

# CASE

(CITIZENS ASSN. FOR SOUND ENERGY)

1426 S. Polk  
Dallas, Texas 75224

214/946-9446

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March 31, 1984

OFFICE OF SECRETARY  
DOCKETING & REPORTS  
BRANCH

David R. Pigott, Esq.  
Orrick, Herrington, & Sutcliffe  
600 Montgomery Street  
San Francisco, California 94111

Dear Mr. Pigott:

Subject: In the Matter of  
Texas Utilities Electric Company,  
et al. (Comanche Peak Steam  
Electric Station, Units 1 and 2)  
Docket No. 50-445 and 50-446

Clarification - Doyle #16

We are attaching some clarifying comments from Mr. Doyle regarding Doyle #16, which was discussed in the 3/27/84 conference call between CASE/Cygna. Also attached is CASE Exhibit 969 (IE Bulletin 79-02), to which Mr. Doyle makes reference in his comments and which will be used in Cygna's cross-examination by CASE.

Sincerely,

CASE (CITIZENS ASSOCIATION FOR  
SOUND ENERGY)

*Juanita Ellis*  
(Mrs.) Juanita Ellis  
President

Attachments

Service List - see attached

Doyle #16

This is to clarify the items which we discussed in the 3/27/84 conference call between CASE/Cygna, regarding the point as to why the equation was not acceptable. Discussion of the equation, however, is really academic since the use of holes more than 1/16" larger than nominal bolt diameter is, in itself, a violation of codes, as was discussed in the 3/27/84 conference call.

While the Cygna mathematical gyrations are academically correct, the equation listed contains a major error and in addition contains a fatal philosophical oversight.

The error in the equation involves the cancellation of safety factors. On the one hand, in compliance with criterion, a 1/5 (a safety factor) of ultimate capacity for the anchor bolt in shear is incorporated in equation 3. But, on the other hand, for the solution shown on page 2, this factor is for all practical purposes negated by the introduction of the inverse of a second safety factor of 4. The result is that the apparent required ductility factor of .232 should in reality be .928. This means that, while the equation as solved by Cygna would indicate that a stiffer bolt would still perform adequately, the reality is that what is required is a bolt with a softer spring rate than the 1" diameter bolt as used in the equation. If the equation were properly done, it would show that the 1" diameter bolt was too stiff to perform as envisioned by Cygna.

The philosophical constraint to this methodology involves the front-end mechanism as opposed to the final mechanism of ultimate failure.

For example, while such a mathematical procedure (correctly done) may be theoretically correct, it is the real world and IE Bulletin 79-02 (CASE Exhibit 969, copy of which is attached) which is of concern. And in this respect, one must consider that in any bolt group for which two bolts are initially active and the remaining bolts of the pattern are located  $1/8"$  from engagement, it is the first active bolts (two) which take the entire shear load during the  $1/8"$  displacement. In viewing the chart (D16-1, sheet 2 of 2, enclosed with the Cygna response), the first two active bolts are subjected to 11.3 kips of shear before the remaining bolts in the pattern accept any loading.

Following the time frame in which all of the bolts in the system become active, additional load is distributed to each of the bolts relative to its stiffness at a particular point on the excursion through the variable stiffness factors along the curve generated by the X-Y plot. Since there is no yield point on the plot, all bolts will continue to pick up loads until failure.

While there will be some disparity in the distribution of loading to the bolts within this range, the stiffnesses are such that for all practical purposes they would be equal for each bolt in the pattern. For a four-bolt pattern with maximum shear load (based on four bolts at 6890 lbs. per bolt), the first active bolts would have loads of 15 kips each (assuming two active bolts) with a displacement equal to .165 inches. This is versus an allowable per bolt of 6.9 kips and a total support allowable deflection of  $1/16"$ .

Two of the bolts in this pattern are approximately halfway to

catastrophic failure. And this does not consider problems for which there are no test results such as cyclic loading. Since no one can predict the consequences of reversal of loading during multiple zero crossing resulting from seismic events (particularly for bearing joints), it must be considered imprudent to court disaster by shaving the safety margin established by IE Bulletin 79-02, item 2, merely to justify a feat accompli.

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 AND 50-446

Docket Nos. 50-445 and  
50-446

CERTIFICATE OF SERVICE

By my signature below, I hereby certify that true and correct copies of  
CASE's 3/31/84 letter to Cygna (David R. Pigott) re: Clarification - Doyle

#16 (with CASE Exhibit 969 attached to parties only)

have been sent to the names listed below this 31st day of March, 1984,  
by: Express Mail where indicated by \* and First Class Mail elsewhere.

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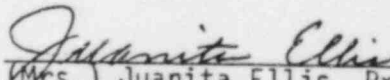
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