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-OL
and 50-446-OL

CASE'S PARTIAL ANSWER TO APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE REGARDING APPLICANTS' USE OF GENERIC STIFFNESSES INSTEAD OF ACTUAL STIFFNESSES IN PIPING ANALYSIS

in the form of

AFFIDAVIT OF CASE WITNESSES JACK DOYLE AND MARK WALSH

MR. WALSH:

1. Applicants state:

"In computing the response of a piping system which is either ASME Safety Class 2 or 3, Applicants use generic stiffness values. For Safety Class 1 systems, Applicants use the actual support stiffnesses. (Iocti, Finneran Affidavit at 2.)"

I agree with Applicants' statements insofar as they apply to the piping system. However, the problem which is at issue here is the pipe support groups do not calculate a stiffness for the supports for ASME Safety Class 2 or 3. A stiffness value, as an example, would be 5,000 lbs./inch; that is, a support will move 1" for a 5,000 lb. load. The pipe support groups use a generic deflection criteria, rather than a generic stiffness criteria. The generic deflection criteria is a

1/16" deflection, no matter what the load is. In other words, the piping analyst assumes the pipe support is in compliance with a generic stiffness requirement, but the pipe support groups do not calculate a stiffness. This procedure is in conflict with ANSI N45.2.11 (to which Applicants are committed), specifically 3.1 and 3.2 which state, in part /1/:

"3. DESIGN INPUT REQUIREMENTS

"3.1 General

"Applicable design requirements, such as design bases, regulatory requirements, codes and standards, shall be identified, documented and their selection reviewed and approved. Changes from specified design requirements including the reasons for the changes shall be identified, approved, documented and controlled.

"The design input requirements shall be specified on a timely basis and to the level of detail necessary to permit the design activity to be carried out in a correct manner and to provide a consistent basis for making design decisions, accomplishing design verification measures, and evaluating design changes.

"3.2 Requirements

"The design input requirements should include the following where applicable:

". . . (2) Performance requirements such as capacity, rating, system output."

(Titles emphasized in the original [illegible] of emphases added.)

/1/ See Applicants' Exhibit 148, ANSI N45.2.11, Draft No. 2, Rev. 2, May 1973, admitted into evidence at Tr. 5398 (supplemented, Addition to Applicants' Exhibit 148, following Tr. 7014).

MR. DOYLE:

2. Applicants state:

"The use of generic stiffness values is a common industry practice and has been found acceptable by the NRC provided that the generic stiffnesses adequately represent the stiffness of the installed supports (Iotti, Finneran Affidavit at 2-3.)"

I agree that the NRC Special Inspection Team (SIT) made this statement, in the SIT Report (NRC Staff Exhibit 207), page 40, last paragraph:

> "The use of generic stiffness values is common practice and is acceptable provided that the generic stiffnesses adequately represent the stiffness of the installed supports."

While I concur with this statement, I do not agree that the actual stiffnesses of the installed supports adequately represent the generic stiffness used when all elements which contribute to the stiffness are considered in the actual stiffness. For example:

(1) In the event a strut/U-bolt structural frame/anchor baseplate arrangement are all in line between the node point of the pipe and the hard point of the building, the following actual stiffness would apply generally for all supports affected by loads of less than 8,000 lbs. in the normal upset case:

The strut extension pipe for 50 inch length 1-1/2" diameter has a stiffness of less than 400 k/inches. The U-bolt 5/8" diameter has a k factor equal to 100 k/inches. Assuming the structural frame is maintained at the 1,000 k/inch stiffness and the anchor bolt baseplate assembly has a k factor of 500 k/inch,

the combined k for this support would only be 69 k/inches or approximately 1/70 of the generic stiffness utilized in the pipe stress analysis at CPSES.

(2) The Applicants' generic stiffness study, which was performed for an as-built system and included only the structural stiffness and strut stiffness (but not including excentricities such as indicated on drawing No. CC-2-011-001-A73R, CC-2-011-003-A73R, and CC-2-011-005-A73R -- this last support also has about a 12 degree kick angle). These supports are unstable structures which depend on the torsional stiffness of the pipe to establish the ultimate stiffness of the support. (For these supports, see Motion for Summary Disposition, Generic Stiffness, discovery item 9, document set No. 1.) Nor were the stiffnesses of the U-bolts or base plate anchor bolt assemblies considered. Applicants' new generic stiffness study indicated that the generic stiffness factors were not represented in the installed supports, and in fact, for the 6" line, the actual stiffness varied from 3.6 times the generic value to 1/70 of the generic value, and for that case 75% of the loads increased and were therefore nonconservative. The maximum increase for one support was 200%; 20% of the supports exhibited load changes greater than 25%. And it must be mentioned one more time, these stiffness values did not include the effects of U-bolts, base plates, anchor bolts, gaps, etc. The greatest load increase in terms of actual load was one support, the load of which went from 824 lbs. to 1371 lbs. At one anchor, force and

one moment also increased more than 25%. At the other anchor, all moments and two forces increased, and it must be recalled that this was for a system with only one support at 1/70 of the generic stiffness, and as shown above, the possibilities for many systems with one or more soft supports (1/70) exists /2/.

(3) Recalculation of support loads was also done for support No. CC-1-107-008-E23R, which was a support that had a generic stiffness of 1/360 of the generic stiffness. The load increase in this particular support was over 600% and resulted in a redesign of the support by CMC 94130, July 29, 1983 /3/.

(4) The fact that the effects of U-bolts, struts, etc. influenced the dynamics of systems while apparently not a concern of the Applicants or NRC Region IV, is an express concern of the Commission. See ASLB 12/28/83 Memorandum and Order (Quality Assurance for Design) at page 38, quoting Board Notification 82-105A, IV, pages 4 and 5, which states:

> "The dynamic interaction between the pipe and pipe clamp is a complex design problem. From a design standpoint, there are many uncertainties that could affect the actual system response such as consideration of total support system flexibility, mechanical non-linearities, construction and installation tolerances, and uncertainties in the dynamic loading itself. It is beyond the scope of this report to

/2/ See NRC Staff Witness W. Paul Chen's Affidavit on Open Items Relating to Walsh/Doyle Concerns (under cover letter of 10/14/83), page 24 and Attachment (Applicants' 8/17/83 Additional Pipe Support Generic Stiffness Study).

/3/ See Chen Affidavit, pages 25 and 26; see also drawing, CASE Exhibit 669B, Deposition/Testimony of Jack Doyle, admitted into evidence at Tr. 3630, item 11TT.

discuss the clamp-to-piping responses to these various factors. However, the report will focus on those local dynamic effects on the piping that can be attributed primarily to the clamp attachment that, in general, are not explicitly evaluated by piping designers."

(5) Therefore, the seismic analysis is rendered nonconservative due to the fact (as shown above) that the generic stiffness values are not representative of the supports as used at CPSES.

(6) The facts are that the use of generic stiffnesses represents a gross concern for the design of CPSES and is in violation of the codes and laws to which Applicants are committed.

The chain of codes and laws is as follows:

(a) In accordance with the provisions of ASME Section III, NA-3250 (PROVISION OF DESIGN SPECIFICATIONS), Applicants prepared a technical specification for nuclear safety-related equipment;

(b) The title of the document generated in compliance with ASME Section III, NA-3250, is NUCLEAR SAFETY CLASS PIPE HANGERS AND SUPPORTS, SPECIFICATION 2323-MS-46A;

(c) ASME Section III, NA-3320(b) regarding Manufacturer's responsibilities, is directed to ASME NA-3340; and NA-3340, RESPONSIBILITY FOR COMPLIANCE WITH THIS SECTION, states:

> "The Manufacturer who completes or substantially completes any component, appurtenance, core support structure, or component support required to be in compliance with this Section has the responsibility for the structural integrity using the Design Specifications as a basis of design . . ."

(7) The practices used in the design and construction at Comanche Peak nuclear plant proceed under a false premise; that is, you construct the facility, then justify the construction as opposed to justifying the procedure and then constructing. /4/.

(8) CPSES practices evade the provisions of 10 CFR 50, Appendix A, Criterion 1.

(9) Also, CPSES practices evade the provisions of 10 CFR 50.55(a)(1) design to stardards commensurate with the safety function.

(10) CPSES practices evade the provisions of 10 CFR 50.34(a)(8) on the requirement to prepare a plan for research and development for unique designs in the PSAR.

(11) Applicants' position is that it is industry practice to use the generic stiffnesses -- even though Applicants admitted that they are not in a position to state that the 1/16" deflection criteria always guarantees that they meet that generic stiffness /5/.

3. Applicants state:

"Applicants have conducted reanalyses of three piping stress problems using actual support stiffnesses effects both prior and in response to the Board's December 28, 1983, Memorandum and Order (Quality Assurance for Design). (Iotti, Finneran Affidavit at 4-10.)"

See discussion in answer 2 preceding.

/4/ For other examples of "preliminary" construction, see CASE Exhibit 669B (Attachment to Deposition/Testimony of Jack Doyle): 8T and 8U, 8V and 8W, 8Q and 8R, 8S and 8T, 11TT, 11UU and 11VV, 11WW and 11XX, 12H and 12I, and 13S.

/5/ See Transcript of 6/6/84 telephone conference call between Applicants, NRC Staff, and CASE, page 93.

MR. WALSH:

4. Applicants state:

"Applicants reviewed a total of about sixty supports as part of their reanalyses to determine stiffness effects. Of the sixty, only four experienced increases in loads in excess of a factor of 2.0. All four were originally lightly loaded. The reanalyses demonstratetd (sic) that only three of the sixty supports (less than 4%) would now have calculated loads which exceed allowable values. All three supports have snubbers. For two of these supports, only the snubbers themselves were computed to experience loads which exceed the manufacturer's rating. (One exceeds its rating by 14% and the other by 57%). The remaining components of these supports are within specified design allowables. The third support is computed to be overloaded (exceed the allowable by less than 5 percent). In no instance were recalculated nozzle or anchor loads or pipe stresses found to exceed allowable values. All other supports (frames, components, and base plates of these supports) are within specified design allowables for the recalculated loads. (Iotti, Finneran Affidavit at 19-20.)"

The reanalysis reflects results similar to the previous reanalysis which was conducted for the SIT team. That is, some supports will increase in loads in excess of a factor of 2.0, and some supports will exceed established code allowables. I disagree with Applicants' statement that pipe stresses were found to be within the allowables.

The reason for my disagreement is as follows: When a support has exceeded the established code allowable based on yield strength, the support is acting in a plastic manner. This plastic behavior will transfer its intended load back into the pipe, which the Applicants did not consider. Their analysis was based on elastic behavior and, although a support had exceeded code allowables and could not take any additional loads, the elastic analysis erroneously assumes the support is still capable of supporting a load and thus does not redistribute

this load back into the piping system. For this reason, the Applicants' position that pipe stresses and other supports were within their allowable stresses is unsubstantiated.

I asked for and received on discovery the drawings of the 60 supports referenced by Applicants, along with the calculations for the drawing which Applicants consider to be most complex /6/.

Of the 60 drawings (actually 59 by my count) /7/, two of the drawings (MS-1-01-003-C72K and CT-1-013-023-S42K) contained axial restraints by the use of welding trunnions to the pipe. The Applicants' present procedure does not consider the effects of the double stanchions' axial restraint or its consequences. This is the subject of a separate Motion for Summary Disposition, which CASE has not answered yet. The results for the generic stiffness are misleading due to Applicants' present position that there is no problem regarding these axial restraints.

Of the 59 drawings, 7 of the drawings (CT-1-013-022-S42K, CT-1-013-014-S32R, CT-1-013-007-S22K, CT-1-013-001-S42R, CT-1-013-016-S32K, CT-1-013-010-S22K, and CT-1-013-008-S22K) contained cinched-up U-bolts. The Applicants' present procedure does not consider the effects of cinched-up U-bolts or its consequences. This is the subject of a

/6/ See 6/6/84 Applicants/Staff/CASE telephone conference call Tr. 102-111.

/7/ All 59 of these drawings were sent to the Board and parties as Attachment B to CASE's 8/13/84 Answer to Applicants' Motion for Summary Disposition Regarding the Effects of Gaps on Structural Behavior Under Seismic Loading Conditions.

separate Motion for Summary Disposition, which CASE has not answered yet. The results for the generic stiffness are misleading due to Applicants' present position that there is no problem regarding these cinched-up U-bolts.

Of the 7 drawings containing cinched-up U-bolts, 3 contain single-acting struts or snubbers (CT-1-013-008-S22K, CT-1-013-022-S42K, and CT-1-013-001-S42R). These three particular supports require (according to the Applicants' criteria) a cinched-up U-bolt to provide stability. Stability is also the subject of a Motion for Summary Disposition which CASE has not yet answered.

Of the 59 drawings, 32 supports utilized tube steel members in bending, which I reviewed for the thinness ratio for punching shear. Of those 32 supports, there were 6 cases (5 supports, with two examples on one support) where the thinness ratio was 10 or above; 5 cases exceeded 10 -- although Applicants had emphatically stated to the NRC Staff that 10 was the largest ratio which exists at Comanche Peak /8/. It is the Applicants' normal design practice not to consider the local punching shear stresses or their consequences. This was discussed in Applicants' separate Motion for Summary Disposition (see Footnote 8 hereto) which CASE has already answered. The results for the generic stiffness are misleading due to Applicants' present position that there is no problem regarding punching shear.

/8/ See discussion at pages 15-17 of CASE's 8/6/84 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.

Of the 59 drawings, 36 of the drawings /9/ contained tube steel members. The Applicants' present procedure does not consider the effects of the reduction in yield strength of the material due to welding and therefore uses a higher allowable stress. This is the subject of a separate pleading by Applicants (regarding A500 Steel) which is being treated as a Motion for Summary Disposition, which CASE has not answered yet. The results for the generic stiffness are misleading due to Applicants' present position that there is no problem regarding the reduction in yield strength of the tube steel members.

In addition, the A500 steel section properties including the strength of the groove beveled weld based on the cross-section of the member is also the subject of a Motion for Summary Disposition (on section properties), which CASE has already answered.

/9/ CT-1-013-023-S42K, CT-1-013-011-S22R, CC-2-011-719-A53R, CT-1-013-002-S42S, MS-1-001-002-C72S, CT-1-013-021-S42K, CT-1-013-008-S22K, CT-1-013-017-S32K, MS-1-01-005-C72K, MS-1-001-004-C72K, CT-1-137-701-S25R, CT-1-017-704-S25R, CT-1-013-020-S42K, CT-1-013-015-S32K, CC-2-011-721-A43R, CC-2-011-720-A43R, CC-2-011-718-A53R, CC-2-011-717-A53R, CC-2-011-715-A53R, CC-2-011-714-A53R, CC-2-011-713-A53R, CC-2-011-712-A53R, CC-2-011-711-A53R, CC-2-011-708-A63R, CC-2-011-707-A63R, CC-2-011-706-A63R, CC-2-11-702-A63R, CC-2-11-701-A63R, CC-2-11-700-A63R, CC-2-011-002-A63R, CC-2-011-001-A63R, CC-2-11-704-A63R, CC-2-011-703-A63R, CC-2-011-716-A53R, CT-1-013-016-S32K, CT-1-013-010-S22K.

Of the 59 drawings, 33 of the drawings /10/ contained a connection that had a gap and these supports were loaded predominantly in shear. The Applicants' present procedure does not consider the effects of a gap in the calculation of their generic deflection criteria or the actual stiffness calculations that were provided. As shown in Attachments A, B, and C hereto, supports CC-2-011-703-A63R, CC-2-11-704-A63R, and CC-2-011-706-A63R did not consider the gap between the bolt and the base plate in their stiffness calculations; i.e., they assumed that no gap existed or they assumed a friction type connection which the Applicants do not design for. This is the subject of a separate Motion for Summary Disposition (on gaps), which CASE has already answered. The results for the generic stiffness are misleading due to Applicants' present position of assuming no gaps.

A simple example can demonstrate the consequences of not considering a gap in the base plate. Referring to Figure 1 following, there are three identical (except for their base plate connection) supports labeled A, B, and C, which are supporting a pipe. Because A, B, and C are identical (except for their base plate connection), they

/10/ CT-1-013-012-S32K, CT-1-137-702-S25R, CC-2-011-710-A53R, CC-2-11-709-A63R, CT-1-013-018-S42K, CT-1-013-009-S22K, CT-1-013-023-S42K, CC-2-011-719-A53R, CT-1-013-002-S42S, MS-1-001-002-C72S, CT-1-013-008-S22K, MS-1-01-005-C72K, CT-1-137-701-S25R, CT-1-013-015-S32K, CC-2-011-721-A43R, CC-2-011-720-A43R, CC-2-011-718-A53R, CC-2-011-717-A53R, CC-2-011-715-A53R, CC-2-011-714-A53R, CC-2-011-713-A53R, CC-2-011-712-A53R, CC-2-011-711-A53R, CC-2-011-708-A63R, CC-2-011-707-A63R, CC-2-011-706-A63R, CC-2-11-702-A63R, CC-2-11-701-A63R, CC-2-11-700-A63R, CC-2-011-002-A63R, CC-2-11-704-A63R, CC-2-011-703-A63R, CT-1-013-016-S32K.

all have an equal amount of stiffness and supports A and C will receive an equal amount of load. For purposes of this example, it will be assumed that the support stiffness is equal to 1,000 lbs. per 1/16" deflection. But support A has a base plate that will transfer the load to the bolts in shear. However, since the base plate was designed as a bearing type connection and slippage is possible, support A will deflect and have a different amount of stiffness now. This stiffness now will be 1,000 lbs. per 3/16" deflection assuming a 1/8" oversize hole in the base plate. The result is the stiffness of support A is 3 times less than that of supports B and C, and with the Applicants' present procedure, this is not accounted for. The results of using incorrect stiffnesses is the subject of Applicants' Motion, but Applicants not using consistent design practices; i.e., bearing type connections for the design of the base plate, friction type connection for the stiffness or deflection calculation.

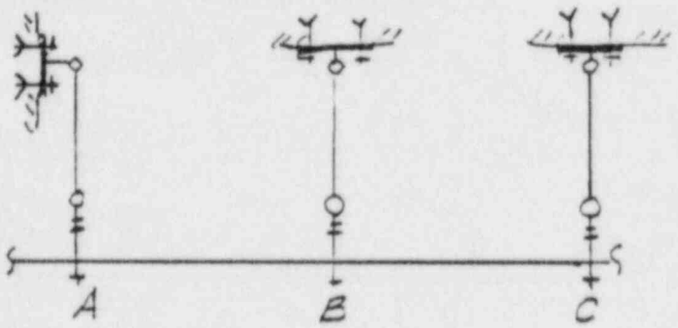


FIG 1

In addition, Cygna has expressed its concern that Applicants have been using improper damping values. The use of the improper damping values indicates a decrease in load for the supports and a decrease in pipe stresses. This is discussed in CASE's 8/6/84 Answer to Applicants' Statement of Material Facts As To Which There Is No Genuine Issue Regarding Applicants' Consideration of Damping Factors for OBE and SSE Loading Conditions at page 4, answer 2. (For instance, since it is a 6" line, the component cooling system (CC) line is one of the systems about which Cygna expressed concern where Applicants are using improper damping factors.) The Applicants' present procedure does not consider the effects of their use of erroneous damping factors. The results for the generic stiffness are misleading due to Applicants' present position of disregarding their use of improper damping factors.

Also, an effect the Applicants have generically not considered in their pipe stress analysis, which would have impact on the conclusion at which Applicants have arrived in their Motion, is mass participation:

> "Gibbs & Hill does not perform any additional analyses or calculations to ensure that the inclusion of additional modes does not significantly increase the response of the piping system and result in higher stresses and support loads." /11/.

As Cygna has stated:

> "Consideration of responses in the rigid range (i.e., ZPA effects) may result in significantly higher support loads. . . the additional loads associated with this concern may lead to failure of the pipe supports during a seismic event." /12/.

/11/ See Independent Assessment Program, Final Report - Phase 3, Volume 1, Appendix F, Potential Finding Report, PFR No. 01, Observation No. PI-00-05, page 1 of 3.

/12/ Id., page 2 of 3.

Further information regarding this is contained in a document just received from Cygna on 8/28/84 /12a/ This 8/25/84 letter from Mr. N. H. Williams, Project Manager, Cygna, to J. B. George, Project General Manager, TUGCO, under Subject of: Phase 3 Open Items - Mass Participation, states, in part:

> "Cygna has reviewed the reference (a) letter regarding a revision to the Gibbs & Hill mass participation study. Since we have not yet received the Gibbs & Hill preliminary report on the result of the revised ADLPIPE analysis . . . our reviewers are unable to fully understand the reasonableness of approaching the analysis in the manner proposed . . . Cygna believes it is necessary to notify TUGCO of the following concerns regarding the use of this revised approach:
>
> ". The method proposed by Gibbs & Hill uses the higher of the loads from the static ZPA analysis and the load from the dynamic analyses. This 'yardstick' for determining support adequacy may be considered inadequate since this criteria does not satisfy the requirements of the CPSES FSAR Section 3.7B.3.1 . . . Checking that the support loads in a system equal the mass multiplied by the ZPA is a good review tool to determine the reasonableness of a dynamic analysis. If it is to be used for design purposes a study must be performed to demonstrate whether or not the ZPA approach ensures that the FSAR criteria is met.
>
> ". Cygna does not believe that a 10% increase in pipe support loads will be acceptable to ensure design adequacy. Our review of the pipe support designs revealed that many of the supports do not have sufficient margins to accomodate an increase of this magnitude and stil meet Code allowables.
>
> ". Cygna does not agree with Gibbs & Hill's proposed reduction of ZPA accelerations below the value at 33 hz. Justification is required to assure that the piping system does not have significant response between 33 hz and the frequency at which the ZPA is taken.

/12a/ Since this document was just received on 8/28/84, just prior to the running of copies, Mrs. Ellis telephoned Mr. Walsh and read him the document. He told her to insert it, what to say about it, and where to insert it. A supplementary Affidavit to this effect from Mr. Walsh will be sent when we send the next Answers to Motions to Summary Disposition.

". Although we have not reviewed the results of the revised Gibbs & Hill analysis, Cygna does not believe that this issue can be resolved by sampling worst case problems. This will quantify some of the potential changes in support loads but will not demonstrate the adequacy of systems which are not analyzed. If Gibbs & Hill desires to continue with the sampling approach, TUGCO should ensure that a portion of the sample includes problems located within a single structure in order to minimize SAM effects." (Emphases added.)

For all the preceding reasons, Applicants' reanalyses are invalid and the results they obtained (even including the overstressed snubbers) are actually working with unrealistic and unconservative design assumptions and design analysis procedures.

5. Applicants state:

"Tests conducted on snubbers with the same rating as the two for which the calculated loads exceeded manufacturer's rated loads (Pacific Scientific Snubbers rated at 1500 lb. for normal and upset loads), have shown that the snubber will perform its intended function at loads which are considerably higher than rated. In addition, the tested snubbers would still function as intended during a seismic event, i.e., in locked position, at even higher loads. (Iotti, Finneran Affidavit at note 10.) Thus, there is no real safety concern with these snubbers."

Applicants have not shown that the tests referenced are applicable to Comanche Peak. If a snubber is installed incorrectly or in t..e wrong location, it is reasonable to assume that it will not perform its intended function. And, obviously, if a snubber is not even installed, it cannot perform its intended function. Considerable doubt in this regard exists, as discussed in CASE's 10/13/83 Motion to Add A New Contention /13/. As discussed in that Motion, regarding the thermal expansion test (pages 26-34), 63 supports containing snubbers had the snubbers removed or the support modified after the thermal expansion test due to binding, 179 snubbers were not installed on the pipe supports during the test, one TDR was used to change the effects of one

/13/ CASE's 10/13/83 (1) Motion to Add A New Contention, (2) Motion for Discovery, and (3) Offer of Proof.

support from a snubber to a rigid support (of significance because it was one of the specific supports contained in CASE Exhibit 669B, Attachment to Jack Doyle's Deposition/Testimony), and many of the snubbers that were installed had mechanical problems such as binding, exceeding travel capabilities, or just being inoperative. The Applicants' position on this seemed to be to remove the snubbers during the Thermal Expansion Test and reinstall them later; thus, they are not addressing the true problem, which is: Why did those supports malfunction to begin with?

It should be noted that thermal expansion testing is one of the tests which the NRC Staff has just approved for deferred retesting, as indicated in Attachment D hereto /14/. As stated on pages 2 and 3 of the Enclosure to that letter:

> "E. 1CP-PT-55-11, Thermal Expansion Preoperational Test
>
> "During the performance of the thermal expansion test, a number of test deficiencies were noted pertaining to snubbers, springs and supports. These deficiencies were of three categories:
>
> "(1) installed items did not meet acceptance criteria;
>
> "(2) installed items removed due to interferences, and;
>
> "(3) items not installed for the test.
>
> "The applicant will have corrected these deficiencies and proposes that the test be repeated after fuel load when the next plant heatup is completed for initial criticality. Final cold setting of retest items would be accomplished at the shutdown scheduled at the end of the 30% power plateau.

/14/ 8/17/84 letter from B. J. Youngblood, Chief, Licensing Branch No. 1, Division of Licensing, NRC, Washington, to M. D. Spence, President, TUGCO.

"The deferral of the thermal expansion retest is acceptable because it is consistent with approved industry practice on other plant test programs. Furthermore, compliance with Technical Specifications relating to piping supports will be required for plant operation to proceed."

(Title emphasized in the original; balance of emphases added.)

As stated previously, Applicants have not demonstrated that the snubbers they reference are applicable to Comanche Peak. And even if they were, the Applicants are trying to justify a fait accompli because of an unsatisfactory result. Applicants would have the Board believe that the problem has evaporated, based on a test that the vendor does not certify (or it would already have been included in the original design). This is not acceptable.

As part of discovery on Applicants' Motion for Summary Disposition Regarding Safety Factors, I obtained copies of most of the References shown on Applicants' Attachment 3. The document shown as Reference 4 /15/, is instructive regarding this particular matter; it states (Page 1-8, emphases added):

"In addition to the parameters discussed in this report, three other considerations that affect the failure/survival characteristics of structures and subsystems are design and construction errors, aging, and construction practices. Design and construction errors are particularly troublesome. They introduce additional uncertainty as to the capacity of a constructed facility. It is improper to accept errors as the status quo, to uniformly increase the uncertainty assigned to the analysis parameters, or to compensate for errors through inflated safety factors or margins. The proper solution is to practice good quality assurance/control techniques to eliminate or effectively minimize the possibility for errors."

/15/ "American Society of Civil Engineers, 'Uncertainty and Conservatism in the Seismic Analysis and Design of Nuclear Facilities,' ASCE Dynamic Analysis Committee, Working Group Report, 1983 (Draft)."
See also further discussions under answer 4 in CASE's 8/29/84 Answer to Applicants' Statement of Material Facts As To Which There Is No Genuine Issue Regarding Safety Factors.

6. Applicants state:

"Applicants' analyses provide reasonable assurance that for variations of actual stiffness from generic stiffness less than one order of magnitude (i.e., less than a factor of 10), there is no adverse effect on the seismic response of piping systems. In addition, the tests indicate that variations in excess of one order of magnitude will, in general, occur only for supports that have light initial loadings, which supports, because of the light initial loadings, are capable of accommodating relatively large increases in loads (Iotti, Finneran Affidavit at 7-10 and 15-20)."

Applicants have explicitly stated above that, when there is less than a factor of 10 from a generic stiffness, there is no adverse effect. However, NRC Staff Witness Dr. Chen /16/ stated that Applicants' supports at times do exceed 10 times the generic stiffness value when utilizing the 1/16" deflection criteria. Where these supports do exceed the 10 times generic stiffness criteria is not known and it has not been established which support configurations do exceed 10 times the generic stiffness criteria.

Further, as discussed in answer 4 preceding, Applicants' reanalyses are invalid and the results they obtained (even including the overstressed snubbers) are actually working with unrealistic and unconservative design assumptions and design analysis procedures.

MESSRS. DOYLE AND WALSH:

It should be noted that in this affidavit, due to the severely restricted time frame under which we were working, we split up the work load and each of us answered specific questions (as indicated herein).

/16/ See NRC Staff Witness W. Paul Chen's Affidavit on Open Items Relating to Walsh/Doyle Concerns (under cover letter of 10/14/83), page 24.

We did not have time to check one another's answers. We would like to have had sufficient time to do a more thorough job.

MR. WALSH

Also, neither of us has had time even to scan the transcript of the 8/6/84 Applicants/NRC Staff/CASE telephone conference call (Mr. Doyle was not on that call), the transcripts of the 8/8/84 and 8/9/84 Bethesda meetings between the NRC Staff and the Applicants, (all of which were just received by CASE on 8/22/84), and of course, the transcript of the meeting held at Comanche Peak 8/23/84 between the NRC Staff and the Applicants. Also, it is our understanding that there will be some changes (at least one substantive) to some of Applicants' Affidavits regarding some of the Motions for Summary Disposition and that by 8/30/84 the Applicants are to provide the Staff with several documents relating to the Motions for Summary Disposition (which obviously we also need to adequately answer Applicants' Motions).

As stated above, we would have liked to be able to do a more thorough job, and would like to be able to supplement our testimony after we have had a chance to review the referenced transcripts, changed Affidavits, and additional documents.

Attachments:

Attachment A Drawings and calculations for support CC-2-011-703-A63R -- see answer 4, page 12

Attachment B Drawings and calculations for support CC-2-11-704-A63R -- see answer 4, page 12

Attachment C Drawings and calculations for support CC-2-011-706-A63R -- see answer 4, page 12

Attachment D 8/17/84 letter from B. J. Youngblood, Chief, Licensing Branch No. 1, Division of Licensing, NRC, Washington, to M. D. spence, President, TUGCO -- see answer 5, page 16

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

Our qualifications and background are already a part of the record in these proceedings. (See CASE Exhibit 842, Revision to Resume of Jack Doyle, accepted into evidence at Tr. 7042, and 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.)

We have read the statements therein, and they are true and correct to the best of our knowledge and belief. We do not consider that Applicants have, in their Motion for Summary Disposition, adequately responded to the issues raised by us; however, we 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 27 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 27 day of August, 1984.

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

My Commission Expires:

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

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

Our qualifications and background are already a part of the record in these proceedings. (See CASE Exhibit 842, Revision to Resume of Jack Doyle, accepted into evidence at Tr. 7042, and 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.)

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

Jack J Doyle

(Signed) Jack Doyle

Date: Aug 24 1984

STATE OF Massachusetts

COUNTY OF Norfolk

On this, the 25th day of August, 1984, personally appeared Jack J. Doyle, 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 25th day of August, 1984.

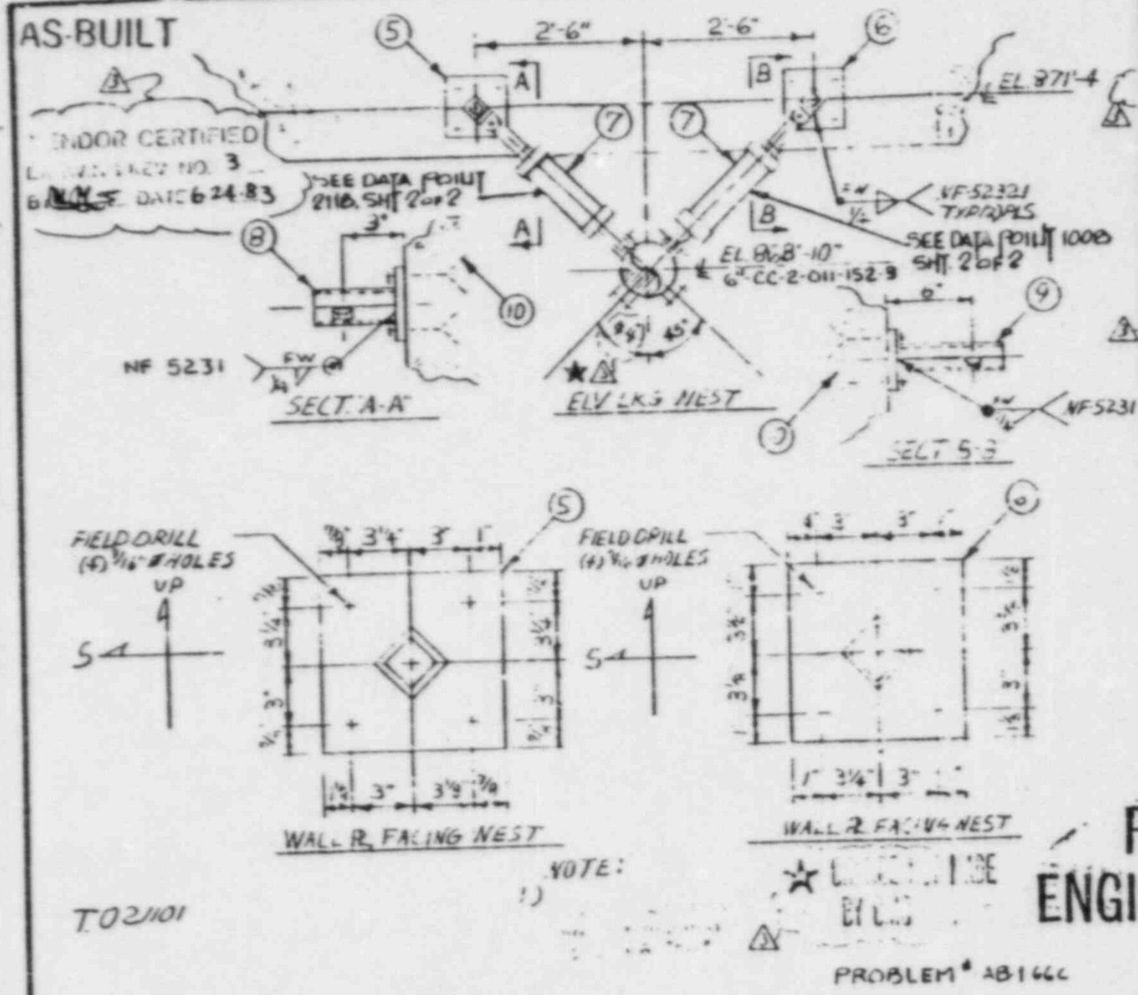
Norma C. Rutt

Notary Public in and for the
State of Massachusetts

My Commission Expires:

MY COMMISSION EXPIRES JANUARY 9, 1987

ATTACHMENT A



ITEM NO	QTY REQ'D	MATERIAL DESCRIPTION	PBS	L	CSS	PRIM	SEC	AISC
5	1	1/2" PL CS (SA-515 OR SA-36)	X			X		
6	1	1/2" PL CS (SA-515 OR SA-36)	X			X		
7	2	[illegible] TYPE [illegible]						
8	1	TS 4"x4"x1/4"x[illegible] LG A500-74A GR B		X		X		
9	1	TS 4"x4"x1/4"x9 1/2" LG A500-74A GR B		X		X		
10	8	HILTI KWIK BOLTS 1/2" x 5 1/2"			X	X		

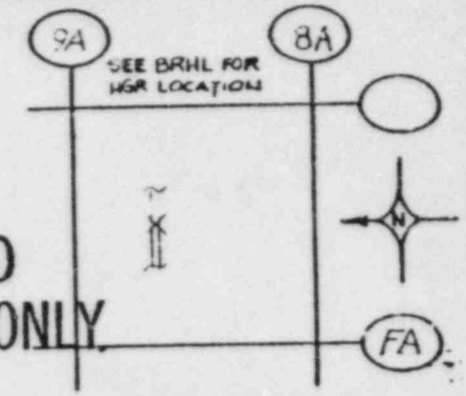
PAINT: CARBO ZINC 11

REV	DESCRIPTION	DATE	DR.	CHK.	APPR.
2	VENDOR CERTIFICATION, REF GIL # 59790	[illegible]	[illegible]	[illegible]	[illegible]
cont	ADDED SHT 2 CM 74965	~	~	~	
3	[illegible] REF NCR # M-8341	[illegible]	[illegible]	[illegible]	[illegible]

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

P.E. CERTIFICATION

FOR OFFICE AND ENGINEERING USE ONLY



LOCATION PLAN

DATA PT	SUPPORT LOADS (LBS) DESIGN	SERVICE LEVEL LIMITS	PIPE MVTS INCHES
VERT	—	SEE SHEET 2 OF 2	—
N-S	—		—
E-W	—		—

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

AUTHORIZED NUCL. INSP. YES [X] NO [ ]
ASME CODE CLASS 2

REF DWGS	STRESS ISO	REV	MECHANICAL	REV	ELECTRICAL	REV
	M2-3231-36	A	M1-0731	0	E1-0703	6
	ISO	REV	STRUCTURAL	REV	HVAC	REV
	CC-2-AB-032	7	S-0735	2	M1-0757	4

Brown & Root, Inc.
HOUSTON, TEXAS

CLIENT TUSI
PLANT COMANCHE PEAK
JOB NO. 2323

SUPPORT NO. CC-2-011-703-A63R
SHEET 1 OF 2 . REV. 3

AS-BUILT

[illegible] 3
6-24-85

FOR OFFICE AND ENGINEERING USE ONLY

DATA PT.	SUPPORT LOADS (lbs)					PIPE MVTS (INCHES)
2118S	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	
VERT.		-197	[illegible] 307	767 305		
N-S		+215	[illegible] 290	419 891		
E-W						
NOTE +N,E,UP -S,W,DN	AUTHORIZED NUCL. INSP. YES ☒ NO ☐ ASME CODE CLASS 3					

DATA PT.	SUPPORT LOADS (lbs)					PIPE MVTS (INCHES)
1008	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	
VERT.		-270	567 147	591 176		
N-S		-270	562 147	591 176		
E-W						
NOTE +N,E,UP -S,W,DN	AUTHORIZED NUCL. INSP. YES ☒ NO ☐ ASME CODE CLASS 3					

MVTS	
Z	+.104
	-.185

MVT'S	
Z	+.103
	-.184

CPSES [illegible]

TO #2110[illegible]

DATA PT.	SUPPORT LOADS (lbs)					PIPE MVTS (INCHES)
	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	
VERT.						
N-S						
E-W						
NOTE +N,E,UP -S,W,DN	AUTHORIZED NUCL. INSP. YES ☒ NO ☐ ASME CODE CLASS 3					

REF. DWGS	STRESS ISO.	REV.	MECHANICAL	REV.	ELECTRICAL	REV.
	M2 3231 36	A				
	BRHL ISO.	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.
	CC-2-AB 032	1				

REV	DESCRIPTION	DATE	DWN.	CHKD.	APP.
2	VENDOR CERTIFICATION REF GIL# 59790	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CMC 76965	~	~	~	~
3	[illegible]	[illegible]	RM	[illegible]	[illegible]

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

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

SUPPORT NO. CC 2-011-703-A63R
SHEET 2 OF 2 REV. 3

FORM DHE-5

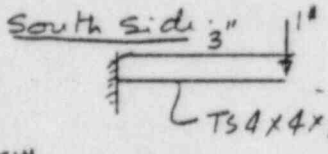
TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

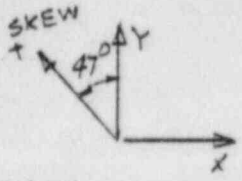
Date 3.25.83
Calc By S. Mazumder
Chk'd/Apprd. By 3.25.83
Subject CC-2-011-703-A63R R2.

Filing Code
Sheet No. 1 Of 1
G & H Job No.
Ref. Dwg./Spec. No.

Stiffness calculation

South Side:





K in restrained direction for $\ell = 8$ = $\frac{3EI}{\ell^3} = \frac{3 \times 27.7 \times 8.22 \times 10^6}{3^3}$

= 25299.333 K/in = K_f.

Joint 2118

K_{RB} = 48042.19 K/in K_c (clamp) = 553.86 K/in

K_S (strut) 30" c to c = 431.161 K/in

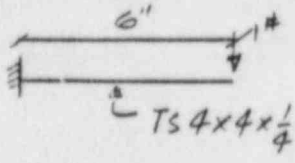
$\frac{1}{K} = \frac{1}{K_f} + \frac{1}{K_{RB}} + \frac{1}{K_c} + \frac{1}{K_S}$

K = 230.94 K/in for Data 2118

= 2.39×10^5 #/in.

North Side.

Data Point 1008 skewed.



K_f (for frame) = $\frac{3 \times 27.7 \times 10^6 \times 8.22}{6^3}$

= 3162.416 K/in

K_{RB} = 48042.19 K/in

K_c (clamp) = 553.86 K/in

K_S (strut) 30° c/c = 431.161 K/in

$\frac{1}{K} = \frac{1}{K_f} + \frac{1}{K_{RB}} + \frac{1}{K_c} + \frac{1}{K_S}$

K = 224.122 K/in for Data 1008.

= 2.241×10^5 #/in

FORM DHE-5

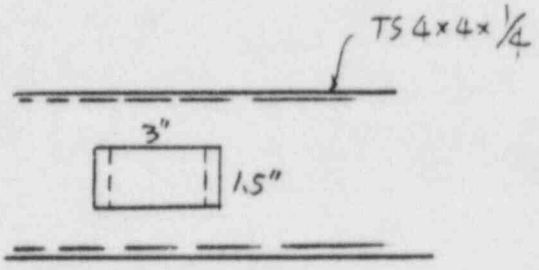
TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3/5/84
Calc By C. Lu
Chk'd/Apprd. By I. H 3.5.84
Subject CC-2-011-703-A63R

Filing Code
Sheet No. Of
G & H Job. No.
Ref. Dwg./Spec. No.

$d/2a = 3/8$

$b' = 1.75 \times 3 = 5.25$



$\therefore I = \frac{1}{12} \times 5.25 \times \left(\frac{1}{4}\right)^3 = .0068$ -

$M = \frac{1}{24 \times 4}(3 \times 4^2 - 1.5^2) = .4766$ -

$M_{BA} = -.626 \times M = -.2983$

Same for both.

$\Delta_1 = 5.5209 \times 10^{-6}$ -

$\Delta_2 = \frac{.2983 \times 1.25(4 - 1.25)}{2E \times .0068} = 2.7517 \times 10^{-6}$

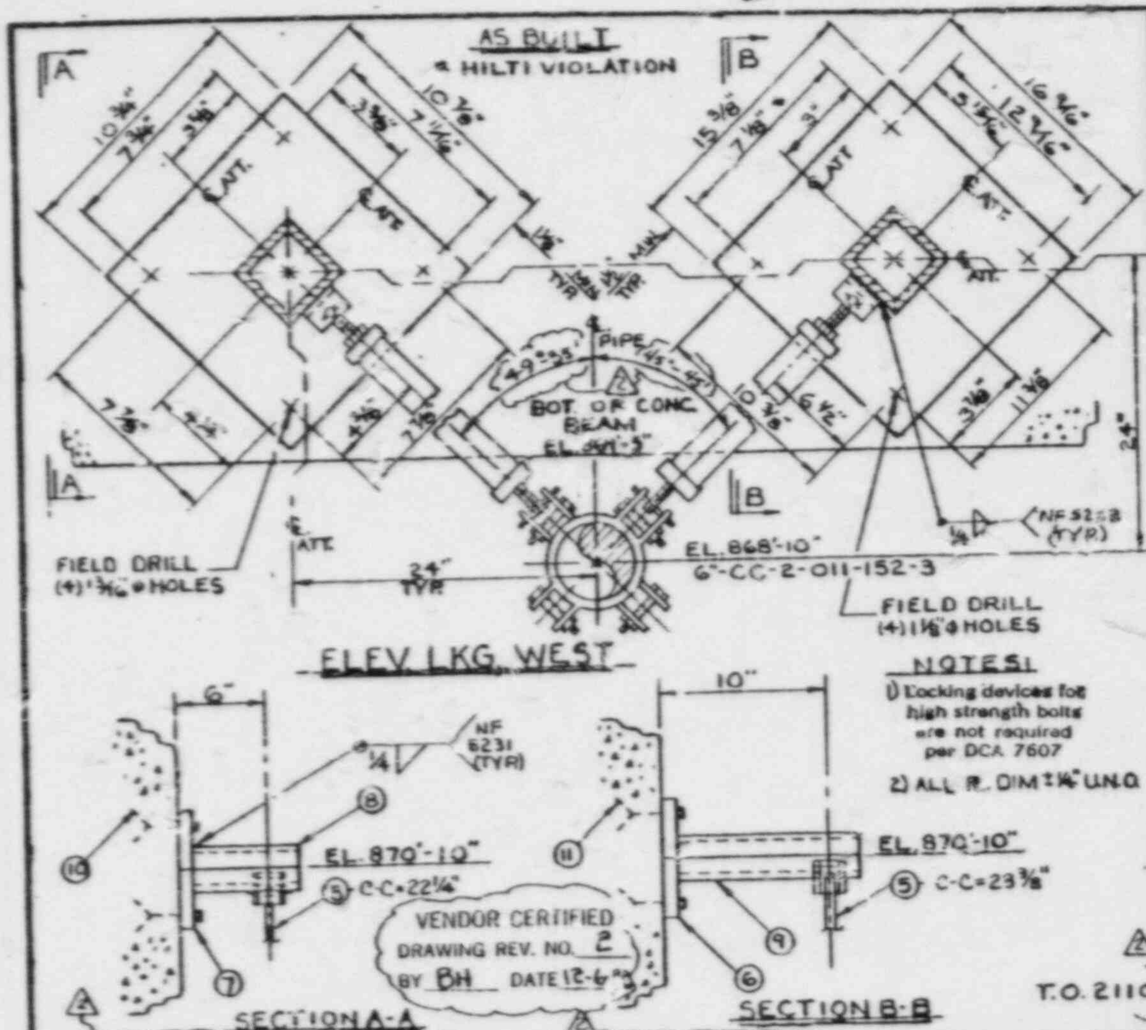
$\Delta = 2.7692 \times 10^{-6}$ -

$K_{\text{rigid}}^{\text{lat}} = \frac{1}{\frac{1}{2118} + 2.7692 \times 10^{-6}} = .143 \times 10^6$ lb/in ✓

$K_{\text{rigid}}^{\text{lat}} = \frac{1}{\frac{1}{.224 \times 10^6} + 2.7692 \times 10^{-6}} = .138 \times 10^6$ lb/in ✓

FOR OFFICE AND ENGINEERING USE ONLY

ATTACHMENT B



NOTES:

1) Locking devices for high strength bolts are not required per DCA 7607
2) ALL R. DIM ±1/16" U.N.O.

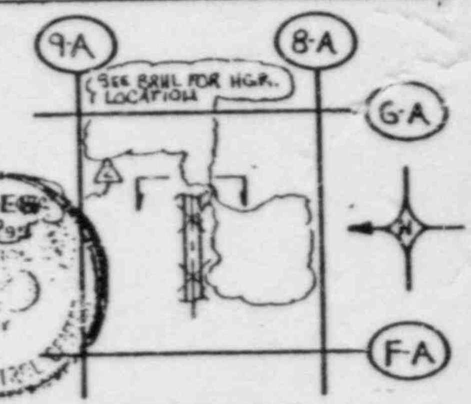
ITEM NO.	QTY REQ'D	MATERIAL DESCRIPTION
5	2	SRS-08-CC SWAY STRUT W/ SPC-08-060 PIPE CLAMP
6	1	3/4 THK. C.S. PLATE (SA-36 OR SA-515 GR. 65)
7	1	3/4" THK. C.S. PLATE (SA-36 OR SA-515 GR. 65)
8	1	T.S. 3/8"x4"x4"x0'-7" LG. (A-500 GR. B)
9	1	T.S. 3/8"x4"x4"x0'-11" LG. (A-500 GR. B)
10	4	3/4" ϕ x10" LG. HILTI KWIK CONCRETE ANCHORS
11	4	1" ϕ x9" LG. HILTI KWIK CONCRETE ANCHORS

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

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPVD.
△	VENDOR CERTIFIED MOD. PER CMC 59790				
2	CMC 76364 ADDED SHT 2 OF 2				

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

P.E. CERTIFICATION



LOCATION PLAN

REF. DWGS.	BRHL 150	REV	MECHANICAL	REV	ELECTRICAL	REV
	CC-2-AB-032	0	MI-0701	6	EI-0703	6
	FAB. 150	REV	STRUCTURAL	REV	H.V.A.C.	REV
	CC-2-AB-032	1	S-0735	2	MI-0757	4

DATA PT.	DESIGN	SERVICE LEVEL				PIPE MVTS (INCHES)
VERT.						
N-S						
E-W						

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

AUTHORIZED NUCL. INSP. YES ☒ NO ☐

ASME CODE CLASS 3

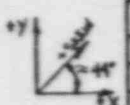
Brown & Root, Inc. HOUSTON, TEXAS

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

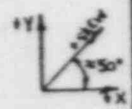
SUPPORT NO. CC-2-11-704-A63R
SHEET 1 OF 2 REV. 2

AS-BUILT

VENDOR CERTIFIED
DRAWING REV. NO. 2
BY BH DATE 12-6-82



DATA PT.	SUPPORT LOADS (lbs)					MVTS.	
1006	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	X	0
							0
VERT.		[illegible]	[illegible]	-452 / +[illegible]	0	Y	0
N-S		[illegible]	[illegible]	[illegible]	0		0
E-W		0	0	0	0	Z	+.123 / -.218



DATA PT.	SUPPORT LOADS (lbs)					MVTS	
2116	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	X	0
							0
VERT.		-192	-327	-352 / +[illegible]	0	Y	0
N-S		+225	+384	-20 / +414	0		0
E-W		0	0	0	0	Z	+.123 / -.219

FOR OFFICE AND
ENGINEERING USE ONLY

CPSES
35-1195
CONTROL
COPY
DOCUMENT CONTROL CENTER

TO# 21101

DATA PT.	SUPPORT LOADS (lbs) DESIGN	SERVICE LEVEL LIMITS A	B	C	D	PIPE MVTS (INCHES)
VERT.						
N-S						
E-W						

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	0	MI-0701	6	EI-0703	6
	FAB. ISO.	REV.	STRUCTURAL	REV.	H.V.A.C.	REV.
	CC-2-AB-032	1	S-0735	2	MI-0757	4

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPR.
2	VENDOR CERTIFICATION, REF. GTD 59790 CMC 76464	11/2/82	[illegible]	[illegible]	[illegible]

Brown & Root, Inc.
HOUSTON, TEXAS

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

SUPPORT NO. CC-2-011-704-A63R
SHEET 2 OF 2 REV. 2

FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3-22-83
Calc By A. Kamal / T. Kuo
Chk'd/Apprd. By SM 3.26.83
Subject CC-2-11-704-A63R, Rev. 2

Filing Code
Sheet No. 1 Of 1
G & H Job. No.
Ref. Dwg./Spec. No.

Stiffness Check:

$$\text{Stiffness, } K = \frac{P}{\Delta}$$

$P = 1364^{\#}$ NODE PT 1006 (SKEW.)

$$\Delta = \frac{1364 \times 10^3}{3 \times 27.7 \times 10^6 \times 10.7} = 0.001534''$$

$$K_1 = \frac{1364}{0.001534} = 889{,}170\ ^{\#}/in.$$

STRUT SRS-08-PC. $K_2 = 501.178\ ^{KIP}/_{IN}$.
C-C = 23 3/8".

REAR BRACKT $K_3 = 48042.19\ ^{KIP}/_{IN}$.
CLAMP. SPC-08-060. $K_4 = 553.06\ ^{KIP}/_{IN}$.

$$K = \frac{1}{\frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_3} + \frac{1}{K_4}} = \boxed{2.02 \times 10^5\ ^{\#}/_{11}.\ \text{NODE}^{\#}1006}$$

NODE PT # 2116 (SKEW)

$$K = \frac{3EI}{l^3} = \frac{3 \times 27.7 \times 10^6 \times 10.7}{6^3} = 4.12 \times 10^6\ ^{\#}/_{11}$$

STRUT SRS-08. C-C = 22 1/4" $K_2 = 515.119\ ^{KIP}/_{IN}$.
REAR BRACKT $K_3 = 48042.19\ ^{KIP}/_{IN}$.
CLAMP. SPC-08-060 $K_4 = 553.06\ ^{KIP}/_{IN}$.

$$K = \frac{1}{\frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_3} + \frac{1}{K_4}} = \boxed{2.49 \times 10^5\ ^{\#}/_{11}.\ \text{NODE}^{\#}2116}$$

FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3-8-84
Calc By DYC
Chk'd/Appvd. By T. K 11.23.84
Subject CC-2-11-704.A63R REV.2

Filing Code
Sheet No. 1 Of 1
G & H Job. No.
Ref. Dwg./Spec. No.

REF.

$d/2a = 3/8$; $b' = 1.75 \times 3 = 5.25$

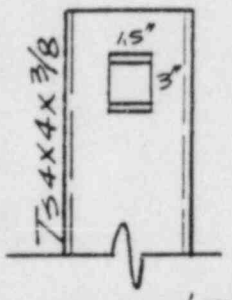
$I = \frac{1}{12} \times 5.25 \times (\frac{3}{8})^3 = .0231$

$M = \frac{1}{24 \times 4}(3 \times 4^2 - 1.5^2) = .4766$

$M_{BA} = -.626 \times .4766 = -.2983$

$\Delta_1 = 1.6252 \times 10^{-6}$

$\Delta_2 = \frac{.2983 \times 1.25(4-1.25)}{2 \times .0231\ E} = 8.1003 \times 10^{-7}$



FOR BOTH STRUT

$\Delta = \Delta_1 - \Delta_2 = 8.1515 \times 10^{-7}$

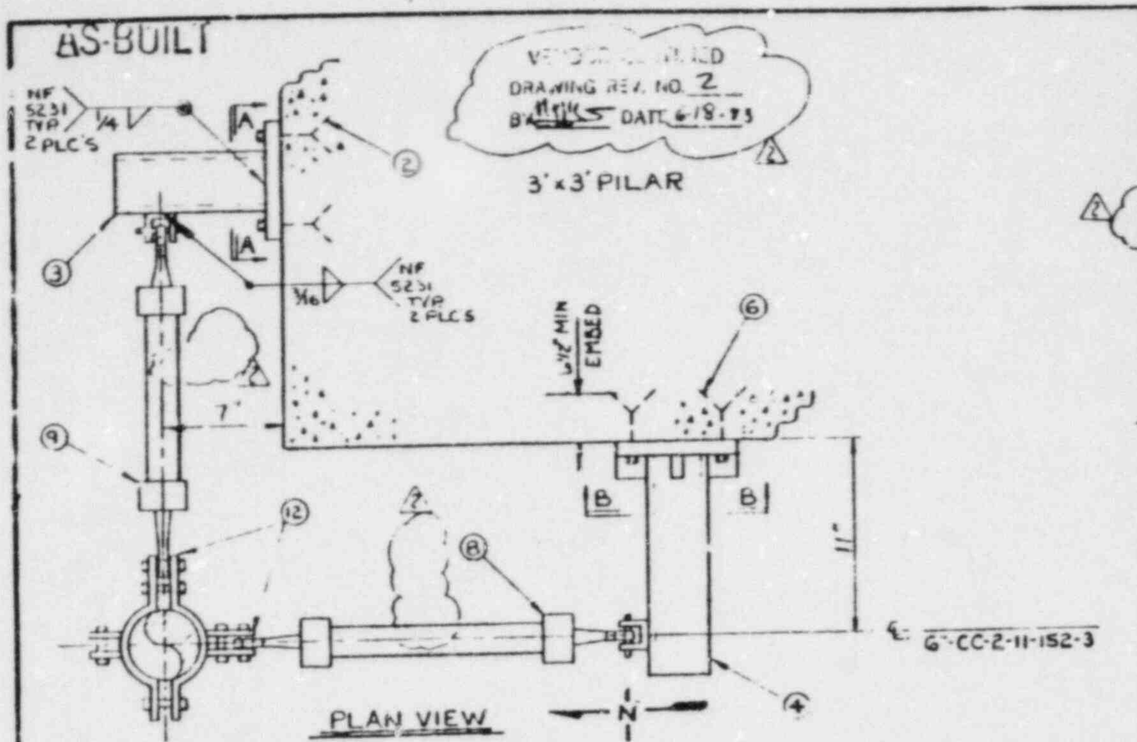
RIGID STRUT @ DATA PT. 2116

$$K = \frac{1}{\frac{1}{.202 \times 10^6} + 8.1515 \times 10^{-7}} = .173 \times 10^6 \text{ lb/in}$$

RIGID STRUT @ DATA PT. 1006

$$K = \frac{1}{\frac{1}{.249 \times 10^6} + 8.1515 \times 10^{-7}} = .207 \times 10^6 \text{ lb/in}$$

AS-BUILT



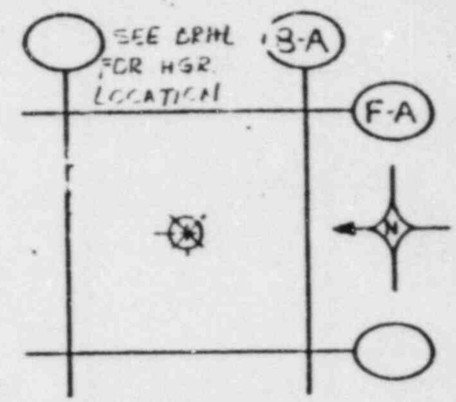
ITEM NO	QTY REQD	MATERIAL DESCRIPTION	P.B.S	L	SS	PRIM	SEC	AISC
2	4	3/4"x7" HILTI KWIK CONCRETE ANCHORS			X			
3	1	T.S. 1/4"x3"x3"x 3 1/4" LG.(A-500-74a, GR.B)		X		X		
4	1	T.S. 1/4"x3"x3"x1'-2 1/4" LG.(A 500-74a, GR B)		X		X		
6	4	5/8"x 8 1/2" HILTI KWIK CONCRETE ANCHORS			X			
7	1	1/2"x4"x3 1/4" LG. STIFFENER PLATE (SA 36 OR SA-515 GR. 65)	X			X		
8	1	SRF-08-RO SWAY STRUT			X			
9	1	SRF-08-RO SWAY STRUT			X			
10	1	3/4" C.S. PLATE PER SECT. A-A (SA-36 OR SA-515 GR. 65)	X			X		
11	1	3/4" C.S. PLATE PER SECT. B-B (SA-36 OR SA-515 GR. 65)	X			X		
12	2	SPC-08-060 C.S. PIPE CLAMP (SA-36)			X			
		PAINT: CARBO ZINC #11						

REV	DESCRIPTION	DATE	DWN	CHKD	APPVD
2	[illegible]	[illegible]	SL	RD	[illegible]

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

P.E. CERTIFICATION
N/A

FOR OFFICE AND ENGINEERING USE ONLY



LOCATION PLAN

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

T.O. 21101

PROBS# AB166CRO

DATA PT	SUPPORT LOADS (LBS) DESIGN	SERVICE LEVEL A	B	C	D	PIPE MVTS ANCHOR
2109						
VERT.	—	—	—	—	—	—
N-S	—	[illegible]	[illegible]	[illegible]	—	—
E-W	—	[illegible]	[illegible]	[illegible]	—	—

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

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

REF DWGS		REV	MECHANICAL	REV	ELECTRICAL	REV
BRHL ISO	CC-2-AB-032	1	MI-0701	6	EI-0710-01	7
FAB. ISO	CC-2-AB-032	2	STRUCTURAL S-0728	2	HVAC MI-0759	4

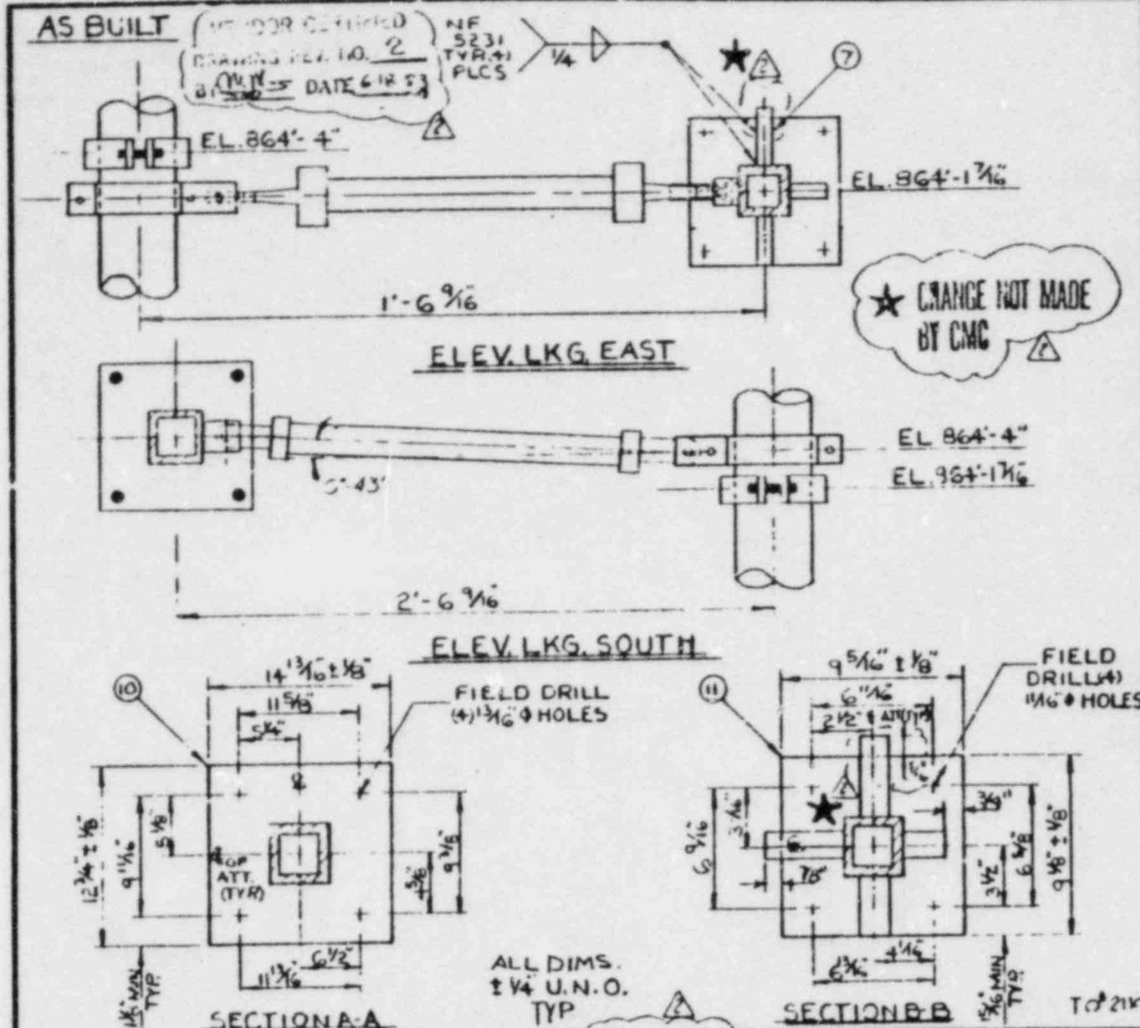
REV	DESCRIPTION	DATE	DWN	CHKD	APPVD
0	IFC	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	C30
	[illegible] AS-BUILT				

Brown & Root, Inc.

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

SUPPORT NO. CC-2-011-706-A63R
SHEET 1 OF 2 REV. 2

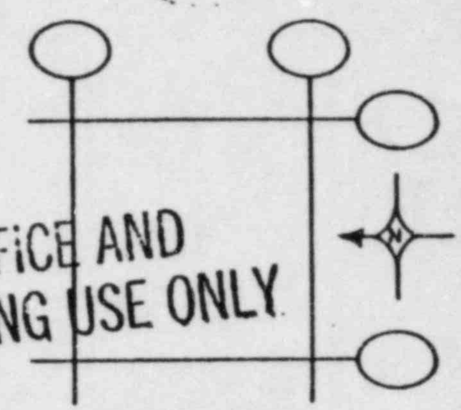
AS BUILT



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

P.E. CERTIFICATION
N/A

FOR OFFICE AND ENGINEERING USE ONLY



LOCATION PLAN

ITEM NO	QTY REQ'D	MATERIAL DESCRIPTION	PBS	L	OSS	PRIM	SEC	AISC

REV	DESCRIPTION	DATE	D.R.	CHKD.	APPVD.
[illegible]	VENDOR CERTIFIED REV.	~	~	~	~
[illegible]	GTN 58730	~	~	~	~
2	REVISED FOR CERTIFICATION REF. [illegible]	6/18/83	[illegible]	RD	RCH

DATA PT	SUPPORT LOADS (LBS)					PIPE MVTS INCHES
2109	DESIGN	SERVICE LEVEL LIMITS A	B	C	D	
VERT.						
N-S						
E-W						

NOTE +N,E,UP −S,W,DN

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

REF. DWGS		REV	MECHANICAL	REV	ELECTRICAL	REV
			M1-0701	6	E1-0710-01	7
	FAB. ISO.	REV	STRUCTURAL	REV	H.V.A.C.	REV
	CC-2-AB-032	2	S-0728	2	M1-0759	4

REV	DESCRIPTION	DATE	DWN.	CHKD.	APPVD.
1	ISSUE FOR AS BUILT REF.	[illegible]	[illegible]	[illegible]	CRD
[illegible]	CMC-45357 R3 [illegible]	~	~	~	~
~	NOT USED SEE ABOVE	~	~	~	~

Brown & Root, Inc.
DESIGNERS CONSTRUCTORS

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

SUPPORT NO. CC-2-011-706-A63R
SHEET 2 OF 2 REV. 2

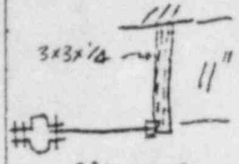
FORM DHE-5

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3/25/83
Calc By K'NA
Chk'd/Apprd. By SM 3/25/83
Subject CC-2-011-706-A63R R.1

Filing Code
Sheet No. 1 Of 1
G & H Job. No. 2323
Ref. Dwg./Spec. No.

REF
NPSI
"T.D. 11"



SEF-08-PC
W/SAC-08-60
CC≈6"

$$K_{T.S} = \frac{3EI}{L^3} = \frac{3(27.7\times10^6)(3.16)}{(11)^3} = 197.292\ ^K/_{IN}$$

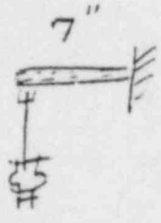
$K_{STRUT} = 2069.685\ ^K/_{in}$ (@ 6")

$K_{CLAMP} = 553.86\ ^K/_{in}$

$K_{BRKT} = 48042.19\ ^K/_{in}$.

$$\therefore \frac{1}{K_X} = \frac{1}{K_{TS}} + \frac{1}{K_S} + \frac{1}{K_C} + \frac{1}{K_B}$$

$$K_X = 135.536\ ^K/_{IN}$$



CC≈18"

$$K_{TS} = \frac{3EI}{L3} = \frac{3(27.7\times10^4)(3.16)}{(7)^3}$$

$= 765,586\ ^K/_{in}$

$K_{STRUT} = 884.015\ ^K/_{in}$

$K_{CLAMP} = 553.56\ ^K/_{in}$

$K_{BRKT.} = 48042.19\ ^K/_{in}$.

$$\frac{1}{K_Z} = \frac{1}{K_{TS.}} + \frac{1}{K_S} + \frac{1}{K_C} + \frac{1}{K_B}$$

$$K_Z = 234.537\ ^K/_{in}$$

TEXAS UTILITIES SERVICES INC.
COMANCHE PEAK S.E.S.
Agent For
DALLAS POWER & LIGHT COMPANY
TEXAS ELECTRIC SERVICE COMPANY
TEXAS POWER & LIGHT COMPANY

Date 3.8.86
Calc By T. K.
Chk'd/Apprd. By
Subject CC-2-011-706-A63R

Filing Code
Sheet No. 2 Of
G & H Job. No.
Ref. Dwg./Spec. No.

(2) IN X-DIRECTION

SINCE SAME SECTION WITH Z-DIRECTION.

$K_L = 0.64 \times 10^6$ #/in

$K_X = 0.135 \times 10^6$ #/in

$$K_X' = \frac{1}{\frac{1}{K_L} + \frac{1}{K_X}} = 0.1115 \times 10^6 \text{ #/in}$$

Rcd. 8/23/84

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 17 1984

Docket No.: 50-445

- ATTACHMENT D -

Mr. M. D. Spence
President
Texas Utilities Generating Company
400 N. Olive Street
L. B. 81
Dallas, Texas 75201

Dear Mr. Spence:

Subject: Acceptance of Preoperational Test Deferrals for Comanche Peak Steam Electric Station, Unit 1

The staff has completed its review of the following preoperational tests requested by letters dated May 29, June 5, June 8 and June 15, 1984 from B. R. Clements:

1. Containment Cooling Systems
2. Safety Injection System Check Valve Leakage
3. Turbine Drive Auxiliary Feedwater Pump Steam Supply Line Check Valve and Drain Pot Level Control Valve
4. Reactor Coolant Pump Seal Performance
5. Thermal Expansion Testing
6. Control Room Ventilation System

Enclosed are the staff's evaluations which are the proposed findings for inclusion in a future SER supplement. These proposed findings indicate that the requested deferrals are acceptable. Therefore, the Unit 1 Operating License will contain license conditions consistent with your commitments on conducting the tests prior to initial criticality.

Sincerely,

B. J. Youngblood

B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing

Enclosure: As stated

cc: See next page

The applicant will have corrected these deficiencies and proposes that the test be repeated after fuel loading when the next plant heatup is completed for initial criticality. Final cold setting of retest items would be accomplished at the shutdown scheduled at the end of the 30% power plateau.

The deferral of the thermal expansion retest is acceptable because it is consistent with approved industry practice on other plant test programs. Furthermore, compliance with Technical Specifications relating to piping supports will be required for plant operation to proceed.

F. Control Room Ventilation System

During performance of the Control Room Ventilation System preoperational test, it was determined that the system provided more than adequate air supply to the control room area for Unit 1, but less than design air flow was supplied to Unit 2 control room area. The applicant is proceeding with modifications to the ventilation system to correct the design deficiency. The applicant plans to start retesting the modified system, but anticipates not being able to complete the testing prior to scheduled Unit 1 fuel loading. The applicant, therefore, requests deferral of completion of the test until after fuel loading.

Based on the condition that this deferral is a retest of a system which was already determined to be acceptable for the Unit 1 control area, we find the deferral of the retesting of the Control Room Ventilation System until completion of the initial fuel loading of Unit 1 (and before initial criticality) to be acceptable.

In summary, the deferral of these six preoperational tests represent retesting of modifications made to correct identified system deficiencies in the respective systems. Retesting these systems after initial fuel loading, but prior to initial criticality, will pose no safety problem, will be controlled by the plant Technical Specifications and are consistent with other plant test programs. On this basis, the requested deferrals are approved.

COMANCHE PEAK

AUG 17 1984

Mr. M. D. Spence
President
Texas Utilities Generating Company
400 N. Olive St., L.B. 81
Dallas, Texas 75201

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Manager - Nuclear Services
Texas Utilities Generating Company
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400 North Olive Street
L. B. 81
Dallas, Texas 75201

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Gibbs and Hill, Inc.
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New York, New York 10001

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Westinghouse Electric Corporation
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ENCLOSURE

SUPPLEMENTAL SAFETY EVALUATION REPORT
DEFERRAL OF CERTAIN PREOPERATIONAL TESTS
COMANCHE PEAK UNIT 1

Texas Utilities Generating Company in letters from B. R. Clements to H. R. Denton, NRC, dated May 29, June 5, June 8 and June 15, 1984, requested approval to defer six preoperational tests until after fuel loading. The testing would be completed prior to initial criticality with the exception of a portion of the thermal expansion test. This test requires heatup and return to cold shutdown conditions for completion and is scheduled at the completion of the 30 percent power plateau.

A. 1CP-PT-45-06, Containment Cooling Systems

The applicant has requested that this test be repeated after fuel loading. Testing of the containment cooling systems were performed during the normal preoperational test program; however, test deficiencies were identified requiring system modifications which could not be retested prior to the scheduled fuel loading.

The repeat of this test after fuel loading is acceptable because only limited portions of the system require retesting, no technical specification exceptions are required and, for operation to continue, the system must still meet technical specifications temperature limits in critical areas.

B. 1CP-PT-57-09, Check Valve and Hot Functional Safety Injection

The applicant has requested that this test be repeated after fuel loading. During the initial test, a number of check valves leaked in excess of their acceptance criteria. These valves have been repaired or replaced. The repeat testing of these valves would be performed as required by the technical specifications surveillance tests for check valves. It is acceptable to defer repeating portions of this test until after fuel loading, but before criticality, because (1) it is consistent with the technical specifications which control normal operation and define check valve operability and (2) presents no safety problem because retesting is completed prior to criticality.

CYGNA
ENERGY SERVICES
101 California Street, Suite 1000, San Francisco, CA 94111-5894
415 397-5600

Rcd 8/28/84

August 25, 1984
84042.016

- ATTACHMENT E -

Mr. J. B. George
Project General Manager
Texas Utilities Generating Company
Comanche Peak Steam Electric Station
Highway FM 201
Glen Rose, Texas 76043

Subject: Phase 3 Open Items - Mass Participation
Comanche Peak Steam Electric Station
Independent Assessment Program - Phase 3
Job No. 84042

References: a) R. E. Ballard (Gibbs & Hill) letter to J. B. George (TUGCO), "Revised Mass Participation Fraction Sensitivity Study," GTN-69316, August 3, 1984

b) R. E. Ballard (Gibbs & Hill) letter to J. B. George (TUGCO), "G&H Followup Activities for Cygna (Phase 3)," GTN-69279, July 20, 1984

Dear Mr. George:

Cygna has reviewed the reference (a) letter regarding a revision to the Gibbs & Hill mass participation study. Since we have not yet received the Gibbs & Hill preliminary report on the results of the revised ADLPIPE analysis (see reference b), our reviewers are unable to fully understand the reasonableness of approaching the analysis in the manner proposed. A Cygna reviewer is scheduled to visit the Gibbs & Hill offices on August 28, 1984 in order to review the work performed to date. In the interim, Cygna believes it is necessary to notify TUGCO of the following concerns regarding the use of this revised approach:

- The method proposed by Gibbs & Hill uses the higher of the loads from the static ZPA analysis and the loads from the dynamic analyses. This "yardstick" for determining support adequacy may be considered inadequate since this criteria does not satisfy the requirements of the CPSES FSAR Section 3.7B.3.1, which specifically states that: "The number of modes chosen is considered adequate provided that inclusion of additional modes does not result in more than a 10% increase in responses, or based upon evaluation of the dynamic participation factors to assure that all significant modes have been included." Checking that the support loads in a system equal the mass multiplied by the ZPA is a good review tool to determine the reasonableness of a dynamic analysis. If it is to be used for design purposes a study must