										
9	2										
10	2										
11	2										
12	2										
13	2										
14	2										

SECTION II

2.2 (Continued)

Clearances required to allow the pipe to move in the unrestrained direction should be 1/2" over the calculated movement or 1", whichever is greater. In certain limited space configurations, where thermal growth is small, lesser clearances may be acceptable.

2.3 DEFLECTION

Effective at the issue date of this Section, the maximum allowable support deflection, at the point and in the direction of load application is 1/16" (0.063") with level "B" loads. See Section XVIII for Class I. There is no deflection criteria for unrestrained (friction) loads.

2.4 DESIGN TEMPERATURE

See Section III for allowable material properties at different design temperatures.

2.5 BASE PLATES

Refer to Section IV for base plate design criteria. Random bolt patterns may be qualified using the ITT Grinnell base plate program or by sending off-site for finite element analysis.

Hand calculations incorporating plate flexibility, bi-axial stress and prying action considerations may also be used. However, this is not recommended due to the complexity and time required to perform a hand analysis.

Base plate material is available in SA-36 or SA-515, GR.65. SA-36 is more abundant and should be the first choice.

2.6 HILTI CONCRETE ANCHOR BOLTS

Refer to Section V for available sizes, and allowable loads.

TEXAS UTILITIES SERVICES INC.		REV.	ISSUE DATE	PAGE
ENGINEERING GUIDELINE TITLE	COVER SHEET FOR GUIDELINE REVISIONS	1	6-2-82	1 OF 7
SECTION XII NPSI and ITT-Grinnell Load Capacity Data Sheets/ Certified Design Report Summaries		APPROVED: John C. Finneran Jr. PSE PROJ. ENGR.		

I. INSTRUCTIONS FOR FILING GUIDELINE PAGES

1. Add the enclosed page 68 A, Rev. 1.

2. Remove the existing cover sheets, page 1 thru 7, Rev. 0 and replace with the enclosed cover sheets, pages 1 thru 7, Rev. 1.

NOTE: This revision added page 68 A. Vendor page numbers have not been changed and consequently two page numbers usually appear on a sheet.

II. STATUS OF GUIDELINE PAGES

PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV	PAGE	REV
1	2	11	B	21	N/A	31	0	41	0	51	0
2	N/A	12	B	22	0	32	0	42	0	52	0
3	N/A	13	B	23	0	33	0	43	0	53	0
4	0	14	B	24	0	34	0	44	0	54	0
5	0	15	N/A	25	0	35	0	45	0	55	0
6	0	16	N/A	26	0	36	0	46	0	56	0
7	0	17	0	27	0	37	0	47	0	57	0
8	0	18	N/A	28	0	38	0	48	0	58	0
9	N/A	19	N/A	29	0	39	0	49	0	59	0
10	N/A	20	N/A	30	0	40	0	50	0	60	0

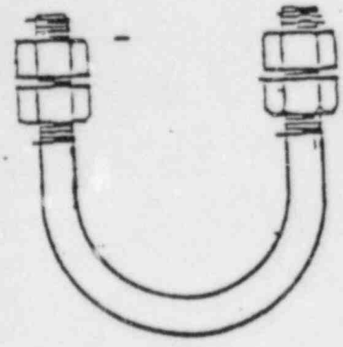
nps industries, inc.
nps! an nps group company

NPS INDUSTRIES, INC.
COMPONENT SUPPORT
CERTIFIED DESIGN REPORT SUMM

LOAD NO.
PAGE 1 OF 3
REV. 1 DATE 6/12/81

Products covered by this Certified Design Report Summary are included in P Section of NPS Industries' Catalog

Product Name/Part Code			Material		Load Capacity at 650° F (lbs.)		
U-Bolt Standard/PUS	Size	Code	Specification	Type Grade Class	Design Level A Level B	Level C	Level D (Per Appendix F)
	1/2	004	SA36(1)	-	485	645	906
	3/4	006	"	-	485	645	906
	1	010	"	-	485	645	906
	1 1/4	012	"	-	1220	1620	2280
	1 1/2	015	"	-	1220	1620	2280
	2	020	"	-	1220	1620	2280
	2 1/2	025	"	-	2260	3000	4225
	3	030	"	-	2260	3000	4225
	3 1/2	035	"	-	2260	3000	4225
	4	040	"	-	2260	3000	4225
	5	050	"	-	2260	3000	4225
	6	060	"	-	3620	4815	6770
	8	080	"	-	3620	4815	6770
	10	100	"	-	5420	7200	10100
	12	120	"	-	7540	10030	14100
	14	140	"	-	7540	10030	14100
	16	160	"	-	7540	10030	14100
	18	180	"	-	9920	13200	18500
	20	200	"	-	9920	13200	18500
	24	240	"	-	9920	13200	18500
	30	300	"	-	9920	13200	18500
	36	360	"	-	16000	21280	29820



DIRECTION OF VERTICAL LOADING

(No lateral load)

(1) Nuts: SA-307 GR B or A-307 Gr. A (per Code Cases 1644-5, 1644-6, N71-7, N71-8, N71-9, N-249-0)

(2) This is a non-welded item

STATE OF NEW YORK · REGISTERED PROFESSIONAL ENGINEER

This Certified Design Report Summary has been prepared by NPS Industries, in accordance with ASME Section III, Subparagraph NCA-3551.1, Code Case N-247 and is applicable for Code Classes 1,2,3 and MC Component supports designed by analysis in compliance with Subsection NF, Article 3000, 1974 Edition and also all addenda thru 1980 Edition, S'80 Addenda. The Applicable Design Specification (NPSS-61876 and Design Report (NPS-DR-PUS are maintained on file in NPS Industries' Quality Assurance Records in Secaucus, New Jersey.

Signature: [illegible] Registration No. [illegible]

State of New York Date: [illegible]

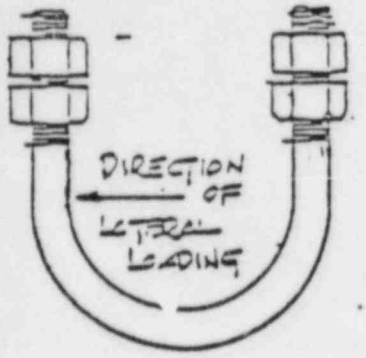
nps industries, inc.
an nps group company

NPS INDUSTRIES, INC.
COMPONENT SUPPORT
CERTIFIED DESIGN REPORT SUMMARY

CDRS NO. PUS
PAGE 2 OF 3
REV. 1 DATE 6/12/81

Products covered by this Certified Design Report Summary are included in P Section of NPS Industries' Catalog

Product Name/Part Code			Material		Load Capacity at 650°F (lbs.)		
U-Bolt Standards/PUS	Size	Code	Specification	Type Grade Class	Design Level A Level B	Level C	Level D (Per Appendix F)
	1/2	004	SA36(1)	-	110	150	205
	3/4	006	"	-	85	115	160
	1	010	"	-	70	95	130
	1 1/4	012	"	-	185	250	345
	1 1/2	015	"	-	160	215	300
	2	020	"	-	130	175	245
	2 1/2	025	"	-	250	335	470
	3	030	"	-	205	275	385
	3 1/2	035	"	-	180	240	340
	4	040	"	-	160	215	300
	5	050	"	-	130	175	245
	6	060	"	-	210	280	395
	8	080	"	-	165	220	310
	10	100	"	-	225	300	420
	12	120	"	-	300	400	565
	14	140	"	-	275	365	515
	16	160	"	-	240	320	450
	18	180	"	-	320	425	600
	20	200	"	-	285	380	535
	24	240	"	-	240	320	450
	30	300	"	-	190	255	355
	36	360	"	-	310	415	580



(No Vertical load)

(1) Nuts: SA-307 GR.B or A-307 GR.A (per Code Case 1644-5, 1644-6, N71-7, N71-8, N71-9, N-249-0)

(2) This is a non welded item.

This Certified Design Report Summary has been prepared by NPS Industries, in accordance with ASME Section III, Subparagraph NCA-3551.1, Code Case N-247 and is applicable for Code Classes 1,2,3 and MC Component supports designed by analysis in compliance with Subsection NF, Article 3000, 1974 Edition and also all addenda thru 1980 Edition, S'80 Addenda. The Applicable Design Specification (NPSS-81876 and Design Report (NPS-DR-PUS are maintained on file in NPS Industries', Quality Assurance Records in Secaucus, New Jersey.

Signature: Registration No.
State of: New York Date:

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

By my signature below, I hereby certify that true and correct copies of CASE's Answer to Applicants' Motion for Summary Disposition of CASE's Allegations Regarding U-Bolts Acting As Two-Way Restraints

have been sent to the names listed below this 20th day of August, 1984, by: Express Mail where indicated by * and First Class Mail elsewhere.

* Administrative Judge Peter B. Bloch
U. S. Nuclear Regulatory Commission
4350 East/West Highway, 4th Floor
Bethesda, Maryland 20814

* Ms. Ellen Ginsberg, Law Clerk
U. S. Nuclear Regulatory Commission
4350 East/West Highway, 4th Floor
Bethesda, Maryland 20814

* Dr. Kenneth A. McCollom, Dean
Division of Engineering,
Architecture and Technology
Oklahoma State University
Stillwater, Oklahoma 74074

* Dr. Walter H. Jordan
881 W. Outer Drive
Oak Ridge, Tennessee 37830

* Nicholas S. Reynolds, Esq.
Bishop, Liberman, Cook, Purcell
& Reynolds
1200 - 17th St., N. W.
Washington, D.C. 20036

* Geary S. Mizuno, Esq.
Office of Executive Legal
Director
U. S. Nuclear Regulatory
Commission
Maryland National Bank Bldg.
- Room 10105
7735 Old Georgetown Road
Bethesda, Maryland 20814

Chairman, Atomic Safety and Licensing
Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Chairman
Atomic Safety and Licensing Appeal
Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

John Collins
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 1000
Arlington, Texas 76011

Lanny A. Sinkin
114 W. 7th, Suite 220
Austin, Texas 78701

Dr. David H. Boltz
2012 S. Polk
Dallas, Texas 75224

Michael D. Spence, President
Texas Utilities Generating Company
Skyway Tower
400 North Olive St., L.B. 81
Dallas, Texas 75201

Docketing and Service Section
(3 copies)
Office of the Secretary
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Renea Hicks, Esq.
Assistant Attorney General
Environmental Protection Division
Supreme Court Building
Austin, Texas 78711

Juanita Ellis

(Mrs.) Juanita Ellis, President
CASE (Citizens Association for Sound Energy)
1426 S. Polk
Dallas, Texas 75224
214/946-9446