

4/26/83

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of

APPLICATION OF TEXAS UTILITIES
GENERATING COMPANY, ET AL. FOR
AN OPERATING LICENSE FOR
COMANCHE PEAK STEAM ELECTRIC
STATION UNITS #1 AND #2
(CPSES)

Docket Nos. 50-445
and 50-446

AFFIDAVIT OF MARK ANTHONY WALSH

My name is Mark Anthony Walsh. At the request of Jack Doyle, I ran the computer program which is attached as CASE Exhibit 761A to Mr. Doyle's 4/26/83 Surrebuttal Testimony.

Although the computer program which I used is not exactly like the STRUDL program used at Comanche Peak, it is a STRUOL program with sufficient similarities to assure that the results will be accurate.

This affidavit was prepared under my personal direction, and the thoughts and words expressed herein are my own thoughts and words (with the exception of minor grammatical changes, either to correct spelling or to clarify my meaning, which did not change the intent of my thoughts).

Mark Anthony Walsh
Mark Anthony Walsh

Date: 4/26/83

STATE OF TEXAS

On this, the 26th day of April, 1983, personally appeared Mark Anthony 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 herein expressed.

Subscribed and sworn before me on the 26th day of April, 1983.

Loth Payne
Notary Public in and for the State of Texas

My Commission Expires: 2/28/85

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GENERATING COMPANY, ET AL. FOR
AN OPERATING LICENSE FOR
COMANCHE PEAK STEAM ELECTRIC
STATION UNITS #1 AND #2
(CPSES)Docket Nos. 50-445
and 50-446SURREBUTTAL TESTIMONY OF JACK DOYLE,
WITNESS FOR INTERVENOR CASE

1 Q: Please state your name and address for the record.

2 A: My name is Jack Doyle. My address is P.O. Box 64, Turnpike
3 Station, Shrewsbury, Massachusetts 01545.4 Q: Are you the same Jack Doyle who testified as a witness for CASE
5 in the September 1982 operating license hearings for Comanche Peak?

6 A: Yes, I am.

7 Q: In preparation of your testimony for the May 16-20, 1983, operating
8 license hearings for Comanche Peak, was there an item of particular concern
9 which you felt should be sent immediately to all parties?

10 A: Yes, there was.

11 Q: Please tell us what that item is and what your concerns are
12 regarding it.13 A: The problem with which I am concerned was discussed somewhat in
14 CASE's 4/20/83 Brief Regarding Consideration of LOCA in Design Criteria
15 for Pipe Supports (beginning on page 33, second paragraph, through page
16 34, second full paragraph). In addition, I will be discussing Applicants'

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1 Exhibit 142D regarding LOCA temperature effects on pipe supports.

2 Q: Why do you feel that this matter is so important that it should
3 be gotten into the hands of the Board and all parties immediately?

4 A: The conclusions of the NRC Staff and the Applicants relative
5 to self-relief of LOCA effects at the joints is based on this material,
6 which the NRC Special Inspection Team reviewed during its investigation
7 of the concerns of Mr. Walsh and me. The accuracy of this material
8 must be assured. In the case of the equations and formulas in question,
9 their accuracy is negated by an erroneous approach. There is no assurance
10 that the supports will function during a LOCA or immediately thereafter.

11 A further question arises: - If these equations are in error,
12 what other equations that are used as proof of a position are also in
13 error? These equations are prepared, checked, reviewed, and approved.
14 They were further blessed by the NRC Special Inspection Team.

15 Q: Please tell us what your specific concerns are regarding this
16 matter.

17 A: In the case of the moment restraint structural support, problem
18 45D (CASE Exhibit 761B), in determining the structural stiffness at joints
19 1, 4, and 5, the stiffness of only one anchor bolt was considered. In
20 fact, there are multiple anchor bolts, and of more consequence, shear
21 keys are welded to the base plate which results in k factors several
22 hundred times those used by Gibbs and Hill, who apparently prepared the
23 calculation.

24 These items, the anchor bolts and shear keys, are a parallel spring
25 system. Effectively, these joints will act as rigid connections unless

1 there is a catastrophic failure of the concrete in the area of the
2 shear keys, which will result in unpredictable consequences. For more
3 details regarding this, see CASE Exhibit 761C.

4 Regarding the upper lateral restraint (CASE Exhibit 758, referred to
5 on page 33, second paragraph, of CASE's 4/20/83 Brief on LOCA) this is
6 approximately a 9 ton beam located a considerable distance above critical
7 piping in the steam generator area. The analysis for this beam considering
8 the flexibility of the walls is based on a simple three-springs series.
9 Gibbs and Hill, in their approach, used an oblique approach that failed
10 to consider, among other things, several critical factors.

11 (1) The beam reacts its loads to a vertical slab, not a beam. The
12 method for determining the stiffness of the walls, therefore, should incor-
13 porate either the "Marsh method, 1904 cross-beam process," the "Okuna
14 Abrams analogous grid method, 1952," or show that dimensionally the
15 above procedures are not required for the aspect ratio in question.
16 Further, the transformed section should have been used to determine the
17 moment of inertia "ACI cracked beam procedure" instead of the monolithic
18 method used.

19 (2) Since the wall deflection is angular to the lateral beam, a
20 component to the deflection induces a side load into the beam across
21 its minor axis, which was not considered.

22 (3) In the interaction equation in the analysis of the upper lateral
23 restraint, Gibbs and Hill used a compression allowable in excess of
24 yield for A50 steel in a 280°F environment.

25 As a result of these errors and other fundamental errors in the

1 equations themselves, I decided to approach the problem independently,
2 using, however, the k factors of the walls, area of the beam, Young's
3 modulus of the concrete, and coefficient of expansion and dimensions
4 indicated in Gibbs and Hill's calculations. The results of approaching
5 the problem from a springs-in-series position results in significant
6 increase in the loads in the beam and on the wall. The hand calculations
7 as shown in CASE Exhibit 761C on the lateral beam were subjected to a
8 computer analysis substituting members of equivalent spring rates to those
9 of the wall.

10 Q: And what were the results of those calculations?

11 A: The results of the hand calculations supported by the computer
12 analysis indicate a gross error in the fundamental approach as used
13 in the Gibbs and Hill calculations. (See CASE Exhibit 761A for the
14 computer analysis.)

15 Q: Who performed the computer analysis?

16 A: It was performed by Mark Walsh at my request.

17 Q: Do you have anything further?

18 A: In reference to Applicants Exhibit 142D, three equations listed
19 as Case 1, Case 2, and Case 3 were supplied to indicate the self-relieving
20 characteristics of Hilti anchors, Richmond anchors, and Nelson studs.
21 In all three cases, the procedures are in error. These are again a problem
22 of several springs in series and additionally, in the case of Hilti
23 Kwik-Bolts and Nelson studs, the joints are a parallel system of multiple
24 springs. For the case of Hilti anchor bolts and Richmond anchors,
25 see material contained in CASE Exhibit 761C. As for Case 3, Nelson

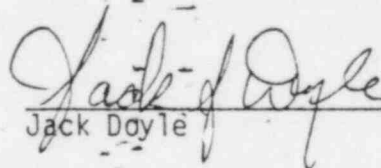
1 studs, the Gibbs and Hill calculations neglect a critical component
2 in the effective spring system. These are embedded plates and therefore
3 shear is transferred through the concrete and the Nelson studs in parallel.
4 The effects of the concrete have not been considered by Gibbs and Hill
5 and therefore their approach would be in gross error.

6 Q: What does all this mean?

7 A: The Applicants, Gibbs and Hill, and the NRC have predicated
8 their arguments that thermal expansion during a LOCA or in fact during
9 normal plant operating conditions is of no consequence in the design
10 calculations, since the self-relieving characteristics of the joints
11 preclude overstressing. This is based on five calculations which were
12 supplied to CASE during discovery and in Applicants Exhibit 142D. These
13 contain gross error in fundamental engineering principles.

14 The question arises: Where are the checks and balances system
15 which assures the safety of a nuclear power plant if such gross errors
16 can be introduced, checked, reviewed, approved, and blessed by the NRC?
17 How far does this acceptance of gross error extend into other areas to
18 which we are not privy, where we are told that something is acceptable
19 because a document exists, but where the credibility of the document
20 itself is now in doubt? What assurance do we have that the checks and
21 balance system has not broken down, not only at Comanche Peak, but in
22 the nuclear industry generally?

I have read the foregoing 5-page Surrebuttal Testimony of Jack Doyle, Witness for Intervenor Case (CASE Exhibit 761), which was prepared under my personal direction; the thoughts and words expressed therein are my own thoughts and words (with the exception of minor grammatical changes, either to correct spelling or to clarify what I meant, which did not change the intent of my thoughts). Where questions were posed, they were posed by CASE. This testimony is true and correct to the best of my knowledge and belief.



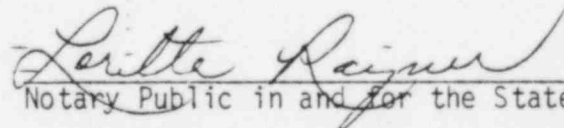
Jack Doyle

Date: 4/26/83

STATE OF TEXAS

On this, the 26th day of April, 1983, personally appeared Jack 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 26th day of April, 1983.



Notary Public in and for the State of Texas

My Commission Expires: 2/28/85