

ORIGINAL
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of:

TEXAS UTILITIES ELECTRIC COMPANY, et al

(Comanche Peak Steam Electric
Station, Units 1 and 2)

Docket No. 50-445
50-446

Location: Fort Worth, Texas

Pages: 9337 - 9601

Date: Monday, February 20, 1984

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the matter of:

TEXAS UTILITIES ELECTRIC
COMPANY, et al.(Comanche Peak Steam Electric
Station, Units 1 and 2)Docket Nos. 50-445
50-446North Main, Fourth Floor
Metro Center Hotel
600 Commerce Street
Fort Worth, Texas

Monday, 20 February 1984

The hearing in the above-entitled matter was
reconvened, pursuant to adjournment, at 8:30 a.m.

BEFORE:

JUDGE PETER BLOCH
Chairman, Atomic Safety and Licensing BoardJUDGE KENNETH MC COLLOM
Member, Atomic Safety and Licensing BoardJUDGE WALTER JORDAN
Member, Atomic Safety and Licensing Board

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APPEARANCES:

On Behalf of the Applicant:

NICHOLAS S. REYNOLDS, ESQ.
WILLIAM A. HORIN, ESQ.
Debevoise & Liberman
1200 17th Street, N.W.
Washington, D.C. 20036

and

ROBERT WOOLRIDGE, ESQ.
Dallas, Texas

On Behalf of the NRC Regulatory Staff:

STUART A. TREBY, ESQ.
GEARY S. MIZUNO, ESQ.
Office of the Executive Legal Director
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

On Behalf of Citizens Association for Sound Energy:

JUANITA ELLIS, President
DR. BARBARA BOLTZ
MARK WALSH
1425 South Polk
Dallas, Texas 75224

On Behalf of Texas Attorney General's Office:

RENEA HICKS, ESQ.
Assistant Attorney General
411 West 13th
Austin, Texas 78701

Also Present:

Frank McRae
Sam Skinner, P.E.
Public Utilities Commission of Texas
7800 Shoal Creek Boulevard
Austin, Texas 78757

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I N D E XWITNESSES:DIRECTCROSSVOIR
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NANCY H. WILLIAMS)

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JOHN E. WARD)

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EXHIBITS:IDENTIFICATIONEVIDENCE

Board Exhibit February '84:

No. 1 (Report, Independent Assessment
Program, Final Report, Vol. 1,
Texas Utilities Services, Inc.
Commanche Peak Steam Elec. Sta.)

9344

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No. 2 (Revisions to Question A)

9346

9347

No. 3 (Experience Summary, Arkansas
Power & Light Company)

9360

9361

No. 4 (Resumes, Cygna personnel)

9363

9363

No. 5 (Table Man Hours, Cygna)

9490

9490

Applicants' Exhibit:

No. 174 (Ltr. 9/23/83 to R.J. Gary, TUGCO; from
D. G. Eisenhut, NRC)

9403

9403

INSERTS:Following Page

Prof. Qualifications,
Witnesses Williams and Ward

9343

Board Exhibit February '84:

No. 2

9347

No. 3

9361

No. 4

9363

No. 5

9490

Applicants' Exhibit No. 174

9403

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P R O C E E D I N G S

JUDGE BLOCH: Good morning, and welcome to this George Washington's Birthday celebration.

I am Peter Bloch, Chairman of the Licensing Board for the Operator License case for Commanche Peak Steam Electric Station, Units 1 and 2.

The case has been recaptioned as a result of the reorganization of the Applicants' utilities. We have Texas Utilities, Texas Utilities Electric Company, et al., Docket Nos. 50-445 and 50-446.

Would the parties and participants please identify themselves for the record, starting on my left?

MR. MC RAE: Frank McRae with the PUC of Texas.

MR. SKINNER: Sam Skinner, PUC of Texas.

MR. TREBY: For the NRC Staff, Stewart A. Treby and Geary Mizuno.

MR. REYNOLDS: For Applicants, my name is Nicholas Reynolds. With me at my counsel table is Mr. William Horin, my associate. Also joining us this morning is Mr. Robert Woolridge. He's from Dallas, Texas.

MS. ELLIS: I am Juanita Ellis, President of Citizens Association for Sound Energy. We are the Intervenor in the proceedings.

Seated to my right is Mark Walsh and Barbara Boltz.

JUDGE BLOCH: With me this morning on the Atomic

mgc 1-2

1 Safety and Licensing Board, on my left, Judge McCollom,
2 and on my right, Judge Jordan.

3 The first matter for testimony this morning is
4 the Cygna Report.

5 Mr. Reynolds, even though these are not your
6 witnesses, would you call them, and I will have them
7 sworn?

8 MR. REYNOLDS: I call Ms. Nancy H. Williams
9 and Mr. John E. Ward.

10 Whereupon,

11 NANCY H. WILLIAMS

12 and

13 JOHN E. WARD

14 were called as witnesses and, having been first duly sworn,
15 were examined and testified as follows:

16 JUDGE BLOCH. You may be seated.

17 This is a proceeding before the United States
18 Nuclear Regulatory Commission, which is an agency of the
19 United States Government.

20 The testimony which you are about to give should
21 be the truth, the whole truth, and nothing but the truth.
22 The obligation to comply with this warning is subject to
23 the possible penalty for perjury.

24 Do you understand the warning which I have just
25 given you?

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1 WITNESS WARD: Yes.

2 WITNESS WILLIAMS: Yes.

3 JUDGE BLOCH: We have agreed that the Applicants
4 may ask the first cross-examination.

5 I guess you would also like to get the report
6 into evidence.

7 CROSS EXAMINATION

8 BY MR. REYNOLDS:

9 Q Ms. Williams, do you have a statement of your
10 educational and professional qualifications before you?

11 A (Witness Williams) Yes, I do.

12 Q Are there any additions or corrections you would
13 like to make to that statement?

14 A No.

15 Q Is it true and correct?

16 A Yes, it is.

17 Q Do you adopt it as part of your testimony in
18 this proceeding?

19 A Yes, I do.

20 Q Mr. Ward, do you have a statement of your
21 educational and professional qualifications before you?

22 A Yes, I do.

23 Q Have you read it, sir?

24 A Yes, I have.

25 Q Do you have any additions or corrections to it?

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A None.

2

Q Is it true and correct?

3

A It is true and correct.

4

Q Do you adopt it as part of your testimony in this

5

proceeding?

6

A I do.

7

MR. REYNOLDS: Mr. Chairman, we move that these
statements of qualifications be incorporated into the
transcript as if read.

10

JUDGE BLOCH: Have you provided copies?

11

MR. REYNOLDS: We have done so.

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(Discussion off the record.)

13

(The educational and professional qualifications
of Ms. Nancy H. Williams and Mr. John E. Ward follow.)

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NANCY H. WILLIAMS

STATEMENT OF EDUCATION
AND PROFESSIONAL QUALIFICATIONS

CURRENT POSITION: Project Manager, Cygna Energy Services

FORMAL EDUCATION: B.S., Civil Engineering, Carnegie-Mellon University,
Pittsburgh, PA, 1977
Boiling Water Reactor Course, General Electric BWR Training
Center, 1981
Finite Element Methods and Application, Ohio State
University, Columbus, OH, 1980
Management Courses, Harvard University, Extension Program,
Cambridge, MA, 1982

EXPERIENCE:

1982 - Present

CYGNA ENERGY SERVICES; Project Manager.
Responsible for the planning, coordination, and
implementation of all project phases from conceptual
engineering to documentation of analysis, modifications, or
recommendations.

1979 - 1982

BOSTON EDISON CO.; Project Manager, Project Engineer, Lead
Engineer.
Project Manager of Pilgrim Station's Equipment
Qualification, IE Bulletin 79-14, and IE Bulletin 79-02
projects. Project Engineer for several commercial design
and construction projects, and lead engineer in the nuclear
civil/structural group.

1978

STONE & WEBSTER ENGINEERING CORP.; Associate Engineer.
Designed pipe supports, and resolved interferences between
plant layout, piping layout and support design on Millstone
Unit 3.

1977

GENERAL DYNAMICS, ELECTRIC BOAT DIV.; Structural Engineer.
Responsible for the construction of various tanks and
foundations in the reaction compartment and engine room of
the Trident Class Submarines. Provided direction for the
trades and engineering resolutions for construction
problems. Worked on the development of a construction
planning program for the reactor compartment of the 688
Class Submarines.

PROFESSIONAL
AFFILIATIONS:

Member, Project Management Institute

PUBLICATIONS:

"Operational Analysis: An Approach to Safety and
Planning," International Meeting on Thermal Nuclear Reactor
Safety, ANS/ENS, August 29 - September 2, 1982



JOHN E. WARD

STATEMENT OF EDUCATIONAL
AND PROFESSIONAL QUALIFICATIONS

CURRENT POSITION: Vice President and Manager of Executive Consulting,
Management Analysis Company

FORMAL EDUCATION: Bachelor Science, Marine Engineering
U. S. Naval Academy, 1952

Master Science, Nuclear Physics
U. S. Naval Postgraduate School, 1959

U. S. Naval Nuclear Power School, 1965

Project Management Wharton School, 1978

EXPERIENCE:

1983 - Present Management Analysis Company, Vice President - Supervise
computing services to clients in the area of business
strategies, business management and human resource
utilization and effectiveness.

1981 - 1983 Cygna Energy Services, Inc. - Chairman, Chief Executive
Officer and President - Exercised management control of
this broad-based engineering consulting firm providing
services to electrical utilities in connection with
nuclear plant engineering, analysis and construction.

1968 - 1981 Sargent & Lundy, Inc. - Vice President, Associate Safety
and Licensing - Division Manager and Nuclear Project
Engineer - Served as nuclear project engineer on two major
projects. Managed regulatory services and nuclear analytic
capability. Coordinated all business development activity.

1967 - 1968 R. W. Beck and Associates - Principal Nuclear Engineer -
Coordinated and performed nuclear plant feasibility
assessments, reviewed nuclear plant performance, performed
nuclear plant siting studies.

1966 - 1967 Commonwealth Edison Company - Nuclear Project Engineer -
Performed design review and contract management for a major
nuclear plant project.

1952 - 1966 U. S. Navy - Commander USN - Various duties including
engineering officer, operations officer, executive and
commanding officer on six vessels. Coordinated all naval
surface missile operational test and evaluations on the
Pacific Coast.

PROFESSIONAL
AFFILIATIONS:

Member - American Nuclear Society
- American Society of Mechanical Engineers
- Atomic Industrial Forum
Past Chairman, AIF Committee on Reactor Licensing and Safety
Member Executive Committee, ANS Power Division
Member Standards Steering Committee, ANS

Registered Professional Nuclear Engineer - California
Registered Professional Mechanical Engineer - California

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2 MR. REYNOLDS: Mr. Chairman, may we have marked
3 for Identification as Board Exhibit February '84 No. 1 a
4 report titled "Independent Assessment Program, Final Report,
5 Volume 1, Texas Utilities Services, Inc., Commanche Peak
6 Steam Electric Station"?

7 This document has the logo of Cygna on its cover.
8 It is a two-volume report which we can mark separately, if
9 you wish, or include it as one exhibit.

10 JUDGE BLOCH: It is included as one exhibit.

11 MR. REYNOLDS: May it be so marked?

12 JUDGE BLOCH: It may be so marked.

13 (The document referred to was
14 marked Board Exhibit
15 February '84 for Identification.)

16 BY MR. REYNOLDS:

17 Q Ms. Williams, Mr. Ward, which of you will be the
18 quarterback witness for this panel?

19 A (Witness Williams) I will be.

20 Q Do you have a copy of Board Exhibit February '84
21 No. 1 for Identification?

22 A Yes, I do.

23 Q Do you have a two-volume document?

24 A Yes, I do.

25 Q Are you familiar with that document?

A Yes, I am.

mgc 1-6

1 Q Would you describe it for me?

2 A It is our final report for the independent
3 assessment program for Commanche Peak.

4 Q Do you adopt it as part of your testimony in this
5 proceeding?

6 A Yes, I do.

7 Q Is it true and correct?

8 A There will be some corrections.

9 Q Would you please provide the reporter with those
10 corrections at that time?

11 (Disucssion off the record.)

12 JUDGE BLOCH: We will take a short break.

13 (Recess.)

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1 JUDGE BLOCH: I would like to tell the witnesses
2 that there is one aspect of our proceedings which is
3 different from others: that is, we tend to receive testimony
4 in written form. That is what we did with your document.
5 These written documents are subject to the same penalties for
6 perjury as with all statements. I just want to clarify that
7 since you are not represented by lawyers today.

8 Mr. Reynolds, please continue.

9 BY MR. REYNOLDS:

10 Q Ms. Williams, you have a document in front of you
11 that is titled "Question A," the first question asking to
12 provide a more literal or exact description of the Cygna
13 project conclusions presented on pages 1.6 - 1.8?

14 A (Witness Williams) Yes, I do.

15 MR. REYNOLDS: Mr. Chairman, may we mark this for
16 identification as Board Exhibit February '84 No. 2?

17 JUDGE BLOCH: It may be so marked.

18 (The document referred to was
19 marked Board Exhibit February '84
20 No. 2 for identification.)

21 BY MR. REYNOLDS:

22 Q Ms. Williams, what is that document?

23 A This is a change to the conclusions in the
24 Executive Summary of the Final Report in order to make our
25 findings consistent with the program objectives.

XXXXX

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1 Q Is it true and correct?

2 A Yes, it is.

3 Q Do you adopt it as part of your testimony in this
4 proceeding?

5 A Yes.

6 MR. REYNOLDS: Mr. Chairman, we ask that it be
7 received into evidence.

8 JUDGE BLOCH: It may.

9 Would you say a word or two about how it came
10 about that you decided to prepare this document?

11 WITNESS WILLIAMS: Well, this is a draft report,
12 and during the course of our review, just as the utilities
13 perform their review, this was something we found was not a
14 proper representation of the objectives of the program and
15 it was not what we intended to say.

16 BY MR. REYNOLDS:

17 Q Ms. Williams, will you then proceed with the
18 changes that you would additionally like to make to the
19 Cygna report?

20 JUDGE BLOCH: This shall be received in evidence
21 and bound into the record as if read.

22 (The document previously marked
23 Board Exhibit February '84 No. 2
24 for identification was received
25 in evidence.)

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(Board Exhibit February '84 No. 2, "Question A,"

follows:)

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QUESTION A

Question: Provide a more literal or exact description of the Cygna project conclusions presented on Pages 1.6 - 1.8.

Response: The Independent Assessment Program for CPSES achieved four important objectives. The Program was able to :

- assess the adequacy of Texas Utilities' design control program;
- assess the adequacy of the design of an important safety related system;
- to verify a selected as-built configuration; and
- to verify implementation of selected elements of the design control program.

With respect to the first objective, we have concluded that:

- Texas Utilities' design control activities, as defined in their design control program documentation, satisfy the project commitments and standard practice; and
- The design control activities of Gibbs & Hill satisfy the commitments of contract documents and the CPSES SAR.

The second objective has been met with the following conclusions:

- The review provided assurance that the design control process has been adequately implemented in the areas of criteria, procedures, interface control, and documentation.
- Selected elements of one safety related system has been adequately designed to perform its intended safety function in accordance with the project commitments, applicable code requirements and industry standards.

The third objective has been met with the following conclusions:

- An as-built walkdown of a completed system provided assurance that proper controls were in place to ensure construction was completed in accordance with the drawing, specifications and associated change notices.

The fourth objective has been met with the following conclusions:

- Texas Utilities and Gibbs & Hill have adequately implemented control of design analyses (G&H only), design changes and interfaces in accordance with the design control commitments as delineated in their respective design program documentation.

This scope of work afforded Cygna an opportunity to examine, in detail, the CPSES design process on safety-related systems located inside the safeguards building and fuel building. It provided an in-depth look into activities related to mechanical (piping, pipe supports, equipment qualification), structural (cable tray supports) and electrical engineering disciplines.

This independent assessment program not only followed the flow of information from the preliminary design stage to the as-built condition, but it also assessed the accuracy and completeness of various elements of the design process. The results of our design control and technical reviews, integrated with the previous reviews of CPSES, provides sufficient evidence for Cygna to conclude that the overall design activities on CPSES are adequate and have been properly implemented.

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1 WITNESS WILLIAMS: Okay. I would like to start
2 with the design criteria document DC-2 contained in
3 Appendix E, Volume 1, entitled "Pipe Support Design Criteria."
4 There are two changes. DC-2, the second design criteria
5 document in Appendix E.

6 JUDGE JORDAN: This is on the pipe supports?

7 MS. WILLIAMS: Yes, that's correct.

8 JUDGE BLOCH: DC-2 is at the bottom of the page.
9 You're going to give us a page number?

10 MS. WILLIAMS: Yes, page 4 of 11.

11 JUDGE BLOCH: Please proceed.

12 WITNESS WILLIAMS: The first bullet at the top of
13 the page, which presently reads, "ASME boiler and pressure
14 vessel code, Section 3, Subsection NF, 1977 Edition," should
15 be reworded to say, "ASME boiler and pressure vessel code,
16 Section 3, Subsection NF, 1974 Edition with addenda through
17 Winter of 1974." That is what we used as the basis for our
18 review.

19 JUDGE BLOCH: Please continue with all the other
20 corrections.

21 WITNESS WILLIAMS: Turning to Exhibit 4.4-1 of the
22 same document, Allowable Stress Table, the item entitled
23 "Catalogue Items," the allowable for emergency should read
24 1.33 times catalogue, not 1.5 as stated in this document. 1.33
25 was the basis for our review.

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1 Turning now to Appendix F, observation number
2 CTS-00-02. When we first wrote this observation, we were
3 questioning whether algebraic summation was applied conserva-
4 tively. We did not mean to imply that the use of algebraic
5 summation was incorrect. Further review has indicated that
6 Gibbs & Hill did apply algebraic summation correctly. The
7 observation will be changed to note that fact.

8 JUDGE MC COLLOM: You don't want us to put anything
9 down now?

10 WITNESS WILLIAMS: I'm paraphrasing what the
11 revisions will be.

12 JUDGE BLOCH: How did this particular change come
13 about?

14 WITNESS WILLIAMS: We were looking at the documents
15 in our original review. Algebraic summation could be
16 unconservatively applied, and at first we thought that
17 possibility existed in some of the modeling. Further review,
18 further detailed review indicated that in every instance it
19 was applied correctly.

20 JUDGE BLOCH: This was just internal ongoing review
21 without any impetus from the outside?

22 WITNESS WILLIAMS: That's correct. We did have
23 discussions with Gibbs & Hill which were all documented on
24 the telecons.

25 JUDGE BLOCH: So the impetus came from outside?

6

1 WITNESS WILLIAMS: It was not based --

2 MR. REYNOLDS: Mr. Chairman, you are leading the
3 witness.

4 JUDGE BLOCH: I'm sorry. I asked whether it was
5 internal only or it came from outside, and she seemed to say
6 it came from inside. Now I understood her to be saying the
7 opposite.

8 WITNESS WILLIAMS: We initiated it but it wasn't
9 without reviewing the documents again at Gibbs & Hill.

10 JUDGE BLOCH: Were contacts and conversations with
11 Gibbs & Hill subject to the same guidelines as contacts
12 with -- so this was under the guidelines that were set by
13 the NRC and therefore if it was a face-to-face contact, there
14 was advance public notice of it.

15 WITNESS WILLIAMS: If there was anything other than
16 just an exchange of technical information, there would have
17 been advance notice; that's correct.

18 JUDGE BLOCH: Please continue.

19 WITNESS WILLIAMS: Going on to Observation CTS-00-
20 03 -- before I go on, maybe it would be important to note that
21 we will be in Rev. 0 since this is a draft report, making
22 these changes, and they will appear in the final report.

23 This observation deals with our questioning of
24 the modeling techniques. We found that they did model the
25 beam correctly to account for proper load placement in a
calculation which was not brought to our attention at the time

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1 of the review. We received further information at a later
2 date.

3 Observation CTS-00-04, the discussion on the
4 height-to-width or aspect ratio, further review has shown
5 that restrictions in the installation specification defined
6 the height-to-width ratio such that the worst case could be
7 identified. Our concern here was that they had no means of
8 identifying what the worst case would be since they were
9 applying generic design concepts.

10 Item 2 of the description --

11 JUDGE BLOCH: On that one, that is a procedure
12 that was in effect -- do you remember the time period?

13 WITNESS WILLIAMS: The installation procedure?

14 JUDGE BLOCH: Yes.

15 WITNESS WILLIAMS: I don't recall what date it was
16 issued, but yes, it was in effect. It was a document that
17 we had in our possession.

18 JUDGE BLOCH: But I'm asking the effective date
19 because obviously, if it was a recent effective date, a large
20 part of the plant would have been designed without that in
21 effect.

22 WITNESS WILLIAMS: I can verify this, but it was
23 in effect from the time of construction.

24 JUDGE BLOCH: You mean the beginning of
25 construction.

8

1 WITNESS WILLIAMS: Yes.

2 JUDGE BLOCH: Please continue.

3 WITNESS WILLIAMS: Item 2 under description, same
4 observation. Further review has proved that out of phase
5 loading on the trays will not increase the bolt loads.

6 JUDGE BLOCH: Is the information which we learned
7 and which was sent to New York by accident, is the backup
8 information on these changes -- does it find itself on that
9 package?

10 WITNESS WILLIAMS: What I have are hand sketches
11 where I could explain the process if people wanted to go
12 into it.

13 JUDGE BLOCH: Do you have those with you?

14 WITNESS WILLIAMS: Either that, or I could
15 refabricate them.

16 BY MR. REYNOLDS:

17 Q Does that conclude your changes, Ms. Williams?

18 A (Witness Williams) No, it does not.

19 Q Please continue.

20 A CTS-00-06. Further review has indicated that the
21 resolution may be revised to highlight the fact that this
22 was not a modeling error but rather an extrapolation of a
23 specific detail from a generic analysis which was used for
24 the basis qualification. Observation CTS-00-08 is a summary
25 observation of the previous items, previous cable tray

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1 observations. That will be revised to appropriately reflect
2 the changes which I have just gone through.

END 2

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9:00 a.m.

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1 Observation PS-02-01.

2 JUDGE MC COLLOM: In what appendix?

3 WITNESS WILLIAMS: The same appendix, continuing
4 through the book from where we were at.

5 JUDGE JORDAN: The last page in appendix --

6 JUDGE BLOCH: We have them in a different order
7 than you have.

8 JUDGE JORDAN: So we need to go back now to PS what?

9 WITNESS WILLIAMS: To the PS series of observations.

10 JUDGE BLOCH: You said PS-06?

11 WITNESS WILLIAMS: PS-02-01, the resolution on
12 Attachment A to that observation will be reworded.

13 JUDGE BLOCH: One moment.

14 WITNESS WILLIAMS: The resolution, Section 2 to
15 Attachment A of that observation will be clarified to say
16 that bolt installation is in accordance with both the drawing
17 and the installation procedure, CEI-20.

18 JUDGE BLOCH: With the procedure and what else?

19 WITNESS WILLIAMS: With the drawing and the
20 installation procedure, CEI-20.

21 Observation PS-09-01, the support noted in the
22 description section is a snubber.

23 JUDGE MC COLLOM: Instead of a hanger?

24 WITNESS WILLIAMS: What we wanted was spring.
25 The number should be SI-1-079-001-S32S -- that's SI-1-079-

mgc 3-2

001-S32S -- and the second one, RH-1 --

JUDGE BLOCH: In which section are we finding this?

WITNESS WILLIAMS: There are two springs. This is a generic observation dealing with springs. There were two springs on the review. The correct reference to the observation should have been the springs and not a snubber.

Then the second spring is RH-1-010-002-S22S.

JUDGE BLOCH: This is in the nature of a typographical error?

WITNESS WILLIAMS: That is correct.

This is the extent of the revisions to the observations that we are aware of at this time. I think it is important to note that because it is a draft report, we are still reviewing it, and that some of these are corrections, but we are trying to make it accurate.

There are two clarifications on the checklist. These are contained in Volume 2, Checklist No. EE-02. It's about halfway through my book. It's entitled "Instrument Controls," Page 1 of 8, Item 1, the second comment down. The reference to 425 psig requirement should be reference from FSAR 7.6.2.1 and refers to the valves 8701 (a) and (b).

Checklist WD-01, Sheet 1 of 11, the last comment reads, "Equivalent PS snubber, PS-A snubber is used." The comment will be revised to say that the reference number on the bill of materials contained on the drawing is an NPSI

mgc 3-3

1 identification number which refers to a rating only. The
2 fact that PS-A snubbers were chosen is independent and
3 acceptable. The PS-A snubbers used were the correct rating.

4 JUDGE BLOCH: Then you mean to change something
5 else on that line; is that correct? Don't you want to
6 change "no" to "yes"?

7 WITNESS WILLIAMS: Yes.

8 JUDGE BLOCH: Ms. Williams, we will ask leading
9 questions from time to time. We count on professionals
10 testifying here to correct us if we are incorrectly leading.

11 WITNESS WILLIAMS: That is the extent of the
12 clarifications we have on the checklist at this time.

13 BY MR. REYNOLDS:

14 Q Does that mean, Ms. Williams, that you have done
15 making your corrections?

16 A (Witness Williams) I would like to add one more
17 definition for the sake of clarity.

18 Section 3.0, Volume 1, Exhibit 3.1 entitled
19 "Terminology," the definition for "observation" should be
20 reworded to read as follows: "An accurate and complete
21 discrepancy with potential design impact as judged by the
22 Project Team."

23 (Discussion off the record.)

Burns follows²⁴

25

1 I would like to add, now, the definition of the
2 discrepancy.

3 JUDGE BLOCH: Do you wish to strike the remainder
4 of the original definition of observation?

5 WITNESS WILLIAMS: That is correct.

6 The definition for "discrepancy" is as follows:
7 Identification of an item in apparent nonconformance with the
8 review criteria.

9 I wish to revise the definition for "vertical
10 review". The definition of "vertical review" should read:
11 an implementation-evaluation of selected design and design-
12 control elements, to replace the definition currently in the
13 draft report.

14 I wish to also revise the definition of
15 "horizontal review" and replace that which is contained in
16 the draft report to read: A quality-assurance review of the
17 design-control program.

18 And, finally, under "definite potential findings"
19 the reference to CG&E should be replaced with Texas Utilities.

20 JUDGE BLOCH: Does that conclude your changes?

21 WITNESS WILLIAMS: Yes, it does.

22 BY MR REYNOLDS:

23 Q Are your changes true and correct?

24 A To the best of my knowledge.

25 JUDGE BLOCH: In light of the changed definitions,

1 is Appendix F still correctly labeled as "observation records,"
2 or are those "discrepancy records"?

3 WITNESS WILLIAMS: That is correct, the discre-
4 pancies are items referenced on the checklist. We found it
5 necessary to define what a nonconformance with the check-
6 list meant.

7 MR. REYNOLDS: Mr. Chairman, we move these
8 corrections of the report be incorporated into the transcript
9 as read by Ms. Williams.

10 And we would propose to provide the Board and
11 parties with typewritten supplemental pages to the report
12 when they are made available by CYGNA.

13 JUDGE BLOCH: That would be helpful. But I think
14 we already have what she said in the transcript, so I don't
15 think we have to do anything else.

16 MR. REYNOLDS: It is not formally in evidence to
17 receive it, sir.

18 JUDGE BLOCH: She has testified. I have received
19 her testimony.

20 BY MR. REYNOLDS:

21 Q Ms. Williams, may we ask you to provide typewritten
22 pages if there are additional changes or corrections to the
23 report, and as to those typewritten pages, would you call them
24 out clearly and correctly in a cover letter to us so we may
25 pass it on to the Board and parties?

1 A (Witness Williams) Yes, I will.

2 MR. REYNOLDS: Mr. Chairman, we have marked for
3 identification as Board Exhibit February '84 No. 3 a document
4 entitled Experience Summaries. May it be so marked?

5 JUDGE BLOCH: Yes.

6 (The document referred to was
7 marked Board Exhibit February '84
8 No. 3 for identification.)

9 FY MR. REYNOLDS:

10 Q Ms. Williams, do you have a copy of that document
11 before you?

12 A (Witness Williams) Yes, I do.

13 Q Do you recognize it?

14 A Yes, I do.

15 Q Would you describe it, please?

16 A This is an excerpt from our General Capabilities
17 description which is contained in our General Services
18 Agreements.

19 Q By "our" you mean CYGNA?

20 A Yes, I do.

21 Q So this document reflects the experience CYGNA
22 has had in the performance of services for and on behalf of
23 the nuclear industry?

24 A This is a representative sample.

25 Q It is not all-inclusive?

xxxxINDEX

1 A That is correct.

2 MR. REYNOLDS: Mr. Chairman, may it be received in
3 evidence?

4 JUDGE BLOCH: It may, and it shall be bound into
5 the transcript.

6 (The document referred to,
7 previously marked Board Exhibit
8 February '84 No. 3 for identifi-
9 cation, was received in evidence.);

LAY-IN

10 (The document follows:)

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Bd Ex #3

EXPERIENCE SUMMARY

ARKANSAS POWER & LIGHT COMPANY

Nuclear One 1 & 2

- o Provided quality assurance engineering services at the plant location during outages and performed audits and surveillances or related activities.
- o Provided an evaluation of the structural capacity of the containment building to withstand an increased seismic design load.

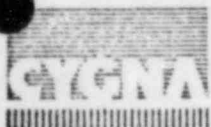
BECHTEL POWER CORPORATION

- o Provided Mark I & II Containment studies encompassing engineering analyses and design services for generic and plant-unique containment structures of boiling water reactors. This effort included simplified torus and vent header analysis, detailed finite element analysis of the torus, conceptual and final design of modifications, and equipment requalification.

BOSTON EDISON COMPANY

Pilgrim I

- o Performed the required analysis for compliance with I&E Bulletin 80-11 including field walkdown, calculation, and design of field modifications.
- o Performed a field walkdown of Class IE electrical equipment in response to I&E Bulletin 79-01B.
- o Providing engineering services and coordination of various TMI modifications including piping layout, pipe stress analysis, pipe support design, and field engineering.
- o Developed and recommended responses to the quality assurance and management concerns evidenced in the TMI accident investigation and problems identified by BECO QA audits.
- o Developed recommendations for changes to the Pilgrim Unit 2 PSAR and Quality Assurance Program.



Provided construction management services including supervision of craft labor and coordination of contractors' field activities for various modification projects.

- o Providing engineering services related to environmental qualification of safety-related components and equipment. Developing and implementing program plans for achieving compliance with I&E Bulletin 79-01B requirements.

CLEVELAND ELECTRIC ILLUMINATING COMPANY

Perry 1 & 2

- o Conducted a three-day PRA Seminar for management personnel.
- o Performed a Mini-PRA study of the Perry plant, including ex-plant consequence assessment using the CRAC2 computer code. System models derived from the Grand Gulf BWR plant were used as a basis for the study.
- o Developed PRA/Systems Interaction Management Action Plan for developing responses to present and future NRC licensing issues.
- o Performing a systems interaction analysis on control and electrical systems in response to the NRC request for information.
- o Performing independent review of NSS suppliers' recommendations for radioactive source terms for use in analyses of postulated containment building failures leading to accidental releases.

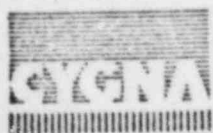
COMMONWEALTH EDISON COMPANY

LaSalle 1 & 2

- o Provided stress analyses and support design services of the Control Rod Drive Hydraulic Systems.

Zion 1 & 2

- o Performed a stress analysis to examine the effects of the flow induced dynamic torque on the 42" RIA8 Containment Isolation/Purge Butterfly Valves at Zion Station, Units 1 and 2. This analysis was required to demonstrate that the valve would perform its safety function when subjected to a specified reactor pressure transient.



CONSUMERS POWER COMPANY

Midland 1 & 2

- o Performing, under contract to Bechtel, pipe rupture restraints and jet impingement barriers for all large and small bore piping systems, including the 24-inch main steam line.

COPES-VULCAN, INC.

- o Providing consulting services in the area of equipment qualification to achieve complete valve product line compliance with IEEE 323-1974, 344-1975, and 383-1980.

DETROIT EDISON COMPANY

Enrico Fermi Unit 2

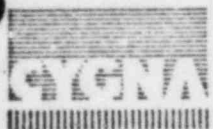
- o Providing an independent design verification review to assess the overall adequacy of the design and design control practices. The review focuses on specified elements of a decay heat shutdown cooling path to the ultimate plant heat sink. It is multidisciplined and covers several consultant interfaces.

GENERAL ELECTRIC COMPANY

- o Provided licensing expertise for reviewing and updating Chapter 7, Instrumentation and Controls of the Standard Final Safety Analysis Report.
- o Provided licensing expertise for interpreting NRC regulations and applying them to the BWR design.
- o Advised GE on responses to various NRC I&E Bulletins and other potential problems such as Systems Interaction Analysis.

GILBERT COMMONWEALTH ASSOCIATES

- o Provided consulting services on a cost-effective approach on systems analysis for Perry 1 & 2. Assisted in presentation of the systems interaction analysis methodology to the NRC.



HOUSTON LIGHTING & POWER COMPANY

South Texas Project

- o Provided management consulting services in the review of the operational QA plan, FSAR Chapter 17, as well as implementing procedures to assess HL&P's capability to operate nuclear power plants. Work was done in preparation for ASLB hearings for the South Texas Project operating license.

KINNEY VACUUM COMPANY

- o Performed analysis and evaluation to seismically qualify the KT-300C and KT-150C mechanical vacuum pumps.

KOCH PROCESS SYSTEMS, INC.

- o Provided an evaluation of the VR-350 Low Level Radioactive Waste Incineration System for fire hazards and provide conceptual designs of fire detection and suppression systems. Also analyzed the incineration facility for potential adverse interactions with adjacent nuclear structures so that the incinerator could be licensed for use at an existing nuclear power site.

LONG ISLAND LIGHTING COMPANY

Shoreham

Providing general engineering support in the following areas:

- performing NUREG-0612 analysis and preparing heavy load handling procedures;
- preparing maintenance and maintainability procedures; and
- providing radwaste systems engineering.
- performed survey and evaluation of available designs for High Integrity Containers (HIC's) for transportation and disposal of liquid radioactive wastes.

MAINE YANKEE ATOMIC POWER COMPANY

Maine Yankee

- o Performed a complete evaluation of all seismic Category I piping systems and structures postulating an increase in Safe Shutdown Earthquake acceleration to 0.2g.



- o Performed Field Engineering Services to provide as-built data for engineering.

MASONEILAN DIVISION, McGRAW-EDISON COMPANY

- o Providing consulting services under continuing services agreement for equipment qualification of products sold to the nuclear industry including valve actuators, electro-pneumatic transducers, and valve positioners.

MISSISSIPPI POWER & LIGHT COMPANY

Grand Gulf Unit 1

- o Provided an independent design review of a seismic Category I piping system to assess the implementation of the "BWR New Loads Adequacy" program. This effort included a review of the quality assurance program and its implementation.

NIAGARA MOHAWK POWER CORPORATION

Nine Mile 1

- o Provided review of Appendix R requirements including fire hazards and safe shutdown analysis, evaluation of fire areas/zones, fire detection and suppression systems, analysis of associated circuits, hot shorts, review of breaker coordination and protection schemes and alternate shutdown systems. Developed a recommended action plan and prepared NRC submittals.
- o Providing final designs for modifications to control and electrical systems in accordance with the requirements and commitments of NMPC's Appendix R safe shutdown analysis.

NORTHEAST UTILITIES COMPANY

Millstone 1 & 2

- o Engineered, designed, and supervised installation of protective enclosures for Class 1E electrical equipment in support of environmental requirements of I&E Bulletin 79-01B.
- o Performed the analysis, evaluation, engineering and redesign of concrete block walls in response to I&E Bulletin 80-11, including defense of the criteria and approach before the NRC.
- o Provided Field Engineering Support Services to resolve field design changes for I&E Bulletins 79-01B and 80-11.



NORTHERN STATES POWER COMPANY

Prairie Island 1 & 2

- o Performed an in-depth analysis of the plant's spare parts control system and its interaction with other NSP plants.
- o Provided quality engineering services both in NSP's Corporate office and at the Prairie Island site.
- o Performed a management diagnostic to assess the adequacy of the operational phase audit program at the Prairie Island plant.

PACIFIC GAS & ELECTRIC COMPANY

Humboldt Bay

- o Performed complete seismic requalification of the unit including development of realistic criteria, dynamic analysis of equipment and structures, and in situ testing to verify analysis.

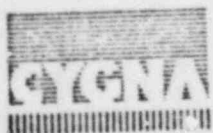
Diablo Canyon 1 & 2

- o Providing piping systems seismic analyses, retrofit design services, and field support services as well as participation in licensing and ACRS meetings.

PENNSYLVANIA POWER & LIGHT COMPANY

Susquehanna 1 & 2

- o Provided expert consultation for the preliminary evaluation of the hydrodynamic effect on all seismic Category I mechanical and electrical equipment.
- o Provided equipment design specifications for equipment mounted on non-rigid supports.



POWER AUTHORITY OF THE STATE OF NEW YORK

Developed and conducted an intensive six-week Engineering Training Program for entry-level engineers on the major aspects of the power industry including Basic Power Plant Cycles, Codes and Standards, Regulatory Agencies, Planning and Scheduling, and Engineering Work Methods and Approaches.

James A. FitzPatrick

- o Prepared high-density spent fuel storage rack installation procedures and 10CFR50.59 Safety Evaluation and presented the procedures and safety evaluation to the Plant Operations Review Committee.
- o Prepared a comprehensive design document and drawing control evaluation. Prepared drawing control and transfer procedures. Provided evaluation of staffing, hardware, and space requirements.

PUBLIC SERVICE INDIANA

Marble Hill 1 & 2

- o Providing engineering assistance for self-initiated (INPO) evaluation of design control processes. Includes development and implementation of the evaluation program.

ROCHESTER GAS & ELECTRIC

Robert E. Ginna

- o Evaluated control room habitability systems in accordance with TMI Action Plan NUREG-0737. The evaluation assessed the ability of the control room to remain habitable following a radioactive release due to a loss of coolant accident or a release of toxic gas at or in the vicinity of the site. Recommendations for modifications were made to satisfy the NUREG requirements.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Rancho Seco

- o Prepared seismic qualification analyses and in situ testing of control panels in accordance with the requirements of IEEE-344 and SRP Section 3.10.
- o Providing on-site coordination to establish qualification maintenance program for all electrical equipment that is classified as "important to safety" in accordance with the requirements of 10CFR50.49.



SOUTHERN CALIFORNIA EDISON COMPANY

San Onofre 1, 2, & 3

- o Conducted a six-day training program covering the relevant ASME codes, ANSI standards, and the principles of piping and support modifications.

TECHNI-FAB DIVISION, NELMOR COMPANY

- o Provided seismic analyses of supports for various Techni-Fab tanks.

VIRGINIA ELECTRIC & POWER COMPANY

Surry 1 & 2

- o Established the initial program for the seismic evaluation of anchorage and supports of Class I electrical equipment and cable trays in response to I&E Information Notice 80-21.
- o Provided a ten-week technical engineering training program for selected VEPCO staff engineers for piping system analysis and design. Training included piping and pipe support stress analysis and design and structural dynamic analysis.

YANKEE ATOMIC ELECTRIC CO.:

Vermont Yankee

- o Provided engineering and field engineering services to assist in preparation of a response to I&E Bulletin 79-02. Services included engineering evaluation and disposition of nonconformance anchor bolts.
- o Provided engineering and field engineering services in response to I&E Bulletin 79-14. The effort included assessment of design documents, review of design changes, inspection of as-built conditions, and evaluation of nonconformance items.
- o Performing a complete seismic evaluation of seismic Category I piping systems and structures on this unit for a Regulatory Guide 1.60 Safe Shutdown Earthquake at 0.14g.

Yankee Rowe

- o Provided engineering and field engineering services in response to I&E Bulletin 79-14. The effort included assessment of design documents, review of design changes, inspection of as-built conditions, and evaluation of nonconformance items.



- o Functioning as the primary consultant for the Systematic Evaluation Program, providing definition of seismic design criteria and analysis of seismic Category I systems and structures. The evaluation includes three-dimensional finite-element analysis and detailed design of necessary modifications.
- o Assisted in the development of the NRC response to SEP topics III.5.A and B, Pipe Break Inside and Outside Containment.
- o Performed an engineering feasibility study including conceptual design and cost-estimate for the installation of a new seismic hot shutdown system.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WNP-2

- o Providing equipment qualification services for mechanical and electro-mechanical equipment for postulated seismic and hydrodynamic conditions. Includes support to NRC's SQRT audit program.

ELECTRIC POWER RESEARCH INSTITUTE

- o Performing development program for Cygna's deductive Systems Interaction Analysis (SIA) methodology. Includes development of SIA approach to safety/non-safety systems interactions in nuclear plants.

DOUGLAS ENERGY CO.

- o Performed diagnostic study on the effects of organic chloride contaminants to turbo-machinery internals from the combustion of sanitary landfill off-gas. Study was in support of a new application for existing gas turbine technology.

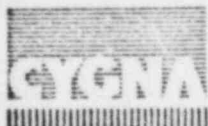
LUZ SYSTEMS, INC.

Daggett Solar Project

- o Provided independent assessment of seismic capability of solar collector hardware. Included risk analysis to identify potential cost exposure to plant investors during the projected operating life of the systems.

IMPROVED PIPING PRODUCTS, INC.

- o Performed finite element analysis of new flange design for use in the mining/minerals industry. Evaluated effects of pressure and bolt load and stresses in accordance with the ASME code.



1 BY MR. REYNOLDS:

2 Q Do you have a copy of what we have marked for
3 identification, Board Exhibit February '84 No. 4, the title
4 of which reads "Pesumes," and below that word a list of
5 names?

6 A (Witness Williams) Yes, I do.

7 Q And is that on CYGNA stationery?

8 A Yes.

9 Q Do you recognize that document?

10 A Yes.

11 Q Please describe it?

12 A It is a summary of resumes of all the individuals
13 involved in the independent assessment program, phases 1 and 2,
14 Comanche Peak.

15 Q Is it complete?

16 A To the best of my knowledge.

17 Q And is every individual who worked on phases 1 and
18 2 included in that list?

19 A Yes, sir.

20 MR. REYNOLD: Mr. Chairman, we ask it be received.

21 JUDGE BLOCH: It shall be marked Board Exhibit
22 February '84 No. 4, and received in evidence, and bound into
23 the transcript.

24 (The document referred to was
25 marked Board Exhibit February '84

LAY IN

(No. 4, was marked for identification, and was received in evidence.)

(The document follows:)

CHUN K. WONG

EDUCATION:

M.S., Structural Engineering, University of California, Berkeley, CA

B.S., Civil Engineering, University of California, Berkeley, CA

Ordinary Certificate Building Construction, Hong Kong Technical College, Hong Kong

PROFESSIONAL REGISTRATION:

Registered Professional Engineer (Civil), California

Registered Civil Engineer, Ontario, Canada

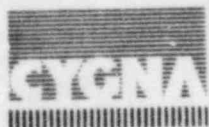
PROFESSIONAL EXPERIENCE:

Mr. Wong is currently an Engineering Supervisor in the Engineering Design Division at Cygna. He was assigned as Project Engineer for the design and analysis of the Control Rod Drive System for LaSalle Units 1 and 2. In this position, he was responsible for scheduling work and leading a group of ten engineers in the design of the support frames. His group used the ANSYS computer code to develop stiffnesses for the frames (for input to the pipe stress work) and to perform the final designs.

Previously, Mr. Wong worked on the Limerick Generating Station project. He coordinated and supervised stress analysts in the performance of the analyses of piping systems in accordance with ASME III and B31.1 codes, and reviewed and approved stress calculations. For the Peach Bottom project, Mr. Wong coordinated and supervised analysts in the performance of NRC IE Bulletin 79-14, as-built analysis of nuclear piping systems. Mr. Wong also served as senior stress analyst, for the Surry Power Plant project and performed NRC 79-14 computer analysis of nuclear piping systems.

Mr. Wong has also worked on such major projects as: Humboldt Bay Nuclear Power Plant, for which he performed dynamic seismic analysis of plant structures and soil-structure interaction analysis; Susquehanna Nuclear Power Plant, for which he performed pipe rupture time-history analysis of piping systems; Yankee Nuclear Power Station, for which he performed dynamic analysis of spent fuel pool; and Geyser Steam Gathering, for which he performed stress analysis of piping system.

During his course of work at Cygna, Mr. Wong has gained extensive experience in structural dynamics and in the use of many commercial and Cygna proprietary programs such as ANSYS, PIPESD, PSA, SAPIV, NUPIPE, ME101 (Bechtel Piping Program).



TED T. WITTIG
(continued)

Mr. Wittig's previous experience has included design of roads, railroads and seismic Category I structures for a major nuclear project. This experience included design and analysis of the containment building basemat and reactor cavity. It also included seismic analysis of the containment building and the design of major equipment supports.



TED T. WITTIG

EDUCATION:

B.S., Civil/Structural Engineering, Michigan Technological University, Houghton, Mi

PROFESSIONAL REGISTRATION:

Civil Engineer, California

PROFESSIONAL EXPERIENCE:

Mr. Wittig has over thirteen years of experience in structural engineering for nuclear power plants and is currently the Manager of Projects. This experience includes criteria development, seismic analysis, high temperature effects, impact evaluations and soil-structure interaction.

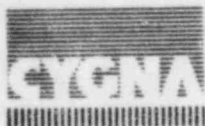
With Cygna, Mr. Wittig has acted as the Project Manager for the following projects:

- Independent Design Review for Mississippi Power & Light
- Independent Design Verification for Detroit Edison Company
- Third-Party Review for Cleveland Electric, Inc.
- Seismic Equipment Qualification for Washington Public Power Supply System

The design reviews listed above covered a broad range of engineering design and design control activities, including structural, piping, pipe supports, cable tray supports, equipment qualification, electrical and mechanical. These reviews involved considerable interaction with the NRC in the form of developing a program plan and presenting the results.

Prior to joining Cygna, Mr. Wittig was employed by a major architect/engineer. During this assignment he was responsible for the conceptual design and analysis of all structures on an LMFBF Study. He also acted as a liaison and technical reviewer for the LMFBF national team commissioned by the Department of Energy. His role as a technical reviewer covered the areas of structural, seismic, and planning/scheduling.

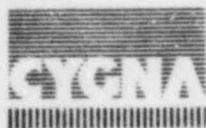
Mr. Wittig also functioned as a structural engineer for a commercial PWR plant. In this assignment he was responsible for the civil/structural design criteria, seismic analysis seismic specification for mechanical equipment and various special studies. The special studies included soil-structure interaction, tornado and turbine missile impact, and liquefaction. In addition, he was responsible for the design and analysis of the circulating water system intake structures.



NANCY H. WILLIAMS
(continued)

PUBLICATIONS:

"Operational Analysis: An Approach to Safety and Planning," International Meeting on Thermal Nuclear Reactor Safety, ANS/ENS, August 29 - September 2, 1982



NANCY H. WILLIAMS

(continued)

- Project Engineer responsible for the content and coordination of technical activities of a multi-million dollar structural evaluation project. Formulated entire evaluation program consisting of selection of acceptance criteria, analytical methodology, and determination of loading data through the use of building seismic and pressure flow models. Elected member of Owner's Group committee of the development of a new masonry wall structural analysis criteria. Developed procedures for the collection of field data necessary for the structural analysis. Organized and coordinated field survey teams. Provided final technical review of project activities for compliance with codes, standards, and regulatory requirements.
- Lead engineer responsible for the design and implementation of a sanitary disposal system including: two pumping stations, gravity and forced main piping layout, and leaching field. Functioned as the field engineer for the construction of:
 - (1) \$300,000 sanitary system
 - (2) \$1,000,000 training/office building
- Structural and civil engineering functions including: seismic analysis of structures using computer codes such as ANSYS, STRUDL, and STARDYNE; seismic and thermal analysis of piping systems and pipe supports; computer program development for data reduction, information management, pipe support base plate analysis; providing construction/engineering interface for field modifications; review and approval of engineering specifications. Responsible for noise data acquisition system located on site boundaries near residential zones. Developed a computer program and user's manual to statistically analyze noise level data and assess its impact on the community. Wrote and documented a computer program currently used to analyze meteorological data including the calculation of atmospheric stability factors and the output of joint wind frequency distribution tables.

Ms. Williams was employed by Stone & Webster Engineering Corporation where she designed pipe supports, and resolved interferences between plant layout, piping layout and support design on Millstone Unit 3.

As a structural engineer for General Dynamics, Inc. Electric Boat division she was responsible for the construction of various tanks and foundations in the reactor compartment and engine room of the Trident Class Submarines. Provided direction for the trades and engineering resolutions for construction problems. Selected to work on the development of a construction planning program for the reactor compartment of the 688 Class Submarines.



NANCY H. WILLIAMS

EDUCATION:

B.S., Civil Engineering, Carnegie-Mellon University, Pittsburgh, PA
Boiling Water Reactor Course, General Electric BWR Training Center
Finite Element Methods and Application, Ohio State University, Columbus, OH
Management Courses, Harvard University, Extension Program, Cambridge, MA

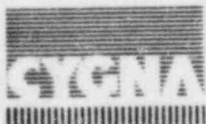
PROFESSIONAL EXPERIENCE:

Ms. Williams has extensive experience in the management of nuclear power facility retrofit programs. In this capacity she has been responsible for the planning, coordination, and timely implementation of all project phases from conceptual engineering to documentation of modifications. As a project manager at Cygna she is responsible for the timely, accurate, and cost-effective completion of projects. Ms. Williams acted as Assistant Project Manager for the Independent Design Verification Program on Fermi-2 and is currently assigned as Project Manager for the Independent Assessment Program on Comanche Peak for the Texas Utilities Company.

Prior to joining Cygna, Ms. Williams held increasingly responsible positions with Boston Edison Company including:

- Project Manager of Pilgrim Nuclear Power Station's Equipment Qualification Program. Developed a Project 2 seven-year program to qualify all safety related equipment for design basis events such as high energy line breaks, LOCA and earthquakes. Initiated the project organization, manual, and priorities necessary to comply with existing and future regulations.
- Manager of several projects involving the seismic analysis of all category I piping systems, pipe supports, baseplates and building steel for an operating nuclear plant.

Responsibilities included: the development and implementation of comprehensive technical, schedule, and cost plans, the assignment of tasks; the development of cost and manhour estimates for each task; the procurement of resources; the interpretation of regulatory requirements; the development of data control systems to process project information; contract administration; cost and schedule reporting; coordination of construction, engineering, operations, licensing, purchasing, and quality assurance groups; refueling outage planning for implementation.



STEVEN C. WHITE

EDUCATION:

B.S., Geology, University of Massachusetts, Amherst, MA

M.S., Geology, University of New Hampshire, Durham, NH

PROFESSIONAL EXPERIENCE:

Mr. White has eight years experience in quality assurance in the nuclear power generation industry. While at Cygna, Mr. White has served as Project Quality Assurance Engineer for several projects involving field walkdowns and structural modifications in response to NRC i&E Bulletins 79-02 and 79-14, and Field Quality Control Supervisor for blockwall modifications in response to NRC I&E Bulletin 80-11 and for various subcontractor surveillances to verify conformance to client requirements. Mr. White also served as a member of a spare/renewal parts task force with responsibilities including receipt inspection and determination of appropriate quality categories. Most recently, Mr. White was a member of a review team for an Independent Design Verification Program.

Mr. White's previous experience was as Weston Geophysical's Quality Assurance Manager. In this capacity, Mr. White's responsibilities included the development and implementation of a Quality Assurance Program for Weston's geological, geotechnical, geophysical and seismological consulting services. This included the control of policies and procedures to maintain compliance with 10CFR50, Appendix B; procurement control and control of purchased services; maintenance of a document control system, including computer software documentation; maintenance of a calibration system to control the use of measuring and test equipment; maintenance of a corporate personnel indoctrination and training program; maintenance of a comprehensive audit/surveillance system to control both internal corporate activities and external supplies activities.

Mr. White's responsibilities also include providing quality assurance consulting services to utilities and design engineers in conjunction with national and international nuclear siting projects.

An earlier position as a Staff Geologist provided Mre. White with experience in the technical aspects of nuclear siting projects.



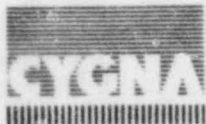
JOHN E. WARD
(continued)

In 1973, Mr. Ward was named General Manager of Sargent and Lundy's Los Angeles affiliate, S&L Engineers, when it was first established. He was active in establishing the facilities and procedures for this new affiliate, as well as engaging the principal staff. He was responsible for directing the administrative and engineering program, as well as business development in the western United States.

In 1968, Mr. Ward joined Sargent and Lundy as a Nuclear Project Engineer. As a Nuclear Project Engineer his principal responsibilities included the Zion Nuclear Station and the William H. Zimmer Nuclear Station.

In 1967, Mr. Ward joined the Commonwealth Edison Company in Chicago as Project Engineer on their Zion Station.

Prior to joining Commonwealth Edison, Mr. Ward spent 15 years in the Navy. His primary experience involved command-at-sea, as well as administrative assignments in the areas of practical research, development, and test and evaluation procedures for surface weapons systems.



JOHN E. WARD

EDUCATION:

M.S., Nuclear Physics, University of California, Berkeley, CA
B.S., Naval Engineering, U.S. Naval Academy,

PROFESSIONAL REGISTRATION:

Registered Professional Mechanical Engineer, California
Registered Professional Nuclear Engineer, California

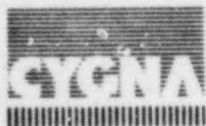
PROFESSIONAL AFFILIATIONS:

Member, American Nuclear Society
Member, American Society of Mechanical Engineers
Member, Atomic Industrial Forum
Member, California Society of Professional Engineers
Member, National Society of Professional Engineers
Institutional Representative to the Pacific Coast Electrical Association
Institutional Representative to the North West Electric Light and Power Association
Institutional Representative to the Rocky Mountain Electric Association
Chairman, Reactor Licensing and Safety Committee, AIF

PROFESSIONAL EXPERIENCE:

Mr. Ward is the Chairman and Chief Executive Officer of Cygna Energy Services responsible for the overall operation and performance of the Company.

Prior to joining Cygna, Mr. Ward held the position of Vice President at Sargent and Lundy. In this capacity, Mr. Ward was responsible for Sargent and Lundy's Los Angeles office, as well as for business development on a firmwide basis for the organization. Mr. Ward played an active role in the nuclear industry by chairing the Atomic Industrial Forum's Committee on Reactor Licensing and Safety. In this capacity, he was instrumental in the development of several NRC/Industry task force approaches to solving licensing issues. This work resulted in his being named the first recipient of the AIF's Clyde A. Lilly Award. This award, named for the former AIF Chairman of the Board, is given annually to an individual who is judged to have made an "outstanding contribution to the technical development, regulatory climate or public acceptance of nuclear energy. The quality of such service is measured by: leadership demonstrated by formulating, reconciling and advancing industry position on nuclear policy, time and effort devoted to Forum programs, and effectiveness in bringing issues key to nuclear development closer to resolution."



EUGENE F. TRAINOR
(continued)

of the DLG(N)25 Nuclear Power Unit installation program. Other assignments held by Mr. Trainor included Project Manager - Special Projects, Process Engineering Manager with responsibilities for manufacturing and industrial engineering, applied research and development and industrial laboratories, and Manager, Nuclear Quality Control, with responsibility for all aspects of quality assurance and control in the design, construction and overhaul of naval Nuclear Power Plants and Facilities.

Prior to his association with the shipbuilding industry, Mr. Trainor was employed by a chemical company complex in Springfield, MA, where he designed and constructed steam generating and chemical processing facilities.



EUGENE F. TRAINOR

EDUCATION:

M.S., Management, Rensselaer Polytechnical Institute, Troy, NY
B.S., General Engineering, U.S. Coast Guard Academy, New London, CN
Naval Nuclear Reactor Testing and Operations, Mare Island Naval Shipyard, Vallejo, CA
Executive Management, Center for Management Development, Northeastern University, Boston, MA
Production, Planning and Control, Massachusetts Institute of Technology, Cambridge, MA
Government Contract Law, Marshall Wythe School of Law, College of William and Mary, Williamsburg, VA

PROFESSIONAL REGISTRATION:

Registered Quality Engineer, California
Registered Mechanical Engineer, Massachusetts

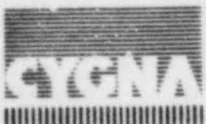
PROFESSIONAL AFFILIATION:

Senior Member, American Society for Quality Control
Member, American Society of Mechanical Engineers
Member, ASME Main Committee on Nuclear Quality Assurance
Vice Chairman, Subcommittee on Personnel Qualifications

PROFESSIONAL EXPERIENCE:

Mr. Trainor, Vice President, Quality Assurance, has over 20 years of extensive experience in quality assurance, construction, engineering, and project management of fossil and nuclear power generation projects. Prior to his association with Cygna, he was associated with a major architect/engineer for eight years serving as Manager of their Quality Assurance Department and Chief Engineer of the Engineering Assurance Division. During this period, he developed the first Quality Assurance Program approved by the then Atomic Energy Commission for an engineer-constructor. Additionally, he developed management systems needed for the effective management of a multi-faceted domestic and international quality assurance organization.

Mr. Trainor was previously associated with the shipbuilding industry in Quincy, Massachusetts, for thirteen years. At that time he was responsible for the establishment of an S5W Submarine Reactor Plant Test Program and the development and management



JAMES P. TONER

EDUCATION:

B.S., Marine and Electrical Engineering, Massachusetts Maritime Academy, Buzzards Bay, MA

Quality Assurance Management, Northeastern University, Boston, MA

PROFESSIONAL REGISTRATION:

Registered Quality Engineer, California

Registered Mechanical Engineer, Massachusetts

Third Engineers License, Steam and Diesel, U.S. Coast Guard

PROFESSIONAL AFFILIATIONS:

Senior Member, American Society for Quality Control

Member, American Society for Nondestructive Testing

PROFESSIONAL EXPERIENCE:

Mr. Toner has had approximately 20 years of extensive experience in quality assurance production engineering, cost and estimating, and construction management aspects of nuclear and conventional marine and commercial power plant construction.

Recently Mr. Toner practiced as a private quality assurance consultant. Previous to that he had been the Chief Engineer of the Cost and Auditing Division of the Quality Assurance Department of Stone & Webster where he was responsible for the establishment and administration of the system for internal auditing of site construction activities and quality assurance operations.

Prior to joining Stone & Webster in 1972, he was associated with the Quincy Shipbuilding Division of both the General Dynamics Corporation and Bethlehem Steel Corporation in a variety of increasingly responsible management positions. As Engineering Manager (MARAD Project), he was responsible for the development and marketing of four R&D projects related to coatings application.

Other assignments included management of the pipe fabrication shop and five years in the Nuclear Quality Control Department, rising from the position of engineer at the time of department formation through various assignments to Chief of Nuclear Quality control. The Quincy shipbuilding Division activities were associated with the design and construction of nuclear and conventionally powered ocean going vessels.



JOHN P. RUSS

EDUCATION:

M.S., Civil Engineering, University of Illinois, Urbana, IL

B.S., Civil Engineering, Purdue University, West Lafayette, IN

PROFESSIONAL ACTIVITIES:

Member, American Society of Civil Engineers

Associate Member, American Concrete Institute

Member, Chi Epsilon

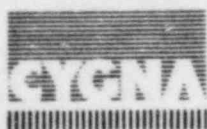
PROFESSIONAL EXPERIENCE:

Mr. Russ' experience with Cygna includes assignments in structural, piping and field work. His experience includes:

- Extreme weather phenomenon analysis and seismic analysis for Yankee Nuclear Power Station at Rowe, Massachusetts.
- Field engineering of pipe support and piping modifications for the Yankee Nuclear Power Station at Rowe, Massachusetts.
- Verification of existing conditions for pipe support modifications for the Diablo Canyon Nuclear Power Plant - Unit 1, San Luis Obispo, California.
- Field surveillance and qualification of air-handling units for the Washington Public Power Supply System - Unit 2, Hanford, Washington.
- Site verification of feasibility of structural modifications to the turbine building at the Yankee Nuclear Power Station at Rowe, Massachusetts.

Prior to joining Cygna, Mr. Russ was employed by a major aerospace company where he was responsible for the development of finite element models for the purpose of dynamic and quasi-static analyses. He was also employed by a major architect-engineering firm where he was responsible for the development of a computer model for seismic-analysis and the checking of structural design calculation.

Mr. Russ also has experience in the development of cost-performance studies on public works projects and in the material estimation of construction projects.



THINH DUC NGUYEN
(continued)

- establishing standards, such as charts related to maximum mass point spacing versus pipe sizes based on cut-off frequencies, and coding procedures conforming to ANSI B31.1 standards.
- writing procedures and final reports.

Dr. Nguyen's other project work included static and dynamic analysis of class 1 and 2 piping systems in accordance with applicable codes and standards such as ASME III, B31.1 for plants such as Vermont Yankee, Arkansas, Susquehanna, and Diablo Canyon. These analyses included the study of behavior of supports, finding the appropriate type of support through load, stress, and mode shape considerations; selection of spectra to be used according to eccentricity, elevation, location of attachment points, and envelope of spectra; evaluation of the applicability of previous thermal analysis to the suggested changes to the systems (cutting a relatively big system to small ones and using the overlapping techniques).

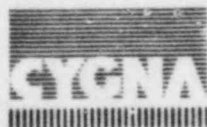
In the performance of the work detailed above, Dr. Nguyen has acquired extensive experience in the use of computer programs such as PIPESD, INSPEC, ADLPIPE, NEWSPECTRA, and ANSYS.

Dr. Nguyen's previous industry experience included serving as a senior engineer for an American architectural/engineering firm based in Saigon, Viet Nam. During this time he concurrently provided private consulting engineering services for a construction firm in Saigon, Viet Nam, which involved the study of unsteady flow in canal networks, hydraulic reduced scale models of outlets, gates, dams, and basins of dissipation of energy.

Dr. Nguyen's academic experience includes holding the position of Professor and Dean of the School of Engineering, National Institute of Technology, Saigon, Viet Nam, for eight years. For five years, he was Assistant Professor at Ecole Centrale de Lyon, France. Dr. Nguyen concurrently performed research in the reduced scale compressor project for the Chatou Thermal Power Plant, France.

THESIS:

"Study of the Secondary Effects of the Flow at the Extremity of Blades in an Axial Compressor." The research was closely related to the rotating stall phenomena in axial compressors.



THINH DUC NGUYEN

EDUCATION:

Doctorate, Mechanical Engineering, University of Lyon, France

Post Graduate Certificate, Applied Mechanics, University of Lyon, France

M.S. Mechanical Engineering, Ecole Centrale de Lyon, France

Certificates in Mechanics, Engineering Mathematics, Fluid Mechanics and Engineering
Electrics, University of Lyon, France

PROFESSIONAL REGISTRATION:

Registered Professional Engineer, California

PROFESSIONAL EXPERIENCE:

As a Senior Engineer at Cygna, Dr. Nguyen is currently assigned as the piping project engineer for the Yankee Nuclear Power Station at Rowe, Massachusetts. This work includes the stress analysis of the piping to the SEP requirements. Dr. Nguyen has personally performed the analyses of those systems requiring special techniques such as displacement time history analyses or inclusion of the structural mass and stiffness in the piping model.

Dr. Nguyen was previously assigned as pipe stress group leader for the La Salle Unit 2 CRD piping analysis. In this function, he was responsible for issuing design criteria and work instruction, coordinating work with the frame analysis group, and liaison with the client. Dr. Nguyen performed parametric studies which allowed the large number (370) of CRD lines to be qualified by the analysis of very few. In a similar position for the La Salle Unit 1 CRD piping, Dr. Nguyen's responsibilities included:

- sensitivity study of static, seismic, and hydrodynamic analyses of the CRD system composed of 370 similar lines. Analysis was principally performed through mode shape studies.
- evaluation of seismic anchor movement, Annulus Pressurization displacement from time history data.
- generation of matching response spectra from time history and envelope spectra to use for each system.
- time history analysis for Annulus Pressurization displacements.
- study of a simplified model for the Hydraulic Control Unit.



ALAN E. MOERSFELDER
(Continued)

Mr. Moersfelder's previous industry experience includes several years with Sargent & Lundy as a Control and Instrumentation Project Engineer. His responsibilities included the technical direction of engineers involved in the design of Illinois Power Company's Clinton Power Station and Cincinnati Gas & Electric's Zimmer Nuclear Power Plant. While at Sargent & Lundy, he was appointed Procurement Specialist in the areas of main control panels and electrical analog panel meters. The responsibilities of a specialist included coordinating the generic review to qualifying vendors who wished to bid on project procurement specifications.

As a result of his working experience, Mr. Moersfelder has a thorough understanding of utility practices, industry standards, and NRC regulations.



ALAN E. MOERSFELDER

EDUCATION:

B.S. Electrical Engineering, Milwaukee School of Engineering, Milwaukee, WI

PROFESSIONAL REGISTRATION:

Registered Professional Engineer in Illinois, Wisconsin, Michigan and Minnesota

PROFESSIONAL AFFILIATIONS:

Member, Institute of Electrical and Electronic Engineers (IEEE)

Member, American Nuclear Society

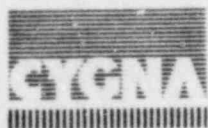
Senior Member, Instrument Society of America (ISA)

PROFESSIONAL EXPERIENCE:

Mr. Moersfelder has more than 13 years experience in the power industry. As a Project and Electrical Engineer with Cygna, he is responsible for the engineering quality and technical direction of work under his control. Mr. Moersfelder has participated in both new plant design and construction, and retrofit projects for nuclear and fossil-fueled power plants.

Before joining Cygna, Mr. Moersfelder was Engineering Manager of the System Design Engineering Group for NUTECH Engineers in Chicago. The Systems Group dealt with electrical, and control and instrumentation issues as they related to retrofit projects in the nuclear power industry. Typical projects included process computer replacements, SPDS implementation, process and area radiation monitoring systems, leak detection system, equipment qualification analysis and documentation, and Fire Protection--Appendix R related work for clients such as Commonwealth Edison Company, TVA, and Northern States Power Company.

Prior to that, Mr. Moersfelder was employed by Fluor as a Principal Engineer. His responsibilities included the technical aspects of process instrumentation, computer systems, main control panels, local instrument racks, annunciator systems, and dedicated automatic control systems. Under his direction, designs were documented in the form of piping and instrument diagrams, logic diagrams, functional block diagrams, control schematics, system descriptions, instrument data sheets, installation details and procurement specifications. Among the projects he participated in were the backfits and modifications which resulted from the TMI incident as they were engineered and implemented for Wisconsin Public Service Corporation at the Kewaunee Nuclear Power Plant and for Northern States Power Company at their Prairie Island Nuclear Generating Station.



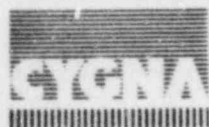
JOHN C. MINICHIELLO
(continued)

proposal generation, direction and completion of the analysis (thermal, stress, and dynamic) of equipment in accordance with ASME, ANSI, and AISC codes. Projects included direction of the analysis of a fuel pool skimmer tank for dynamic loading, the dynamic analysis of vacuum relief valves, and the stress analysis of heat exchangers. He was also responsible for technical direction for a team of 25 engineers performing the piping analysis of 200 sub-systems for the Wm. H. Zimmer Nuclear Station. Mr. Minichiello generated proposals for linear and nonlinear (gapping) analysis of heat exchanger component parts. For the Nine Mile Island plant, he performed fracture analyses of welds on the downcomers. This activity involved determining the stability of crack growth initiated by thermal cycling. His past work also included dynamic analysis of high radiation sampling systems (panels and piping), and analysis of various pressure vessels.

As Lead Senior Engineer with EDS Nuclear, he was responsible for the design and analysis for safety-related piping systems for the McGuire Nuclear Station. This effort involved the thermal transient and fatigue analysis required for ASME Class I systems and the identification of system modifications, when required to alleviate thermal problems. Other projects included finite element analysis of penetration head fittings for thermal and structural loads and verification of the SUPERPIPE program per EDS QA standards.

Mr. Minichiello's previous experience at NUS Corporation includes fluid, thermal and structural analysis of nuclear systems and components using finite element codes such as ANSYS, STARDYNE and PIPESD. These analyses included such evaluations as the dynamic response of the auxiliary cooling piping for a reactor coolant pump test loop, the dynamic response of centrifugal chiller assemblies, the dynamic response of high density spent fuel racks and the high temperature response of spent fuel shipping casks. He produced the hydraulic and thermal analysis report for the S7G reactor pressure vessel head and performed the flow calculations for the S7G purification filter. He has performed complete stress and thermal analysis of the LOFT reactor vessel, including comparison of results to ASME code allowables and generation of the final stress report, and was responsible for the computer code generation used to pre- and post-process finite element stress output to aid in the evaluation of ASME code requirements. As a stress engineer, Mr. Minichiello performed thermal and stress analysis of a purification filter using finite-difference and shell computer codes and performed the stress analysis of electrical plug plates per ASME Class III criteria.

Earlier, at Raytheon Co., Mr. Minichiello worked as a design engineer and was in charge of fabrication of a prototype analog-digital computer interface device. He also designed components of a control board for missile tracking systems.



JOHN C. MINICHIELLO

EDUCATION:

M.S., Applied Mechanics, Harvard University, Cambridge, MA
B.S., Mechanical Engineering, Tufts University, Boston, MA

PROFESSIONAL REGISTRATION:

Professional Engineer, Mechanical, Massachusetts and California

PROFESSIONAL AFFILIATIONS:

Member, American Society of Mechanical Engineers
Member, Tau Beta Pi Engineering Society
Member, American Nuclear Society

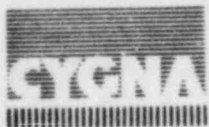
PROFESSIONAL EXPERIENCE:

Mr. Minichiello is assigned as the Manager of the Engineering Design Division at Cygna. His responsibilities include technical direction of all projects within the Division, staffing and budget preparation, and proposal generation.

As part of his assignment, Mr. Minichiello served as the project engineer for the dynamic requalification of Mechanical Equipment for the Washington Public Power Supply System Unit 2 nuclear plant. This work involved upgrading the previous work to the new hydrodynamic loads and the new criteria (IEEE-344-1975). His division is currently also responsible for the stress analysis of the piping and the design of new pipe supports to meet the SEP requirements for the Yankee Nuclear Station at Rowe, Massachusetts. Included in this evaluation is the analysis of the mechanical equipment (valves, steam generators, etc.) necessary to the operation of the plant. Other projects within his division included: the stress analysis and support design for the control rod drive piping for the LaSalle station; and reanalysis of piping and pipe supports for Diablo Canyon Unit 1.

As Section Manager for stress analysis at Brown and Root, Inc., Mr. Minichiello's responsibilities encompassed the overall direction of all mechanical analysis and design activities for the company's nuclear and fossil projects. Activities included: a full range of piping design and analyses for the South Texas Nuclear Project; computer-aided structural analysis of an electric substation insulating posts under 3-phase short circuit dynamic loading; and development of stress design standards for Brown and Root.

As head of the component analysis section at NUS Corporation, he was responsible for



A. PATRICK McCARTHY

EDUCATION:

B.S., Marine Engineering, Maine Maritime Academy, Castine, ME

PROFESSIONAL LICENSE:

3rd Assistant Engineer, Issued by U.S. Coast Guard

PROFESSIONAL AFFILIATIONS:

Senior Member, Instrument Society of America

Member, ISA SP67.10 Committee, Sample Line Piping and Tubing Standards for Use in Nuclear Power Plants

PROFESSIONAL EXPERIENCE:

Mr. McCarthy has over fourteen years experience in engineering, design, licensing, and operation of power plants. At Cygna, he is the Supervisor of Instrumentation and Controls and a Project Manager. Some of his significant experience includes: Project Manager of an Appendix R Fire Hazard Evaluation for a Radwaste Incineration System; and the seismic qualification of a series of vacuum pumps to be used in processing uranium fuel.

Prior to joining Cygna, Mr. McCarthy was employed by Stone and Webster Engineering for seven years, where he held positions of increasing responsibility within the Controls System Division, including Controls Systems Division Specialist. His last assignment was as the Lead Control Engineer on the Millstone 3 Project. Mr. McCarthy's responsibilities in this capacity included all aspects of engineering, design, procurement, licensing, and field construction.

Mr. McCarthy also held the positions of both Principal and Support Instrumentation Applications Engineer for the Shoreham Nuclear Project where he worked with vendors to qualify their equipment to meet changing NRC guidelines.

Mr. McCarthy's previous industry experience was with an industrial equipment engineering firm. As Project Engineer and as a Field Service Engineer, Mr. McCarthy was responsible for safety and relief valve design, fabrication, testing and installation.

Prior to the above, Mr. McCarthy sailed for Grace Lines as a third and second Assistant Engineer.



MOHAN K. MANI

EDUCATION:

M.E., Mechanical Engineering, Indian Institute of Science, Bangalore, India

B.E., Mechanical Engineering, University of Mysore, Bangalore, India

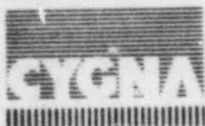
PROFESSIONAL EXPERIENCE:

Mr. Mani has eight years of experience in the nuclear power field. His specialization has been in the analysis of nuclear power plant piping systems to ASME B&PV Section III code, as well as pipe rupture analysis utilizing computer programs. He has been involved in the development of computer programs in these areas.

As a research engineer in Cygna's Research & Development Division, Mr. Mani is working on developing and maintaining Company proprietary CAE (Computer Aided Engineering) systems. These computer programs make use of interactive graphics interfaces that enable the engineers to work more effectively. As a part of this experience and advanced course work, Mr. Mani has developed a familiarity with industry graphics standards and the conversion of programs from one machine to another.

Prior to joining Cygna, Mr. Mani was employed by major A/E and consulting engineering companies where he was responsible for performance of the following representative projects: development and maintenance of a public domain piping analysis computer program; pipe rupture analyses on several nuclear power plants; piping analysis to ASME B&PV Section III code on several nuclear power plants; and development and maintenance of an in-house computer program for pipe rupture analysis.

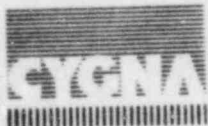
The above analytical experience included extensive use of piping codes such as PIPESD, SUPERPIPE, PISOL, ANSIS and STRUDL.



MAX S. MAIRE
(continued)

Before joining Cygna, Mr. Maire was Principal Consultant for the ROIT Corporation, a management engineering consulting firm specializing in systems, procedures, and industrial engineering with assignments for various domestic and foreign clients, as well as government agencies such as the USDA, NIOSH, and the Texas and Oklahoma Departments of Commerce. He was responsible for site location studies; pollution and energy engineering; safety engineering; and the design of production, inventory, cost and management information control systems.

In the production control sector, Mr. Maire's emphasis has been on systems that integrated production and cost control for industrial applications, and production and quality control for office applications. In the field of productivity improvement, he developed and installed productivity enhancement programs in a number of different manufacturing plants. Initially, Mr. Maire was an Industrial Engineer in the Casting Division of ALCOA.



MAX S. MAIRE

EDUCATION:

B.S., Engineering, U.S. Coast Guard Academy, New London, CN
Engineering Economics, American Management Association, New York, NY
Economics, Harvard University, Cambridge, MA
Labor Economics, Harvard University, Cambridge, MA
Business Law, University of Hawaii, Honolulu, HA
Industrial Engineering for Managers, Lehigh University, Bethlehem, PA

PROFESSIONAL REGISTRATION:

Professional Engineer in Massachusetts, New Hampshire, New Jersey, Wisconsin,
Nebraska, Oklahoma, Texas
Certified Safety Professional
Certified Plant Engineer
Licensed Construction Supervisor, Massachusetts

PROFESSIONAL ACTIVITIES:

Member, American Institute of Plant Engineers
Member, American Society of Heating, Refrigeration, and Air Conditioning Engineers
Member, American Association for the Advancement of Science

PROFESSIONAL EXPERIENCE:

Mr. Maire has over 25 years experience in industrial engineering with emphasis on productivity improvement and the development of user-effective operational control and management information systems. He has designed and installed materials management systems such as materials acquisition, inventory, and usage analysis for diverse industrial applications including plastics fabrication, non-ferrous casting, and machinery manufacturing. He is presently a Project QA Engineer at Cygna, responsible for various QA functions on projects for the Maine, Yankee and Shoreham nuclear power plants.



SIMON LUO
(continued)

Additional industrial experience was acquired by Mr. Luo through his association with the Public Works Department, Taipei City. He was responsible for construction material quality and quantity control, sheer wall and basement construction design, schedule control.

PUBLICATIONS:

"A fracture spall finite element model in impact problems," Eleventh Southwestern Graduate Research in Applied Mechanics, Oklahoma State University, April 11, 1980.

SIMON LUO

EDUCATION:

M.S., Civil Engineering (structural), Texas Tech University, Lubbock, TX

B.S., Civil Engineering, Tamkang University, Taipei, Taiwan, R.O.C.

PROFESSIONAL REGISTRATION:

Engineer-in-Training, Texas

PROFESSIONAL AFFILIATIONS:

Member, American Concrete Institute

Member, American Institute of Steel Construction

PROFESSIONAL EXPERIENCE:

Mr. Luo is a Staff Engineer currently assisting in program development for Cygna's CYTRAC computer program which tracks radwaste in-plant. Other projects Mr. Luo has been involved in were the static and dynamic structural analysis and design evaluations of the pipe support systems for Perry Unit 1, Diablo Canyon Unit 1 and La Salle Unit 2.

Previous assignments have included computer analysis for the Susquehanna Nuclear Power Plant pipe support system under seismic load and documenting analysis results to meet ASME, ANS codes; computer pipe stress analysis for the La Salle Unit 1 Nuclear Power Plant CRD piping system under seismic, thermal and gravity loads.

Formerly employed by the Hugh M. O'Neil Company, Mr. Luo was responsible for the design and analysis of a jib crane including the detailing of structure in steel. Other design work required the application of finite element methods of dynamic analysis for a Lucky Stores' project.

While working on his master's at Texas Tech University, Mr. Luo was involved in the research of spall behavior for the U.S. Air Force. He developed a finite element computer program to simulate the stress wave propagation due to impact and by using a suitable numerical integration scheme for the dynamic equation of motion involved in the stress wave propagation phenomena.



CHUAN LIU

EDUCATION:

M.S., Civil Engineering, San Jose State University, San Jose, CA

B.S., Civil Engineering, Chung-Yuan College, Taipei, Taiwan

PROFESSIONAL REGISTRATION:

Registered Civil Engineer, State of California

PROFESSIONAL EXPERIENCE:

Mr. Liu is currently a Senior Lead Engineer at Cygna's Engineering Design Division. He is presently the Project Engineer in charge of the pipe support redesign for Diablo Canyon Unit 1 due to the Hosgri earthquake and latest criteria.

Previously, Mr. Liu was Project Engineer (pipe supports) for the Independent Design Review of the Grand Gulf Nuclear Plant. This included development of review criteria, walkdown of piping, and review of as-built designs.

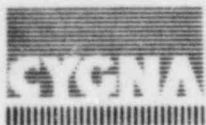
Other experience includes the design of pipe supports for the Yankee Rowe SEP modifications and the development of criteria and work instructions for Vermont Yankee. Mr. Liu established 79-14 evaluation criteria and work instruction for the pipe support group and supervised and directed the pipe support group to perform pipe support design review base on as-built data.

At Cygna, Mr. Liu also worked on the Palo Verde project, leading an eight-member group, working as an independent group performing pipe support design.

Other projects include: La Salle; Millstone, for which he performed the environmental enclosure design to protect electrical equipment from steam due to piping failure, the ventilation duct support design, and design verification for selected problems; and Susquehanna where he was responsible for pipe support design review, component hardware design review and stress and stiffness calculations, as well as providing modifications for overstressed supports.

Prior to joining Cygna, Mr. Liu was responsible for structural design and analysis for high rise and parking structures and office buildings at Skidmore, Owings & Merrill.

Mr. Liu's experience also includes assignments with: S. K. Noravian & Associates - responsible for structural analysis and design for wood, concrete masonry and pre-cast and various structures; Engineering Decision Analysis Corporation - responsible for dynamic analysis of power plants and buildings, seismicity evaluation and rehabilitation checking for existing buildings; and Consoer, Townsend and Associates - responsible for structural design of facilities for sewage treatment plants.



ANTHONY W. KLINGER

EDUCATION:

M.S., Civil Engineering, Cracow Institute of Technology, Cracow, Poland

B.S., Technical Geologist, Technical College of Geology, Cracow, Poland

PROFESSIONAL EXPERIENCE:

As a Senior Engineer at Cygna, Mr. Klinger is currently assigned to the piping analysis work for Diablo Canyon Unit 1, where he is responsible for defining spectral loading for the stress problems. In this capacity, he utilizes his extensive experience in both pipe stress analysis and structural design and construction. His previous project experience includes: the piping analysis and redesign of the Safety Injection system for the Yankee Rowe Nuclear Plant, using the ADLPIPE program; and the piping analyses for Diablo Canyon, Arkansas, and Vermont Yankee nuclear stations using both in-house and general purpose finite element codes.

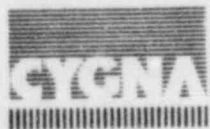
Prior to transferring to Cygna Energy Services, Mr. Klinger worked for Cygna Consulting Engineers as a Structural Engineer involved in the design of earthquake resistant buildings.

Previously as a civil engineer with Bernhard Benning Construction Firm, Mr. Klinger was in charge of the construction details for workshops and housing units, and the design of drainage facilities.

As a Civil Engineer and Chief of Construction with the State Agency of Civil Engineering (Harbor Construction) Gdansk, Poland, Mr. Klinger was in charge of construction of the Cval Pier and Wharf in the new North Harbor at Gdansk and the dry dock in the Gdansk Shipyard.

MASTER'S THESIS:

"Harbor Design Illustrating Different Computational Methods," January 1973, Cracow Institute of Technology

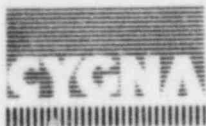


LARRY L. KAMMERZELL
(continued)

various systems and component designs into an optimum plant design and to organize, direct and administer overall systems engineering efforts on HTGR plants including Safety Analysis, Probabilistic Risk Assessment programs, and Economic Study Evaluations.

In other positions held at General Atomic, Mr. Kammerzell was responsible for plant thermal performance evaluations including the development of analytical techniques to determine the thermal performance risk associated with the specific plant design.

- As lead nuclear engineer at United Engineers and Constructors, he was responsible for the preparation of the safety analysis report for systems and facilities supporting the nuclear steam supply. These included the radwaste, core cooling, and fuel storage systems and the associated building arrangements.
- At Stone and Webster, Mr. Kammerzell was responsible for evaluation of vendor test and weld procedures. He was also responsible for the design, specification, and field erection of nuclear power plant pumps, vessels and heat exchanges.
- Mr. Kammerzell held several positions in the United States Navy. Representative of this period is his assignment as Nuclear power plant prototype instructor and assignment as M/A division officer on board the NR-1 during the construction, testing, sea trials and initial service. The NR-1 is a Nuclear Powered Deep Submersible research submarine. Mr. Kammerzell had responsibility for: all phases of testing, trouble shooting, calibration and maintenance of reactor, propulsion, and turbine generating equipment; all power plant evolutions; and all underwater evolutions. He was the duty officer during power range testing and was responsible for testing during initial criticality.



LARRY L. KAMMERZELL

EDUCATION:

M.B.A., National University (in progress), San Diego, CA

B.B.A., National University, San Diego, CA

Third Year Industrial Engineering, Drexel Institute of Technology, Philadelphia, PA

SPECIALTY COURSES:

Business Management Seminars at General Atomic Company

Naval Training:

Navy Nuclear Power School

Advanced Submarine Engineering School

Nuclear Deep Submersible Pilot and Power Plant Training

PROFESSIONAL REGISTRATION:

Professional Engineer (Nuclear), California

PROFESSIONAL AFFILIATIONS:

Member, American Nuclear Society (Past Chairman of San Diego Section)

Member, National Management Association (Past President, General Atomic Chapter)

PROFESSIONAL EXPERIENCE:

Mr. Kammerzell has twenty years of nuclear-related experience covering a broad spectrum of Nuclear Power Plant risk assessment, analysis, testing, construction, and operations. He is presently serving as a Product Development Manager for Cygna. Previously, he acted as a discipline and project manager for reliability, risk assessment and radwaste projects, and as manager of Cygna's San Diego office.

Prior to joining Cygna, Mr. Kammerzell held responsible engineering and management positions with Stone & Webster Engineering Corp., United Engineers and Constructors, General Atomic Company and the U.S. Navy. The following summarizes his activities over the past 20 years.

- At General Atomic Company Mr. Kammerzell was Manager of Systems Engineering, responsible for the coordination and technical integration of the



BEN K. KACYRA
(continued)

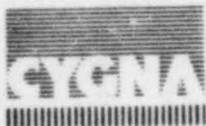
"Report of the Overturning Subcommittee," 1971.

"Report of the Vertical Acceleration Subcommittee," 1972.

"In-Situ Testing for Seismic Evaluation of Humboldt Bay Nuclear Power Plant for Pacific Gas and Electric Company," with N. Chauhan, Transactions of the Fourth International Conference on Structural Mechanics in Reactor Technology, San Francisco, California, August 1977.

"Seismic Evaluation and Modification of the Humboldt Nuclear Power Plant, Unit 3," with N. Chauhan et al, accepted for presentation at the Third ASCE Specialty Conference on Structural Design of Nuclear Plant Facilities, Boston, Massachusetts, April 1979.

"A Methodology for the Determination of Seismic Resistant Design Criteria," with J. Vallenias, presented at the Second U.S. National Conference on Earthquake Engineering, Stanford, California, August 1979.



BEN K. KACYRA
(continued)

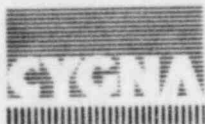
- Seismic evaluation of the Yankee Rowe Nuclear Station in response to the NRC Systematic Evaluation Program (SEP). This project requires a wide spectrum of involvement from seismic hazard development, cost evaluation, criteria development, and analysis, to implementation of design fixes.
- Methodology for structural performance criteria determination for thermal electric generation and transmission facilities, for California Energy Resources Conservation and Development Commission.
- Feasibility of a rational approach to damage mitigation in existing structures exposed to earthquakes, for the National Science Foundation.
- Seismic requalification of the Humboldt Bay Nuclear Power Plant structures and equipment systems which included the development of fixes for the structures and equipment.
- Structural engineering and seismic risk analysis on a \$80,000,000 federal complex in Anchorage, Alaska.
- Seismic design criteria and structural review of the Yerba Buena Convention Center, San Francisco.

PUBLICATIONS:

- "Seismic Risk Analysis Optimizes Life Cycle Costs," presented at the ASCE National Structural Engineering Conference, Madison, Wisconsin, August 1976.
- "Dynamic Response of a Four Storied Building to Changes in Its Configuration," ASCE/SEAONC New Earthquake Design Provisions Seminar, November 1975.
- "Application of Dynamic Analysis," with Sanford Tandowsky, ASCE/SEAONC New Earthquake Design Provisions Seminar, November 1975.
- "Computer Methods vs. Hand Methods in the Lateral Analysis of Multistory Shear Wall Buildings," with Ashraf Habibullah, presented to the Advisory Board of the California State Office of Architecture and Construction, November 1975.
- "Behaviour of Structures Under Earthquake Motion," presented at the Seminar of the Hospital Council of Northern California, December 1974.

Reports to the Seismology Committee of SEAONC:

- "Report of the Overturning and Load Factor Subcommittee," 1970.



BEN K. KACYRA

EDUCATION:

M.S., Structural Engineering, University of Illinois, Urbana, IL

B.S., Civil Engineering, University of Illinois, Urbana, IL

PROFESSIONAL REGISTRATION:

Registered Civil Engineer, California

Registered Structural Engineer, California

Registered Structural Engineer, Ohio

PROFESSIONAL AFFILIATIONS:

Member, Atomic Industrial Forum, Seismic Design Bases Subcommittee

Member, American Nuclear Society

Member, Seismological Society of America

Member, American Society of Civil Engineers

Member, Structural Engineers Association of California

Expert Examiner, Structural Examination, California State Board of Registration for
Professional Engineers

PROFESSIONAL EXPERIENCE:

Mr. Kacyra has been practicing seismic analyses and structural engineering for more than eighteen years, more than twelve of which have been in the field of structural analysis, seismicity and earthquake engineering. His major expertise is in the fields of structural criteria development and seismic risk analysis. He has also gained broad experience in the development and application of advanced analytical techniques essential in the achievement of imaginative engineering designs.

As Chief Executive Officer of Cygna since 1973, he has been personally involved in all Cygna projects. His work includes problem definition, determination of criteria, establishment of procedures and evaluation of results.

Some of the significant projects he has worked on as Principal-in-Charge during the past two years are:



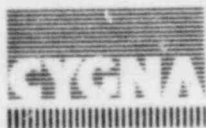
ROBERT W. HESS
(continued)

As Project Engineer for the design of large waste treatment facilities for two fossil generating facilities, Mr. Hess was responsible for directing and sequencing project tasks to accomplish the work scope within budget and schedule, and maintaining formal communications with the client. This assignment required close coordination of design, procurement and construction efforts of process, mechanical, electrical, I&C, and civil/structural engineers.

Other assignments with NUS included responsibilities for conceptual and detail design of make-up water and wastewater treatment systems for both nuclear and fossil power plants. These projects included specification of demineralizer systems, floating roof make-up water storage tanks, sand filters, pumps and tie-ins to existing systems. Mr. Hess supervised engineers and designers in performance of discipline work scope within schedule and budget constraints; established system design criteria and coordinated inputs with other disciplines; prepared and supervised preparation of equipment specifications, construction bid packages, proposal bid evaluations, P&ID's, equipment and piping layout drawings and engineering manhour estimates. Various other project experience includes engineering design and analysis of radioactive waste treatment systems for nuclear power plants, design and review of RCP oil enclosure systems, fossil plant fire water system modifications, and addition of fire suppression systems to the cable spreading rooms. While assigned to a core spray system modification project, he coordinated field engineering efforts and client inputs during the analysis and modification design, in addition to being responsible for the preparation of specifications, drawings and construction work packages for the installation of mechanical modifications. Also, Mr. Hess prepared conceptual mechanical designs and weight analyses of shippings casks for solid waste generated by nuclear fuel reprocessing plants (concepts included both rail and truck-mounted casks for high- and low-level wastes).

Previously, Mr. Hess worked with Newport News Shipbuilding where he was responsible for the design and review of various fluid systems required for operation and support of a naval nuclear power plant. He participated in the formulation and composition of technical documents detailing and justifying system design characteristics, operating principles and maintenance requirements for primary shield water, reactor plant air and evacuation and nitrogen purge systems.

As Lead Systems Engineer with Grumman Aerospace Corporation, Mr. Hess was responsible for systems checkout and launch operations on the Lunar Module Propulsion Subsystems. His position required consideration of such items as test scheduling, manpower planning, review and approval of test procedures and direct supervision of engineers and technicians during pre-launch and launch operations. As Systems Engineer, he prepared and performed test procedures for fluid systems checkout, directed troubleshooting and repair of ground support and flight equipment, and participated in development and site start-up of high pressure gas and cryogenic loading equipment.



ROBERT W. HESS

EDUCATION:

B.S., Engineering, University of Maryland, College Park, MD

Graduate course work in Engineering Administration, George Washington University, Washington, DC

Basic Project Management Course, American Management Association

Air Conditioning and Refrigeration, Brevard Junior College, Cocoa, FL

Cryogenics, Genesys's Extension of University of Florida, Gainesville, FL

PROFESSIONAL REGISTRATION:

Professional Engineer, Mechanical, State of California

PROFESSIONAL AFFILIATIONS:

Member, American Nuclear Society

Member, American Institute of Aeronautics and Astronautics

PROFESSIONAL EXPERIENCE:

Mr. Hess has more than eighteen years of experience in engineering and management. He is currently assigned as Engineering Manager-Systems Engineering for the Western Region. In this capacity he is responsible for the supervision of multiple discipline groups including mechanical, electrical, and instrumentation and control in the performance of systems analysis and design, systems modification, computer applications, and regulatory compliance projects.

Formerly associated with NUS as General Manager of its Western Engineering Office, he was responsible for the management, direction and staffing requirements of all engineering and design projects. In an earlier position as Manager, Plant Engineering, his duties included technical direction and administrative activities associated with process development and system design of modifications to nuclear and fossil-fueled generating facilities. This included supervision of site investigations to determine system design requirements based on plant operations and site-specific constraints, technical approval of conceptual and detail design and management of assigned discipline engineers and designers to meet schedule and budget requirements. Specific projects included NUREG 0612 compliance reports for Trojan and Crystal River Power Plants, ATWS modification requirements study for BWR's, preparation of emergency implementing procedures for a PWR, and modification of a pH control system for a fossil unit cooling tower.



JAMES P. FOLEY
(continued)

Mr. Foley was lead Licensing Engineer for the development of the FitzPatrick Final Safety Analysis Report. This included preparation of schedules, directing stenographics and reproduction activities, drafting text, coordinating reviews, and participating in AEC reviews.

JAMES P. FOLEY

EDUCATION:

B.S., Nuclear Engineering, Lowell Technological Institute, Lowell, MA

Graduate courses, advanced mathematics and mechanical engineering, Northeastern University, Boston, MA

Nuclear Reactor Safety Course, Massachusetts Institute of Technology, Cambridge, MA

Applications of Reliability and Risk Technology, George Washington University, Washington, D.C.

PROFESSIONAL AFFILIATIONS:

Member, AIF Committee on Systems Interaction

PROFESSIONAL EXPERIENCE:

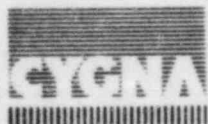
Mr. Foley has over 13 years experience in the nuclear industry, including assignments in engineering design, licensing, and safety evaluations of both BWR and PWR nuclear plants.

He is presently assigned as project engineer on the Control Room Habitability Study on the Robert E. Ginna Nuclear Power Plant, and is acting Licensing Manager for Cygna.

Mr. Foley has been a key member in developing Cygna's Systems Interactions Analysis Program, and is coordinating activities relative to PRA and Systems Interaction Analysis.

Prior to joining Cygna, Mr. Foley held various positions with a large East Coast architect/engineer. Most recently he was Senior Licensing Engineer responsible for performance of the Fire Hazard Analysis for the James A. FitzPatrick Nuclear Power Plant, including suppression and protection of the plant. Modifications resulting from this analysis were implemented to the NRC's "defense in depth" approach to fire protection. He has also had responsibility for following and developing corporate recommendations on several licensing issues, including Systems Interaction Analysis, foreign licensing, BWR pool swell, and determination of safety classes for BWR systems.

Mr. Foley served as plant arrangement coordinator for the Conceptual Engineering Group. In this capacity, he was the coordinator for the early conceptual design effort of several BWR and PWR units, including Nine Mile Point 2, River Bend 1 and 2, Montague and Green County. While in Conceptual Engineering, he served as the group BWR specialist.

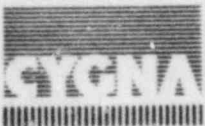


STUART W. DILLON
(continued)

shedding under cyclic waveloading and constant current, checks on static deflections, fatigue, clamp bolting, and recommendations to improve and existing design.

He further investigated research papers on Spectral and Deterministic Fatigue Analysis and hot spot "stress concentration factor" prediction by the use of Parametric Equations and Finite Element Analysis. He prepared a short document explaining the relevance of each of the above to fatigue analysis and resulting major structural repairs on Occidental's Claymore "A" Platform. He assisted in the investigation of the adequacy of the proposed repairs. In connection with this, he wrote an extensive specification for "Procedures For Remedial Grouting of Conductor Framing at (-)100'-0 elevation".

Mr. Dillon researched the Nastran Finite Element Program for tubular joints in order to prepare a report for Occidental Petroleum on Petro-Marine's finite element analysis. These were performed to determine the variation of stress concentration and stiffness at cross-joints on the Claymore "A" Platform as a result of adding external stiffeners and then grout.



STUART W. DILLON

EDUCATION:

B.S. Civil Engineering, Imperial College of Science and Technology, University of London, 1979

PROFESSIONAL EXPERIENCE:

EES, INCORPORATED, Santa Ana, California, Junior Engineer

Mr. Dillon has been involved in the finite element modeling of a concrete floor slab of varying thickness. The finite element analysis was performed to determine how dynamic loading from shear walls above flowed through the slab to shear walls below. He has also been involved in the design and analysis of supporting steelwork for piping and machinery in the Palo Verde Nuclear Generating Station. This work has required hand and computer analyses of structural systems to determine if they satisfy stress and deflection criteria a dynamic analysis of the pipe work under seismic loading.

Prior to joining EES, Mr. Dillon obtained an Upper Second Class Honours Degree in Civil Engineering from Imperial College. His major topics of study were Structural Analysis, Engineering Mechanics and Elasticity, Mathematics, Fluids and Hydraulics and Soils Mechanics; design of Structural Steel and Reinforced and Prestressed Concrete.

PETRO-MARINE, London, England, Engineer 3

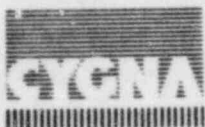
Mr. Dillon's work involved design, analysis and specification for various projects on North Sea Offshore Platforms, for Petro-Marine, a firm of Offshore Engineering Consultants.

He was responsible for the computer analysis of three North Sea Gas Platforms each in approximately 120 ft. of water. The analyses were required to determine pile factors of safety and member and joint stresses subsequent to the installation of riser protectors and incorporating revised loading criteria.

He completed three offshore surveys to investigate site conditions in the vicinity of proposed "lifecraft areas" and one to determine existing roof loading on a Storage Module.

Mr. Dillon has designed and supervised the drafting of various parts of the "C" Process Platform in Denmark's Gorm Field, including mud mats, bouyancy tanks, pipe supports, plant room for heating, ventilation and air conditioning and removable boat fenders for Wellhead Platforms "A" and "B".

He investigated the dynamic response of proposed "Firewater Stilling Tubes" for five gas platforms. His final report included investigation of the dynamic response to vortex



PAUL D. DIDONATO

EDUCATION:

B.S., Business Administration, Industrial Technology, Northeastern University, Boston, MA

A.S., Civil and Highway Engineering Technology, Wentworth Institute of Technology, Boston, MA

PROFESSIONAL AFFILIATION:

Member, American Society for Quality Control

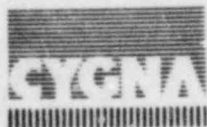
PROFESSIONAL EXPERIENCE:

Mr. DiDonato has over nine years of experience in the nuclear industry. Presently, he is assigned as the Quality Assurance Operations Supervisor, Western Region, and is responsible for the implementation of the Cygna Quality Assurance Program for all West Coast area offices. In addition, some of Mr. DiDonato's recent assignments were acting as Project Leader for the quality assurance evaluation portions of the Grand Gulf Unit 1 and Enrico Fermi Unit 2 Power Plant independent design reviews. Previous work at Cygna has included various assignments in auditing, management diagnostics, and training program development and presentation.

Prior to joining Cygna, Mr. DiDonato worked as a Quality Assurance Engineer for Stone & Webster Engineering Corporation. His initial responsibilities included the development and presentation of Quality Assurance training programs, specializing in the requirements of ASME III Division I, Industry Auditing Standards and Regulatory Guides, as they relate to nuclear power plant construction. Subsequent to this, he was assigned to the Quality Assurance Auditing Division. In that capacity, he was responsible for the preparation and conduct of headquarters, site and sub-contractor quality assurance audits during pre-construction and construction phases of all active nuclear power plant projects. Mr. DiDonato is certified as a lead auditor in accordance with the requirements of ANSI N45.2.23. Prior to joining Stone & Webster, Mr. DiDonato was employed by Chicago Bridge and Iron Company working in the field of Nuclear Quality Assurance.

PUBLICATIONS:

"Techniques of Quality Auditing," a paper presented at the ASQC Idaho Falls Spring Conference, May, 1981.



MIGUEL DE GUZMAN
(continued)

Mr. de Guzman spent some time as an instructor at the College of Engineering, University of Pangasinan, Philippines, where he taught subjects such as steel, concrete and timber design, principles of reinforced concrete, foundation engineering, theory of structures and soil mechanics.

PUBLICATIONS:

Co-Author, "Seismic Analysis of the 101 California Building." If the topic is selected, it will be included in the technical publications for the Eighth World Conference on Earthquake Engineering to be held in San Francisco in 1984.

MIGUEL DE GUZMAN
(continued)

- Oakland Convention Center Parking Structure, 5-level structure with exposed steel-framed parking decks.

In the performance of the work detailed above, Mr. de Guzman has acquired extensive experience in structural modeling techniques for complex structures, and the application of computer programs such as BATS, EESAP and SAPIV in the structural analysis of multistory structures subjected to linear static and dynamic loadings. His work has included major modifications to improve the dynamic response of large structures and detailed analysis to provide qualification of structures which do not meet standard criteria.

Before joining Cygna, Mr. de Guzman was employed by Parsons, Brinckerhoff, Quake & Douglas, Inc., in both their Boston and San Francisco offices. He was involved in many projects related to bridge design and analysis, subsurface transit structures and aerial structure analysis and evaluations, all involving concrete design and stability.

In performing this work Mr. de Guzman acquired experience in evaluating geotechnical investigations and structural adequacies. He was also responsible for structural design and drafting efforts in the production of contract documents, and interfacing structural work with other design disciplines, consultants and utility companies.

In a previous position as Structural Engineer, Mr. de Guzman was involved in several mass-transit related projects such as the BART, Ferry Building Plaza Platform and the Halawa Interchange in Hawaii.

In performing the work detailed above, Mr. de Guzman was responsible for the structural design and production of contract documents and interfacing structural effort with other design disciplines and utility companies.

As Senior Engineer/Lead Engineer for Parsons-Brinckerhoff-Tudor-Bechtel, Mr. de Guzman was involved in projects for the Metropolitan Atlanta Rapid Transit Authority. These included the Preliminary Design of Cain Street Station, final design of ancillary structures for the Five Point Station, and the final design of the Forsyth Street Bridge and structures.

Mr. de Guzman was responsible for supervising structural design and production of contract drawings, as well as preparing conceptual and preliminary design phase drawings for underpinning and demolition of existing buildings and bridges.

Additional industry expertise acquired by Mr. de Guzman include his position as Structural Engineer/Resident Inspector for Thomas J. Davis, Inc; Structural Engineer and general contractor for a metropolitan cathedral, construction project engineer and structural design engineer of churches and schools, industrial, commercial and residential buildings; and as structural engineer, he participated in the final designs of 12-, 14-, and 16-story buildings.



MIGUEL DE GUZMAN

EDUCATION:

B. S., Civil Engineering, University of the Philippines, Quezon City, Philippines

Graduate Courses in Structural Engineering, University of the Philippines, Quezon City, Philippines

Prestress Concrete Seminar, San Francisco, CA

Soil Lateral Pressures Seminar, sponsored by the Department of Transportation, at M.I.T., Cambridge, MA

Construction Management Seminar, sponsored by the Association of General Contractors, New England Region

PROFESSIONAL REGISTRATION:

Registered Civil Engineer, California

Registered Professional Engineer, Georgia

Registered Professional Engineer, Massachusetts

PROFESSIONAL AFFILIATIONS:

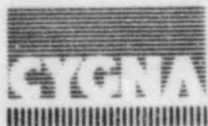
Member, National Society of Professional Engineers

Member, American Society of Mechanical Engineers

PROFESSIONAL EXPERIENCE:

As an engineering Supervisor/Structural Group Leader, Mr. de Guzman has participated in the following projects:

- Yankee Rowe Systematic Evaluation Program, a detailed structural evaluation and design of necessary modifications of all Category I structures of the Yankee Nuclear Power Station at Rowe, Massachusetts.
- LaSalle County Station Units 1 & 2, where he reviewed all the frames supporting the Control Rod Drive Hydraulic System.
- Diablo Canyon Nuclear Power Plant Unit 1, where he was involved in the reevaluation of the pipe supports.
- Hines Building (101 California), a 48-story steel-framed building in downtown San Francisco, with built-up 92'0" tall columns, horizontal transfer trusses and stub girder flooring systems.



JAMES W. DADY

EDUCATION:

Ph.D. candidate, Electrical Engineering, California Western University, Santa Ana, CA
B.S., Electrical Engineering, Indiana Technical College, Fort Wayne, IN

PROFESSIONAL REGISTRATION:

Professional Engineer, Control Systems, California

PROFESSIONAL AFFILIATIONS:

Senior Member, Instrument Society of America

PROFESSIONAL EXPERIENCE:

Mr. Dady has more than 26 years of controls and instrumentation experience in the nuclear, petrochemical, mining and pharmaceutical industries. During the past 15 years, he has held positions such as Principal Instrument Engineer or Engineering Supervisor. Mr. Dady has more than seven years of BWR experience, all of which has been at the Perry, Grand Gulf, Susquehanna or Browns Ferry sites.

Mr. Dady has been involved in the design, installation, functional check-out and start-up of both NSSS and BOP systems. He routinely needs to read and interpret piping and instrument diagrams, instrument loop diagrams, elementary diagrams, instrument data sheets and specifications, and logic diagrams and system descriptions. Being in the field, he has had to coordinate the efforts of the A/E, NSSS vendor and construction people.



ANDREW D. COWELL

EDUCATION:

M.Engr., Structural Engineering, University of California, Berkeley, CA

B.S.C.E., Civil Engineering, California State Polytechnic University, Pomona, CA

PROFESSIONAL REGISTRATION:

Engineer-in-Training, California

PROFESSIONAL EXPERIENCE:

As a Staff Engineer at Cygna, Mr. Cowell's work includes the dynamic testing and structural analysis of equipment. His recent assignments have included:

- Seismic testing of mechanical equipment and electrical cabinets at WPPSS-2, Quad Cities, and Rancho Seco Nuclear Plants.
- Dynamic analysis of equipment and structure for the Yankee Nuclear Power Station at Rowe, Massachusetts.
- Assessment of the dynamic capability of equipment and tanks for a prototype solar power plant.

His experience has also covered pipe stress and local stress analysis for nuclear power plants and evaluation of jet impingement loads on steam generators.

Before joining Cygna, Mr. Cowell worked on static and dynamic testing of large piping structural models. He has several years of experience using mechanical and electronic testing equipment. Models tested include a multiple-support piping system, base isolation devices, and reinforced concrete subassemblages. This experience includes writing and modification of nonlinear analysis computer programs.

PUBLICATIONS:

Cowell, A.D., V.V. Bertero, and E.P. Popov, "Local Bond-Slip Under Variation of Specimen Parameters," Report No. UCB-EERC 82-17, Earthquake Engineering Research Center, University of California, Berkeley.

Popov, E.P., V.V. Bertero, A.D. Cowell, and S. Vivathanarepa, "Epoxy Repair of Bond in Reinforced Concrete," Eastern European Earthquake Conference, Dubrovnik, 1978.

Cowell, A.D., E.P. Popov, and V.V. Bertero, "Reinforcing Steel Bond Under Monotonic and Cyclic Loading," SEOC Convention, Sept. 1978.

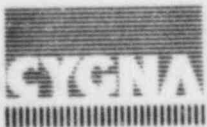


JOHN P. BONNER
(continued)

Bulletin 79-01(B). He also provided technical support at the NRC pre-full power license audit of Unit 2. A full power license was issued upon satisfactory completion of the audit.

While assigned to Millstone 3 for the Northeast Utilities Service Company, Mr. Bonner was responsible for the design supervision of raceway, wiring and cable scheduling, and manpower estimating. He also recommended a means by which a reduction of 50% of the isolation relays could be made, and still maintain the requirements of NRC Regulatory Guide 1.75 in the area of associated circuits.

Other duties at Stone and Webster included developing specifications, bid evaluations, and calculations for power systems analysis.



JOHN P. BONNER

EDUCATION:

B.S., Electrical Engineering, Northeastern University, Boston, MA

PROFESSIONAL REGISTRATION:

Professional Engineer, Massachusetts

PROFESSIONAL EXPERIENCE:

Mr. Bonner has over ten years of experience in electrical engineering and design for nuclear and non-nuclear power plants. He is currently a Supervising Electrical Engineer with Cygna, responsible for the analysis, design, and specification of electrical systems. He also serves as an Electrical Systems Specialist, to assure compliance with all applicable requirements of industry codes and standards such as IEEE, ANSI, NEC, and NEMA.

Mr. Bonner is currently providing detailed designs for modifications required to comply with Appendix R modifications on Nine Mile Point I including development of new logic systems for the Automatic Depressurization System (ADS). He is also developing a conceptual design for the low-low-set fix to the pressure-relief system to protect against SRV loads and cold-shutdown repair procedures needed for Appendix R. This includes diagnostics of system damage as a result of fire and detailed procedures for repairs that are needed to put a plant in safe cold-shutdown state. He is also providing consulting services for environmental qualification and seismic qualification of control systems associated with the ADS and low-low-set modifications.

Earlier, he was part of the task force which developed the Appendix R response for Niagara Mohawk Power Corporation's Nine Mile Point - Unit I. The effort included the analysis of fire zones, fire suppression and detection systems, associated circuits, and breaker coordination to determine the plant's capability to safely shutdown under various postulated fires.

Prior to joining Cygna, Mr. Bonner was employed by Stone and Webster Engineering Corporation as Principal Electrical Engineer for all VEPCO projects. In this capacity he was responsible for the coordination of all electrical activities in support of design change packages for station modifications at Surry Power Station Units 1 & 2. Those modifications included the implementation of Appendix R requirements, the replacement and upgrading of electrical equipment due to an environmental qualification review; addition and modification of plant safety and post-accident monitoring systems, and engineering of the plant emergency power degraded voltage modifications.

For Unit 2 of the North Anna Nuclear Power Station, Mr. Bonner coordinated the review of electrical equipment environmental qualification per NRC NUREG-0588 and IE



STEPHEN L. BIBO

EDUCATION

B.S., Industrial Technology, Northeastern University, Boston, MA

A.S., Aeronautical Technology, Wentworth Institute, Boston, MA

PROFESSIONAL REGISTRATIONS

Associate Engineering Technician

PROFESSIONAL AFFILIATIONS

Member, National Society of Professional Engineers

PROFESSIONAL EXPERIENCE

Mr. Bibo has over seven years of experience in the nuclear industry. As a Project QA Engineer, he is responsible for all quality related activities of assigned projects at Cygna.

Prior to working at Cygna, Mr. Bibo worked for Stone & Webster Engineering Corp. as the Records Management Administrator for the Beaver Valley Unit No. 2 Nuclear Project. His responsibilities included supervising the Records Management Group, developing and implementing computerized information systems, and coordinating the use of computerized indexing and retrieval systems. Prior to his assignment as the Records Management Administrator, he was assigned as the Engineering Assurance Engineer on the Beaver Valley Project where his work included assisting project and site personnel in the implementation of S&W's QA Program, development of QA requirements for specifications, preparation of project instructions, and the coordination of training programs for project and site personnel. Major areas of responsibility included implementing corrective action for client and NRC audits and conducting audits of project and site engineering activities. He is qualified as a lead auditor per ANSI N45.2.23.

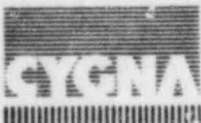
Mr. Bibo's earlier experience at Stone & Webster included: preparation of Engineering Assurance Procedures and Technical Guidelines; preparation of the S&W Corporate Specification Manual; mechanical engineering design, analysis, and design review activities; and vendor bid evaluation and cost estimating.



LENNOX D. BARNES
(continued)

His experience also includes assignments with the General Electric company in their Nuclear Energy Division. He has supervised the construction, start-up testing, and initial operation of a number of BWR reactors including the Peach Bottom Nuclear Power Plant. At Dresden Nuclear Power Station Unit 2, he was assigned as Shift Supervisor, responsible for monitoring all activities during a refueling outage. Other responsibilities included fuel loading, CRD replacement, field design changes, and operational testing.

Prior to his employment with General Electric, Mr. Barnes spent six years in the U.S. Navy Submarine Program.



LENNOX D. BARNES

EDUCATION:

M.S., Nuclear Engineering, University of California at Berkeley, Berkeley, CA

B.S., Mechanical Engineering, University of New Hampshire, Durham, NH

PROFESSIONAL REGISTRATION:

Professional Engineer, Massachusetts

Professional Engineer, California

Professional Engineer, New York

NRC Senior BWR Operator's License

PROFESSIONAL AFFILIATION:

Member, American Society of Mechanical Engineers

PROFESSIONAL EXPERIENCE:

Mr. Barnes has over 20 years experience in the nuclear industry, including senior levels of responsibility for plant engineering, design, licensing, start-up, and plant operation. He is currently the Manager of Cygna's Training Services Division.

Previously, Mr. Barnes was assigned as the Manager of the Systems Engineering Division in the Boston office of Cygna. He was responsible for all engineering activities associated with the electrical, mechanical, nuclear, and instrumentation and control disciplines. Concurrently, Mr. Barnes was the Project Manager on various projects within his division. In this capacity, he was directly responsible for manpower planning, technical direction, project execution, and fiscal performance of the projects.

In a previous assignment, Mr. Barnes served as Project Engineer for the James A. FitzPatrick Nuclear Power Plant. In this capacity he was directly responsible for the engineering, design, and licensing activities associated with retrofit packages. He was also responsible for maintaining project management liaison with the client.

Prior to joining Cygna, Mr. Barnes was the Assistant Chief Engineer of the Engineering Assurance Division of Stone & Webster Engineering Corporation. In this position he directed the development and implementation of engineering quality standards which applied to all project activities.



MEHMET BILGIN ATALAY
(continued)

PUBLICATIONS:

- "Simplified Pipe Whip Analysis Using a Rigid Plastic Pipe Model," Proceedings of the 1983 ASCE EMD Specialty Conference, Purdue University, W. LaFayette, Indiana.
- "State-of-the-Art of Lifeline Earthquake Engineering," Panel Secretary's Report; State-of-the-Art in Earthquake Engineering 1981, Edited by Turkish National Committee on Earthquake Engineering, Ankara, October, 1981; 7th World Conference on Earthquake Engineering.
- "Forced Vibration Experiments of Structures," Earthquake Engineering Research Institute Report, Middle East Technical University, Ankara, May 1981.
- "Dynamic Tests on Keban Dam," Earthquake Engineering Research Institute Report No. 80-2, Middle East Technical University, Ankara, March 1980 (in Turkish).
- "Experimental Determination of the Dynamic Parameters of the Cubuk II Dam," EERI Report No. 79-8, METU, Ankara, December 1979 (in Turkish).
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- "Rate of Loading Effects on Repaired and Uncracked Reinforced Concrete Members," Proceedings of the 5th World Conference on Earthquake Engineering, Rome, Italy, 1973; and Earthquake Engineering Research Center Report No. 72-9, Berkeley, 1972.



MEHMET BILGIN ATALAY

EDUCATION:

Ph. D., Civil Engineering, University of California, Berkeley CA

M.S., Civil Engineering, University of California, Berkeley, CA

B.S., Civil Engineering, Middle East Technical University, Ankara, Turkey

PROFESSIONAL EXPERIENCE:

As a supervising engineer with Cygna, Dr. Atalay is responsible for the direction of advanced structural and dynamics work within the Structural Mechanics Division. His recent work involved:

- Seismic risk assessment for a solar-powered plant in California.
- Testing of electrical control panels using an HP-5423A dynamic analyzer.
- Evaluation of structural computer program for a software developer.
- Equipment qualification for the WPPSS-2 nuclear plant.

Dr. Atalay's previous work with Cygna included the design of friction connection devices in precast panel structures, pipe whip analysis, probabilistic seismic risk analysis, nuclear power plant equipment qualification, identification of dynamic systems using Kalman filters, soil-structure interaction, and piping analysis.

Prior to joining Cygna, Dr. Atalay was an Assistant Professor at the Middle East Technical University in Ankara, Turkey lecturing on structure dynamics, earthquake engineering, and engineering mathematics. He also participated in various research projects including experiments on dynamic characteristics of structures and site-selection and geophysical studies for Turkey's first nuclear power plant. Earlier experience includes experimental and analytical research on inelastic behavior of reinforced concrete structural elements, work which he performed as a research specialist and research assistant at the University of California at Berkeley.

Dr. Atalay's experience with dynamic testing techniques exceeds thirteen years. At the University of California at Berkeley, he was involved in testing a 100-foot long model box girder bridge for the California State Department of Highways, inelastic testing of uncracked and epoxy-injection repaired reinforced concrete flexural members, and dynamic testing of the Transamerica Pyramid in San Francisco using ecocentric-mass vibration generators. His doctorate thesis was also experimental in nature and included hysteretic testing of twelve reinforced concrete column specimens. While at the Middle East Technical University, Dr. Atalay participated in dynamic tests of various dams and building structures using ecocentric-mass vibration generators. While with Cygna, Dr. Atalay conducted tests to determine dynamic cyclic behavior of a friction device intended for use for seismic control of large panel structures.



RESUMES

Mehmet Bilgin Atalay
 Lennox D. Barnes
 Steve Bibb
 John P. Bonner
 Andrew Cowell
 James W. Dady
 Miguel de Guzman
 Paul DiDonato
 Stuart W. Dillon
 James P. Foley
 Robert W. Hess
 Ben K. Kacyra
 Larry L. Kammerzell
 Anthony Klinger
 Chuan Liu
 Simon Luo
 Max S. Maire
 Mohan K. Mani
 A. Patrick McCarthy
 John C. Minichiello
 Alan Moersfelder
 Thinh Duc Nguyen
 John P. Russ
 James P. Toner
 Eugene F. Trainor
 John E. Ward
 Steve C. White
 Nancy H. Williams
 Ted T. Wittig
 Chun K. Wong

1 BY MR. REYNOLDS:

2 Q Ms. Williams, referring to Board Exhibit No. 4,
3 that which was just received, can you identify which of these
4 individuals were on the project team?

5 (Pause)

6 Mr. Ward, while she is making notes, I will next
7 ask you to identify those members who were on the senior
8 review team. Are you prepared to answer that question, sir?

9 A (Witness Ward) Yes, sir, I think so.

10 Prior to doing that, though, with the Chairman's
11 admonition that the written testimony is liable to perjury,
12 I might say my resume states I am the Chairman of CYGNA
13 Energy Services. I am the former Chairman of CYGNA Energy
14 Services.

15 Those who performed on the senior review team
16 includes Ben Kacyra, who is the Chairman of CYGNA Corporation;
17 Larry Kammerzell, who at the time was Vice President and
18 Manager of the Western Region; Eugene F. Trainor, Vice
19 President for Quality Assurance, CYGNA; and myself, John
20 Ward.

21 JUDGE BLOCH: Mr. Ward, thank you for that
22 clarification.

23 I obviously understand when there's a whole bunch
24 of resumes like this, you can't vouch for all the facts; but
25 I appreciate your having reviewed your own.

1 BY MR. PEYNOLDS:

2 Q Mr. Ward, is your resume as currently incorporated
3 in the record, is your educational and professional qualifica-
4 tions there current?

5 A (Witness Ward) Yes, that is correct.

6 Q Ms. Williams, is it fair to say that the remainder
7 comprise the project team?

8 A (Witness Williams) With the exception of in-house
9 consultants whom we draw on for the purposes of conducting
10 in-house reviews from time to time.

11 Q Can you list them for us?

12 A In-house consultants are T. Wittig, J. P. Foley,
13 A. P. McCarthy; J. Minichiello is also listed as an in-house
14 consultant, but also functions as the project engineer.

15 Q And the balance of the individuals were on the
16 project team, is that correct?

17 A There are individuals listed here who performed
18 independent reviews of design criteria who were not, as such,
19 part of the project team.

20 Q And who are they?

21 A M. B. Atalay, M. de Guzman, T. Nguyen, C. Wong.

22 I would have to verify that by going back through
23 the criteria documents, however.

24 Q Now, what were those individuals, again?

25 A They performed the independent review function on

1 our design criteria as required.

2 Q Ms. Williams, would you please turn to Appendix
3 A of Board Exhibit February '84, No. 1, which is your
4 principal report?

5 Would you summarize what that appendix is?

6 A This is our statement of independence.

7 Q Does that accurately reflect the independence of
8 CYGNA with respect to Texas Utilities?

9 A Yes, it does.

10 Q I invite your attention to paragraph 3 of that
11 statement; would you read that to yourself, please?

12 (Pause)

13 Are you familiar with the name Dave Ferg?

14 A Yes, I am.

15 Q Would you explain what, if any, involvement he had
16 in the preparation of your review?

17 A He had no involvement in the review.

18 Q Was he involved in any step of the process that led
19 to the review?

20 A Based on his familiarity with Comanche Peak he was
21 involved with helping me come up with a list of documents at
22 my request to start the review, only.

23 Q And what is his background?

24 A He is an electrical engineer, to the best of my
25 knowledge.

SPELLING???

1 Q Has he ever been associated with design activities
2 at Comanche Peak?

3 A He used to work for Westinghouse.

4 Q So there is a chance that he may have been involved
5 in such design activities? Mr. Ward?

6 A (Witness Ward) Yes, he functioned briefly as the
7 Acting Project Manager for Westinghouse in the field; so it
8 would appear he had significant knowledge of that.

9 Q Then how would his involvement at the earlier
10 stages be consistent with the statement of independence?

11 A He was not a member of the project team. He was
12 used as a liaison to help us identify significant documents
13 that would apply to our review.

14 Q Did he participate in directing the scope of the
15 review?

16 A No, he did not.

17 JUDGE BLOCH: Have I heard correctly, he is not a
18 member of corporate management?

19 WITNESS WARD: That is correct.

20 BY MR. REYNOLDS:

21 Q If he were a member of corporate management,
22 Mr. Ward, would that taint CYGNA from an independence stand-
23 point?

24 A (Witness Ward) I am trying to recall the NRC
25 criteria for independence.

1 Q Let us help you: I will introduce that in the
2 record right now.

3 (Pause)

4 Why don't you try it, based on your experience,
5 Mr. Ward?

6 A Based on our statement, I would say no member of
7 corporate management has ever worked for Texas Utilities.
8 Were he a member, that statement would not be correct.
9 Were he a corporate member, let's say.

10 Q So the answer to my question is yes, it would
11 impair your independence if a corporate officer had been
12 employed with Texas Utilities?

13 A I believe that's correct; yes.

14 Q Ms. Williams, with regard to CYGNA's review of
15 the Document Control Center, there has been a suggestion that
16 CYGNA provided to Texas Utilities a list of documents that
17 CYGNA wished to see before CYGNA reviewed the packages. Can
18 you explain to us what happened in that situation?

19 A (Witness Williams) The afternoon prior to our
20 QA people arriving on-site to do some follow-up review
21 activities of the Satellite Document Control System, I provided
22 a list of documents to Mr. Hayward Hutchinsor that we would
23 require the computer printouts for the distributions, and the
24 list of design change documents outstanding against those
25 drawings.

1 This is common practice in QA audits. But beyond
2 that our checks were solely for the purpose of verifying the
3 accuracy of the listing of CNCs against those drawings; we
4 were trying to assess the operations, including the procedural
5 aspects of the Satellite Document Control Center.

6 The effort involved in coming up with a list we
7 asked for, I understand is at least a four-hour effort; in an
8 attempt to schedule these activities we had better turn-around
9 by giving that to people on night shift.

10 The number of design change documents associated
11 with the drawings we were asking for was over 1,000.

12 Q Let us parse that out a little bit:

13 You asked for computer printouts, correct?

14 A That is correct.

15 Q And design change drawings?

16 A We asked for a copy of the drawing--excuse me. I
17 don't believe we asked for a copy of the drawings. I would
18 have to verify that.

19 We asked for a computer listing of the control
20 distribution folders which would be the satellites.

21 Q You said, I believe, that your checks were not
22 solely to verify the accuracy of the documentation control
23 paperwork?

24 A That is correct.

25 Q That implies that a part of your review was to

1 verify the accuracy of that process?

2 A That is correct. And we were dealing with over
3 1,000 documents.

4 Q What if, hypothetically, you gave the list to the
5 people and they rushed around and verified that things weren't
6 satisfactory; would that impair the validity of your review?

7 A Not entirely.

8 Q In part?

9 A We already had identified the fact that they had
10 some problems in the accuracy of the indices for the design
11 change documents. We knew that they had set up a satellite
12 system in an attempt to tighten controls on the distribution.

13 They are two separate issues.

14 Q When did you identify that they were having
15 problems?

16 JUDGE BLOCH: You said there were two different
17 issues?

18 WITNESS WILLIAMS: The satellite system was an
19 attempt on the part of Texas Utilities to tighten the control
20 of the distribution of documents.

21 The other issue is that we found there was diffi-
22 culty or errors in their listings of CNCs and DCAs against
23 assigned documents.

24 So we were setting out to verify both of those
25 facts.

1 The problem with the validity of the listings of
2 CNCs and DCAs had to be resolved through alternate means,
3 and that being, we had to assure ourselves that Texas
4 Utilities was taking appropriate actions to make those lists
5 accurate; and that effort is much larger than just initiating
6 a satellite control system.

7 JUDGE BLOCH: Did you attempt to verify how easy
8 or hard it would be if a construction person walked up to the
9 center and needed a document for construction purposes,
10 obtaining accurate documentation in an efficient way?

11 WITNESS WILLIAMS: That was part of our check on
12 the satellite system, where we did watch that procedure
13 being conducted; and we did observe the operations during the
14 course of the two days we were there for this follow-up
15 audit.

16 And that's what I mean by "procedural". We did
17 verify that the construction people brought packages back.
18 We were trying to understand what the life cycle of a document
19 in the satellite control system is.

20 JUDGE BLOCH: Then you did not use the documents
21 that were obtained through this prenotification system for
22 the purpose of verifying field-use?

23 WITNESS WILLIAMS: Not for the explicit purpose.

24 JUDGE BLOCH: Why?

25 WITNESS WILLIAMS: Because we were going to go in

1 and check to make sure that their lists were accurate. But
2 if we had gone in for that review and found that the lists
3 were accurate, that would not be the basis for resolution for
4 their problem with accuracy of the listings on their design
5 documents; there's a much larger problem on that. And we
6 approached it from a different angle.

7 BY MR. REYNOLDS:

8 Q You said something to the effect that this is a
9 standard QA audit approach?

10 A (Witness Williams) Yes.

11 Q Do you agree with that, Mr. Ward?

12 A (Witness Ward) Yes, I would.

13 MR. REYNOLDS: May we pause?

14 (Pause)

15 BY MR. REYNOLDS:

16 Q Ms. Williams, you said that you were, as part of
17 your effort, checking on the satellite control system; would
18 you explain what that means?

19 A (Witness Williams) You would like me to explain
20 what the satellite system is?

21 Q Yes?

22 A The satellite system is, as the word implies,
23 miniature document control centers which replaced the
24 discipline groups which used to control design documents for,
25 say, structural, a structural group would have controlled

1 or been the control copy holders prior to the institution of
2 the satellite control system.

3 This was replaced by these centers which operate
4 similar to the DCC, or document control center; they also are
5 the location where the crafts obtain their construction
6 packages at the beginning of the day, and where they turn them
7 in at the end of the day.

8 It was an attempt to tighten the controls over the
9 distribution, because we had found that earlier-on in our
10 audit, there were problems with the distribution control.

11 Q How did you go about your review? Did you look at
12 more than one satellite?

13 A Yes.

14 Q How many, do you recall?

15 A I would have to verify that.

16 Q How many satellites are there?

17 A The program is still being developed. I think
18 at the time we were doing the review there might have been
19 somewhere around five or six.

20 Q And you looked at more than one?

21 A That is correct.

22 Q Would you describe for us--

23 JUDGE BLOCH: One second.

24 You said the most there could be, would be about
25 seven; is that right?

1 They wouldn't have added more than about one more
2 center, based on your report; would they?

3 WITNESS WILLIAMS: I can't answer that without
4 checking.

5 JUDGE BLOCH: I am basing that to the 85-percent
6 completed figure, meaning they at least had seven of eight
7 centers in operation?

8 WITNESS WILLIAMS: The 85-percent figure does not
9 necessarily imply a number of satellites. There is a lot
10 involved in starting a program up like that, including the
11 drawing all the documents from the previous discipline groups,
12 and reissuing them to the satellite centers.

13 The 85-percent refers to a scheduling time.

14 JUDGE BLOCH: And as measured by what, total number
15 of documents that are going to be placed in the satellite
16 centers?

17 WITNESS WILLIAMS: Well--

18 JUDGE BLOCH: What is the 85-percent of?

19 WITNESS WILLIAMS: It is a schedule. They had a
20 schedule for instituting the system, and the estimate of time
21 there was 85-percent complete.

22 JUDGE BLOCH: So it's not an independent judgment
23 by CYGNA, that--of some measure of what the system is--85-percent
24 completed?

25 It is a landmark in the documents of the Applicants,

1 and it is a step that is labeled 85-percent complete?

2 WITNESS WILLIAMS: It is an assessment that it is
3 85-percent complete. I don't know if you could see it
4 written down anywhere.

5 JUDGE BLOCH: Okay.

6 But you don't know the basis for that conclusion
7 that it is 85-percent complete?

8 WITNESS WILLIAMS: I don't think I understand your
9 question?

10 JUDGE BLOCH: Someone makes an independent judgment
11 about the percentage of completion; you need some measure of
12 total number of documents or activities, and you'd say 85-
13 percent of them were done.

14 You don't seem to know what the baseline is from
15 which to draw the conclusion of 85-percent; is that correct?

16 WITNESS WILLIAMS: I do not have hard, fast,
17 numbers. It was an assessment based on our discussions and
18 a document presented to us with their total plan.

19 BY MR. REYNOLDS:

20 Q Ms. Williams, did you give advance notice to the
21 various satellites you visited that you were coming to those
22 satellites?

23 A (Witness Williams) No. We only contacted the
24 document--the central document control center, to receive the
25 printouts only.

1 Q And then you conducted your review independently?
2 You just walked around?

3 A Yes.

4 Q You went where you chose?

5 A Yes.

6 Q Unannounced?

7 A Yes.

8 JUDGE BLOCH: Did you expect that the central system
9 would notify the satellites?

10 WITNESS WILLIAMS: Being that it's a standard
11 procedure to do that, I would not say it was not a concern.

12 BY MR. REYNOLDS:

13 Q Is that answer you expected them to notify the
14 satellites?

15 A (Witness Williams) I suppose that's a possibility.

16 Q Would that invalidate your review of those
17 satellites?

18 A No.

19 Q Let us assume that you are on-site, and I am the
20 satellite director; and I call my satellites and I say,
21 "Nancy Williams is on-site."

22 What could they do in the time between when I
23 called them and when you went there to fix things so that you
24 would not find problems?

25 A Well, considering what we are talking about, over

1 1,000 documents, it sounds like a massive effort in a four-to-
2 five-hour time frame, to me.

3 Q So you think that there would not be much that
4 they could do?

5 A No.

6 And they certainly could not revise procedures in
7 that time frame.

8 JUDGE BLOCH: Do you know what, if anything, they
9 did do?

10 WITNESS WILLIAMS: No.

11 BY MR. REYNOLDS:

12 Q Incidentally, Mr. Ward, if you can shed any light
13 on any of this, please feel free to do so.

14 JUDGE BLOCH: That is a general invitation: any
15 time that another witness wants to explain or clarify, please
16 do. Feel free to come into the conversation.

17 MR. REYNOLDS: Mr. Chairman, we have marked for
18 identification as Applicants' Exhibit 174 a letter from NRC
19 Staff to Mr. Gary, dated September 23, 1983.

20 (The document referred to was
21 marked Applicants' Exhibit No.
22 174 for identification.)

23 BY MR. REYNOLDS:

24 Q Ms. Williams, do you have a copy of that?

25 A (Witness Williams) Yes, I do.

xxxxINDEX

1 Q Do you recognize it?

2 A Yes.

3 Q Is it the same letter that is referenced on
4 page 1-1 of your report in the Executive Summary?

5 A Yes.

6 Q I invite your attention to the enclosure to that
7 letter; I ask you if you recognize it?

8 A Yes.

9 Q What is that enclosure?

10 A These are the rules of protocol governing
11 communications between ourselves and the Applicants.

12 Q And did those rules of protocol apply to communica-
13 tions between you and Applicants?

14 A Yes.

15 Q Did you take exception to any of the requirements
16 of that protocol?

17 A No.

18 Q Is the protocol still in effect?

19 A Yes.

20 Q You mentioned earlier that you had had a meeting
21 with Gibbs & Hill; would a meeting with Gibbs & Hill fall
22 within the scope of this protocol?

23 A Item 2 of the rules of protocol state telecons
24 may take place between TUGCO and CYGNA technical staff to
25 resolve open findings and discuss TUGCO's proposal of

1 corrective actions.

2 We did prepare telecon summaries of each one of
3 those discussions for the purposes of verifying the validity
4 of the observations or resolving the observations.

5 Q You may have misunderstood my question: I asked
6 you about Gibbs & Hill and CYGNA?

7 A I am sorry; the same would apply to Gibbs & Hill.

8 Q Mr. Ward?

9 A (Witness Ward) We drew no distinction between
10 TUGCO and Gibbs & Hill. We applied this to Gibbs & Hill as if
11 it were written.

12 I might also comment that this is the first such
13 protocol that I am aware, and that CYGNA has been aware,
14 of being applied. It's quite tight.

15 CYGNA, as you are aware, did it twice before this
16 without such a protocol. It has tightened up.

17 Q Why do you think that was the case?

18 A I think basically the NRC is in a learning curve
19 on assessments and they are becoming more and more formalized
20 as time progresses.

21 Q Does the increased formality enhance the product?

22 A It may enhance the acceptability of the product
23 to the public.

24 Q The independence of it?

25 A Yes.

1 JUDGE BLOCH: To clarify, I assume from what you
2 said that paragraph 3 was also applied to Gibbs & Hill and
3 TUGCO?

4 WITNESS WILLIAMS: Yes.

5 JUDGE BLOCH: Could you clarify what the meaning of
6 the phrase "all meetings" is?--line 2, paragraph 3?

7 In particular, I am not trying to trap you; but it
8 seems to me you indicated earlier that technical exchanges of
9 documents were somehow excluded from the "all meetings"
10 criteria.

11 WITNESS WILLIAMS: We were doing that under item-2;
12 you could interpret that to say anything else other than just
13 the technical exchange of information for the purposes of
14 conducting a review.

15 JUDGE BLOCH: I am sorry--under item-2?

16 WITNESS WILLIAMS: Under item-2, we interpreted
17 item-2 to be technical exchanges of information for the pur-
18 poses of conducting our review, which is necessary for us to
19 do such a review. Anything other than that, you may interpret
20 as a "meeting," therefore under item-3.

21 JUDGE BLOCH: Item-2 refers to telephone conversa-
22 tions?

23 WITNESS WILLIAMS: We conducted the reviews on-
24 site.

25 JUDGE BLOCH: Item-2 became applied to on-site

1 meetings face-to-face?

2 WITNESS WILLIAMS: On-site exchanges of information.
3 But item-3, I am not sure I would classify it as a meeting.
4 It would be the same effect as having the telephone conver-
5 sation and asking for follow-up documents on an open item that
6 we have.

7 JUDGE BLOCH: On the requirement that meetings be
8 announced beforehand, were there any verbal discussions
9 during these exchanges of technical documents, or were you
10 just merely exchanging written technical documents?

11 WITNESS WILLIAMS: In most cases, because we are
12 trying to control our own internal personnel, we would have
13 an internal CYGNA meeting where we would write down our
14 questions; we would, for the sake of time, provide them with
15 that list, with as many items on it as possible. Those requests
16 are documented in our telecons.

17 Sometimes we would verbally ask them the same
18 question, but they are also on a telecon.

19 JUDGE BLOCH: Okay.

20 I am not concerned about your communication to
21 them so much, which I understand was either done by telephone
22 or by a written document; I am more concerned about what
23 happened when they gave you technical documents?

24 Did they make statements at the time you received
25 the technical documents?

1 WITNESS WILLIAMS: They may make a statement,
2 "this is in response to your request for..".

3 JUDGE BLOCH: But no discussion about "how obvious
4 it is that we were right about this?"--or something like that?

5 WITNESS WILLIAMS: No.

6 JUDGE BLOCH: So it was merely an exchange of
7 technical documents; if they said anything else, there was a
8 telecon prepared?

9 WITNESS WILLIAMS: That is correct.

10 ENDT4JRB
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mgc 5-1

1 BY MR. REYNOLDS:

2 Q Ms. Williams, in your report you refer at times
3 to Applicants' calculations.

4 Did you accept the results of such calculations
5 at face value?

6 A (Witness Williams) We would review them, just as
7 we did our original review.

8 Q You conducted an independent review of whatever
9 calculations you relied upon?

10 A Yes.

11 Q Does that apply to design approach as well?

12 A Yes.

13 Q Methodology?

14 A Yes.

15 Q Calculations?

16 A Yes.

17 Q What about assumptions?

18 A Yes.

19 Q You independently checked each of those during
20 the course of your review?

21 A Yes.

22 Q You did not rely upon Gibbs & Hill or Texas
23 Utilities for any of those methodologies, calculations,
24 assumptions?

25 A No. The express purpose of the review was to

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1 check that independently.

2 Q When performing your review, did you accept it at
3 face value, statements made by Gibbs & Hill or Texas
4 Utilities?

5 A Absolutely not.

6 Q Representations of fact made by them?

7 A No. We would always investigate the basis.

8 JUDGE BLOCH: Could you explain to us the
9 difference between what you have in mind now and what
10 happened with the 85 percent completed requirement? Was
11 there some failure to investigate the basis of the conclusion
12 that the system was 85 percent completed?

13 WITNESS WILLIAMS: I'm not sure how pertinent that
14 is to our conclusion. The fact that we said it was 85
15 percent complete was just a measure for us to determine
16 whether what we were looking at was sufficiently underway to
17 make the judgments that we wanted to make, and all we needed
18 to see when we got down there was enough examples of how the
19 system would work and how the procedures would work and how
20 well the people were trained and how well they knew their
21 jobs.

22 If they were going to institute ten more satellites
23 using the same concept, we wouldn't have a problem with that.

24 JUDGE BLOCH: If it had been 50 percent completed,
25 that also would have resolved the observation?

mgc 5-3

1 WITNESS WILLIAMS: As long as when the satellites
2 were functional -- we needed to have satellites functional
3 in order to make that judgment. So that is really the
4 criterion, more than 85 percent complete.

5 JUDGE BLOCH: What percentage of the plant was
6 completed at that time that this system was about 85 percent
7 completed?

8 WITNESS WILLIAMS: I would have to defer that
9 question to the Applicant.

10 JUDGE BLOCH: Do you know what percentage of the
11 plant was completed roughly at that point?

12 WITNESS WILLIAMS: I haven't seen anything written
13 on it. There are discussions on it. It is somewhere around
14 90, but I would not want to be quoted on something like that.

15 JUDGE BLOCH: Were you independently satisfied
16 that the 90 percent of the plant that was already completed
17 with the old document control system was satisfactory?

18 WITNESS WILLIAMS: That was a large effort. I will
19 try to explain it.

20 They have a group called the Design Change
21 Tracking Group, referred to as DCTG, in our observations.
22 This group was originally formed to help track the design
23 verification process that was taking place by the various
24 originating organizations. With time, it had developed into
25 something larger. Texas had plans to convert that tracking

mgc 5-4

1 system into the document control tracking system. The
2 document control system was running on a manual system when
3 we looked at it. The DCTG system is a computerized system.

4 The original base for the DCTG data base was a
5 Gibbs & Hill tracking system for design verifications, and it
6 was a logical starting point, since they had the bulk of the
7 design documents associated with Commanche Peak. They
8 took a copy of that data base and all the information in it,
9 added additional columns so that they could track other
10 information in addition to what Gibbs & Hill was tracking,
11 and then set out on a process to validate that data base.

12 The CMCs have a sequential numbering system. The
13 DCAs have a sequential numbering system. They are one-by-one
14 going through them with an appropriate discipline engineer
15 and verifying whether those design documents were incorporated,
16 whether there is any outstanding work such as design
17 verification, whether it is voided and whether it is
18 appropriate drawing.

19 This effort is essentially complete on the DCAs
20 and underway for the CMCs.

21 JUDGE BLOCH: Did you consider whether this was
22 in keeping with the requirements of Appendix B, Criterion 16,
23 for prompt quality assurance, identifying deficiencies and
24 correcting deficiencies? Or was this an effort to catch up
25 at the end and make sure that the problems that had arisen

mgc 5-5

1 earlier were sooner or later found?

2 WITNESS WILLIAMS: You are referring to the
3 timeliness?

4 JUDGE BLOCH: Prompt identification of deficiencies.
5 I assume, if your effort is to go back and make sure that
6 finally you've caught up all your design problems, that there
7 was a period of time under which you didn't have good control
8 under what the design problems were, and therefore it would
9 have been difficult to verify the construction to the design.

10 MR. REYNOLDS: Mr. Chairman, we're not talking
11 about design problems. You are making hypotheticals there.

12 JUDGE BLOCH: To verify what the design actually
13 was. If you don't know what the design is because you have
14 difficulty tracking it, it's going to be hard, isn't it, to
15 verify construction against design?

16 WITNESS WILLIAMS: In the systems that we looked
17 at, we didn't find any evidence that there was a problem
18 with that. We did come across errors in their logs in DCC,
19 and that did cause us a similar concern to what you are
20 saying. But you have to answer that from a design standpoint,
21 and for the systems that we reviewed, we did not find any
22 problems.

23 BY MR. REYNOLDS:

24 Q By systems that you reviewed, are you talking
25 about the walkdowns?

mgc 5-6

1 A (Witness Williams) The walkdown would be one
2 example. If you wanted to look at the analytical side,
3 the RHR system.

4 JUDGE BLOCH: You say at the time you were doing
5 walkdowns against current design documents?

6 WITNESS WILLIAMS: Drawings that were stamped
7 "as-built."

8 JUDGE BLOCH: These were as-built, but not
9 as-built verified; is that right? Do you know the difference?

10 WITNESS WILLIAMS: They were -- my definition is
11 going through their 79-14 as-built program. They have a
12 procedure for that. Is that what you are referring to?

13 JUDGE BLOCH: We have been told that there are
14 two types of documents, as-built and as-built verified.

15 Do you know the difference between them?

16 WITNESS WILLIAMS: The verification is done by the
17 originating organization. As-built is a QC check in the
18 field, from my understanding. Once the drawing is stamped
19 "as-built," it is sent back to the originator to make sure
20 that there are no deviations which would affect the basis of
21 the analysis.

22 JUDGE BLOCH: You think as-built documents have
23 already been checked in the field to make sure that they
24 are the way they are in the design?

25 WITNESS WILLIAMS: When we did the walkdown, we

mgc 5-7

1 took as-built drawings and checked them to make sure that
2 the hardware complied with the drawings. When we were doing
3 our design review, we took the as-built drawings and then
4 made sure that there was no discrepancy between those
5 drawings and the analysis.

6 JUDGE BLOCH: Do you know of a category called
7 as-built verified?

8 WITNESS WILLIAMS: I would presume they are
9 referring to my second item.

10 JUDGE BLOCH: Being what?

11 WITNESS WILLIAMS: Being that you do a verification
12 on your final analysis. That has to be done by the originator
13 of the design. You would do that for the as-built condition.

14 JUDGE BLOCH: So the difference between as-built
15 and as-built verified is the addition of the check by the
16 design originator?

17 WITNESS WILLIAMS: That's my understanding.

18 MR. REYNOLDS: Mr. Chairman, are you confusing
19 vendor verified with as-built verified?

20 JUDGE BLOCH: I think I am.

21 MR. REYNOLDS: I'm not sure that will help
22 Ms. Williams, but it will help the record.

23 JUDGE BLOCH: It will help me.

24 Please continue.
25

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BY MR. REYNOLDS:

Q Ms. Williams, let's turn to the selection of your review criteria. Were you requested by Applicants to employ specific review criteria in your analysis?

A (Witness Williams) No.

Q Were you requested by the NRC to do so?

A Could you define review criterion?

Q How do you go about conducting a review? What issues do you review? What documents do you look at?

A The hardware scope is agreed to by the NRC. The criteria that we use in assessing technical adequacy is ours although it is based on their licensing commitments. The methodology is ours that we propose and is also approved by the NRC.

Q Are these criteria a part of a question of independence?

A We feel that we have a methodology which ensures that.

A (Witness Ward) I think the answer to the question is yes, we proposed criteria to the Applicant, and in the program document the Applicant then submitted those criteria along with the methodology plan to the NRC Staff for their review and concurrence. There were some modifications to both the criteria and scope made by the NRC and accepted by the Applicant and incorporated in their program.

6jcy2 1 Q Do those changes made by the NRC impair the
2 independence?

3 A I don't believe so. I think they were constructive
4 suggestions.

5 JUDGE BLOCH: Ms. Williams, when you say the
6 criteria were "ours," could you tell us the extent to which
7 those criteria assure that all applicable minimum code
8 provisions have been met?

9 WITNESS WILLIAMS: The first thing we do is take
10 their FSAR and licensing commitments to determine what the
11 code of record is. We then list what the applicable standards
12 would be and then add any additional criteria that we feel are
13 important for the design we are looking at.

14 JUDGE BLOCH: When you say you list all the
15 standards, does that mean, for example, going through the ASME
16 code and listing each design allowable?

17 WITNESS WILLIAMS: No.

18 WITNESS WARD: I think the correct answer to your
19 question is the criteria do not specify codes; they specify
20 how you select the scope of the review. Once the scope of
21 the review has been selected, then the methodology has to be
22 developed, and that indeed has to specify codes.

23 JUDGE BLOCH: Well, at one point or another in
24 the review, was there a step taken that assured that each of
25 the ASME code allowables was met?

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1 WITNESS WILLIAMS: Yes.

2 JUDGE BLOCH: And that involved somehow developing
3 a matrix which compared the code against, for example, the
4 computing codes used on site?

5 WITNESS WILLIAMS: We didn't document it as a
6 matrix. But we do have checklists. They do not take the
7 code line by line and write down what the criteria is. What
8 the checklist will say is, check for compliance with the code.
9 We used experienced engineers and we don't want to make the
10 checklists limiting, but we do check for all the aspects that
11 would be associated with complying with the code.

12 JUDGE BLOCH: Are there differences in code
13 interpretation among experience engineers?

14 WITNESS WILLIAMS: I suppose there have been cases
15 that are generally accepted interpretations.

16 WITNESS WARD: The standards bodies have a procedure
17 for interpretation of differences of opinion and come out
18 with a resolution as a code case.

19 JUDGE BLOCH: I would generalize there are at
20 least some code sections that have judgmental standards built
21 into them. The word "significant" may appear or you shouldn't
22 have too much of something. Are there problems in setting a
23 standard as to whether or not that has been met? In terms
24 of your checklist, the ASME code is rarely mentioned. It's
25 just up to each individual engineer's judgment that he goes

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1 through as to whether the code minimum, code allowables is
2 met? Is that basically the idea?

3 WITNESS WILLIAMS: Where the code is referenced in
4 the design criteria, the design criteria and the checklist
5 go hand in hand for the review. Those are the two key docu-
6 ments. They know they have to verify that the design is in
7 accordance with the applicable codes and standards that are
8 listed in the criteria document.

9 BY MR. REYNOLDS:

10 Q Let's pursue that a little further, Mr. Ward. Are
11 you familiar with current engineering judgment?

12 A (Witness Ward) Yes.

13 Q What does engineering judgment mean to you?

14 A That's a very good question. To many the beauty
15 of engineering judgment is in the eye of the beholder. I
16 don't think it is akin to female intuition, nor do I think
17 engineers, because they hold a degree, have a mystique and
18 clairvoyance that is not granted to others. But there are
19 times when engineering judgment may be the key factor. But
20 critical to that is to understand the appropriateness of using
21 a judgment factor as opposed to a standard and adopted
22 methodology, adopted criteria. Engineering judgment is not
23 a substitute for those.

24 Those of us who earned our grey hair at the
25 engineering business have made lots of mistakes, and we have

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1 been in the field, we have seen what has happened under
2 substantial upset conditions in plants, and in many cases in
3 the design of some very difficult pieces of equipment, like
4 fluedheads, like valve bodies, seismic analysis, for which
5 Cygna is one of the foremost companies in the country, there
6 still needs to be some experience applied.

7 It's important, I think, to judge the experience
8 of the engineer who is making the judgment, and if his
9 experience is relevant and if the object of that judgment is
10 something wherein definitive standards and procedures do not
11 exist, then I think engineering judgment can be accepted.

12 Q What is the alternative, in your judgment, in the
13 design of a plant?

14 A Conservatism in the design, and that usually is the
15 basis of many an engineering judgment.

16 Q I'm not sure I understand that. It seems to me
17 that the alternative to the exercise of judgment is cookbook,
18 prescriptive, by-the-numbers design. Would you accept that?

19 A We may be looking at two different legs on this
20 elephant called engineering judgment. I was commenting on
21 those areas where in essence standards, i.e., cookbooks,
22 don't exist. There also is the aspect that you have referred
23 to wherein there are very detailed procedures that are being
24 developed for certain engineering design and risk assessments,
25 and there needs to be judgment placed on these. You cannot

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1 follow a cookbook without understanding the basic principles
2 involved.

3 Q Would you say that engineering judgment would be
4 appropriate where you have conservative design and the
5 engineer is attempting to evaluate minor effects?

6 A Oh, yes, certainly; again with the qualification
7 that the engineer doing the testing has the relevant
8 experience to make that judgment.

9 JUDGE BLOCH: There is one area of engineering
10 judgment that seems to me particularly difficult to evaluate.
11 I understand that there is some feeling in the design field
12 that some NRC regulations represent over-regulation, that some
13 of the criteria are overly strict, overly rigorous, maybe
14 even that some of the industry standards are overly strict or
15 overly rigorous.

16 In that context, are there special problems of
17 making engineering judgments as to whether or not a particular
18 thing has to be considered?

19 WITNESS WARD: I don't believe so because you are
20 talking about requirements, you are talking about regulatory
21 guides, you are talking about items specified that are not
22 negotiable.

23 JUDGE BLOCH: In those instances you could use
24 judgment but it would be because you had some way of quanti-
25 fying the effect you are looking at, saying, well, if we

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1 considered it, we still would be okay under the old rules.
2 Is that basically the idea, or would you disregard some things
3 thinking that -- you wouldn't disregard something that is
4 allowable as not important.

5 WITNESS WARD: I don't know whether I really
6 understand the question, Mr. Chairman. I thought you were
7 talking about areas where the NRC had specified what had to
8 be done.

9 JUDGE BLOCH: You may specify an allowable, but
10 the question arises whether a particular feature should be
11 analyzed or not, and the engineer may look at it and say it
12 really won't make much difference. When he does that, does
13 he have to assure himself that much difference will not be
14 under allowable?

END 6

mgc 7-1 1

2 Can he just say "That's not an important effect,
3 and I'm not concerned whether it will take my particular
4 support under the allowable"?

5 WITNESS WARD: Again, are you driving at an
6 engineer making a decision that the requirement is too
7 severe and something less is sufficient?

8 JUDGE BLOCH: I guess I am concerned that there
9 are areas where there is a difficult problem as to whether
10 that is the effect of an engineering judgment. They may
11 say some effect is not important; it's the support that
12 is affected, or a support that is affected is right at
13 code allowable. The decision to disregard a certain thing
14 generically would cause you to be under allowable for that
15 particular item. That's not an allowable engineering
16 judgment.

17 WITNESS WILLIAMS: You are talking about things
18 that might be construed to have a minor effect?

19 JUDGE BLOCH: That's right. I assume that if
20 you have an extra design allowable above code, that it might
21 be legitimate to throw away a number of things that
22 have minimum effects, but if you are designing right to
23 code, then disallowing unimportant things has the effect
24 of taking you under the code allowable; is that correct?

25 WITNESS WILLIAMS: It's possible you could have
that effect, if you were designing right to code. In this

mgc 7-2

1 particular case, they were not always designing right to
2 code.

3 JUDGE BLOCH: Were they ever designing right to
4 code?

5 WITNESS WILLIAMS: I can't think of an instance
6 right now, and I would have to go back and check and find
7 out the specifics. But it was truly right to the limit.
8 And then you also have to consider that as there are effects
9 that you are saying are not considered, there are also
10 other effects that, because you are doing, say, a simplified
11 analysis, there is some inherent conservatism in there.
12 If you wanted to do a true evaluation of the situation, you
13 should do a more detailed analysis and get a more exact
14 picture of the behavior of the structure.

15 JUDGE BLOCH: The closer you get to code, the
16 more precise the analysis has to be.

17 WITNESS WILLIAMS: It doesn't have to be. You can
18 still qualify it using simplified assumptions. You are
19 probably being more conservative. If you did not want to be,
20 quote, "penalized" for the conservative assumptions, then
21 you might choose the alternative of doing a more detailed
22 analysis.

23 JUDGE BLOCH: On pipe supports, was there an extra
24 design allowable? Was there a standard policy at Gibbs & Hill
25 to allow an additional design allowable over code for pipe

mgc 7-3

1 supports?

2 WITNESS WILLIAMS: I would have to have the
3 specific reference. You are, I think, referring to welded
4 attachments?

5 JUDGE BLOCH: I was thinking more of the fact that
6 on the cable trays, there was a design allowable as you
7 went back. Everything was designed a certain percent over
8 code, so when you found some calculation problems, there was
9 leeway.

10 Was this a uniform policy of Gibbs & Hill that they
11 always had design allowables over code?

12 WITNESS WILLIAMS: We probably should pull out the
13 document. I suspect you are talking about the PFR. This
14 was also a discussion we had with the NRC, because they had
15 a similar interpretation. We were not trying to say they
16 designed over code. They did not; they designed to code.

17 The question was evaluating generic items and
18 assessing their effect, and then determining whether there
19 would be an effect to increase the loads to the extent that
20 they would then exceed the code.

21 JUDGE BLOCH: So there was no conscious policy to
22 allow an extra design margin, even on the cable trays?

23 WITNESS WILLIAMS: There is an extra design margin
24 inherent with their approach.

25 JUDGE BLOCH: Because of the built-in conservatism

mgc 7-4 1 at different steps?

2 WITNESS WILLIAMS: Yes. They did simplifying
3 calculations, but they did not exceed code.

4 JUDGE BLOCH: Okay. I understand they are trying
5 never to exceed code, but I am just curious whether you can
6 quantify the extent of these extra margins, so that when
7 you make calculational errors, there's room for them.

8 WITNESS WILLIAMS: To some degree, we feel we can.
9 When we were assessing it, we also were trying to be
10 conservative and did not take into account additional effects
11 that will decrease the loads as well. We did not go seeking
12 out the limit of the conservatisms in order to justify the
13 cable trays.

14 BY MR. REYNOLDS:

15 Q Mr. Ward, it has been suggested that Cygna has an
16 inherent bias in the performance of its review, because it
17 has experience in the nuclear industry and will continue to
18 provide services to the nuclear industry.

19 Would you comment on that charge?

20 A (Witness Ward) Well, I think just the opposite is
21 true. I think Cygna has a special expertise to be able to
22 present and to perform these kinds of analyses. That requires
23 experience in the nuclear industry.

24 The convoluted and Byzantine requirements that are
25 placed upon the design and the review of that design need

mgc 7-5

1 experienced people to be able to interpret.

2 The same charge could be made, I guess, of anybody
3 who works in the nuclear industry, that they are biased. And
4 if the criteria is, you must know nothing about the subject
5 about which you are to make a judgment, then I think we're
6 in real trouble.

7 Cygna has significant expertise that grew out of
8 the civilian construction, commercial construction area,
9 and has applied that in the nuclear field very successfully
10 to some very unique and confounding designs, the review of
11 designs that had no design criteria, seismic design, at the
12 very early plants -- Yankee Rowe, for instance -- and has
13 developed expertise that is unique in many cases, that is
14 specialized and can look at these kinds of design problems
15 with an expertise that provides the public and the regulator
16 with some confidence that proper methodologies were used.

17 That Cygna wants to continue to work in the nuclear
18 industry is probably clear, and that cannot, I think, in and
19 of itself, be determined as bias.

20 Q Sir, have you and I discussed your testimony?

21 A No. We had a telephone conversation where you
22 discussed the format and what the procedure would be, but
23 we haven't discussed the testimony.

24 Q Ms. Williams, same question.

25 A (Witness Williams) No.

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1 Q Ms. Williams, did you rely on the SIT Report to
2 resolve issues that arose during your review?

3 A There is an instance where we did, yes.

4 Q What was that instance?

5 A There are two notes on the pipe support checklist,
6 I believe.

7 Q Can you find that for us?

8 A On Checklist No. PS-01.

9 JUDGE BLOCH: Immediately following Sheet 4 of 4.

10 BY MR. REYNOLDS:

11 Q Would you describe what those notes impart to us?

12 A (Witness Williams) During the course of our
13 review, we questioned the fact that they did not consider
14 self-weight excitation in the design of the supports. During
15 the course of resolving that open item, we discovered that
16 it had also been discovered by Walsh/Doyle and that the NRC
17 SIT team was reviewing a report. We did not review that
18 report, since it was under review by the NRC, and we are
19 conducting this review for the NRC.

20 Q I have one last area for you, Mr. Ward.

21 Let's assume that there was no criterion for
22 independence in your review. Does that mean that there
23 would be a significant risk that your engineers would accept
24 something that is technically unsound?

25 A (Witness Ward) No. I think there's no risk

mgc 7-7

1 involved. I think the criterion for independence is a
2 criterion developed to assure the public that there is no
3 possibility under any circumstances.

4 No. I would feel that any competent engineering
5 firm with trained professionals could perform this kind of
6 review.

7 Q To employ an overused word, it is a conservatism?

8 A A significant conservatism, yes.

9 MR. REYNOLDS: I pass.

10 Mr. Chairman?

11 JUDGE BLOCH: Yes, Mr. Reynolds.

12 MR. REYNOLDS: I move that Applicants' Exhibit
13 174 be received in evidence.

14 JUDGE BLOCH: It may be so marked and bound into
15 the transcript at this point.

16 (The document referred to was
17 marked Applicant's Exhibit
18 No. 174 for identification, and
19 was received in evidence.)

20 JUDGE BLOCH: We will take a five-minute recess
21 at this point.

22 (Recess.)

23 (The document referred to follows.)
24
25



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

App 174

SEP 20 1983

Docket No.: 50-445

Mr. R. J. Gary
Executive Vice President
and General Manager
Texas Utilities Generating Company
2001 Bryan Tower
Dallas, Texas 75201

Dear Mr. Gary:

Subject: Comanche Peak Steam Electric Station - Independent Assessment Program

By a letter dated September 9, 1983, Mr. H. C. Schmidt of Texas Utilities Services Inc. (TUSI), transmitted a revised proposal for an Independent Assessment Program (IAP) for Comanche Peak to be performed by CYGNA.

The NRC staff has reviewed the revised proposal and finds it to be responsive to the staff comments contained in our letter dated July 15, 1983 and to comments made during the meeting on August 18, 1983. Further, the revised proposal conforms to the program revisions described by your staff and CYGNA at the meeting on August 18, 1983. In summary, we find the overall objective, scope and plan of action to be acceptable; and if conducted effectively, we believe it will provide significant additional evidence for judging the quality of design and construction at Comanche Peak.

We also find CYGNA to be an acceptable contractor for the conduct of this program. Your staff and CYGNA should adhere to the protocol described in the enclosure. Should you have any questions or need clarification, please contact the Project Manager, S. Burwell.

We look forward to receiving the draft report for our review.

Sincerely,

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/encl.: See next page

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Enclosure

COMANCHE PEAK STEAM ELECTRIC STATION - INDEPENDENT ASSESSMENT PROGRAM

Protocol Governing Communications
Between TUGCO and CYGNA

1. Written recommendations, evaluations, meeting and telecon summaries, and all exchanges of correspondence, including drafts, between CYGNA and TUGCO will be kept on file by both TUGCO and CYGNA. The file shall be accessible to the NRC, and shall be maintained until issuance of the full power license for Comanche Peak Unit 1.
2. Telecons may take place between TUGCO and CYGNA technical staff to resolve open findings and discuss TUGCO's proposed corrective actions. Telecon summaries will then be prepared by CYGNA and placed on file per the protocol of paragraph (1).
3. The NRC Project Manager (S. Burwell) and the Chief, Reactor Projects Branch No. 1 in Region IV (G. Madsen) shall be notified of all meetings between TUGCO and CYGNA to afford them (or their representatives) the opportunity to be present, as deemed necessary, and to notify the public of the meeting. In this regard, TUGCO shall provide a minimum of five days advance notice to the NRC of any such meeting.

The NRC shall make reasonable efforts to notify the public of the meeting, but the inability of any person to attend shall not be cause of delay or postponement of the meeting. Any portion of such meetings which deals with proprietary information may be closed to the public. Meeting minutes will be written and placed on file per the protocol of paragraph (1).

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1 JUDGE BLOCH: The hearing will please come to
2 order.

3 Mrs. Ellis, before you begin, I would like to
4 comment that I have a special sympathy for these witnesses,
5 not that I have prejudged at all whether or not Cygna is
6 independent, but I worked for eight years as a consultant
7 and had to testify in seven different cases as a result of
8 my work. I would like to say that there is a guarantee of
9 independence working here that doesn't ordinarily work, and
10 that is that these people are now subject to cross-examination,
11 and that while it is true that they have an incentive to
12 perform in a way that is acceptable to the nuclear industry,
13 they also cannot risk performing in a way that gets destroyed
14 under cross-examination. I consider that to be a portion of
15 the guarantee of independence of this study.

16 Please continue.

17 MS. ELLIS: In that regard, I might mention that
18 one of our concerns has not been that Cygna necessarily has
19 done anything willfully wrong. I don't want to give that
20 impression. Our concern is more with what happened with the
21 Applicants when they were given the lists. That has been
22 our primary concern.

23 (Discussion off the record)

24 MS. ELLIS: Mr. Walsh will have some questions on
25 voir dire and then we will have some further questions on

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1 some of the subject matter we talked about here.

2 VOIR DIRE

3 BY MR. WALSH:

4 Q Ms. Williams, do you consider yourself an expert
5 in civil structural engineering?

6 A (Witness Williams) My expertise is project
7 management.

8 Q Do you consider yourself an expert in structural
9 engineering?

10 A No. I have people that I consider experts working
11 on the project who conducted the structural review.

12 A (Witness Ward) I think, if I may also chime in on
13 the answer, Ms. Williams' expertise has come from working at
14 the utility as a project manager for a lot of retrofit
15 projects. She has managed technical reviews at Cygna; and
16 the validity of the review is certainly not dependent upon
17 the qualifications of a single person but upon the team and
18 the team experience that is being applied to the problem.

19 Ms. Williams' expertise is in structural
20 engineering. She is a qualified project manager.

21 JUDGE BLOCH: I'm sorry. Did you say her expertise
22 is in civil engineering?

23 WITNESS WILLIAMS: I have a degree in civil
24 engineering. I have been practicing project management.

25 WITNESS WARD: The team that Cygna placed on

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1 the project included not only the project team but two groups
2 of oversight, one being a senior management committee that had
3 brought experience, my own being engineering management and
4 project management, others being detail structural dynamic
5 analysts, and in addition, a team of consultants that reviewed
6 the work.

7 So it was, in my view -- the team was a competent
8 team.

9 BY MR. WALSH:

10 Q Okay.

11 Ms. Williams, will you be able to discuss technical
12 structural engineering problems?

13 A (Witness Williams) I have gone through your
14 testimony and gathered the answers if I didn't already know
15 them. I am very familiar with the contents and basis for the
16 review. My only drawback would be those things that are lost
17 in the boxes.

18 Q Would you be able to answer additional technical
19 questions?

20 A I will either answer them or get the answer for
21 you after a break.

22 JUDGE BLOCH: You are saying that you believe
23 that you can answer all relevant technical questions either
24 of your own knowledge or from the documents that you hope
25 to obtain shortly; is that correct?

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1 WITNESS WILLIAMS: That's correct. I believe I
2 brought an inclusive set, and if it requires a phone call, I
3 can certainly go and do that to get the answer as well.

4 BY MR. WALSH:

5 Q Do you have the ability to make an engineering
6 judgment based on your experience?

7 A (Witness Williams) I was not the sole source of
8 making engineering judgments on this review. I guess I
9 don't understand why you are asking the question. I can make
10 judgments based on my knowledge in certain areas. I have an
11 understanding of the conservatisms and where they lie and
12 how analyses were performed and the purpose of the codes.

13 Q If we were to show you possibly an unstable support,
14 would you be able to say that that support was unstable with-
15 out doing any calculations?

16 A Not in all cases. I don't think anyone can
17 necessarily do that without calculations in some cases.

18 JUDGE BLOCH: Mr. Walsh, as a matter of procedure,
19 these are the experts who are here. If you ask questions on
20 which they do not know the answers, we will have to consider
21 what the effect of that will be.

22 MR. WALSH: Okay.

23 BY MR. WALSH:

24 Q Did the Cygna team review the Walsh-Doyle allega-
25 tions?

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1 A (Witness Williams) Not prior to conducting the
2 review.

3 Q How about during the review?

4 A I don't know as we ever saw a document with the
5 allegations other than your testimony and the decision, the
6 Board decision.

7 JUDGE BLOCH: Ms. Williams, could you think again
8 about that? I think you did see a document.

9 MS. WILLIAMS: Called the Walsh/Doyle Allegations?

10 JUDGE BLOCH: No, no, that contained the Walsh/Doyle
11 allegations. You just testified that you relied at times on
12 the SIT report.

13 WITNESS WILLIAMS: Yes, but we didn't discover that
14 until we asked Texas the question, and why didn't you consider
15 self-weight excitation? We were then referred to the fact that
16 there were these allegations and they had done that in
17 response to an allegation and that SIT was currently reviewing
18 it. So we bumped into it in time in the course of doing a
19 review and probably became more and more familiar with the
20 contents of it, but that wasn't the purpose of doing the
21 review.

22 JUDGE BLOCH: So we should not expect that each of
23 the concerns that were handled there were independently
24 evaluated by Cygna.

25 WITNESS WILLIAMS: We would only have crossed them

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1 if it was applicable to the scope. I'm sure there are
2 allegations that we wouldn't have seen examples of in the
3 scope that we looked at.

4 BY MR. WALSH:

5 Q And did Cygna see the proposed findings of the
6 Walsh/Doyle allegations, CASE's proposed findings?

7 A (Witness Williams) I don't believe so. I have
8 in front of me just your testimony, and I have a document
9 that I guess is referred to as the Board Decision, and that's
10 all.

11 Q Did you ever see the SIT Report, or your organiza-
12 tion?

13 A We may have come into looking at parts of it, but
14 it was not part of the review documents.

15 Q Mr. Ward, why did you leave Cygna?

16 A (Witness Ward) The answer is always a better job
17 and more money, I guess; but the real answer is that I
18 decided that my bent was in consulting and in management
19 consulting and I wanted to try that. It was a career change.

20 Q When did you specifically leave Cygna? What month,
21 date?

22 A Oh, I could give you the month. I think it was
23 March, and it was the first week or so of March of 1983.

24 Q So you were not involved in the report when they
25 did it in July of '83?

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1 A I was retained by Cygna as a consultant and a
2 member of the senior review, and that was to provide continuity
3 from the role I had started to play in the early discussions
4 as to the criteria and scope of the study.

5 Q So then there is an association between your
6 present company and Cygna?

7 A There is a letter of contract for my services,
8 yes.

9 Q Did Cygna used to be known as Earthquake Engineer-
10 ing?

11 A Yes, Earthquake Engineering Systems, Inc.

12 Q Did Earthquake Engineering ever do any work for
13 Texas Utilities?

14 A Not to my knowledge.

15 Q Might they have?

16 A They could have. That would have been before my
17 tenure with Cygna, and I am not aware of it.

18 JUDGE BLOCH: How long ago would that have been?

19 WITNESS WARD: Since I don't know if they did any
20 work with them, I can't answer that question.

21 JUDGE BLOCH: When was the change from Earthquake
22 Engineering to Cygna?

23 WITNESS WARD: I believe it was during 1981 that
24 the name changed.

25 JUDGE BLOCH: Wasn't the statement of independence

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1 that none of the individuals had done work for Texas
2 Utilities?

3 WITNESS WILLIAMS: That's correct. There was a
4 PRA two-day training seminar or something of that nature.

5 JUDGE BLOCH: That's disclosed somewhere in the
6 document.

7 WITNESS WILLIAMS: Yes. I was just trying to
8 think where that was. But there was such a seminar. I don't
9 know whether it was two days or a week or what name we were
10 under at the time.

11 WITNESS WARD: That's correct. I recall now it
12 was a PRA training seminar.

13 BY MR. WALSH:

14 Q I have just got one more question, I believe.

15 JUDGE BLOCH: Mr. Walsh, I have noticed that your
16 legal talents are improving greatly. That's one statement
17 that lawyers don't usually make.

18 BY MR. WALSH:

19 Q Is Eric VanStijgeren a member of Cygna, still, or
20 employed by Cygna?

21 A (Witness Ward) I have been gone for
22 about a year, but I believe he is still there.

23 A (Witness Williams) Yes.

24 Q Was he involved in this report?

25 A No.

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1 Q Do you know if he has read this report?

2 A I haven't asked him. He wasn't part of the review
3 team for the report. There was no reason for him to be
4 involved in reviewing it unless he was personally interested.

5 JUDGE BLOCH: Were there procedures that would have
6 insulated project staff members from other staff members who
7 may have had previous contacts with Texas Utilities, or would
8 you expect there to be normal discussion in the course of
9 professional life?

10 WITNESS WILLIAMS: Such as a person like Mr.
11 Ferg? He was not involved in any of the project reviews, any
12 of the decisions.

13 JUDGE BLOCH: You know, there are other ways you
14 interact in a professional organization. You have lunch, you
15 sit down and talk about what you are interested in. Were you
16 concerned about whether that would be a problem, or was that
17 just something you said, well, we are not going to care about?

18 WITNESS WARD: I think specifically we were
19 concerned about Mr. Ferg. I know I personally had discussions
20 with him during this. It was very important that he remain
21 arm's length from us. In addition, he works out of the
22 Chicago office, and principal investigations were being
23 performed out of San Francisco.

24 BY MR. WALSH:

25 Q Eric Van Stibern. He has an expertise in a certain

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8joyl0 1 field, is that correct?

2 A (Witness Ward) Yes. I think he is very strong in
3 structural dynamics and analysis, pipe supports, et cetera.

4 Q He was not, then, involved in the dynamic problems
5 that were found in the Cygna report? He was not consulted?

6 A (Witness Williams) No, we did not consult with
7 Eric at all.

8 Q Why was that?

9 A We had no need to. We had the expertise required
10 for any of the questions we had within the project team.

11 MS. ELLIS: I believe that is all we have on voir
12 dire. We have some further questions regarding some of the
13 other things that we have discussed.

14 JUDGE BLOCH: Mr. Treby?

15 MR. TREBY: I have one or two questions on
16 qualifications --

17 JUDGE BLOCH: I'm sorry. You said you had further
18 things?

19 MS. ELLIS: Not on voir dire.

20 JUDGE BLOCH: Either voir dire or independence?

21 MS. ELLIS: Yes.

END 8

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mgc 9-1

1 JUDGE BLOCH: I'm sorry.

2 CROSS-EXAMINATION

3 BY MS. ELLIS:

4 Q I'd like to talk for just a moment regarding
5 Mr. Ferg again.

6 Am I correct that Mr. Ferg attended a few of
7 the early organizational meetings regarding the Commanche
8 Peak review in which procedures or other preliminary
9 matters were discussed?

10 A (Witness Williams) No, he was not.

11 JUDGE MC COLLOM: Mr. Ward, would you put your
12 microphone closer? I'm having difficulty hearing.

13 WITNESS WARD: Ms. Ellis, I just wanted to make
14 sure you understood, when we were in the stage of
15 considering proposing these services, that Mr. Ferg was
16 in on some of the conversations as to whether or not we
17 should or we should not propose services and was instrumental
18 in telling us that, should we propose services, that he
19 could not participate because of his past experience with
20 Westinghouse. So to that extent, he was in on some of the
21 very first organizational discussions.

22 BY MS. ELLIS:

23 Q Those would not have included the procedures or
24 other preliminary matters?

25 A (Witness Ward) No. We had already established

mgc 9-2

1 that from our experience in two previous meetings.

2 Q I would like to show you a document (handing
3 document to witness).

4 (Discussion off the record.)

5 JUDGE BLOCH: While we were off the record, we
6 decided that since copies of this document are not readily
7 available for everyone, Ms. Ellis could handle it by reading
8 the statement and then asking a question about it.

9 BY MS. ELLIS:

10 Q I will read to you from February 1, 1984, Applicants'
11 Answer to CASE's Motion for Reconsideration of the Board's
12 December 28th Memorandum and Order (Quality Assurance and
13 Design); Page 3 of that document, the second paragraph
14 states: "As an employee of Cygna, Mr. Ferg attended a few
15 of the early organizational meetings regarding the Commanche
16 Peak review, in which procedures and other preliminary matters
17 were discussed."

18 Do you have any knowledge of how the Applicants
19 might have come to that conclusion?

20 A (Witness Ward) All right. I guess I understand
21 your question.

22 I was referring to procedures for conducting a
23 review. That was organizational procedures, how we would
24 interact, how we would get documents, et cetera. But I
25 think that's a fair statement.

mgc 9-3

1 Q Thank you.

2 When the list of documents were supplied, am I
3 correct that they were supplied to the Document Control
4 Center, and the Document Control Center in turn supplied
5 them apparently to the satellites is that correct?

6 A (Witness Williams) I guess you would have to tell
7 me which lists, because you are talking about our earlier
8 discussion on the audit of the satellites; is that correct?

9 Q Yes. The list of specific items which would be
10 looked at by Cygna.

11 A Okay. That was our second follow-up on it, and
12 it was given to Heyward Hutchinson.

13 Q And to Heyward Hutchinson alone? No one else?

14 A I believe I was alone in the room. If there was
15 anyone else there, it was one of our employees.

16 Q But at any rate, you didn't give documents to any --
17 to several people, perhaps at the site or anything like that?

18 A Oh, no.

19 Q At that time, did you discuss with Mr. Hutchinson
20 to whom he was to give the documents? Did you specify, for
21 instance, that he would not give them to more than one person?

22 A The only instruction I gave him was what we
23 wanted. "Here's the list of documents that we need to have,
24 the computer printouts on the distribution and the list of
25 outstanding design changes."

mgc 9-4

1 Q Do you know of your own personal knowledge to whom
2 he gave copies of the lists?

3 A No.

4 Q The lists, I believe you said were given to them,
5 was it the afternoon of the day before Cygna was to come and
6 look at the documents?

7 A To the best of my recollection, it was the latter
8 part of the afternoon, because I didn't have the list myself.
9 I don't have this written down anywhere. It's just what I
10 remember. And our reviewers arrived first thing in the
11 morning, which would be about 8:00 o'clock.

12 Q When the reviewers arrived, did they go to several
13 satellites or more than one satellite?

14 A Yes.

15 Q How many did you go to; do you remember, roughly?

16 A I would have to confirm that again. If you are
17 looking for a ballpark number, it would probably be
18 somewhere around three or four, and I am judging that on
19 what I knew as operational at the time. But I could find
20 out for sure.

21 Q All right. I think we would like to have that
22 information, if possible.

23 If the reviewers arrived first thing in the
24 morning at one of the satellites -- first, let me backtrack.

25 Did the reviewing team act as a unit? In other

mgc 9-5

1 words, they didn't split up and go to one satellite, somebody
2 else go to another satellite? How was that handled?

3 A Okay. In this case, we did three follow-ups,
4 and I'm just trying to get them straight in my mind. For
5 this one, which was the last follow-up on this document
6 control question, we had one reviewer come down and myself.
7 Now I didn't actually go through and check the documents, but
8 I was there doing other things.

9 Q So the other reviewer actually did the checking of
10 the documents?

11 A Yes.

12 Q So when you arrived there and went to the site
13 of the first satellite, that would mean, would it not, that
14 by the time you reviewed the documents at each of the
15 satellites, for some of the satellites you might not have
16 arrived at the site until late in the afternoon; would that
17 be correct?

18 A That's possible.

19 Q So in effect, some of the satellites could actually
20 have had the specific items you were going to review for a
21 period of as long as perhaps 24 hours; would that be accurate?

22 A Yes. But I guess you would have to couch that to
23 some degree, because it depends on which satellite, because,
24 for example, in the case of the craft, we were also
25 interested in watching the distribution take place, and we

mgc 9-6

1 might have -- and again, I can verify this -- gone to that
2 one at the time the distributions was taking place and this
3 type of thing -- so there could have been some revisits to
4 satellites for different reasons.

5 JUDGE BLOCH: When you were observing the craft,
6 did the observer use some kind of a standard format for
7 reporting observations?

8 WITNESS WILLIAMS: We still use -- we have the
9 base checklist for doing the DCC audit.

10 JUDGE BLOCH: Could you point out the portion of
11 the checklist which would have been used to see how the
12 craft were getting documents?

13 WITNESS WILLIAMS: I don't believe it's that
14 specific. What our checklist says would be something along
15 the lines of following procedures. We would have reviewed
16 the procedures to assure ourselves that they were adequate.
17 But again, just as in the case of the code we were discussing
18 earlier, we don't tend to get that specific, although we
19 do make sure that they comply with procedures, and then in
20 doing so, we have to find out what procedures are applicable.

21 JUDGE BLOCH: It seems to me a fairly complex
22 factual inference as to whether or not craft are getting
23 document packages which are adequate. There's a lot that
24 goes into that. You would have to see who was getting which
25 documents and actually look at the packages as they are

mgc 9-7

1 received.

2 Is that the nature of the review that was done?

3 WITNESS WILLIAMS: You would want to make sure
4 that they were complete packages. You would want to make
5 sure that the Control Center was following their distribution
6 procedures.

7 JUDGE BLOCH: So that one of the things this
8 reviewer did was to take the actual package that would be
9 handed to a craft person, that the craft person requested,
10 not that Cygna had requested, and review it for completeness?

11 WITNESS WILLIAMS: The only thing I would hesitate
12 on there is, based on the list of documents that we used
13 for this review, I'm not sure that there was any construction
14 going on on those particular documents going on at the time.
15 So this could have been an observed process going on. But,
16 for example, if one of the documents we requested was the
17 stress isometric --

18 JUDGE BLOCH: I'm not asking about the ones that
19 you requested. I'm asking about the observation program with
20 respect to documents requested at the satellite by craft
21 people. That is something you looked at, isn't it?

22 WITNESS WILLIAMS: We looked at if they were
23 following procedures, but again, we only checked the
24 accuracy of the contents of the package if it was on our
25 list. You know, we go in there with a scope, and if they

mgc 9-8

1 don't happen to be working on it in the field that day, then
2 we wouldn't see that actual drawing go out and check it.
3 But what we would see is, is the process of doing this
4 distribution in accordance with the procedures.

5 JUDGE BLOCH: So the only documents as to which
6 you did a completeness check were the documents that were
7 received by you with this advance notice.

8 WITNESS WILLIAMS: That was the scope of that
9 follow-up, yes.

10 JUDGE BLOCH: Then you did not do an additional
11 independent check of whether the documents actually handed
12 to craft people at their request was accurate?

13 WITNESS WILLIAMS: The only way we could do that
14 would be again to go back to the computer and request the
15 printout and go and verify that that was a complete package.

16 JUDGE BLOCH: You could do it by being there --
17 that's right. You'd have to be there and request a computer
18 printout afterwards. You were relying on printouts as to
19 what was the complete package?

20 WITNESS WILLIAMS: We were trying to assess whether
21 their printouts were accurate, so we would take the printout
22 with the list of the outstanding design changes. We checked
23 the packages to make sure that they had all the same documents
24 in there that were on the listing.

25 JUDGE BLOCH: That doesn't even verify that the

mgc 9-9

1 computer printout -- that the computer listing is complete,
2 does it?

3 WITNESS WILLIAMS: That's where you get back to
4 the DCTG discussion. We asked ourselves the same question.

5 JUDGE BLOCH: I guess I can't follow the chain of
6 logic through which you concluded that the documents being
7 handed out to the craft were complete. It's a rather
8 tortuous chain of reasoning that I can't trace.

9 WITNESS WILLIAMS: We identified the fact that there
10 were errors in their logs. We said, "Okay, we know there's
11 a problem there." This was very early on in the reviews.

12 They said, "We're instituting a satellite system.
13 It will tighten controls, and it should alleviate the problem."

14 We went back, and we did a second follow-up. They
15 weren't far enough along in the implementation, and we still
16 found problems. We went back -- this time that we're
17 discussing now, which was the second follow-up -- to again
18 assess this distribution process, but now we still had this
19 other open question which was, how can we assure ourselves
20 that they have got accurate listings of the change documents?

21 So with that, we started to pursue the DCTG, which
22 was their process of validating their data base. So there's
23 two issues. Is the data base valid, and are they
24 controlling the distribution?

25 This follow-up on the satellite is more focused

mgc 9-10 1 towards distribution, although as part of that, we always
2 use a scope of drawings to serve as the basis of our check.

3 JUDGE BLOCH: I thought that when you were asked
4 by Mr. Reynolds before, you said there were two purposes for
5 looking at the documents. And one of them, whether or not
6 things were being handed out on a current basis, had something
7 to do other than this prenotification process, that there was
8 some other way of looking at how the documents were actually
9 being handed out.

10 WITNESS WILLIAMS: That is the assessment of the
11 procedures.

12 JUDGE BLOCH: That's the procedure itself, not the
13 implementation of the procedure.

14 WITNESS WILLIAMS: We watched it being implemented.
15 We found problems with their procedures in the second
16 follow-up -- I don't know if this will help -- and we said,
17 "Your procedures really aren't adequate to control this new
18 system that you have."

19 Then we waited until they corrected that and then
20 went back again to assess whether these procedures were
21 adequate to provide the controls that we feel are necessary.

22 JUDGE BLOCH: I guess you've got the classical
23 Hawthorne Effect though, don't you? You have the reviewer
24 who is going to make independent conclusions making a request
25 at a period of 14 hours or 12 hours in which the people can

mgc 9-11

1 scurry around and try to make things right. That doesn't
2 seem to me to be an adequate test of how documents are used
3 day to day.

4 WITNESS WILLIAMS: I guess the best way I can
5 separate it is, our concern there is with the distribution
6 system. We have a separate observation on that. The fact
7 that the listings were inaccurate was very important to us
8 as well, and we pursued that on a separate channel, nothing
9 to do --

10 JUDGE BLOCH: A separate system? That's what I was
11 trying to get you to describe to me, the separate observation
12 system for finding out about the actual distribution of
13 documents.

14 WITNESS WILLIAMS: Okay. That's the satellites.
15 The distribution question is the satellites.

16 JUDGE BLOCH: You said there is an independent way,
17 other than this Hawthorne Effect problem, for looking at
18 the distribution system?

19 WITNESS WILLIAMS: The only thing that I can say
20 we do in addition to checking that the listings are accurate
21 is to look at the procedures and look at how the clerks
22 function in following the procedures.

23 JUDGE BLOCH: How did you look at how they function
24 in following the procedures?

25 WITNESS WILLIAMS: Only in assessing, like I said,

mgc 9-12

1 the distribution to the craft and the fact that they had
2 instituted a system which exhibited greater control than
3 previously.

4 JUDGE BLOCH: How did you check the distribution
5 to the craft?

6 WITNESS WILLIAMS: Only by observing that (a) they
7 had a procedure in place, and (b) they had checks to make
8 sure they were turned in at the end of the day.

9 JUDGE BLOCH: So you didn't observe the distribu-
10 tion to the craft. You looked at the procedure.

11 WITNESS WILLIAMS: We watched that physically
12 happening. That's what I mean by observing --

13 JUDGE BLOCH: So you knew that things were handed
14 to craft people, but what was in them, you never inquired
15 about?

16 WITNESS WILLIAMS: That's right. But we already
17 knew that we had sited a problem on observation with the
18 accuracy of the central DCC index, and by just going to the
19 satellites and checking that the craft had a complete package
20 would not have satisfied us that they were correcting that
21 problem.

22 JUDGE BLOCH: There's a second possible problem.
23 Let's assume that their listing is correct. The other problem
24 is that you can have a correct listing, but the documents
25 wander around, so that when a craft person comes up and asks

mgc 9-13

1 for them, they don't get as complete a search as Cygna would
2 get by requesting them ten hours in advance.

3 First of all, if you are just a craft person working
4 on the site, they're not Cygna, and second of all, there's
5 no prenotification, so the question is, what do you actually
6 get when you are a craft person? You need a design document.
7 That you haven't addressed directly.

8 WITNESS WILLIAMS: Standard auditing practice in
9 QA is to request what you want to look at.

10 JUDGE BLOCH: Your standard practice violates some
11 scientific principles as to whether or not you actually
12 measured what was happening in the field.

13 WITNESS WILLIAMS: I guess I feel like the emphasis
14 here should be placed on the accuracy of the listings, because
15 I think that's very important. And I think it's also
16 important that they have a control distribution that is
17 tighter than that that they exhibited before. And we did
18 check to make sure that they were going through an effort
19 to make sure that those listings were accurate, because we
20 did think that was a problem, and we spent considerable
21 time going through the DCTG to discern that they had a
22 corrective program in place for that.

23 In the case of the satellites, we wanted to make
24 sure that they were implementing and moving ahead with
25 procedures that would control it better, and we simply went

mgc 9-14 1

down there to ensure that that was the case.

2 Now we do use a list of documents to serve as
3 the general basis for that, but there are other qualities
4 that go into assessing whether a program is functioning,
5 other than just checking a list.

6 JUDGE BLOCH: Let me make clear, because you are a
7 management expert, I have worked with police departments.
8 You know, in police departments, there are differences between
9 procedures and practice.

10 Now we are just clearly stating that you have looked
11 at the procedures, but you don't know the practice in this
12 area; is that correct?

13 WITNESS WILLIAMS: Because we felt that the
14 completeness of the --

15 JUDGE BLOCH: Don't tell me why. You explained
16 that at great length. But you haven't looked -- am I correct
17 in believing that you did not look at the practice? You
18 looked only at the procedures?

19 WITNESS WILLIAMS: You are saying because they
20 had advance notification, they corrected the errors?

21 JUDGE BLOCH: Well, that's a possibility. You did
22 not look at what the craft people actually get.

23 WITNESS WILLIAMS: If there was a document in the
24 listing that was being issued to the craft, then it would
25 have been checked. Now I can't tell you whether that was

mgc 9-15 1

2 true of the listing that we used to serve as a basis for
3 this particular follow-up.

4 But yes, we would have.

5 JUDGE BLOCH: Mr. Reynolds, you may want to ask
6 further redirect later, because I don't understand that
7 language right now.

8 WITNESS WARD: Let me see if I can help,
9 Mr. Chairman.

10 Basically we were looking, as I am sure you are
11 aware, in two areas: first, the programmatic area, the
12 design control process that was in place at the site. And
13 this is what Ms. Williams is addressing, the procedures.

14 Then we were -- we had a selected scope where
15 we looked at the actual design, the actual pieces of
16 equipment in the field, to see that it reflected the most
17 current design.

18 The piece that you are talking about is the
19 in-between piece, how did it get that way, and I don't think
20 -- what we said, if the final product reflected the latest
21 state of design, then the process was working.

22 JUDGE BLOCH: You did by inference. You never
23 examined it directly.

24 WITNESS WARD: We didn't go up and take the drawings
25 out of the craft person's hand and check it against the
list; we did not.

End 9

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1 MR. REYNOLDS: Mr. Chairman, may I state for the
2 record, I have a continuing objection to the Board conducting
3 in the hearing cross-examination. You just asked this
4 panel questions for 10 or 15 minutes, interrupting cross-
5 examination of Mrs. Ellis. You are, in effect, trying to make
6 her case for her, it appears. I object to it and I would ask
7 the Board to refrain from doing it.

8 JUDGE BLOCH: Mr. Reynolds, our practice is to ask
9 questions to clarify things for our own mind. I have also
10 made it clear when I interrupt cross-examination Mrs. Ellis
11 has a right to object. It seems to me if we interfere with
12 her cross-examination that there is a problem, but we are
13 clarifying matters for our own minds and assuring the adequacy
14 of the record. I feel that that is correct. You can appeal
15 it at the end of the case if you think it is in error.

16 MS. ELLIS: I would like to note for the record
17 that CASE has no objection to this. We feel that it is far
18 better for CASE to try to keep up with keeping notes, than
19 for the Board to have to.

20 MR. REYNOLDS: Mr. Chairman, is the point clear
21 now in the Board's mind or not?

22 JUDGE BLOCH: Yes, Mr. Ward's answer is clear to
23 me and I believe that there is no disagreement about what
24 Mr. Ward has said.

25 WITNESS WILLIAMS: The only thing I might add is

10joy2 1 I could verify based on that scope whether we checked the
2 construction package or not. I can do that and let you know
3 because I'm not privy to that information right now.

4 BY MS. ELLIS:

5 Q Who decided which specific documents would be
6 looked at?

7 A (Witness Williams) I would say we used the
8 technical review scope as the basis for the documents in terms
9 of what system they are associated with, and all the technical
10 reviewers, we have a master list of drawings that are
11 associated with the technical review, and we do a random
12 selection out of that.

13 Q And who specifically did that?

14 A QA, our QA people.

15 Q The ones you mentioned earlier?

16 A Our QA review team, yes.

17 Q I believe you mentioned that you came to the site
18 in July. Is that correct? And then when did you come back
19 again?

20 A With regards to this -- the satellite and DCC
21 issues, there were three visits. I'm going to have to
22 estimate because I don't have a schedule in front of me. The
23 initial review was performed, I believe, sometime in late
24 July. Again, I can verify this. We did a follow-up sometime,
25 perhaps, in the late August time frame, and then the second
follow-up was perhaps sometime around October, allowing them

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1 time to implement the satellite system.

2 Q And that was the final one?

3 A Yes. But I'm not real sure of those dates.

4 Roughly in time that's about how it fits.

5 Q And this final review, this was the one, was it
6 not, where the list of documents was supplied in advance; is
7 that correct?

8 A Yes.

9 Q And this was the final review which was the basis
10 for closing out this observation; is that correct?

11 A It was the basis, and I would have to look at which
12 observation, and it is basically associated with the distribu-
13 tion, yes.

14 Q When you mentioned it's a standard practice of
15 QA to give this in advance and so forth, is that the
16 standard throughout the industry or with Cygna or with whom?
17 What standard practices?

18 A To the best of my knowledge in discussions with
19 our quality assurance personnel, it is throughout the indus-
20 try.

21 Q Is it your understanding that the satellites do
22 work nights as well as days?

23 A I don't know about -- I know central DCC does.
24 The satellites, I suppose it would depend on whether the craft
25 was working or not. I don't know if they all remained open.

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1 In, for example, the analytical groups, I can't think at the
2 current stage of construction that they are at now that they
3 would have the need to do that. If there are construction
4 activities, they would have to be open to do the distribution.

5 Q The final review, was that the part included in
6 Volume 1, DC-01-02? Is that where that is discussed in your
7 report? I believe that's under Appendix F.

8 A I just want to take a minute to review the four
9 DC observations.

10 (Discussssion off the record)

11 WITNESS WILLIAMS: Could you repeat the question
12 again? I'm sorry.

13 BY MS. ELLIS:

14 Q Yes. The section was referenced, DC-01-02. Is
15 that the portion of the Cygna report which contains the
16 information regarding the review of the satellites that we
17 have been discussing?

18 A (Witness Williams) That deals with the distribu-
19 tion. You will see elements of discussion associated with
20 distribution control and a couple of the other DC observa-
21 tions as well.

22 Q Could you tell us which ones those are?

23 A Just to follow up on that other one, the resolution
24 is discussion on 01-02. On 01-01 you also see, down in the
25 page 1, potential impact that we feel is necessary to have

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1 accurate distribution as well as an accurate log. 01-01 is
2 more of a general type observation, and on that one we go into
3 a discussion of how they are validating the data base.

4 On 01-03 there is a discussion on stamping draw-
5 ings. This document affected by design changes. To some
6 degree that is an element that we checked in the satellites
7 to make sure that they had procedures that the file custo-
8 dians or satellite operators understood and that, in fact, that
9 was happening.

10 And then 01-04 deals strictly with DCTG.

11 Q In regard to DC-01-02 on sheet 2 of 2, the top of
12 the page, it says, "Although some manual logs are still
13 maintained, DCC satellites now have the capability to
14 ascertain information instantly from the computer data base
15 by remote terminals in satellites."

16 Is it your understanding that that was at that time
17 being done?

18 A That they had a mix of manual audits and computerized
19 audits?

20 Q That they were able to do this retrieving at that
21 time? You said the capability. In other words, were they
22 doing it?

23 A Yes. We went in there, and although we already
24 had a copy of the list of outstanding design changes, we did
25 see them call it up on the screen as well within the

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1 satellite.

2 JUDGE BLOCH: And at that time, how accurate do you
3 feel that that computer listing was?

4 WITNESS WILLIAMS: This is not the DCTG computer
5 listing. That's a different one.

6 JUDGE BLOCH: Do you know whether this computer
7 listing is accurate?

8 WITNESS WILLIAMS: The answer to that question
9 really gets tied to this entire cleanup effort, so any
10 changes --

11 JUDGE BLOCH: First answer that. Do you or do you
12 not know how accurate that computer system is?

13 WITNESS WILLIAMS: We didn't find any inaccuracies
14 or problems when we reviewed the design. You have to answer
15 that with regard to the adequacy of the design. I don't mean
16 to sound like I'm going around in circles, but we didn't think
17 it was necessarily accurate. We couldn't convince ourselves
18 that it was with the errors that we had found in the logs,
19 and that is why we pursued this issue with the Design Change
20 Tracking Group, and what are you, Texas Utilities, doing
21 about this.

22 JUDGE BLOCH: So at the time this was being used,
23 though, you still have uncertainty as to how accurate the
24 information that is at the satellites on computer is.

25 WITNESS WILLIAMS: Yes, that was a parallel

10joy7 1 activity, yes, and that is listed in a separate observation,
2 01-04.

3 JUDGE BLOCH: Do you know whether in practice they
4 use the manual logs on the computer listing?

5 WITNESS WILLIAMS: It's a mix, as is stated here.
6 Originally it was all manual.

7 JUDGE BLOCH: This says they are maintained and
8 they have the capability of doing it on computer data base.
9 It doesn't say which ones they used.

10 WITNESS WILLIAMS: They do use both, is the answer
11 to the question, and they do have access for those that are
12 on the computer.

13 JUDGE BLOCH: When you say they use both, you mean
14 they get a computer listing and then they check it against
15 the manual log?

16 WITNESS WILLIAMS: When we went back for the first
17 audit, we found they were doing that, I think because the
18 clerks were not quite familiar with running the computer. When
19 we went back the second time, they were more versed on operat-
20 ing the computer and were relying on what they saw on the
21 screen from the computer.

22 JUDGE BLOCH: Is that an improvement or did that
23 degrade the system?

24 WITNESS WILLIAMS: I think it's an improvement
25 because it's a real time data.

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1 JUDGE BLOCH: It's only an improvement if it's
2 more accurate than the log book.

3 WITNESS WILLIAMS: Which goes back to -- we asked
4 ourselves that question, too.

5 JUDGE BLOCH: How did you answer it?

6 WITNESS WILLIAMS: Back to the DCTG.

7 JUDGE BLOCH: That's not a real time concern, the
8 DCTG, right? That's a process that's ongoing.

9 WITNESS WILLIAMS: That data base is being
10 validated, that the process for doing this validation is
11 one by one taking every piece of changed paper that exists
12 and checking it, and then if there are any changes that they
13 want to make in terms of the applicable drawing or whatever the
14 case might be, then the data base is being revised to reflect
15 that. At the end of this process there should be an accurate
16 data base.

17 JUDGE BLOCH: But the plant may be completed before
18 the process is over.

19 WITNESS WILLIAMS: Then you have to make sure that
20 you have done an assessment on the design to ensure plant
21 safety, and we did that on the RHR system.

22 BY MS. ELLIS:

23 Q Might the fact that they had a listing of the
24 specific documentation that was to be reviewed -- is it
25 possible that that could have been used by the Applicants in

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1 some way to make sure that the programming was accurate on
2 those specific things that you reviewed in this instance?

3 A (Witness Williams) You are asking could they have
4 updated the listing since they had the list?

5 Q (Nodding affirmatively.)

6 A I suppose that's always possible.

7 Q I believe that Applicant's attorney asked earlier
8 something to the effect -- I don't remember the exact word-
9 ing -- had you discussed the findings or anything with
10 Applicants or with him before the hearings. Did you discuss it
11 with anyone else prior to the hearings other than the
12 specific Cygna people?

13 A We didn't really know what our testimony was going
14 to be. The only thing we knew was we were going to be
15 submitting the final report. The only thing that we were
16 doing up to this point in time is collecting comments because
17 it's a draft report.

18 Q When you say you would be submitting the final
19 report, you don't mean right here today; you mean later?

20 A I mean our testimony was the final report.

21 Q I see.

22 A (Witness Ward) Ms. Ellis, to correct if that
23 misled you, our testimony is these two documents which you
24 have, which are the draft final report.

25 JUDGE BLOCH: There is another revision that's
going to be done; is that right? The changes you gave us

10joy10 1 today are part of that process.

2 WITNESS WARD: That's correct.

3 WITNESS WILLIAMS: We are going to issue formal
4 Rev. 0.

5 JUDGE BLOCH: I understand the corrections you
6 made today are all of the important corrections you know at
7 this time.

8 MS. WILLIAMS: Yes.

9 BY MS. ELLIS:

10 Q Might there be additional significant corrections?

11 A (Witness Williams) If we get comments back, yes,
12 there is always that possibility.

13 Q If you get comments from the NRC?

14 A From the NRC requesting further clarification, or
15 from the Applicants saying that data is not correct, as in the
16 case of -- we had reference to snubber on one observation, and
17 in fact it was a spring. We agree it should have been a spring.
18 It was a generic issue, what belongs there is springs in the
19 system looked at. Those types of comments.

20 Q How about comments from CASE?

21 A I suppose.

22 A (Witness Ward) I feel quite confident if CASE
23 has comments, NRC will probably see that we answer it.

24
25
END 10

mgc 11-1 1

2 Q When do you foresee that the completed Cygna
report will be available?

3 A (Witness Williams) We haven't established a
4 schedule as of yet. The NRC is still conducting their
5 review. I suppose the schedule is more a function of their
6 time.

7 JUDGE BLOCH: Have they communicated anything to
8 you yet as to how that review is progressing?

9 WITNESS WILLIAMS: Yes. They have gone and audited
10 our work. We went to New York, and they sat down and went
11 through all the cable tray calculations we reviewed and
12 tried to understand the extent of our approach, and the same
13 thing on the site on the mechanical areas, and a vendor
14 audit in San Francisco, where they generally also reviewed
15 our approach.

16 BY MS. ELLIS:

17 Q When you say a "vendor audit," a vendor audit
18 of whom?

19 A (Witness Williams) Of us.

20 Q Cygna. I see.

21 That was by the NRC?

22 A Yes.

23 JUDGE BLOCH: Mr. Treby, will that sooner or later
24 be a public document, the vendor audit of Cygna?

25 MR. TREBY: It will, to the extent relevant, be a

mgc 11-2

S2BU

1 part of the SER supplement that will be issued by the Staff,
2 which supplement will contain the Staff's evaluation of
3 Cygna's report, including such matters as this vendor audit.

4 BY MS. ELLIS:

5 Q I believe there was a discussion earlier regarding
6 the fact that the satellites distribute the documents.

7 Isn't it also one of their functions to control
8 those documents as well?

9 A (Witness Williams) They do control them in the
10 sense that -- yes, they are responsible for them.

11 Q Isn't it also true that they would have access to
12 information that would enable them to change the documents,
13 if they wanted to?

14 A Well, I guess it would depend on where the change
15 was made. I don't think they have the capabilities, for
16 example, to change the data base from within the satellites.

17 JUDGE BLOCH: I'm sorry. I don't understand the
18 question, so I'm not sure I'm going to understand the answer.

19 You are asking whether people could forge
20 documents?

21 MS. ELLIS: Well, whether they have access to the
22 information to change the documents, if they wanted to,
23 not necessarily -- I think "forge" is a little bit of a
24 drastic word. "Update" might be a better word.

25 JUDGE BLOCH: That the clerks in the satellite

mgc 11-3

1 center might change what appears on the documents, like the
2 document blocks?

3 MS. ELLIS: That, or like stamping drawings,
4 anything of that sort. They do have the capability is what
5 I'm asking.

6 WITNESS WILLIAMS: No, not to change or alter the
7 document itself, no.

8 JUDGE BLOCH: You don't know of any capability they
9 have to do that? Do they have the stamps there? Do you
10 know whether they have the stamps?

11 WITNESS WILLIAMS: They would have to, for example,
12 stamp, "This is a control document," or, "This document is
13 affected by design changes."

14 Now the basis for stamping "This document affected
15 by design changes" is the data base.

16 JUDGE BLOCH: It's supposed to be. The question was
17 whether it could be done when it shouldn't be done. It seems
18 to me, in most cases if people want to, they can do things
19 -they're not supposed to do.

20 Are you saying they don't have the ability to do
21 that?

22 WITNESS WILLIAMS: Now I don't understand the
23 question.

24 JUDGE BLOCH: Maybe you can clarify the question.
25 I thought it was just, can't people mess up documents?

mgc 11-4

1 WITNESS WARD: It's tough for a professional
2 engineer with integrity to do that.

3 JUDGE BLOCH: I would think most people can do
4 that -- what else did you mean?

5 WITNESS WARD: I think we will stipulate that
6 people can lie, cheat and steal.

7 JUDGE MC COLLOM: May I intercede?

8 If they were to, quote, "mess up" the document at
9 the satellite center, is there a way that you could find out
10 that that had been done, because it isn't complete because
11 of the data base?

12 WITNESS WILLIAMS: I think the difficulty I'm
13 having with this question is "messaging up the document."

14 JUDGE MC COLLOM: Stamping it when it shouldn't
15 have been stamped.

16 WITNESS WILLIAMS: With the wrong stamp? That
17 would mean they are not following procedures.

18 JUDGE MC COLLOM: Would it have been detected?

19 WITNESS WILLIAMS: It would have been detected in
20 our review, in that what we would do is go there and ask
21 the clerk to go through the motions of what they would be
22 doing, and if there is design changes on the screen, then
23 she would have to go and stamp the drawing, "This drawing
24 affected by design changes." That's really the only decision
25 that they have in that process.

mgc 11-5

1 JUDGE MC COLLOM: It's stored back in the computer,
2 and you check it with a document that's there, and it's not
3 the same.

4 WITNESS WILLIAMS: The listing of design changes
5 is not the same.

6 JUDGE MC COLLOM: Is that the way you detect it?

7 JUDGE BLOCH: When you do the review of the
8 document package, are you just looking at whether each of
9 the documents on the list was there, as indicated by
10 verification stamps, or were you actually looking at the
11 substance of the document?

12 WITNESS WILLIAMS: We were not looking at the
13 technical substance of the documents, no. Maybe that's the
14 basis for the confusion.

15 Now we did do that in the design review and the
16 technical review, but what we're talking about here is the
17 QA review.

18 JUDGE BLOCH: Now there is absolutely no basis
19 for this in the record, Mrs. Ellis, so I assume you are doing
20 this because you think you are going to lay a basis later;
21 is that it?

22 MS. ELLIS: I have another couple of questions.

23 JUDGE BLOCH: Were you asking -- are you going
24 to lay there or submit evidence that says this kind of
25 fraudulent activity took place?

mgc 11-6 1

MS. ELLIS: I don't think I have really said any kind of fraudulent activity took place.

JUDGE BLOCH: If somebody took documents in preparation for Cygna coming to the site and stamped documents that weren't supposed to be stamped, that's fraudulent activity, isn't it? They would be violating procedures in order to create the impression of regularity at the plant, when there was no regularity.

I think you had better get back to that, if we have evidence to that effect. Otherwise I think we really shouldn't ask questions of that.

MS. ELLIS: I am getting at, I think, a different point from what the Board is suggesting.

JUDGE BLOCH: I don't understand your point.

BY MS. ELLIS:

Q Is it your understanding that documents are supposed to be controlled by the satellites? I think we just established that, correct?

A (Witness Williams) Yes.

Q When they are controlled, to your knowledge, do the satellites have a stamp which they can use, which states "For Information Only"?

A Yes.

Q And do they have a stamp which states "For Office and Engineering Use Only"?

mgc 11-7 1

A Yes.

2 Q What is your understanding of those stamps as they
3 pertain to the control of the documents?

4 A They are not controlled.

5 Q So if they have those stamps, either one of those
6 stamps on them, they are not control documents?

7 A That's correct.

8 Q So if someone from the craft obtained documents
9 from the satellites, they should be controlled documents,
10 rather than the ones which have the stamps I've mentioned
11 on them; is that correct?

12 A They are not to do construction to uncontrolled
13 documents, so they would not be allowed to construct to ones
14 with the office use and information use only stamp.

15 Q Do you of your own personal knowledge or from
16 having participated in the Cygna review, did you check to
17 see if, in fact, changes like that were being made in the
18 field with the use of the two stamped kind of documents?

19 A You mean, did we go out in the field and make
20 sure that the craft packages were stamped for construction?

21 Q Yes. Did you check to be sure that they were
22 actually using controlled documents?

23 A I would have to verify that for you. I can do that.

24 Q Okay. If you could, I would appreciate it.

25 (Discussion off the record.)

mgc 11-8

BY MS. ELLIS:

Q I believe you mentioned earlier something about the need to look at, say, about a thousand documents. Did I recall that correctly?

A (Witness Williams) A thousand change documents.

Q A thousand change documents.
About how many supports or packages would that have been?

A I think there were about 32 drawings in that many design changes.

Q Just to be sure I understand you, about 32 packages, then, and all of them had design changes, and the total number of changes and so forth added up to a thousand?

A Yes.

JUDGE BLOCH: Was that, in your experience, an unusually large number of change documents?

WITNESS WILLIAMS: They have a large number of change documents, yes.

JUDGE BLOCH: Compared to other plants?

WITNESS WILLIAMS: I would say in general they are one of the higher.

JUDGE BLOCH: Did you satisfy yourself as to whether that, in itself, has design implications or construction implications?

WITNESS WILLIAMS: Well, I guess you could say,

mgc 11-9 1 we went about satisfying it in two ways. One was, if you've
2 got that many documents, you want to make sure that you are
3 tracking them, and that's where we get into the problems
4 with data base and our pursuit along those lines.

5 The other thing you want to do, when you're doing
6 the design review, we also went through all the changed
7 documents associated with the specifications, the drawings
8 and the analyses that we were reviewing, and made sure from
9 a technical standpoint that they were, in fact, incorporating
10 all of those changes.

11 BY MS. ELLIS:

12 Q Do you recall if the packages contained calculations
13 as well as the design changes and so forth?

14 A (Witness Williams) For the QA reviews, they were
15 drawings, because they don't have the calculations control
16 that the satellites necessarily -- calculations, we went
17 back to the originating company and looked at their calcula-
18 tions.

19 Now they have their own program for controlling the
20 calculations.

21 Q So you would not have been able to tell from
22 looking at the package itself what calculations there might
23 have been to back it up or whether there were calculations
24 to back it up?

25 A For the particular sample in the QA, we didn't

mgc 11-10¹

1 have that one-for-one correspondence, but in the technical
2 reviews, we did do that. We would get the whole package
3 together, and we would collect the analyses and all the
4 specifications and procedures and criteria-type documents
5 and review that as a whole to make sure that they did
6 incorporate all the changes and that they did account for
7 the as-built condition and that nothing had fallen through
8 the cracks.

9 Q All right. In that regard, would that have entailed
10 quite a few pieces of paper and large numbers of items for
11 you to look at as well?

12 A Oh, yes. They are listed in the reports, in one
13 of the appendices.

14 Q All right. In doing that, might there have been a
15 list supplied in advance of your looking at those documents
16 as well?

17 A For those documents, I was the principal data
18 collector myself. I went down to the site and went over
19 to Document Control myself and said, "I want your Specifica-
20 tion MS-100 for pipe length and all of the design changes,"
21 and they would give me everything that was associated with
22 that, and I would take that back with me.

23 Q And you just stood there and waited until they gave
24 it to you?

25 A Maybe not physically all of the time, because some

mgc 11-11¹

2 of these are huge documents. I was working in the Document
3 Control Center, though, going through their indices to find
4 out what drawings I wanted and this type of thing.

5 Q About how long did it take them to retrieve the
6 information?

7 A I got very good turnaround. I can't think of an
8 instance where, if it was a drawing, I didn't get it within
9 half an hour to an hour in the specifications. It was just
10 a matter of putting it in the Xeroxing stream, and I was
11 right there, and I went through, in fact, their original files
12 in seeking out the specifications that I wanted. I actually
13 went back to the file cabinets, looked at the specs, saw if
14 it was applicable to what our technical review needed, and
15 I would say, "I'd like a copy of this."

16 Q I believe you mentioned something at one point
17 about being a much larger problem and that you approached
18 things from different angles.

19 Could you tell us what problems you perceived
20 specifically that you are talking about, or are they all
21 included in the Cygna report?

22 A Yes. I believe that conversation was associated
23 with the accuracy of the listing of design changes against
24 drawings, and we consider that something very important in
25 controlling the design process, and we spent considerable
time checking that out.

mgc 11-12¹

Q I believe you mentioned at one point that with the satellite program, the way you saw it set up, that you thought that that would be a workable system; is that correct?

A It was similar to approaches we have seen at other plants, and we assured ourselves that they had incorporated our comments and the procedures from our previous audits, and we felt that that was a workable system.

Q Is your understanding that that is the system that is presently being used at Commanche Peak?

A Beyond the point of issuing the report, we haven't been back down there, so if there have been any changes, we wouldn't be aware of them.

JUDGE BLOCH: You are planning to go back down there; is that right?

WITNESS WILLIAMS: We are doing a technical evaluation. Is that what you are referring to? Yes.

JUDGE JORDAN: You mentioned several times that the procedures seemed to be in response to previous criticisms by Cygna.

Does that mean if there had not been a Cygna review, that these are things that would not have come about -- the plant -- there would have been deficiencies?

WITNESS WILLIAMS: Not necessarily. I guess I could make a general comment that we saw many cases where they were very willing to initiate corrective actions on things. For

mgc 11-13¹

2 example, this problem with the accuracy of the listing of
3 design changes, they were already aware and initiating this
4 program for getting this computer data base up and running.
5 And as far as the distribution system, this plan for the
6 satellites was on the board before we came. And in the case
7 of the procedures, they were in a state of revision. We
8 just ensured that our comments got incorporated. Whether
9 they knew them beforehand or we were the first person in
10 that particular instance, I can't answer. But we did see
11 sufficient evidence where they did initiate corrective
12 actions for things we considered problems, and it wasn't
13 necessarily a reaction to our comments.

14 JUDGE JORDAN: But there was a feedback process,
15 then, going on during the writing and development of the
16 Cygna review. There was a feedback process with the
17 Applicant, so that corrections were being taken care of.

18 WITNESS WILLIAMS: Yes. They were very responsive.

19 JUDGE JORDAN: And, therefore, partly the reasons
20 that you were able to make the findings that you are that
21 deficiencies were corrected; is that correct?

22 WITNESS WILLIAMS: Yes.

23 BY MS. ELLIS:

24 Q Would it be accurate to say, then, that Cygna
25 did not see its job as to merely go in and look at the
system which was currently in place, as opposed to going in

mgc 11-14 1 and finding problems which were then corrected by the utility?

2 A (Witness Williams) Well, the process -- the
3 answer to your question is yes. The job is more than just
4 identifying problems, because we have to be able to close it
5 out and satisfy ourselves that there is no impact on plant
6 safety. The only way you can do that on something that
7 is possibly programmatic is to go in and make sure that they
8 get a program in place, and that any possibility for things,
9 in the case of the accuracy of the listing, get corrected,
10 that they do have a program in place to make sure that
11 everything is in place and accurate in the case of the DCC
12 stuff. So the job is somewhat more than that, and we do have
13 to close the loop on every observation in that regard.

14 They -- as we would identify observations during
15 the course of the review, if they saw it was a problem as
16 well, they were quick to react to correct the problem.

17 A (Witness Ward) I think I might expand a little bit
18 on that, Ms. Ellis, because it's important that we did look
19 at the system as is and as it was functioning. And as you
20 can see from the size of these books, we found things that
21 weren't functioning as well as they could or in accordance
22 with requirements.

23 In the process of attempting to resolve those, the
24 utility did take actions which we thought was worthy of note
25 in the report for completeness.

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1 But the resolution of some items could have been a part of
2 the report 21.

3 Q When you go back to the plant, if you found that
4 the satellite system as you understand it currently exists
5 had been changed, would this be cause for concern?

6 A (Witness Williams) It would be cause for concern
7 if it wasn't functioning, I guess. The only reason we would
8 encounter checking that again was if we were asked to do so.
9 The program that we are currently starting is a technical
10 review again, and that would not bring us into contact with
11 this issue on satellites.

12 A (Witness Ward) I guess it would be important to
13 understand what you meant by change. Certain changes we
14 would think would be salutary. If they were no longer using
15 manual logs in the computer system, if they had verified that
16 the drawing controls or the accurate issues, was it -- if they
17 verified the accuracy of the data base, we would think that
18 would be positive.

19 Q If you had a change, say, where the satellites --

20 JUDGE BLOCH: Ms. Ellis, I'm not sure I understand
21 the relevance.

22 MR. REYNOLDS: I was just about to object, Mr.
23 Chairman. Unless there is subsequent proof --

24 JUDGE BLOCH: You have been doing a good job of
25 asking questions, but let's try to make things relevant.

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1 BY MS. ELLIS:

2 Q I believe you mentioned you had done two other
3 independent assessments. Were you speaking of two other
4 independent assessments at Comanche Peak?

5 A (Witness Williams) No, at other facilities.

6 A (Witness Ward) Technically speaking, those were
7 independent design verification programs, which are slightly
8 different in context to this one.

9 Q They went into more detail; is that correct?

10 A This was an added assurance program as opposed to
11 a design verification program. It, coupled with other inspec-
12 tions, provides information or is planned to provide informa-
13 tion for the NRC to make a judgment.

14 JUDGE BLOCH: In either of those other two design
15 verification programs, were there any Cygna recommendations
16 that resulted in costly changes at the plant?

17 WITNESS WILLIAMS: I'm not aware of any.

18 WITNESS WARD: No.

19 BY MS. ELLIS:

20 Q Where were those other two conducted?

21 A (Witness Williams) Mississippi Power and Light,
22 and Detroit Edison.

23 Q What plants were those?

24 A Grand Gulf and Fermi.

25 Q I don't recall the exact context of what was said,

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1 but at one point it appeared to me that something was said
2 that indicated that there was a difference between the QA
3 review as opposed to technical information. But isn't, in
4 effect, the total review based on the technical information?

5 A (Witness Ward) I think Nancy uses the term "QA"
6 for what I conceive of as the programmatic review of the
7 management of the design process. And what we performed, first
8 of all, was what we refer to as a horizontal review, and that
9 was what was the management process in place for controlling
10 the design and construction of a plant. Now, that is a
11 programmatic review, procedures, how things are done, what
12 controls management places on a lot of the design process.

13 Then we check the implementation by looking at a
14 selected scope of specific design information where then the
15 technical information came into play.

16 JUDGE BLOCH: Ms. Williams, do you know whether or
17 not Gibbs & Hill has a design QA management?

18 WITNESS WILLIAMS: Not by that title, no. We looked
19 at their program. That's all we did there to make sure that
20 they had one which complied with ANSI N45 2.11.

21 JUDGE BLOCH: Do you know whether the FSAR says
22 that they have a design quality assurance management?

23 WITNESS WILLIAMS: No, I don't.

24 JUDGE BLOCH: Did you see any evidence of there
25 being a quality assurance review program within the design

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1 area in terms of a structure, a formal structure of design
2 quality assurance, an independent organization quality
3 assurance?

4 WITNESS WILLIAMS: I would have to check that.
5 What we do is we look to make sure that they have the
6 appropriate procedures in place to comply with the standard.
7 We did go through and check that and we reviewed all the
8 procedures associated with the program.

9 JUDGE BLOCH: Do you know whether or not TUGCO
10 quality assurance has the responsibility, according to the
11 FSAR, of quality assurance for engineering and design?

12 WITNESS WILLIAMS: No. The only way I could check
13 that is to review the procedures.

14 JUDGE JORDAN: But doesn't ANSI N45 --

15 WITNESS WARD: I'm sure it requires it and I'm sure
16 we checked it. We don't have the fellow who ran that review
17 with us. We will get the answer for you. Coming from an AE
18 organization, I would be startled if they didn't have it.
19 The quality assurance management might not.

20 WITNESS WILLIAMS: We didn't find any violations
21 in their program.

22 JUDGE BLOCH: Is there anywhere in the report that
23 reviews the operation of the office of the quality assurance
24 manager for design?

25 WITNESS WILLIAMS: Not in this particular review.

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1 What we did was look to make sure that they had a program in
2 place, and that is documented in the matrices. Then we
3 checked certain aspects of a design control system. We
4 checked their design change control, interface control, and
5 design analysis control. Now, there are other elements
6 which constitute a complete program, but we did not look at
7 them all as part of this review.

8 JUDGE JORDAN: The checklist that you had, does it
9 require there be a stamp from a QA manager on the package?

10 WITNESS WILLIAMS: I can review the checklist and
11 find out for you.

12 JUDGE JORDAN: All right.

13 WITNESS WILLIAMS: So the question was, again, is
14 there a requirement for a stamp by the QA manager?

15 JUDGE JORDAN: Yes. Was this a part of the
16 checklist, and if it was, was it obviously complied with?

17 WITNESS WILLIAMS: And by Staff, are you talking
18 about is he signing off on the procedures?

19 JUDGE JORDAN: Precisely.

20 WITNESS WILLIAMS: I will look at a procedure and
21 be able to tell that right away. I don't have any with me.

22 JUDGE JORDAN: I was more thinking in reviewing
23 packages which Gibbs & Hill designed, that these packages have
24 sign-offs, and among the sign-offs, is there one by a QA
25 manager.

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1 WITNESS WILLIAMS: I see, and this is specific to
2 Gibbs & Hill, is your question?

3 JUDGE JORDAN: In this case it was Gibbs & Hill,
4 yes.

5 JUDGE BLOCH: When you said you were interested
6 in two aspects once the program is place, one is a
7 procedural question and the other one is a substantive
8 question, what does it do. I can't see anything in the
9 report that reflects the activities of QA manager or that
10 reflects the activities of TUGCO in this area of design
11 quality assurance. I guess I would like to know if you
12 learned anything about that in the course of doing a design
13 review, what the activities were of the Gibbs & Hill quality
14 assurance manager, if there was one, and what activities
15 TUGCO quality assurance undertook in the area of design
16 quality assurance or engineering quality assurance.

17 WITNESS WARD: Okay. I think it is important,
18 again, to focus on the scope of the study we did, which,
19 first of all, looked at the procedural aspects to make sure
20 they were in place across the board, and then we looked at
21 certain selected systems and certain aspects of those
22 systems for the technical accuracy of compliance with the
23 latest revisions and the as-built walkdown in the field.

24 JUDGE BLOCH: The Board has some problems because
25 it was our interpretation of Appendix B, Part 50, that it

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1 requires independent quality assurance because Criterion 1 of
2 Appendix B requires independent quality assurance. The fact
3 that there is a QA manager who is relieved from design
4 production pressures may be a part of compliance with
5 Appendix B.

6 WITNESS WILLIAMS: I think I can answer that. We
7 did not check Criterion 1. It was not part of our program.
8 We only checked the criterion from 10 CFR Part 50, Appendix
9 B, involving design control.

10 JUDGE BLOCH: Just the three.

11 WITNESS WILLIAMS: Design control is the
12 criterion that we looked at under Appendix B. Now, we checked
13 that against ANSI N45 2.11, and that was an implementation
14 check, and there we looked at three of possibly ten elements
15 associated with a good design control program.

16 JUDGE BLOCH: Are Criterion 1 and Criterion 16
17 ordinarily complied with by the nuclear industry in design
18 quality assurance?

19 WITNESS WILLIAMS: It's a law.

20 WITNESS WARD: I think the answer is yes. The
21 answer is yes.

22 WITNESS WILLIAMS: Yes.

23 WITNESS WARD: But further, this was not a full
24 scope quality assurance/quality control audit that we
25 performed, so some of the questions you asked, we did not

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1 address.

2 JUDGE BLOCH: More of a final design check.

3 WITNESS WARD: Yes.

4 JUDGE BLOCH: With some quality assurance
5 components to it.

6 WITNESS WILLIAMS: The design control aspects of
7 it.

8 JUDGE JORDAN: You do conclude that they meet
9 the requirements of ANSI N45? That is one of the conclusions
10 that you have made.

11 WITNESS WILLIAMS: That's correct. That is
12 design control, which is one criterion of Appendix B.

13 JUDGE BLOCH: It doesn't include Criterion 1 or
14 Criterion 16.

15 WITNESS WILLIAMS: That's correct.

16 WITNESS WARD: Correct.

17 WITNESS WILLIAMS: Does that mean we don't need to
18 answer this question?

19 (Discussion off the record)

20 JUDGE BLOCH: It was clarified for the Board that
21 we were talking about the questions about a design QA manager
22 and sign-offs. Dr. Jordan now has a comment.

23 JUDGE JORDAN: To review, you did check compliance
24 with, of course, ANSI N45-2.11, and I believe it was your
25 representation, and I believe Mr. Ward is cited in the report

12joy9 1 as being an expert in this field, that meeting the
2 requirements of ANSI 45 2.11 is equivalent to meeting
3 Appendix B Criteria 3; is that correct?

4 WITNESS WARD: Yes. Again, we were looking at it
5 from a programmatic standpoint.

6 JUDGE JORDAN: But as I said, you are, as an
7 expert -- what you said, that their check that they have
8 met their criteria, ANSI 45 2.11 is equivalent to meeting
9 Appendix B.

10 WITNESS WILLIAMS: No.

11 WITNESS WARD: No.

12 WITNESS WILLIAMS: You cannot extrapolate that.

13 JUDGE JORDAN: All right.

14 JUDGE BLOCH: I would narrow the request. The
15 narrowed request would be that we would appreciate if you
16 would review what you have collected to see whether there is
17 anything you have learned that is inconsistent with the
18 proper operation of a QA manager for the TUGCO QA program.
19 Now, you may not have looked at it at all. That would be
20 a satisfactory answer if there is nothing learned that would
21 reflect on that one way or the other.

22 WITNESS WARD: We certainly can within the scope --

23 WITNESS WILLIAMS: It would be as applied to
24 design control.

25 BY MS. ELLIS:

Q In regard to the calculations which you looked at,

12joy10 1 when you did those calculations, am I right in assuming that
2 it was a check of the Applicant's calculations? In other
3 words, you didn't sit down from scratch and look at this and
4 say, okay, go to somewhere and check what the allowables were
5 yourself and go from scratch? Am I correct in that?

6 A (Witness Williams) No, we definitely went and
7 checked the allowables. We would check their assumptions,
8 we would check their methods, we would check that they com-
9 plied with the Code, and in doing that we have a code there
10 and we go check the allowables against what they are saying
11 they are.

12 Q My question goes a little beyond that. You
13 checked them, I understand that; but did you sit down with,
14 say, a support and analyze it yourself and prepare your own
15 calculations completely independent from what had been done by
16 the Applicants?

17 A That's one method of doing a design review. That's
18 not the approach that we took. We reviewed what they had
19 done and made sure that they had not left anything out, and
20 then went through to check that we agreed with the answer
21 and that they were using all the proper allowables and other
22 design inputs.

23 JUDGE JORDAN: This in many cases, of course,
24 involved putting data into a computer program. Now, did you
25 have a similar computer program? Did you actually run the

12joyll 1 program or did you just check that this material went into
2 the proper program?

3 WITNESS WILLIAMS: We would check -- we are
4 familiar with the programs that were run. We have run them
5 in-house ourselves. In this case we did not rerun them, but
6 we did check the input, we did check the output, and we would
7 sometimes run hand calculations to make sure that they were
8 realistic.

9 JUDGE BLOCH: Where the conclusions about the
10 particular design element depended partly on calculations
11 related to that particular element and partly on generic
12 studies, were these looked at together to see whether it was
13 appropriate to combine them?

14 WITNESS WILLIAMS: Yes.

15 BY MS. ELLIS:

16 Q In regard to the conversation earlier regarding
17 the as-built versus as-built verified and so forth, is it
18 your understanding when you see the word "as-built" on a
19 drawing that what that drawing reflects is actually
20 constructed there in the field?

21 MR. REYNOLDS: Objection, Mr. Chairman. We are
22 far afield from independence and voir dire, which is
23 purportedly the scope of this cross.

24 MS. ELLIS: I believe it was raised earlier.

25 MR. REYNOLDS: It was raised by the Board, Mr.

12joy12 1 Chairman, not by cross of any party.

2 MS. ELLIS: I don't recall an objection at that
3 time.

4 MR. REYNOLDS: I object to the Board frequently,
5 but the Board never grants my objection.

6 (Laughter)

7 JUDGE BLOCH: What is the reason for that question?

8 MS. ELLIS: The reason for the question is to find
9 out how the process is working, how can you look at a drawing
10 and tell what that drawing means.

11 JUDGE BLOCH: It seems to me it is within what we
12 have been calling the scope.

13 MR. REYNOLDS: We haven't addressed that here. I
14 have questions on scope myself.

15 MS. ELLIS: I think some of the previous questions
16 have gotten into that.

17 JUDGE BLOCH: Why don't you defer that? I think
18 Mr. Reynolds is correct. You will get a chance for that,
19 though. Make a mark next to it.

END 20

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mgc 13-1 1

BY MS. ELLIS:

2 Q I believe there was some discussion earlier
3 regarding the use of engineering judgment. Even when an
4 engineer uses engineering judgment, that doesn't mean that
5 they should not be able to adequately explain or to document
6 their engineering judgment with calculations or other
7 documentation, does it?

8 A (Witness Ward) I think my comments were, Ms. Ellis,
9 that if there are calculation methods available, those should
10 be used. Engineering judgment may be used where, if there is
11 a minor perturbation to the problem or where calculational
12 methods or analytic methods are not available.

13 Q But where analytic methods are available, they
14 should be used?

15 A That's my opinion, yes.

16 Q There was also some discussion regarding
17 conservative design in regard to evaluating minor effects.

18 What would you consider a minor effect? Would
19 that also be prone to engineering judgment?

20 (The panel confers.)

21 MR. REYNOLDS: Ms. Williams, before you answer,
22 if you are confused, Mr. Ward, by the representation of
23 Ms. Ellis of the previous testimony, please say so.

24 MS. ELLIS: Certainly.

25 WITNESS WARD: I guess I have some questions as to

mgc 13-2

1 what part of my testimony are you talking about.

2 JUDGE BLOCH: As I understand the question,
3 Ms. Ellis just wants to know whether an engineer should be
4 able to explain his judgment that something is a minor effect,
5 that something he would stand up and say, "Well, that's the
6 way I feel about it as a matter of intuition," or would he
7 be able to explain some analogy he's got in mind or some
8 logic that makes it minor.

9 WITNESS WARD: I thought the question was more
10 complicated. The answer is, yes, he ought to be able to
11 stand behind his judgment.

12 JUDGE BLOCH: Now we will find out if there is
13 something more complicated there. I don't think there was.

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14 (Discussion off the record.)

15 BY MS. ELLIS:

16 Q Referring now to the Cygna report under Appendix
17 F, Observation PI-00-03, Sheet 1 of 1, it's about midway in
18 that section, --

19 JUDGE BLOCH: Before you ask, I infer that the
20 00 numbers came about as a result of observations made on
21 other primary matters, and that you then manufactured a 00
22 number for some generic concerns?

23 WITNESS WILLIAMS: Yes, that's basically right.

24 BY MS. ELLIS:

25 Q In regard to Item 2, "Resolution," it states, "Upon

mgc 13-3

1 furt er review, Cygna found Gibbs & Hill does instruct
2 their engineers to review the dynamic results for adequate
3 support loads."

4 How did Cygna obtain that information?

5 (Discussion off the record.)

6 JUDGE BLOCH: The question is about Attachment A
7 to this observation.

8 WITNESS WILLIAMS: We ended up looking at other
9 calculations, other stress analyses, and found that they
10 did run them beyond 33 Hz.

11 BY MS. ELLIS:

12 Q How did you know that Gibbs & Hill does instruct
13 them to do that?

14 A (Witness Williams) That's really based on a
15 discussion. We didn't really put a lot of weight to it.
16 We're not relying on that as a basis for resolution; however,
17 we thought it was important to note, because we did see
18 examples where that was done.

19 Q In regard to this discussion, what form did that
20 take?

21 A The same thing. Telecon: Question: "Do you
22 run beyond 33 Hz?" Answer: "Yes, we do instruct our
23 engineers to do it."

24 And then we went through and looked at some other
25 stress analysis problems to find out if that was true.

mgc 13-4 1

JUDGE BLOCH: This is a verbal instruction? That
is not in a procedure; is that what your understanding is?

WITNESS WILLIAMS: That's our understanding.

BY MS. ELLIS:

Q And how many instances did you look at to check that
out?

A (Witness Williams) Actually what we did is go and
look at some systems that we thought would have characteristics
where we would be interested in running it beyond 33 Hz, and
in those cases we did see that they had done it, so it was
a selective process.

JUDGE BLOCH: Who selected the sample?

WITNESS WILLIAMS: We did.

BY MS. ELLIS:

Q Do you recall about how many instances?

A (Witness Williams) I believe the discussion
predominantly settled around two systems.

Q Is it your understanding that in both of the
systems that you looked at, that that was the case, as is
stated here, that they --

A That they did run beyond 33 Hz? Is that the
question?

We saw that they had run a program beyond 33 Hz.

JUDGE BLOCH: It says "the feedwater lines."
Do you know what the size of the sample was?

mgc 13-5 1

WITNESS WILLIAMS: That was one of the systems.

2 Oh, you mean, how many systems are there that
3 we selected? For example, feedwater lines?

4 JUDGE BLOCH: It says "the feedwater lines." Are
5 you talking about one analysis, or are you talking about a
6 number of analyses?

7 WITNESS WILLIAMS: We are talking about the stress
8 analysis for the feedwater system.

9 JUDGE BLOCH: The whole system?

10 WITNESS WILLIAMS: Which is made up of several
11 stress problems.

12 JUDGE BLOCH: And so that means you checked each
13 of the stress problems, or you check one of them?

14 WITNESS WILLIAMS: I would have to verify that.
15 What we did was, opened up their books and looked at the
16 stress analysis for the feedwater system.

17 JUDGE JORDAN: This was on the residual heat
18 removal system?

19 WITNESS WILLIAMS: Our technical review was on
20 the residual heat removal system, but this other system
21 we are talking about, feedwater, was one that we looked at
22 to see if Gibbs & Hill ever ran the analysis beyond 33 Hz,
23 and that's an example of one where we did see they had done
24 that.

25 JUDGE BLOCH: Do you know how frequently in the

mgc 13-6

1 conclusions you reached you were relying on telephone
2 conversation information, as opposed to procedures?

3 WITNESS WILLIAMS: Well, we never really took just
4 a verbal response at face value, so I would say the answer
5 to that is, we did not rely strictly on verbal response from
6 them.

7 MS. ELLIS: I believe we have no further questions
8 on this line of questioning. We will have further ones
9 regarding the independence, insofar as they may pertain to
10 specific items in the SIT Report, as we get into discussions
11 in that regard. Also, they will be mainly of the technical
12 context of the discussions.

13 JUDGE BLOCH: If I understand what Ms. Ellis is
14 saying, she is saying when she gets to ask technical questions
15 about the substantive merit of the reviews, obviously some
16 of that will have relevance to the independence question.
17 If she were, for example, to find dozens of technical errors
18 in Applicants' favor, as obvious relevance, we're not going
19 to ask questions later. Independence is not divorced from
20 something of substantive merit.

21 MS. ELLIS: That's right.

22 (Discussion off the record.)

23 JUDGE BLOCH: Mr. Treby?

24 MR. TREBY: Earlier the Board asked about the audit
25 of Cygna and whether that would be coming out shortly.

mgc 13-7 1

2 I was informed after I answered the Board that, in
3 fact, Cygna was looked at by two different offices of NRC.
4 One office was the Vendor Inspection Office of I&E, and they
5 issued their results of their review in an Inspection Report,
6 so there will be an Inspection Report based on that audit.

7 The other visit was by NRR. To the extent that that
8 is relevant to the evaluation, that will be included in the
9 supplement.

10 JUDGE BLOCH: Thank you.

11 We will adjourn until 1:30.

12 (Whereupon, at 12:25 p.m., the hearing was
13 recessed for luncheon, to resume at 1:30 p.m. this same day.)

End 13 14

But follows. 15

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T14JRB:jrb

AFTERNOON SESSION

(1:30 p.m.)

JUDGE BLOCH: The hearing will please come to order.
We will go on the record.

The State of Texas?

MR. REYNOLDS: A preliminary matter?

JUDGE BLOCH: Off the record?

MR. REYNOLDS: No, on the record.

I wanted to invite the Board's attention to
17.1-3 in Applicants' FSAR, that is the Gibbs & Hill
quality assurance organization chart; and it indicates--do
you have it there?

I think it's responsive to the Board's question
earlier.

JUDGE BLOCH: That was, in fact, the source of
our question.

MS. ELLIS: What are we talking about?

MR. REYNOLDS: That was the source of your
question? You asked as to the Gibbs & Hill QA--

JUDGE BLOCH: I'll explain it, or I'll explain it
to Ms. Ellis, who asked the question:

Yes, this document shows the Gibbs & Hill QA
management; but in discussing QA for design, the name never
comes up. And we just were kind of curious as to whether he

1 existed. The document here says he does. But you filed an
2 Attachment A to your filing of reconsideration of the design
3 decision, which is called Summary of Quality Assurance Program
4 for Design of Pipe Supports, and it does not mention a QA,
5 a director for QA design.

6 And I just wanted to know whether--what he does?

7 MR. PEYNOLDS: That's--

8 JUDGE BLOCH: Is that where they do pipe line
9 analysis and pipe supports, and there is an interactive process
10 in which they get involved in things which involve pipe
11 support.

12 Okay.

13 State of Texas?

14 MR. HICKS: Yes, I don't have a microphone, so I'll
15 just yell it out.

16 Whereupon,

17 NANCY H. WILLIAMS

18 and

19 JOHN E. WARD

20 resumed the stand as witnesses and, having been previously
21 duly sworn, were further examined and further testified as
22 follows:

23 CROSS-EXAMINATION, Resumed

24 BY MR. HICKS:

25 Q A couple of questions, the first one has to do

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1 with the protocol that was attached to the September 23rd,
2 1983 letter. I don't know what the document number is, or
3 what the exhibit number is.

4 JUDGE MC COLLOM: Applicants' 174.

5 MR. HICKS: Thank you.

6 BY MR. HICKS:

7 Q Do you have that, do you have a copy of that
8 report?

9 A (Witness Ward) Yes.

10 A (Witness Williams) We do, I am hunting for my
11 copy.

12 Q Well, the first question is: the protocol was
13 not implemented until after CYGNA had begun work on the
14 independent assesement; is that correct?

15 A That is correct.

16 Q What communications procedures were followed before
17 the protocol was implemented?

18 A Prior to this we did not document all conversations
19 on the telecon.

20 Q Did you document some of them?

21 A Some of them are; yes.

22 Q And how did you decide which ones to document and
23 which ones not to document?

24 A Mainly if we felt that it had any importance in a
25 resolution of anything for our own records, purposes, we made

1 it.

2 Q And did you ever follow the procedure set out in
3 paragraph 3, or similar procedures as set out in paragraph 3,
4 prior to the implementation of the protocol on meetings?

5 A Meaning did we have any public meetings?

6 Q Yes?

7 A No, we did not.

8 Q Now to the protocol itself, in paragraph 3 it
9 discusses "meetings". Can you define--can you tell us how
10 you define "meetings"?

11 A Okay.

12 I guess we do it by approaching it the other way:
13 what we defined was all exchanges of technical information
14 for the purposes of the review; and response to technical
15 questions would be handled in accordance with item-2; anything
16 else, any meetings for whatever purpose other than that,
17 in terms of our dealings with Texas, would be handled under
18 item-3.

19 There were no such meetings.

20 Q So you never have had to use the procedures set
21 out in paragraph 3?

22 A (Witness Williams) That is right.

23 Q Okay.

24 On the thing that you said was a teleconference,
25 which was the meeting you had with Mr. Hutchison, I believe,

1 where the list was provided on documents you would like to get
2 the next day; did you prepare a telecon summary of that?

3 A What is the date of this letter? -- September 23rd.

4 The answer is yes. It was after that date; I
5 would have to check on that date.

6 Q Well, earlier you had said you interpreted that
7 meeting to be a teleconference under paragraph 2?

8 A All I was doing was handing him a list and saying,
9 this is what I want; and that would fit under paragraph 2.
10 It is not a "meeting" by our interpretation of the protocol.

11 Q So, then, you did prepare a teleconference memo?

12 A If it was after the 23rd, which I think it was,
13 because that's when this was in effect. Actually, we got this
14 letter sometime after the 23rd of September.

15 Q Now to another area: in response to a question--

16 JUDGE BLOCH: Just a question: are you interested
17 in seeing that telephone conference summary?

18 MR. HICKS: Yes, I am. I'm such a rookie at this--

19 MR. REYNOLDS: He didn't ask for it, Mr. Chairman.

20 JUDGE BLOCH: I thought I'd help out this
21 "rookie".

22 (Laughter)

23 MR. SKINNER: I was going to ask her to go back
24 and get a copy. I'll ask now.

25 JUDGE BLOCH: Will one be available in that box

1 that's been mis-sent?

2 WITNESS WILLIAMS: If it's not available, I'll have
3 to check back at the office, and get it back to you.

4 MR. SKINNER: Thank you.

5 BY MR. SKINNER:

6 Q The other question I had concerns a question that
7 Mr. Reynolds asked you. He asked if you had--if either of you
8 had met with him to discuss the testimony today. You said
9 you had, and I believe Mr. Ward said he had a brief conversa-
10 tion over the telephone.

11 Had you all met with any other lawyers to discuss
12 the testimony?

13 A (Witness Ward) I haven't; I talked over the
14 telephone with him.

15 A (Witness Williams) I had the same telephone
16 conversation that Mr. Ward did; we were all on the telephone
17 conversation.

18 Q Okay.

19 MR. SKINNER: That's all the questions I have.

20 BY MR. TREBY:

XXXXXINDEX? 21 Q Continuing with that line of questioning, was the
22 --were the documents which you reviewed that you asked for
23 during these exchanges of information, listed in Appendix C?

24 A (Witness Williams) The documents that we requested
25 for the technical review?

1 Q That is correct?

2 A They are listed in Appendix C.

3 JUDGE BLOCH: Does that include documents that
4 were exchanged in the on-site meetings that you call
5 "teleconferences"?

6 WITNESS WILLIAMS: Yes. If it was a portion of a
7 calculation or something like that--but these are all the
8 specifications that we requested; and all the drawings; and
9 the only--all the change documents to the extent that we could
10 record them; calculations do not show up here. The calcula-
11 tions are tied to the support identification number.

12 BY MR. TREBY:

13 Q So that I am clear, your testimony is that this is
14 an all-inclusive list, except for some possible calculations
15 you might have received?

16 A (Witness Williams) It was intended to be, unless
17 we left one out unintentionally.

18 Q And this list might include groups of documents?

19 A Do you have a document type in mind?

20 Q I guess I just want to clarify in my mind, you
21 indicated you might be looking at thousands of documents, and
22 I think this list goes up to 200-and-something?

23 A Oh, I think I see what you're saying.

24 That particular reference was because we had 32
25 drawings we started with, but there were 1,000 pieces of

1 change paper associated with them. And if you looked at the
2 CMCs and DCAs, I think you will find there's quite a few
3 there.

4 Q All right.

5 But would those documents be listed in Appendix C?

6 A The CMCs and DCAs are. We attempted to get them
7 all recorded, except that with the volume of that, I suppose
8 there is always a chance that one slipped in or that we missed
9 one.

10 Q Turning now to the protocol, it indicates that
11 a file will be kept by both TUGCO and CYGNA of all the
12 written evaluations, recommendations, meetings and telecon
13 summaries.

14 Could you tell us where the location of those files
15 are?

16 A We have one file in our San Francisco office, and
17 Mr. Wade of Texas Utilities, I believe, is the keeper to
18 TUGCOs.

19 JUDGE BLOCH: Does TUGCOs include Gibbs & Hill's?

20 WITNESS WILLIAMS: It should in that we tried to
21 ensure he was cc'd on any telecons that were associated with
22 that work.

23 JUDGE BLOCH: Okay.

24 So there was one memo prepared by CYGNA, and that
25 was for both sides?

1 WITNESS WILLIAMS: That's right.

2 In each case, whenever there was a telecon it was
3 prepared by us.

4 BY MR. TREBY:

5 Q And a copy was sent to both file rooms?

6 A (Witness Williams) And it was sent to our file
7 and to Dave Wade.

8 Q Earlier we had testimony that CYGNA has had prior
9 experience in conducting independent reviews, one for
10 Mississippi Power & Light at Grand Gulf, and the other for
11 Detroit Edison, at Fermi; is that correct?

12 A That is correct.

13 Q Can you tell us, first, what was the scope of
14 work at Grand Gulf of the independent review?

15 A I was not involved in that review.

16 A (Witness Wade) If you look at the Experience
17 Summary, which was labeled as Board Exhibit 3, it will pro-
18 vide you with some of the answers.

19 I don't have the program document list to respond
20 fully to that.

21 However, the Grand Gulf review was a rather li-ited
22 review which focused principally on piping design, pipe
23 stress design; and that, I think, grew out of the fact that
24 it occurred very quickly after the events at Diablo Canyon
25 that put emphasis on this point.

1 The review at Detroit Edison was broader than that,
2 structured somewhat similar to this one; but emphasized the
3 programmatic review and the implementation.

4 Q And with regard to the review at Fermi, Ms.
5 Williams, you were involved in that one?

6 A (Witness Williams) Yes, I was.

7 Q Your qualifications indicate you were assistant
8 project manager?

9 A That is correct.

10 Q And the Exhibit 3 indicates that the subject of
11 that independent review was design and control practice?

12 A Yes.

13 Q Could you compare, perhaps grossly, what that
14 involved compared to what you did here, with Comanche Peak?

15 A Okay.

16 Taking the design control area first, we looked at
17 all 10 elements of the implementation for the design control
18 program.

19 Q At which review?

20 A At Detroit Edison.

21 Whereas, we looked at three, here.

22 JUDGE JORDAN: Excuse me.

23 Are those the elements identified in the ANCI
24 criteria, report?

25 WITNESS WADE: Yes.

1 WITNESS WILLIAMS: Right.

2 We did--anyway, we did a programmatical review
3 the same as we did for Texas; in that case we did it for the
4 utility and the organizations principally involved in the work
5 for the design of Fermi-2.

6 We also did an implementation evaluation for all
7 10 elements of design control program, whereas here, we did
8 it for three.

9 In the design and technical area, we did the two
10 piping systems, but they were smaller systems in general; and
11 we did two; whereas here, we are doing one.

12 We did a walkdown; we did a walkdown here.

13 We did an electrical review; and we did an electri-
14 cal review here.

15 We did a structural review for Fermi. There we
16 were using a portion of the building, whereas here we were
17 doing the cable tray support design.

18 Here, in Texas, we did some seismic qualification
19 work for the pump.

20 And I believe we did it on a valve for Fermi, but
21 I am not sure of that one without checking.

22 And that is about it.

23 WITNESS WADE: I think the basic difference to keep
24 in mind is that review covered all 10 elements, a complete
25 review; and this was a review of three key elements that had

1 been called out in other reviews performed by others, as
2 areas of possible weaknesses.

3 So we focused on those. This was supplemental
4 information, as opposed to a more complete design review.

5 JUDGE BLOCH: Would you clarify the 10 elements or
6 3 elements, which section of the code you are talking about?

7 WITNESS WILLIAMS: The events reference for those
8 were not program plan documents.

9 JUDGE BLOCH: What page is that?

10 WITNESS WILLIAMS: It unfortunately--oh, we might
11 reiterate it in the report. Let me check here.

12 (Pause)

13 We had a proposal of what we call program plan,
14 and laid it out there. I think that we re-list them in the
15 final report here.

16 Okay. If you turn to Section 2, Volume 1, page
17 2-4?

18 And what we are saying here is those are major
19 elements of the program. We did the programmatic review for
20 Texas; we did the programmatical review for Gibbs & Hill--
21 pages 2-5 you will see the same list again.

22 Then if you continue on to 2-6, or actually the
23 bottom of page 2-5 it starts, the implementation evaluations;
24 that is where you will see that we have chosen three of those
25 elements to evaluate for proper implementation.

1 JUDGE BLOCH: It say five in my copy; it says five
2 elements were selected.

3 WITNESS WILLIAMS: Okay.

4 The vertical reviews are defined as the three
5 implementation evaluations, and the design control area, plus
6 the design of the RHR system; and the walk-down, spent fuel
7 pool cooling system; so that makes the five. We consider them
8 what we call "vertical" reviews. It's just our terminology.

9 JUDGE JORDAN: Now, those three elements that
10 you have identified there, control design changes, control of
11 design analyses and interface control, can you point to the
12 specific parts of ANCI 45211 that cover those?

13 WITNESS WILLIAMS: I would have to go through--

14 JUDGE BLOCH: It's not in one place?

15 WITNESS WADE: It's not on one, but it is covered.

16 WITNESS WILLIAMS: This is our assessment. Our
17 breakdown of that terminology isn't quite on a one-for-one
18 correlation; but if you look at the content, you will see how
19 it filters out.

20 JUDGE BLOCH: Were these preselected by the Staff?
21 Is that how you got to those?

22 WITNESS WILLIAMS: It was agreed to with Staff.

23 JUDGE BLOCH: But they were proposed by CYGNA?

24 WITNESS WADE: We proposed them because they were
25 areas that other audits had mentioned as areas requiring

1 review assessment.

2 WITNESS WILLIAMS: I think they had been identified
3 as areas in previous reviews; and the purpose of this report
4 was to supplement some of the issues out of those reports.

5 JUDGE JORDAN: But I thought one of the conclusions
6 was that they did comply with ANCI 45211; and if you only did
7 three elements of it, how can you reach that conclusion?

8 WITNESS WILLIAMS: Okay.

9 The first thing we do is program. Do they have a
10 program in place with all the procedures that address all
11 elements of the ANCI 45211; and that is what we are saying at
12 the top of page 2-4; that is the first step.

13 WITNESS WADE: And, Dr. Jordan, we did look at all
14 elements from the programmatic standpoint.

15 JUDGE JORDAN: That's the nature of it?

16 WITNESS WILLIAMS: We did that for Gibbs & Hill
17 and for Texas Utilities.

18 The next step is, yes, you have these procedures
19 in place; but are you performing the work correctly under the
20 procedures?

21 And that's where you get to the implementation
22 evaluation.

23 In that case we selected three to track that down.

24 JUDGE JORDAN: Thank you, that helps a lot.

25

1 BY MR. TREBY:

2 Q I believe you testified earlier that these two
3 reviews, the one dealing with the Fermi plant and the one
4 for Comanche Peak, were done for different purposes.

5 Could you elaborate on that, the different purposes
6 that each of these were done for?

7 A (Witness Williams) I guess I can most readily
8 speak to Texas:

9 And, you know, I'm not sure that "purpose" is the
10 best description as much as "scope differences," although the
11 scope may be chosen to address certain issues which, in the
12 case of Comanche Peak, that was partly because so many other
13 reviews had been done of the plant.

14 As to what reviews, and what we looked at to
15 supplement those reviews--and that was a joint decision between
16 Staff and ourselves--and in the case of the other ones, I
17 suppose they are referred to as formal IDPPs, the major
18 difference being we did the implementation evaluation for the
19 entire design control system; and there had not been so many
20 reviews done on those plans.

21 Q Is there anything significant in the fact that
22 one had an independent design plan and the other an independent
23 assessment?

24 A You want my opinion? No.

25 A (Witness Wade) Well, I think I disagree with that.

1 I think you have to keep in perspective the historic evolution
2 of these things.

3 When the Diablo Canyon drawing incident, the
4 mirror-image to piping system arose, there became significant
5 concern that this could happen some place else. They needed--
6 the NRC needed--some kind of assurance, particularly on those
7 plants that were very near-term to getting operating licenses
8 granted at that time.

9 At that time the owner of the plant--Mississippi
10 Power & Light--decided they should provide some kind of
11 assurance to the NRC that such a mistake had not occurred at
12 their plant. And they selected a scope that addressed
13 particularly the problem of piping design.

14 And so that design verification, added assurance--
15 whatever you'd like to call it--program, was addressed specifi-
16 cally as a problem identified initially.

17 And the Fermi review occurred some time later-- I
18 am losing track of time, in a sense, some time later--at the
19 point when a broader review of the design was indicated, and
20 outside, third-party-type assessment.

21 And we proposed to assist Detroit Edison in that.
22 And this style of independent design verification, which
23 included a broad scope look at the management of the design
24 process, and then an assessment of its implementation on the
25 specific system; and all of what we are calling the 10 elements

1 of the design process were looked at.

2 I previously indicated to a question that I did not
3 believe large costs were involved, large costs were incurred,
4 by the utility coming out of our particular assessment.

5 And, I must confess, I was thinking of very large
6 hardware costs.

7 There was significant procedural and time costs
8 that came out of those; Texas Utilities is presently going
9 through a significant cost in getting the documentation control
10 system.

11 In this particular instance, where we have designed
12 an independent assessment program, and the difference in my
13 mind is we are looking at--we are using a rifle rather than a
14 shotgun-approach in looking at specific elements of the design
15 control process; wherein, in other inspections and audits
16 of Texas Utilities, while on the whole they have been very good,
17 they have indicated their weaknesses.

18 I think we have talked about the many changes that
19 are outstanding here. And that is a problem with the change
20 control process, if it is not tightened; and so we looked at
21 that.

22 The interface between organizations is probably an
23 area where anyone who's been in engineering understands things
24 can fall through the cracks. We took specific areas to
25 address, potential problem areas that other inspections had

1 highlighted.

2 Q Can you give us a feel for how many manhours were
3 spent in looking at Comanche Peak?

4 A The project manager can do better on that.

5 JUDGE BLOCH: "Person" hours?

6 WITNESS WADE: Thank you very much--"consultant"
7 hours.

8 WITNESS WILLIAMS: We did submit that. And it is
9 around 6,000.

10 But I was looking for the numbers.

11 (Pause)

12 The submittal we made which would be manhours
13 expended as of approximately the end of 1983, was 5,986.

14 Since then, during the course of responding to
15 comments on the draft, there have been further hours expended.

16 BY MR. TREBY:

17 Q Have you prepared a chart setting that out?

18 A (Witness Wade) That was submitted in a letter to
19 the NRC.

20 MR. TREBY: Mr. Chairman, I think it should be
21 bound into the record.

22 JUDGE BLOCH: Let's mark it, first.

23 Board Exhibit 84, No. 5.

24 MR. REYNOLDS: February '84, No. 5.

25 JUDGE BLOCH: It is marked as of this point.

Bd & Feb 84 No 5

COMANCHE PEAK INDEPENDENT ASSESSMENT PROGRAM
MANHOUR SUMMARY

<u>Review Activity</u>	<u>Manhours*</u>	
Programmatic Reviews		
G&H Design Control Program	132	
Texas Utilities Design Control Program	<u>305</u>	
Sub-Total - Program Reviews		437
Implementation Evaluations		
Design Analysis Control	284	
Design Change Control	1067	
Interface Control	516	
As-Built Verification	600	
Design		
Pipe Stress/Flued Head	772	
Pipe Supports	456	
Raceway Supports	1029	
Seismic EQ	214	
Electrical/I&C	<u>611</u>	
Sub-Total - Implementation Evaluations		<u>5549</u>
TOTAL:		5986

* - Includes Data Collection, Project Management, Project Administration, and Documentation.

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(The document referred to was
marked Board Exhibit February
'84, No. 5 for identification.)

BY MR. TREBY:

Q Do you have a copy before you?

Is this the document which has been identified
as the Chairman said?

JUDGE BLOCH: No. 5?

BY MR. TREBY:

Q No. 5?

A (Witness Williams) Yes.

Q Was this prepared by you or under your supervision?

A Yes.

Q And is it accurate to the best of your knowledge?

A Yes.

Q With the caveat you just stated, that there are
some additional hours?

A That is right.

MR. TREBY: With that, I would like to offer it
into evidence.

JUDGE BLOCH: It is received in evidence, and shall
be bound into the transcript at this point.

(The document referred to,
previously marked Board Ex. Feb 84
No. 5, was received.)

(The document follows:)

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1 BY MR. TREBY:

2 Q You previously submitted a list of the qualifica-
3 tions of the various people who worked on this project; could
4 you explain for the record what considerations went into--
5 what selection considerations went into the selection of each
6 of the members in the project organization?

7 A (Witness Williams) Well, you would want to select
8 the one who had expertise in each of the disciplines listed
9 here.

10 A (Witness Wade) In addition, there was considera-
11 tion given to continuity of information. You go through a
12 learning curve on these kinds of assessments.

13 The first one we performed at Grand Guld, Ted
14 Wittig was the project manager. He also managed the Detroit
15 Edison.

16 Wrong?

17 (Witness panel conferring)

18 WITNESS WILLIAMS: Wrong.

19 WITNESS WADE: Excuse me. He participated. And he,
20 as you saw, was on the consultant list for this particular
21 list. We tried to have some continuity of people. Some took
22 part in all three.

23 We wanted to have continuity because an assessment
24 of another organization is a difficult thing to do. And the
25 training that people received on one, where they might be

1 looking for adequacy, as opposed to trying to optimize
2 everything, one engineer when he looks over another's shoulder,
3 very frequently wants to say, "Ah, this isn't the way I
4 would have done it"; when, in fact, the matter he was reviewing
5 is adequate to do the job and assure safety.

6 And so we had significant training programs for
7 these people on how to perform these assessments. And we
8 wanted to make sure there was continuity.

9 So, in addition to being experts in their field,
10 we wanted to make sure that they had the right kind of
11 attitude towards these kinds of things, so it did not become
12 an adversarial kind of thing, but a truly dispassionate
13 assessment of the adequacy.

14 MR. TREBY: I have no further questions.

15 JUDGE BLOCH: To clarify what you raised earlier,
16 and Dr. Jordan asked me about it, to what extent is ANCI
17 standards on design verification addressed in the CYGNA
18 review?

19 WITNESS WILLIAMS: I believe there's a line
20 element on the matrix for design control, because it is
21 mentioned in ANCI 45211, but not to a great level of detail.

22 JUDGE BLOCH: Well, do you have the ANCI document
23 before you, so you could explain what detail is included, and
24 what is not?

25 WITNESS WILLIAMS: Well, what we did, I believe, in

1 that case--I forget--is to see they had procedures for design
2 verification; but that is the extent of the programmatical
3 review involved.

4 JUDGE BLOCH: But the vertical review was designed
5 to check in more detail, was it not?

6 WITNESS WILLIAMS: Yes, the vertical review; but
7 we did not do that element. We did not do an implementation
8 evaluation on design verification.

9 We did, however, when we were looking at the program,
10 again--this is this programmatical review--ensure that there
11 were procedures in place to address design verification.

12 JUDGE BLOCH: Well, to what extent were you looking
13 at the individual items within the plant design to test whether
14 design verification had occurred properly?

15 WITNESS WILLIAMS: The question was, what did we
16 do to--

17 JUDGE BLOCH: To what extent is it possible to
18 draw conclusions from your study of individual elements of
19 the plant to decide whether or not ANCI Standard-6 under
20 design verification was complied with? Does that answer this?

21 WITNESS WILLIAMS: The best example of that would
22 be our as-built walkdown.

23 JUDGE BLOCH: Okay.

24 And could you give us your insight to the extent
25 we should draw conclusions about whether Comanche Peak complies

1 with Standard-6 based on the as-built walkdown?--or other
2 data that you collected--that you would like to bring to our
3 attention?

4 WITNESS WILLIAMS: I just wanted to read the
5 paragraph here.

6 (Pause)

7 JUDGE BLOCH: Please, when we ask a question if
8 you want to read something to answer it fully and knowledgeably,
9 take whatever time you need.

10 If you need an extended delay, ask for it.

11 (Pause)

12 WITNESS WILLIAMS: Okay.

13 Reading from the end of the paragraph on design
14 verification, design by one or more methods to provide
15 assurance that the design meets the specified design inputs;
16 there are two facets of what we did that are involved in this.

17 Starting with the as-built walkdown, we looked at
18 the as-built drawings and ensured that the hardware in the
19 field did comply with those drawings.

20 And the second part would be in the technical or
21 analytical field, where we took the as-built drawings and made
22 sure that they analysis matched the as-built drawings, such
23 that any changes that took place in the field were incorporated
24 into the analysis.

25 JUDGE BLOCH: Okay. You are just addressing 6.1?

1 WITNESS WILLIAMS: Yes, that's as far as I got.

2 JUDGE BLOCH: Okay.

3 If you're going to continue, would you like a little
4 break to do this?

5 WITNESS WILLIAMS: There's quite a bit of reading.

6 JUDGE BLOCH: Let us take a ten-minute recess.

7 (Recess)

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ENDT14JRB
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1 JUDGE BLOCH: Let's resume the witnesses.

2 MR. REYNOLDS: Before we go on, may I ask a
3 question? I thought I heard the Board ask the witnesses how
4 they reviewed per Section 6 of ANSI N45 2.11, and I thought
5 the answer was they didn't do an implementation review of
6 design verification. Then the Board proceeded to ask them
7 how they did it.

8 JUDGE BLOCH: No, what we did was they didn't do
9 it that way. They had a different cut. They had ten criteria
10 that they abstracted out of the ANSI code. They did three of
11 those in some depth, according to the testimony as I under-
12 stand it, and they weren't able to tell us which portions of
13 the ANSI code related to those three.

14 Now what we have asked them to do is go back and
15 consider which portions of this were, in fact, included in
16 their review.

17 MR. REYNOLDS: I think that is going to clarify
18 what they thought your question was.

19 WITNESS WARD: We didn't understand that.

20 WITNESS WILLIAMS: Because we were going to start
21 out by saying we did not review that element; however, we did
22 touch upon it in the area of design analysis, control.

23 JUDGE BLOCH: Should we have some disclosure of
24 what the nature and the extent of the discussion with Mr.
25 Reynolds was in the hall?

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1 MR. REYNOLDS: None at all, sir. I have been
2 sitting here figuring it out after your question because I
3 thought it was a mismatch in what their answer was.

4 JUDGE BLOCH: You just stated they didn't under-
5 stand it.

6 MR. REYNOLDS: No, I didn't say that. Let me say
7 for the record, I haven't talked to these people since the
8 break.

9 JUDGE BLOCH: Okay. You inferred from something
10 that I didn't understand --

11 MR. REYNOLDS: I was confused.

12 JUDGE BLOCH: Okay.

13 WITNESS WILLIAMS: What we have done here is taken
14 ANSI N45 2.11 and correlated it to our ten items. That was
15 the question to start with?

16 JUDGE BLOCH: Yes.

17 WITNESS WILLIAMS: This is our interpretation or
18 how we see it. What I have in front of me is a table of
19 contents for N45 2.11, and the list of the ten elements.

20 JUDGE BLOCH: We were only asking about design
21 verification.

22 JUDGE JORDAN: The question I asked was, indeed,
23 broader. I wanted to know which of the elements, and you were
24 about to exactly answer my question. Go ahead.

25 WITNESS WILLIAMS: So I should answer that

3
1 question?

2 JUDGE JORDAN: Please do.

3 WITNESS WILLIAMS: Okay. Using the bullets on
4 the ten elements on page 2-4 of our draft final report,
5 I am going to go down from top to bottom and give you the
6 corresponding section of N45 2.11.

7 JUDGE JORDAN: Good.

8 WITNESS WILLIAMS: Okay. Design Input Documents,
9 Section 3 of N45 2.11, Design Input Requirements. Design
10 Analysis Control, Section 4.2 under the Design Process for
11 ANSI N45 2.11. Drawing Control, the remainder of Section 4
12 in ANSI N45 2.11. Procurement Control we have picked up to
13 some extent under Records, Section 10 of N45 2.11. The
14 Design Control and Procurement Control in our list are the
15 only ones that aren't an easily identifiable one-for-one
16 correspondence between the two.

17 Internal, External Interface Control, Section 5 of
18 N45 2.11. Design Verification, Section 6 of N45 2.11.
19 Document Control, Section 7 of N45 2.11. Design change
20 control, Section 8. Corrective Action, Section 9. Internal,
21 External Audits and Surveillance, Section 11. So there is
22 pretty much a one-for-one correspondence, and we did not look
23 at design verification implementation as part of this review.

24 JUDGE BLOCH: Now I want to clarify the question
25 I asked. I think you did look at some parts of design

4

1 verification as part of the review.

2 WITNESS WILLIAMS: There is some overlap between
3 the categories on the types of things you would tend to look
4 at, and we do have a checklist where you will see in the
5 DC checklist some reference to that, and that would be, for
6 example, Checklist DC-02-09, where we are discussing design
7 review of calculations, which is a method of design
8 verification per ANSI N45 2.11.

9 JUDGE BLOCH: Okay, but in addition, you told me
10 that you were concerned about making sure that the ASME code
11 provisions were complied with in that Section 6.3.1, Sub 4.

12 WITNESS WILLIAMS: Section 6.3.1(4)? Okay. This
13 is in the quality assurance standpoint. You want to make
14 sure that they are clearly identified in the technical area.
15 Yes, we do check that the designs were in accordance with the
16 codes of record.

17 JUDGE BLOCH: Okay, I know you checked some of
18 the calculations by doing some of your own calculations.
19 What I really was asking was your assistance to the Board
20 in knowing the extent to which we can take confidence that some
21 of the design verification work you did actually shows us
22 there is compliance with design verification. You didn't
23 address it purposely, but I am suggesting that there clearly
24 is an overlap.

25 If you can't answer the question right now, maybe

1 we can come back to it another time after you have had a
2 chance to think about it.

3 WITNESS WILLIAMS: I think we would have to go
4 through this in some detail. The other thing is, to some
5 extent, N45 2.11 is addressing the documentation aspect of it,
6 and the other that we did was a technical evaluation of
7 compliance with the code of record.

8 JUDGE BLOCH: Technical evaluation and its
9 implications for whether there was design verification done
10 properly at the plant, is what I'm interested in. To what
11 extent should we draw or not draw inferences from the
12 technical evaluation whether the design evaluation is being
13 done properly.

14 WITNESS WILLIAMS: I see. I think that is some-
15 thing we would definitely want to discuss and review
16 internally.

17 JUDGE JORDAN: It seems to me it's a little
18 broader even than that because -- was it your vertical
19 review that looked at all of the procedures? Oh, that is
20 the horizontal. I get confused, yes. And it is summarized, I
21 believe you said, in the matrix, which is Section D of your
22 report. If I look under design verification, I see, yes,
23 under the Texas Utilities program that there are no comments
24 under 6.1, 6.2 and 6.3, and therefore you find verification.

25 WITNESS WILLIAMS: That they have a procedure in

1 place for verification.

2 JUDGE JORDAN: All right. But now, then, if I look
3 at Section 6.3 under ANSI 45 2.11, I find under design
4 verification some 19 elements, requirements, 3.2 -- I'm
5 sorry -- 6.3.1. There are 19 elements which are available for
6 a design verification.

7 Now, do you believe that they looked at those 19
8 elements? Do you have any belief, any way of determining
9 whether they have or not? Is it in -- are those things in
10 the procedures, a checklist, for example, which would include
11 those elements?

12 WITNESS WILLIAMS: I am just checking in our
13 matrix to make sure, but what we would do is check that they
14 have procedures which address all those elements.

15 JUDGE JORDAN: I see.

16 WITNESS WILLIAMS: But we just didn't check the
17 implementation of it.

18 JUDGE JORDAN: Fine.

19 WITNESS WILLIAMS: This is in Appendix D of the
20 final report. There are two matrices, one for Gibbs & Hill
21 and one for Texas Utilities.

22 JUDGE JORDAN: Yes, I noticed it was a very
23 abbreviated 6.1, 6.2, 6.3, and so I wondered what detail you
24 had looked at, and you have answered my question.

25
END 15

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2 JUDGE BLOCH: Mr. Reynolds, for the "Scope and
Method" section, which unfortunately we did broach already --

3 MR. REYNOLDS: I have a few questions on recross.

4 JUDGE BLOCH: Please. It's possible that we
5 should -- you have your choice as to whether you want to
6 recross on scope or wait until you start your part of the
7 scope. You can do it either way. We just did questions
8 which arguably were within the scope portion of the
9 proceeding.

10 MR. REYNOLDS: I'm thoroughly confused.

11 RECROSS EXAMINATION

12 BY MR. REYNOLDS:

13 Q Ms. Williams, I would like to talk, if I may, about
14 the DCC review, because it seems to me that the Board may
15 be clear on its questions, but I'm not clear on what the
16 record reflects.

17 It would be helpful, I think, if you would troop
18 us through your review of the DCC process. What were you
19 seeking to verify, how did you go about doing it, and so
20 forth? And take your time.

21 JUDGE BLOCH: If there is a summary of that somewhere
22 in the report, you might want to lead us to that also, to
23 help us know where you are.

24 WITNESS WILLIAMS: That would be in DC observations.
25 Perhaps that would be the best way to structure this

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description, so that you can relate back to the observations.

JUDGE BLOCH: You are referring to the checklists or the observations?

WITNESS WILLIAMS: The observations. I'm on DC-01-01.

JUDGE BLOCH: Appendix F?

WITNESS WILLIAMS: Okay.

The first thing that we do as part of the review on the DCC system was to verify the accuracy of their logs, and we did that in the Central Document Control Center, and we found some discrepancies in the logs.

BY MR. REYNOLDS:

Q This was in August?

A (Witness Williams) I think this was in the latter part of July.

JUDGE BLOCH: I'm a little confused at why we are looking at the observation record instead of a checklist.

WITNESS WILLIAMS: I might even be better off just to walk you through it, because neither one of the documents, in and of itself, will paint the whole picture. I was trying to point to the one by number that would give you the best history, and I'm not sure I can, and perhaps its' confusing trying to really relate these back to the observations. Maybe I should walk through it, and then if you have questions on the observations, I can answer those. I'll try

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that.

2 JUDGE BLOCH: Is what you are going to tell us
3 something that you don't have a document describing, and
4 therefore you do it out of memory?

5 WITNESS WILLIAMS: It's not all in one place.

6 So we did a check on the accuracy of the DCC
7 listings for design changes outstanding against drawings and
8 specifications. We found some discrepancies in that list.
9 We then continued on --

10 MR. REYNOLDS: Let me interrupt you for a minute.

11 BY MR. REYNOLDS:

12 Q Please relate your story to timeframe. That was
13 late July?

14 A (Witness Williams) All right. This is all July.
15 There were three site visits on this issue, the first of
16 which was July.

17 We checked the accuracy of the logs. We reviewed
18 the entire system, their procedures, to understand how the
19 system worked.

20 Q What logs are we talking about?

21 A These are the DCC manual logs.

22 Q A listing of DCCs --

23 A Outstanding design changes, DCAs and CMCs,
24 against drawings and specifications.

25 The next thing as part of the procedures in the

mgc 16-4

1 Document Control Center that you would be concerned with is
2 the distribution. At that time, they were operating with a
3 system of what they called file custodians. The file
4 custodians were actually secretaries or personnel with
5 responsibility within each of the discipline groups, be
6 that electrical, structural, what have you, pipe supports,
7 who were the control document receivers.

8 This was prior to satellites existing at all.
9 What we found was, there were some discrepancies between the
10 logs that DCC was maintaining as a listing of outstanding
11 design changes and the logs that the file custodians were
12 maintaining as a list of outstanding design changes.

13 The next thing we found was that if we went to DCC
14 and got the control distribution list and then spotchecked
15 the file custodians, that there was not always a correlation
16 there.

17 So at the conclusion of this July review, we had
18 two major issues, which were, we have inaccuracies, we think,
19 in the logs, which we had to go through and verify, and we
20 think that there is a problem with the distribution system
21 or the control of the distribution system.

22 JUDGE BLOCH: Did you ever attempt to identify a
23 cause for these problems or to quantify the extent of the
24 difficulty?

25 WITNESS WILLIAMS: That's where we get to the

mgc 16-5

1 observation. Yes, we recorded it, and at that time, we write
2 down what we think what the cause is, be that either the
3 procedures or a breakdown in the procedures, or I can go
4 back to the observations, but it is listed on the observation.
5 It's called "Probable Cause," and it is on Sheet 1 of each
6 observation, but it's written at the time of recording the
7 observation. It's what we think at the time before we
8 investigate it any further.

9 BY MR. REYNOLDS:

10 Q Okay. So that is late July. Now what happens?

11 A (Witness Williams) Then we went back, regrouped,
12 thought about it, sorted out through all the information
13 that we had gathered, wrote up the observations, documented
14 what we thought the probably cause was, and then the next
15 step is to find out either, is there anything in process at
16 Texas Utilities that is going to correct it, are they aware
17 of it, and we ask the question, we stated what the problem
18 was to Texas Utilities.

19 At that point in time, they had embarked on
20 developing the satellite system.

21 Q Let me understand. This is the matter that you
22 said Texas Utilities was already aware of?

23 A The fact that they had started to set up a
24 satellite system at that point in time indicated that they
25 were aware of the distribution control or the need to

mgc 16-6

1 control the documents a little better than was being done
2 with the file custodian system.

3 Then we went back for a follow-up review when we
4 thought the satellite system was to be in place. The
5 timeframe for that -- I'm guessing at this -- somewhere
6 either late August, perhaps, or early September timeframe,
7 roughly a month, five weeks or so later.

8 The review still indicated that the system was
9 not fully operational, that they still had to tighten their
10 procedures, that there were still errors in logs, and we
11 said -- and it wasn't a large number of errors. When I say
12 that, I guess I should qualify it. You can see exactly how
13 many it was out of the total number of documents we
14 reviewed in the observations. But we still had to assure
15 ourselves that there was a mechanism in place to maintain
16 these logs as accurate. So even if it was just a few, we
17 thought it was necessary to go back and reevaluate this
18 situation.

19 We then told Texas again, "Your system is not
20 fully operational. You are going to have to tell us what
21 your plan is for getting the satellite system up and running.
22 And we also want to know what your plan is for ensuring the
23 accuracy of the logs."

24 And with that, we got a response back from Texas
25 on the schedule for implementing the satellite system and

mgc 16-7 1 when they felt we could come back down to check it and to
2 verify that they had, in fact, tightened up the distribution
3 system.

4 We did go back down -- and this is the third time --
5 to verify that it was functional.

6 Q Let's go back to the second time. This is late
7 August, early September.

8 When you went to the site for that visit, did you
9 provide the company with a list of documents you wanted to
10 see?

11 A I believe in that case we walked in with it.

12 Q With the list?

13 A Yes.

14 Q And asked them to compile the documents?

15 A I would have to doublecheck with the reviewers,
16 but I'm fairly certain that was the case.

17 Q But the scope of the review that you conducted at
18 that time was similar to the review that you conducted in
19 October?

20 A It was similar, yes.

21 Q Please continue.

22 A Okay. The other thing that was going on, while
23 we were asking Texas for their plans for tightening up the
24 controls and implementing the satellite distribution system,
25 we wanted to know what they were doing about ensuring the

mgc 16-8 1 accuracy of the logs. That's when we started to get involved
2 with DCTG.

3 Q That is an acronym for what?

4 A Design Change Tracking Group.

5 Q And what is it?

6 A That is an organization on-site who has several
7 responsibilities, one of which is maintaining this computerized
8 data base, which was originally founded from the Gibbs & Hill
9 design verification tracking data base.

10 Q Was the compilation of the data base part and
11 parcel of the satellite concept?

12 A Only to the extent that it is -- it will serve as
13 the data base for the satellites in determining what
14 outstanding design changes there are against documents.

15 Q This was the data base that was created recently,
16 this summer?

17 A It's a data base that they have been trying to
18 make accurate before they turn it into the document control
19 tracking system.

20 Q Is it an effort to go from a manual log system
21 to a computerized system?

22 A Yes.

23 Q That's basically the thrust of it?

24 A Yes.

25 Q Please continue.

mgc 16-9

1 A So DCTG and this effort to verify the contents of
2 the data base is going on while they are still operating
3 with the manual system in DCC, so as not to confuse the
4 fact it might appear there are a lot of errors in the DCTG
5 data base at that point in time. It's not the controlling
6 listing for DCC. They are still operating with these manual
7 lists.

8 The effort in cleaning up this data base
9 consisted of -- and it still is going on -- of taking each
10 CMC and each DCA with a discipline engineer, the appropriate
11 discipline, and checking to make sure whether the design
12 verification has been done, whether it's been incorporated
13 in the drawing yet, whether it references the correct
14 drawings that it affects, and then updating -- that's as a
15 minimum; there's a lot of data involved in that data base --
16 but as an example, they are going through and checking all
17 the entries in the data base against each CMC and each DCA.

18 The DCAs, to my understanding, are essentially
19 done. The CMCs were ongoing at the time that I was down
20 there, the CMCs being the last to be done because of the
21 number of organizations that needed to be pulled in.

22 Once the data base is accurate, then, as portions
23 of it are validated, turning that over into the document
24 control tracking system, which now at this point in time,
25 they have the computer terminals at the satellites and are

mgc 16-10 1

accessing that data base for much of the documentation.

2 So that's the effort to clean up the logs. We
3 felt that because they were going through them individually
4 and sequentially, they were ensuring -- they were checking
5 each and every one that had been written -- that they were,
6 in fact, making sure that the documentation was corrected in
7 the data base, that they then had procedures to control the
8 data base, and that on the other hand they were attempting
9 to tighten up the controls on the distribution system, and
10 eventually these two will meet in the Document Control Center.

11 Q Okay. Now you haven't talked about your October
12 meeting, your October site visit.

13 JUDGE BLOCH: Before we get to that one, I think it
14 would be helpful if I try to clarify something.

15 When you did the August trip and you found these
16 problems at that time, did any of the field documents
17 prepared by Cygna provide data that would help the Board to
18 know the extent and severity of the problem at that time?

19 WITNESS WILLIAMS: In terms of number of documents
20 that we found problems with?

21 JUDGE BLOCH: Yes. The number of documents there
22 were problems with and the practical implications of that.
23 The fact that there are documents missing is one thing, but
24 if they would have caused a problem for a construction worker
25 or a problem for a QA person who wanted to find out if the

mgc 16-11 1 plant was properly built, that's another thing.

2 WITNESS WILLIAMS: Okay. We didn't find any
3 examples of documents missing per se. The question was,
4 were they always cross-referenced to the right drawings
5 when you have manual listings where they are all matching?

6 We did go in and do a field walkdown to make sure
7 that we could say that what's installed in the field does
8 match the drawings of record. That's kind of on the
9 implementation side of it.

10 The number --

11 JUDGE BLOCH: The discrepancies you found, the
12 problems in the logs, would or would not have had any effect
13 upon the quality of construction? Would they have, or
14 wouldn't they have had an effect on the quality of
15 construction or QA?

16 WITNESS WILLIAMS: We used the same documents. It
17 was the same documents that we were using to test the DCC
18 system. They were the same documents that we were also going
19 and checking in the field.

20 JUDGE BLOCH: Are there possibly other questions?
21 I don't understand the answer. Maybe you can bring it out
22 for me.

23 MR. REYNOLDS: Let me testify.

24 JUDGE BLOCH: I prefer that you ask questions of
25 the witness, unless it really is straightforward on the record.

mgc 16-121

MR. REYNOLDS: It seems to me straightforward.

That is, they had documents that they used to review the adequacy of DCC. They took those documents out to the field and looked at what was built in the plant, the same documents, and found that what was installed was satisfactory and as per the documents.

BY MR. REYNOLDS:

Q Is that a fair summary of your testimony?

A (Witness Williams) Yes, we found that.

MR. REYNOLDS: Does that help the Board?

End 16

mgc 17-1

1 JUDGE BLOCH: To some extent.

2 MR. REYNOLDS: Let me testify further.

3 The universal problems that they found were
4 confined to the documents they looked at, so if they then
5 used those documents and went out into the plant --

6 JUDGE BLOCH: The documents they looked at finally
7 were the ones after the system was cleaned up, right? The
8 system got cleaned up before you took the documents to
9 the field?

10 WITNESS WILLIAMS: It was all as-built verified.

11 JUDGE BLOCH: Okay. Now between the time that the
12 plant is constructed and the time of the final as-built
13 walkdown, whenever there are problems in documentation and
14 they are corrected, I assume that people would then have gone
15 out and changed things in the field. Is that an accurate
16 assumption?

17 WITNESS WILLIAMS: That's a possibility. I think
18 in the case of the documents -- let me check the observations
19 here.

20 Okay. In the situations we ran into -- for
21 example, on DC-01-01, we physically had the changes, and
22 we checked them against what was in the field, but they were
23 not accurately listed in the logs. They have kind of checks
24 and doublechecks, and I was trying not to confuse the issue.
25 They have got 8½ x 11 file index cards that one group in

mgc 17-2 1 DCC tracks. They've also got these manual notebook logs,
2 and these are all manual logs prior to this DCTG. They run
3 checks on each other more or less, and we also ended up with
4 a set of documents, but their tracking system left a little
5 to be desired.

6 JUDGE BLOCH: Let me ask it slightly differently.

7 Between July and October, was there much
8 construction work being done on this system in the field?

9 WITNESS WILLIAMS: On the spent fuel pool cooling
10 system?

11 JUDGE BLOCH: Either of the systems you looked at
12 in the vertical review.

13 WITNESS WILLIAMS: Painting, things of that nature.

14 JUDGE BLOCH: So there were no substantial
15 construction changes between the time you discovered these
16 problems with logging documents and the time that you
17 concluded that the documents matched the structures?

18 WITNESS WILLIAMS: That's correct.

19 JUDGE BLOCH: Are you sure, because I asked a
20 leading question?

21 WITNESS WILLIAMS: They weren't doing construction
22 when we were there. That's one part of the question.
23 On the spent fuel pool cooling.

24 JUDGE BLOCH: When you say while you were there,
25 I mean during the period that the study was going on, not

mgc 17-3

1 while you were actually at the plant. In other words, did
2 they do any construction on these two systems that you
3 looked at after July?

4 WITNESS WILLIAMS: As far as construction goes,
5 I can only somewhat talk to the spent fuel pool cooling,
6 because we did not do a walkdown on the RHR system. We only
7 looked at the design aspect of it, although we were dealing
8 with as-built drawings, which would imply that the construct-
9 tion is done since the as-built drawing, unless they want
10 to issue another as-built drawing, which they would have to
11 do if they did a change.

12 On the spent fuel pool cooling system, there were
13 activities going on on the system, such as testing or
14 painting. Some of the snubbers were in place, and others
15 would have a rod in place, which was normal practice. Then
16 they installed the snubber. I mean, there was some clean-up
17 or punchlist items going on on the spent fuel pool cooling
18 system.

19 JUDGE BLOCH: No structural changes that you know
20 of?

21 WITNESS WILLIAMS: I can't really say that was
22 part of our review, to check for them. I can only tell you
23 what we saw when we were in there. But they could certainly
24 have gone in and added instrument controls or something,
25 and we would not have been privy to it. We only took a

mgc 17-4

1 snapshot in time.

2 JUDGE BLOCH: When you did the October walkdown
3 with the current documents, you would have had design change
4 documents that showed when the last design change was made,
5 right?

6 WITNESS WILLIAMS: The walkdown was done in July.

7 JUDGE BLOCH: The walkdown was done in July?

8 WITNESS WILLIAMS: Roughly.

9 JUDGE BLOCH: With the full packages?

10 WITNESS WILLIAMS: With the full packages.

11 JUDGE BLOCH: Okay. So whatever log problems
12 there were at that time were not reflected in the spent fuel
13 pool cooling system in the field, as you looked at it in the
14 walkdown. The log problems obviously did not cause
15 construction problems.

16 WITNESS WILLIAMS: That's correct.

17 JUDGE BLOCH: The findings were at the same time --
18 the walkdown was at the same time as the finding of the log
19 problems?

20 WITNESS WILLIAMS: That's right.

21 BY MR. REYNOLDS:

22 Q Please take us back to October and going to the
23 site again.

24 JUDGE BLOCH: I'm sorry, Mr. Reynolds.

25 Did the log problems include problems with the

mgc 17-5 1 spent fuel pool cooling system?

2 WITNESS WILLIAMS: Let me check here.

S2BU

3 Okay. They were mainly specifications. The
4 biggest problem we found was the accuracy of the logs of the site
5 file custodians. The drawings that we used to go do
6 the walkdown were from the Central DCC location, and that's
7 reflected in observation, DC-01-02. If you look down,
8 you'll see a lot of specifications, and it's also referring
9 to the site file custodians, still a question on the accuracy
10 of the logs, though, but it's also tied to the distribution
11 problem.

12 JUDGE BLOCH: But DC-01-02 refers to the system
13 that you did the walkdown on?

14 WITNESS WILLIAMS: They are purchase specifications
15 for components and instrumentation mainly, I believe, for that.
16 And it's only as pertain to the site file custodian, and not to
17 Central DCC.

18 JUDGE BLOCH: Which of these DCC problems were not
19 related to the fuel pool?

20 WITNESS WILLIAMS: All the drawings are drawn from
21 that sample, but they are not all hardware-related documents
22 in the sense that you wouldn't be taking them in with you
23 for the walkdown.

24 JUDGE BLOCH: To what extent does the walkdown
25 demonstrate that the log problems did not get reflected in

mgc 17-6 1 the plant?

2 WITNESS WILLIAMS: I think it does to a great
3 extent.

4 JUDGE BLOCH: Well, some of the log problems, you
5 say, are not related to the hardware. What would they be
6 related to? Where would they be reflected in problems, if
7 they cause problems?

8 WITNESS WILLIAMS: In the case of the file
9 custodians, they are just purchase specifications. Probably
10 none. They are not constructing to them, and the file
11 custodians -- it was just a matter of the control distribution
12 holder, not the central clearing house for the documents.
13 So that is on DC-01-02.

14 JUDGE BLOCH: How about 01-01?

15 WITNESS WILLIAMS: That's what I'm looking at now.
16 (Pause.)

17 WITNESS WILLIAMS: The drawings here are three
18 structural drawings, one electrical drawing, and it states,
19 "Design change missing from the DCC log." Now that's the
20 8½ x 11 three-ring-binder logs. It does not imply that it is
21 missing from the index card log.

22 JUDGE BLOCH: And the index card log, you believe,
23 is the one that was being used in the field? What was being
24 used in the field?

25 WITNESS WILLIAMS: They really use both. It's a

mgc 17-7 1 confusing system.

2 JUDGE BLOCH: Do these relate to the fuel pool or
3 other systems?

4 WITNESS WILLIAMS: All these documents do, because
5 we used our technical review as the basis for selecting our
6 quality assurance tie for implementation evaluations.

7 JUDGE BLOCH: When you did the walkdown, did you
8 pay any special attention to these particular aspects of the
9 plant, since the documentation was incomplete on them?

10 WITNESS WILLIAMS: I would have to pull out the
11 drawing. The one most likely to be in that category would
12 be the electrical drawing, and we did not find any problems
13 with the electrical.

14 JUDGE BLOCH: The question was whether you looked
15 especially at these particular design drawings in the walkdown?

16 WITNESS WILLIAMS: We would, yes, but it depends
17 on -- maybe the drawing is just one standard detail. It's
18 not like these are pipe support drawings or anything like
19 that. Some of these are -- gosh, I don't want to guess what's
20 in them, but they might be structural details that --

21 JUDGE BLOCH: One hypothesis you would worry about,
22 it seems to me, in an independent review is if you found
23 documentation problems that might be reflected in the field.
24 And you would identify, I would hope, the particular
25 documentation problems and do a special check of those in

mgc 17-8

1 the field.

2 Was that done?

3 WITNESS WILLIAMS: We did use the same documents
4 for the walkdown, yes.

5 JUDGE BLOCH: For example, these, you say, are
6 generic details, basically that occur repeatedly.

7 WITNESS WILLIAMS: I would want to check the
8 drawings before I go on the record with a statement like
9 that, because I can't memorize this among all the other
10 drawings.

11 JUDGE BLOCH: When you get the box, could we have
12 a further discussions of the way that these particular
13 drawings got followed up in the walkdown?

14 WITNESS WILLIAMS: I didn't bring all of the
15 drawings, unfortunately, because we have an awful lot of
16 drawings.

17 MR. REYNOLDS: Mr. Chairman, you are really getting
18 into the methodology, as opposed to the adequacy in the field,
19 aren't you? You are suggesting that you would do it a
20 certain way. That doesn't mean that they way they did it, if
21 they didn't do it your way, was inadequate.

22 JUDGE BLOCH: I want to know if we have any
23 assurance that the drawing problem didn't get reflected in
24 hardware. It seems to me, you've got to ask tough questions
25 to figure that out.

mgc 17-9

1 MR. REYNOLDS: You've had your answers to those
2 tough questions.

3 JUDGE BLOCH: No, I haven't on this one. I don't
4 know what the methodology was for following up on the
5 specific drawing deficiencies to find out that they weren't
6 reflected in the field. I don't think I've had a specific
7 answer to that.

8 WITNESS WILLIAMS: I guess the best example I could
9 give you is more along the lines of the piping and pipe
10 supports and the level of detail and accuracy by which we
11 found in the walkdown. For these specific drawings, I would
12 have to pull them out to tell you. I would have to see what
13 they are.

14 BY MR. REYNOLDS:

15 Q Ms. Williams, in those documents which contained
16 errors, when you used them in your walkdown, did you assure
17 that the errors were corrected before you went out for your
18 walkdown?

19 A (Witness Williams) I'm not sure. I think it's
20 somewhat of a misnomer to say that they are errors.

21 Q Okay. What would you call them?

22 A I would say that they were having problems in their
23 multiple listing system in DCC, but we still had a complete
24 set of the drawings when we went out for the walkdown.

25 Q That's my point. You did have a complete set

mgc 17-10 1 of the drawings, include all current DCAs, CMCs, whatever
2 design change documents there may have been?

3 A That's correct.

4 Q When you conducted your walkdown?

5 A That's correct.

6 JUDGE BLOCH: The question that the Board had was
7 that it wanted to know whether, when you looked at the
8 complete set of drawings and you compared them with these
9 particular elements of the plant, whether there was any
10 problem that could have been attributed to the incomplete
11 documentation, to the previously incomplete documentation.

End 17

18joy1

1 MR. REYNOLDS: Doesn't the result of the walkdown
2 answer that question?

3 JUDGE BLOCH: Providing they looked at that, and
4 I don't know the detail with which they looked at these
5 particular drawings.

6 MR. REYNOLDS: Are you asking whether there was
7 greater attention paid to these than to the others or was
8 there attention paid to the others?

9 JUDGE BLOCH: Let's ask the witness. What is the
10 extent to which we can be assured that attention was paid to
11 these particular drawings during the walkdown? What's the
12 level of attention in which an individual drawing would
13 necessarily have been looked at?

14 WITNESS WILLIAMS: The level of detail was, in
15 my opinion -- it was a great level of detail that went into,
16 and that is evidenced by looking at, for example, the piping
17 geometry walkdown. We measured elbow-to-elbow, support
18 support. We went into a lot of detail. We are not implying
19 here that there was anything technically wrong with these
20 drawings. We did have a complete set of the drawings. We
21 felt their logging system was confusing and left a lot to be
22 desired and would not continue to operate that way. We
23 further did a technical evaluation on the RHR system, and
24 that is where we get into the technical assessment of whether
25 we feel there is any impact on the plant. You have to look at

18joy2

1 perhaps both pieces. One of them is taking the process from
2 what is installed in the field up through the as-built drawings
3 and making sure that there is proper compliance there. The
4 other step of the process is to take the as-built drawing
5 and make sure that it complies with the analysis, and we did
6 do both of those halves, the first half on the spent fuel
7 pool cooling and the second half on the RHR.

8 JUDGE BLOCH: And the checklists necessarily would
9 have been applied to these particular drawings, is that
10 correct?

11 WITNESS WARD: Could we have just one minute?

12 JUDGE BLOCH: Oh, was the sample less than complete
13 so you might not have looked at these drawings? Was 100
14 percent sample of all the drawings in the spent fuel pool
15 cooling system?

16 WITNESS WILLIAMS: The walkdown scope, is that
17 the question?

18 JUDGE BLOCH: Yes.

19 WITNESS WILLIAMS: The walkdown scope was piping
20 geometry --

21 JUDGE BLOCH: No, no. There are four drawings
22 here. Was the intensity with which you looked at the system
23 so great that you can say without even looking at those
24 drawings that they were looked at in detail?

25 WITNESS WARD: Could we have just a minute before she
answers that?

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(Panel of witnesses conferring)

WITNESS WARD: I just wanted to make sure because I'm getting confused by the answers. I wanted to make sure that you understood that this discrepancy that is shown in DC-01-01 says there was a change to drawing 2323-S-0800 that was missing from the log, not that it was missing on the drawing or that the drawing was in error, but there was merely a change missing from the log.

WITNESS WILLIAMS: But we had the change physically or we never would have known it was missing.

WITNESS WARD: Yes. So we were seeing if the logs reflected all of the changes that had been applied.

JUDGE BLOCH: But would the people who were going to go out to the site during construction be interested in what was in the log? Do they use the log to verify they have got the right stuff?

WITNESS WILLIAMS: The DCC people used the log.

JUDGE BLOCH: What possible safety significance is there at all in these log discrepancies?

WITNESS WARD: To my mind, there may be none; but to do the proper walkdown, you get the applicable drawing, and you also get the list of all of the effective changes, and before you do that, you make sure that the changes are effected on the drawing, and then you go to the walkdown.

JUDGE BLOCH: So the fact that it is not in the

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1 law creates the possibility that you could go to the walkdown
2 or you could go as a construction worker to the place without
3 the most current design changes.

4 WITNESS WARD: Yes, if you didn't correlate the
5 drawing and the changes noted on the drawings with the list
6 of applicable changes.

7 JUDGE BLOCH: But you are saying the list is
8 incomplete so you can't do that accurately; is that right?

9 WITNESS WARD: If you look on the drawing and you
10 see a change that is not listed in the log of changes, then
11 you have got a problem and you have to resolve that, and
12 vice-versa.

13 JUDGE BLOCH: Of course, if the drawings are
14 always complete, you don't need a log.

15 WITNESS WARD: Why don't you correct that because
16 I made a mistake. I made a misstatement.

17 WITNESS WILLIAMS: The potential design impact is
18 as stated on Section 4 of the observation record.

19 WITNESS WARD: The vice-versa part does not apply.

20 WITNESS WILLIAMS: You're right. If it was on the
21 drawing, you would need a log. Incorporated CMCs and DCAs
22 are on the drawing.

23 JUDGE BLOCH: Mr. Reynolds suggests and I was
24 trying to explore the possibility that we don't need to look
25 at the specific documentation on the walkdown if it was planned

18joy5

1 to be so thorough that we could be assured that these
2 drawings did not cause problems in the configuration.

3 Now, can we? Is there anything we know about the
4 walkdown methodology that would assure us that these parti-
5 cular incomplete drawing problems did not cause deficiencies
6 in the plant?

7 WITNESS WILLIAMS: I will quickly go through a
8 couple of steps in methodology, perhaps, and see if that
9 answers the question.

10 JUDGE BLOCH: What I am interested in, the possi-
11 bility that while you did a very thorough look, you may not
12 have looked thoroughly at the particular places where the
13 problems could have existed.

14 MR. REYNOLDS: Mr. Chairman, the premise of your
15 question is that the drawings are deficient; that isn't the
16 case.

17 BY MR. REYNOLDS:

18 Q Is that correct, Ms. Williams?

19 A (Witness Williams) That is what I was saying,
20 there are not errors. That's what I meant. There is no
21 implication in this observation that the drawings are in
22 error.

23 Q The log is not current; is that your point?

24 A That's my point.

25 JUDGE BLOCH: 4.0 says that there could be

18joy6

1 construction configuration that won't reflect the intended
2 design. I just want to know if we are assured that that did
3 not happen.

4 WITNESS WILLIAMS: So what we did was assemble
5 the entire set of drawings, in spite of the log, if you will,
6 by looking at every source that we could to make sure that we
7 had a complete set of the drawings, including the disciplined
8 groups, go out in the field and check that; and in every
9 instance we found that it had complied with the entire set of
10 drawings.

11 JUDGE BLOCH: That was 100 percent sample.

12 WITNESS WILLIAMS: That was 100 percent of the
13 stuff that we looked at, all of the piping, pipe supports for
14 the system, train A of the spent fuel pool cooling.

15 JUDGE BLOCH: So necessarily these four drawings
16 were in the package that we looked at.

17 WITNESS WILLIAMS: Yes, except the structural
18 pertains to the building, which is more global. Best
19 example is the piping system for your question on the level
20 of detail.

21 JUDGE BLOCH: But there at least would have been
22 some observations within the system you were looking at about
23 that drawing.

24 WITNESS WILLIAMS: We had no observations dealing
25 with these drawings.

18joy7

Sense

1 JUDGE BLOCH: I'm sorry. Now we have got the
2 terminology. You looked at observation which in most senses means
3 something different than a problem. It means you looked at
4 it. You looked at the aspects of this drawing that were
5 within the scope of your walkdown, and you didn't find any
6 construction deficiencies there?

7 WITNESS WILLIAMS: We did not find any construction
8 deficiencies. I'm having a hard time with structural
9 drawings. I'm not trying to be evasive. Structural drawings
10 have many tiers and levels of detail, one out of five of
11 which might be the ones pertinent to checking the dimensions
12 and sort of thing that you want to check for the walkdown,
13 say the foundations, the locations of pump foundations and
14 what have you, and without looking at these drawings, it is
15 hard for me to make a conclusion like that.

16 JUDGE BLOCH: Okay. With the exception of that
17 problem, that this actually specified much more than you
18 were looking at, you didn't find any actual construction
19 problems?

20 WITNESS WILLIAMS: That's correct.

21 MR. REYNOLDS: Can we get to October now?

22 JUDGE BLOCH: Mr. Reynolds, we are up to October.

23 (Laughter)

24 BY MR. REYNOLDS:

25 Q Ms. Williams, back to October. Now, you came to

18joy8

1 the site for a third look at the DCC. Why don't you tell us
2 about that site visit?

3 A (Witness Williams) At that point in time it was
4 our understanding that the satellite system would be fairly
5 well under way, and I did, in fact, find out that I believe
6 the number of satellites at that point in time, there were
7 physically five satellites. I also understand that that is
8 probably about what there are or were at the end of our
9 review, and they may or may not have been shuffling or
10 redefining them. We wanted to find out whether the concerns
11 we had with the procedures and procedural control in the first
12 follow-up still existed. We wanted to run a check on how well
13 the satellite clerks understood their jobs, could execute
14 the procedures. We observed the daily issuance of the
15 packages to the construction craft. In this case it was
16 electrical because that was the predominant work going on at
17 the plant at that point in time.

18 Q You are going a little fast for me. Let's back
19 up and affirm what it is you are looking for. You are looking
20 for the adequacy of the data base from the DCTG; correct?

21 A That was not part of this follow-up, not for DCTG.

22 Q You are looking for confirmation that the
23 distribution system is adequate? Is that correct?

24 A That's correct.

25 Q What else?

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1 A And we did go and check to make sure that the
2 books which maintained the CMCs and DCAs in whatever satellite
3 we chose to visit did have copies of those.

4 Q Okay. Now, let's talk about the documents you
5 requested through the lists that you gave to Mr. Hutchinson.
6 To what purpose did you put those documents?

7 A It's a two-fold purpose: one, to serve as a basis
8 for tracing a document through its life cycle in the system;
9 and second, we did check to make sure that the people that
10 were supposed to have copies did have copies. But the
11 accuracy of the listing in the logs and this sort of thing
12 is also covered on the DCTG side.

13 JUDGE BLOCH: Ms. Williams, if I understand, there
14 was a change in procedures. During the August visit you
15 didn't give advance notification; during the October, you did.
16 Was that accidental or was there some reason for the change?

17 WITNESS WILLIAMS: No. If I recall my time
18 frames correctly, we were also on site already at that point
19 in time for the first follow-up, and --

20 BY MR. REYNOLDS:

21 Q This was in August, September, August?

22 A (Witness Williams) August-September time frame,
23 follow-up number 1. I believe that we were still on and off
24 the site from time to time, and from a scheduling standpoint
25 we simply walked in there, as much as I recall now, because
I do not recall going in and giving any list and the next

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1 day simply -- or that afternoon or whenever we got the
2 documents, continued on with the audit. For the second one
3 we were already pulled off-site, we were involved in document-
4 ing our review at that point in time and had to make a special
5 trip down there to do this review.

6 JUDGE BLOCH: When you testified earlier that it
7 was standard QA procedure to give advance notice of record,
8 what did you mean by that? What's the test of standard
9 procedure?

10 WITNESS WILLIAMS: It's my understanding that if
11 the time frame involved in gathering the documents is such
12 that you are talking about four hours or half a day or what
13 have you, that that is done. The approach you would want to do
14 is like we did on the first follow-up, is walk in and just
15 request the documents and continue on with your audit. It
16 was a timing question.

17 JUDGE BLOCH: When you say it's standard procedure,
18 you don't mean to say it's uniformly done. You mean it's
19 okay but not that it's uniform practice that you give
20 advance notice.

21 WITNESS WILLIAMS: That's correct.

22 BY MR. REYNOLDS:

23 Q Do you agree with that, Mr. Ward?

24 A (Witness Ward) I think it's common practice when
25 you are looking at programmatic implications. When you are

18joyll 1 looking at the number of documents involved, checking out
2 overall design control and project control system, it is
3 common practice to say, please get all of these documents
4 in one place because they normally are spread throughout the
5 organization. When you are looking at audits for compliance,
6 then more of the surprise kind of approach is used. I don't
7 think there is a Standard, with a capital "S," in this area.

8 JUDGE BLOCH: Cygna did it three times. I guess
9 I don't know what the approach was the first time, but the
10 second time there was no advance warning. The third time
11 there was. It is far from uniform practice by Cygna, I take
12 it.

13 WITNESS WARD: I think in the programmatic look
14 it is fairly uniform, but in conducting these things, which
15 frequently have the time element and distance that has to be
16 involved, we have used letting them know in advance if that
17 suits the schedule, or if we are there on site, just go in and
18 ask what we have. But I think even in this case, in the
19 programmatic review, that is, the horizontal review, as we
20 call it, we asked for the documents.

21 BY MR. REYNOLDS:

22 Q Ms. Williams, out of curiosity -- Ms. Williams,
23 did you at Cygna internally discuss sending this document in
24 advance, or was it just something that you decided to do? How
25 did it happen?

A (Witness Williams) We discussed it.

18joy12.

1 Q You discussed it with whom, somebody inside
2 Cygna?

3 A Quality assurance personnel.

4 Q Why did you think you should discuss it with
5 quality assurance personnel?

6 A Probably for all the implications we are hearing
7 today.

8 Q What did your people say to you, your QA people?

9 A They felt that with the time frame involved in
10 gathering the documents and the fact that they would have to
11 run them off the computer and the fact that we were then off-
12 site and the nature of the types of things surrounding what
13 we were looking at, as well as trying to validate a listing
14 which we already knew was an issue besides that we were taking
15 alternate means at solving or addressing, it would be
16 acceptable.

17 Q To what use did you put these documents?

18 A When we got on site, what did we do with them?

19 Q Yes.

20 A We decided what satellite we wanted to go to
21 based on having control distribution run off of the computer,
22 went to that satellite, checked that they had the documents
23 they were supposed to have, observed the daily workings of
24 the satellite, checked that they were operating in accordance
25 with their procedures, had them bring up a listing on the

18joyl3 1 screen and observed how the remote terminal system was
2 working since that was new from the last time we were there.

3 Q Did you interview personnel on the satellites to
4 determine their familiarity with the procedures?

5 A There were some cases, yes, sir, we would ask
6 them, well, where do you get the information on when to
7 stamp a drawing, this drawing affected by design changes, and
8 get a response.

9 Q Did you watch people perform their jobs out in
10 the satellites?

11 A Our reviewers did.

12 Q Did you spot check other documents?

13 A I don't believe that we necessarily did, no.

14 Q What are the alternative procedures that you
15 alluded to earlier a couple of minutes ago? You said, we
16 had alternative procedures, alternate means. What did you
17 mean by that?

18 A To verify the accuracy of the listing question.

19 Q Yes. Explain that, please.

20 A That is the DCTG data base cleanup effort.

21 Q Okay. Now, how is that an alternate means?

22 A Because that is the massive effort that is ongoing
23 to validate the listing. Once the listing is validated in
24 the central location, all the satellites will access that
25 by a computer. There won't be the potential for having two
separate lists.

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MR. REYNOLDS: May we have a minute, Mr. Chairman?

(Counsel for the Applicants confer.)

BY MR. REYNOLDS:

Q Ms. Williams, let's assume hypothetically that someone went out and falsified documents in accordance with the list that you gave to assure that whatever discrepancies may have existed were no longer there.

What effect would that have had on the purpose and scope of your review?

A (Witness Williams) I feel that we still would have been able to make an assessment as to the completeness of their procedures, whether they had incorporated the changes or problems or inadequacies in the procedures that we had cited before. I think we would have been able to still trace the life cycle through the documents and understand how the system is working, from which to make a determination on the effectiveness of the system.

Q And you, in fact, conducted that life cycle review of these documents?

A Because we would pick them up from the central system and follow it through to the satellite where it was supposed to be distributed.

JUDGE BLOCH: I don't understand the last answer.

MR. REYNOLDS: The witness has testified earlier that their objective was to evaluate whether procedures were

mgc 19-2

1 adequate and being implemented.

2 JUDGE BLOCH: I understood that you could tell
3 whether the procedure is adequate by looking at the procedure.
4 If I understood the last answer, the question was, if the
5 documents were fixed up in some way, would your conclusions
6 have been right about implementation?

7 MR. REYNOLDS: Her testimony was that she would
8 have found discrepancies. If the entire system went on
9 functioning properly, if a satellite was out doctoring
10 documents, her review would have found it, because it was
11 a comprehensive review in two directions, back to the
12 computer and out to the satellites.

13 JUDGE BLOCH: No, wait. The satellite was given
14 a computer list of what you would be looking at. Now the
15 hypothesis is that somehow -- it's not true?

16 WITNESS WILLIAMS: I don't know that.

17 JUDGE BLOCH: They might have.

18 WITNESS WILLIAMS: I suppose that's possible.

19 JUDGE BLOCH: If they were somehow alerted to the
20 fact that you would be there, they may have been given a list
21 of what you would be looking at. Is that possible?

22 WITNESS WILLIAMS: I suppose that's possible.

23 JUDGE BLOCH: So I don't see how, if the data were
24 phony -- I don't know why we're back to this, because I don't
25 know that there's any proof that the data was phony, but if

mgc 19-3 1

2 the data was phony, I don't see how you can make accurate
3 conclusions about implementation.

4 WITNESS WILLIAMS: The question might be whether
5 they would be able to go through something the size of
6 a thousand CMCs and DCAs in a time period.

7 JUDGE BLOCH: Let's think about it. What is the
8 usual demand on the services of a satellite center? How
9 many documents do they have to come up with per hour?

10 WITNESS WILLIAMS: You'd have to ask Texas
11 Utilities.

12 JUDGE BLOCH: Isn't that related as to whether
13 or not the availability of five extra hours to respond to a
14 Cygma request could result in a lot of extra time being spent
15 to make sure everything was just the way it should be?
16 Wouldn't you have to look at the demand, the number of people,
17 and figure out whether this was an advantage to them?

18 WITNESS WILLIAMS: Yes. That's one way you could
19 look at it.

20 JUDGE BLOCH: Is there another way to look at it?

21 WITNESS WILLIAMS: I think that wasn't the only
22 thing we were looking for. And the possibility always
23 exists that they would go an do that. And we felt that the
24 number of documents, the timing and the fact that it takes
25 them so long to individually make the runs -- it's not like
they can punch one key in the computer and get all of the

mgc 19-4 1 listings of distribution for these documents that they need.
2 It's a one-for-one activity that both the front-end timeframe
3 and the number of documents would tend to reduce that risk.
4 And that was our judgment.

5 JUDGE BLOCH: I think I understand the implementa-
6 tion. Mr. Reynolds, to clarify, said that a couple of times.
7 That means I understand the evidence. It doesn't mean I'm
8 satisfied with it. I have to think about it for awhile.

9 MR. REYNOLDS: That's why I'm asking questions,
10 Mr. Chairman. I'm not dumb.

11 (Laughter.)

12 BY MR. REYNOLDS:

13 Q Ms. Williams, in reviewing the file clerks' and
14 satellites' performing their jobs and in watching the system
15 function, as you did, correct --

16 A (Witness Williams) Yes.

17 Q -- would you have detected if those clerks were
18 doing their jobs incorrectly?

19 A I think the best example of that would be, on our
20 first follow-up where we found there was some confusion
21 between the clerks on when they should stamp a document,
22 this document affected by design changes, and just what
23 source of information they were using to make that
24 determination.

25 Q So the answer is, you would detect if they were

mgc 19-5 1

performing their jobs incorrectly?

2

JUDGE BLOCH: At least in some ways.

3

WITNESS WILLIAMS: Yes.

4

JUDGE BLOCH: For example, if they weren't assembling a complete package, and you don't look at the package, you wouldn't know that, would you?

7

WITNESS WILLIAMS: You would want to check the package that they were assembling. But there was only one satellite operating at this point in time with packages, and that's the electrical satellite. All the rest of them have a set of three-ring binders of the CMCs and DCAs. They are structured a little differently.

13

JUDGE BLOCH: In any event, if they handed out documents, without looking at the documents, you don't know they are the right documents, do you?

16

WITNESS WILLIAMS: Yes, that's correct; you would not know that.

18

BY MR. REYNOLDS:

19

Q Mr. Ward, I'd like to clarify your testimony earlier about engineering judgment.

21

On questioning from the Board, it seemed to me that you concluded, having been led there by the Board Chairman, that --

24

JUDGE BLOCH: I notice Mr. Ward is a very gullible person. He's easily led to conclusions.

25

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BY MR. REYNOLDS:

2 Q When analytical techniques are available, they
3 should be used in lieu of engineering judgment; is that a
4 fair summary of your testimony?

5 A (Witness Ward) Yes, I think so. I think, however,
6 it is important to understand the context.

7 Q Please explain the context.

8 A There are various degrees of engineering judgment.
9 For instance, in cases where there are developed criteria
10 on what is required that a system must perform, and there is
11 a design objective and there are several routes in getting
12 between the criteria and how the system is actually designed,
13 engineering judgment may be used to select which of the
14 techniques or methodologies is to be used. These are all
15 established methodologies.

16 I think my question or my answer was a much
17 simpler answer. It said that if you have the choice between
18 picking a number out of the air and using an analytical
19 technique, I would use the analytical technique.

20 JUDGE BLOCH: As I recall, the question included
21 the possibility of reasoning by analogy also. You didn't
22 necessarily have to do an analytical technique for each
23 situation, but you should at least know there is an
24 analogous situation that you have solved that puts a limit
25 on the situation.

mgc 19-7

1 WITNESS WARD: That's certainly true, as long as
2 the analogy exists, and you have to test that analogy
3 carefully.

4 BY MR. REYNOLDS:

5 Q Mr. Ward, do you have a copy of Appendix B with
6 you?

7 A (Witness Ward) I do not.

8 (Document handed to witness.)

9 JUDGE BLOCH: Let the record reflect that the
10 witness was handed Appendix B .

11 MR. REYNOLDS: We don't want the Board to be
12 without Appendix B.

13 JUDGE BLOCH: I know it by now, Mr. Reynolds.

14 (Laughter.)

15 WITNESS WARD: I should do a review of this to make
16 sure it's the latest version.

17 BY MR. REYNOLDS:

18 Q I am looking at Criterion 3, so it hasn't changed.
19 Would you look at Criterion 3, please?

20 A (Witness Ward) Yes, sir.

21 Q Criterion 3, Design Control.

22 A Yes, sir.

23 Q I particularly would like to focus on the third
24 paragraph, which starts, "Design control measures shall
25 provide for verifying and checking the adequacy of design,"

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1 et cetera.

2 A Yes.

3 Q I would like you to focus specifically on the
4 second sentence on the paragraph. Would you read that, please,
5 out loud?

6 A "The verifying or checking process shall be
7 performed by individuals or groups other than those who
8 performed the original design, but who may be from the same
9 organization."

10 Q In your opinion, what are the qualifications of
11 persons who are to do the design review?

12 Let me rephrase it. Are we talking there
13 necessarily about quality assurance people per se?

14 A No, we are not talking about quality assurance
15 people.

16 Q What are we talking about?

17 A We're talking about qualified engineers to perform
18 that similar task on probably another -- what we are saying
19 is, we want an engineering analyst to review the work of
20 another engineering analyst and confirm that.

21 JUDGE BLOCH: How do you see that provision as
22 relating to Criterion 1, which states, "The persons and
23 organizations performing quality assurance functions shall
24 have sufficient authority and organizational freedom," et
25 cetera, and then it states in the next sentence, "should

mgc 19-9

1 have sufficient independence from cost and schedule when
2 opposed to safety considerations"?

3 Is there a relationship between them? Is the
4 design organization excused from this independent QA
5 organization requirement of Criterion 1?

6 WITNESS WARD: The normal implementation of
7 Criterion 1 is a separate quality assurance organization.

8 JUDGE BLOCH: That applies to design as well as
9 Criterion 3 does?

10 WITNESS WARD: Yes. Criterion 3 is talking about
11 a similarly qualified engineer or analyst checking the work
12 of another engineer or analyst.

13 JUDGE BLOCH: So we can think of the implementation
14 for design as including design verification functions, but
15 superimposed upon that is the QA program, which is by
16 independent people.

17 WITNESS WARD: That's correct. That's correct.

18 JUDGE BLOCH: We just had a little legal argument
19 conducted through the witness.

20 WITNESS WARD: I see. Who won?

21 JUDGE BLOCH: You are now a lawyer, if you don't
22 mind being.

23 WITNESS WARD: I do mind being.

24 (Laughter.)

25 JUDGE BLOCH: In addition to other skills.

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MR. REYNOLDS: I have no further questions.

JUDGE BLOCH: This is to remind everyone, this is recross.

We are next to CASE on the first set of issues, and you have a choice as to whether to pursue the enlarged scope of this issue or stick to the narrow scope and pursue your scope issues next.

WITNESS WARD: If we could go off the record just a minute.

(Discussion off the record.)

(Recess.)

End 19 NBU

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JUDGE BLOCH: The Board would like to memorialize a conversation that occurred by telephone last week on the record. In a previous telephone conversation we had explained that we thought that CASE had on occasion called the Board and had addressed matters that should not be addressed ex parte. We established a rule that before any part telephoned the Board, it should speak to another party first to explain what it should say. Subsequently, Mr. Reynolds called the Chairman and I asked first whether he had spoken to another party, and he said he had not. I said, is the matter strictly procedural? He said yes, and then he asked the Chairman whether he had told a reporter that the Cygna report was superfluous. I said I had not and I denied it vigorously. I did think that if I had done that, it would have been a form of prejudgment. Mr. Reynolds explained that if I had, it could have led to the disqualification of the Chairman.

That matter was not procedural and it should not have been addressed to the Board ex parte, and I am going to strictly enforce the requirement that all telephone calls be made first to another party before the Board, and there will be no exceptions for procedural matters.

MR. REYNOLDS: Mr. Chairman, the record should also reflect you instructed me on the phone, parties were called and advised as to the subject of our conversation.

JUDGE BLOCH: You did. My concern was that it

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1 wasn't enough because, in fact, you obtained testimony from
2 the Chairman in an ex parte conversation. It wasn't proper
3 and I don't want that to be repeated by any party.

4 Please continue.

5 BY MS. ELLIS:

6 Q I think we have discussed this some before, but
7 just to clear the air here completely, have either of you
8 discussed the testimony here at breaks or at lunch or any
9 other time with any other persons other than one another?

10 A (Witness Williams) Just one another, Cygna and
11 John Ward.

12 A (Witness Ward) We have discussed during lunch
13 with some of the project team some clarifications on the
14 answers we have given.

15 A (Witness Williams) But internal to Cygna.

16 A (Witness Ward) Yes, sir.

17 JUDGE BLOCH: Since you don't have a lawyer, there
18 is no redirect of you.

19 As a result of your conversations with the project
20 team, is there anything you would like to clarify?

21 WITNESS WILLIAMS: We were getting some of the
22 answers from this morning.

23 JUDGE BLOCH: Oh, I see. There was nothing you
24 learned that requires the clarification of something you
25 told the Board; you are just following up on matters that

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1 were left open.

2 WITNESS WILLIAMS: Yes. I think the one we did
3 want to clarify, John has already picked out, which was you
4 have asked whether there were any significant price tags
5 associated with the previous independent design reviews. We
6 didn't want to imply that there weren't changes and correc-
7 tions since we were thinking of hardware changes. That was
8 the biggest clarification. The rest of them were answers to
9 the questions.

10 BY MS. ELLIS:

11 Q And you spoke with no one other than the Cygna
12 team?

13 A (Witness Ward) That's correct.

14 Q Do you know whether or not they might have spoken
15 with anyone with the Applicants or any other parties?

16 A No. I guess I also might say I said hello to
17 Dr. Jordan in the men's room.

18 (Laughter)

19 Q I think I have reference regarding testimony. If
20 not, that's what I meant. That is what we are discussing.

21 A Not to my knowledge.

22 A (Witness Williams) (Nodding negatively)

23 Q To go quite a ways back now to something we had
24 discussed earlier that was mentioned, I think, again in
25 passing later on in your testimony, is it your understanding

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1 that when you have "as-built" stamped on a drawing, that what
2 is shown on that drawing is what is actually built and
3 installed in the field?

4 A (Witness Williams) That is my understanding.

5 Q I believe at one point you stated that there was
6 a time when you stated a particular problem to Texas Utilities
7 and that they had already started to set up a satellite.
8 Apparently this was a problem with documentation control
9 and so forth. What form did that notification take, please?
10 What form was used?

11 A I'm trying to recall if there were any documents
12 at Comanche Peak on the plan at that point in time. We told
13 them it was a problem, and their problem was: we are setting
14 up this system. There was no document associated with that.
15 We sat and waited then for the system to be set up.

16 Q All right.

17 JUDGE BLOCH: My recollection is that our record
18 should shown in June, as I recall, that those satellite
19 systems were being planned; is that correct?

20 MR. REYNOLDS: Mr. Tolson testified to that last
21 summer.

22 JUDGE BLOCH: I thought it was actually before
23 the first Cygna visit that he testified to you.

24 MR. REYNOLDS: I think it may have been.

25 BY MR. REYNOLDS:

Q My question went more to what form of

20joy5 1 communication was it. Was it by telephone or by letter? How
2 was it handled?

3 A (Witness Williams) In all likelihood I would say
4 that it was down at the site, but there is a possibility it
5 was over the telephone.

6 Q Would there have been a record kept of that
7 conversation?

8 A It was prior to the rules of protocol.

9 Q So it would not.

10 A No, not necessarily. I can check. There are
11 things that I wrote down in telecons, and that would be a
12 likely candidate for one because of the importance of the
13 information, but I would have to check. The observation
14 record is the document. We write this up when we got back,
15 or as soon as we discovered the error, and this is how we
16 were documenting the issues at the time as opposed to the
17 telecons in all cases.

18 Q Would there be any other handwritten notes or
19 anything about that?

20 A No. There is a checklist.

21 Q Would that have been shown on the checklist?

22 A The observation, the finding is referenced off of
23 an item on the checklist, yes.

24 JUDGE BLOCH: When these things are done at the
25 site, the original notes, I take it, are handwritten; is that

20joy6

1 right?

2 WITNESS WILLIAMS: The reviewers, some have their
3 own field notes.

4 JUDGE BLOCH: And then it is typed later?

5 WITNESS WILLIAMS: Then they come back and we write
6 up the observation and that becomes the official document.

7 BY MS. ELLIS:

8 Q Could we have that supplied if there is a document
9 like that?

10 A (Witness Williams) I can't promise whether they
11 kept their notes or what is available. This is our official
12 document as far as we are concerned. The signed-off observa-
13 tion is the reviewer's statement as to what they found.

14 JUDGE BLOCH: Ms. Ellis, why in this one instance
15 when there was public testimony prior to this communication
16 about this, and I recall there was, that Mr. Tolson did
17 testify about the satellite system in June, why are we
18 concerned about documenting this particular conversation?

19 MS. ELLIS: I would like to see what was said in
20 that particular conversation and who said it to whom and the
21 extent that it was represented to be complete at that time, or
22 the extent -- or the time frame in which they were told it
23 would be ready. It seems to me that they had understood that
24 it would be ready earlier than what it was. In fact, they made
25 a trip to the plant thinking it would be ready, if I recall

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1 that correctly.

2 JUDGE BLOCH: I don't remember testimony about
3 that. Did you think at the time you went to the plant that
4 the satellite system was going to be ready?

5 MS. ELLIS: The second time.

6 JUDGE BLOCH: The second time?

7 WITNESS WILLIAMS: The first follow-up, we thought
8 that it would be sufficiently operational.

9 JUDGE BLOCH: Was that based on the communication
10 that occurred the first time?

11 WITNESS WILLIAMS: Yes. Yes, it was.

12 JUDGE BLOCH: Why was the time period in which that
13 satellite system was expected to be developed excluded from
14 the observation record or the checklist? Apparently there
15 was a portion of the communication that took place on site
16 which related to when the satellite system would be ready,
17 and that relates to this observation record. How would it be
18 decided not to mention the schedule, the time schedule as
19 part of the observation record.

20 WITNESS WILLIAMS: I think the only way I see it
21 relates to the observation is in our ability to resolve or
22 not resolve the issue, as the case may be. The observation
23 remains open until further information is available, and it
24 sits on our files as such. The personnel contacted during the
25 course of the review, however, Texas Utilities personnel, do

20joy8 1 show up on a checklist.

2 JUDGE BLOCH: What would the date be on which you
3 were told that there was going to be a satellite system?
4 Do you know about the date that that occurred? Was it, in
5 fact, in July?

6 WITNESS WILLIAMS: I would say it was sometime
7 early in August, based on the fact the observation record was
8 written up on July 29th.

9 MR. REYNOLDS: Mr. Chairman.

10 JUDGE BLOCH: Yes?

11 MR. REYNOLDS: I object to the request for late
12 discovery which Mrs. Ellis has just made. It is obvious
13 from DC-01-01 in Appendix F that the information was contained
14 in the Cygna report, that Texas Utilities had previously
15 known of the problems in the DCC arena and had told Cygna
16 that they were going to do the satellite system. Mrs. Ellis
17 had the opportunity to ask for whatever documentation supported
18 that conversation when she took discovery in this matter, and
19 that period is closed.

20 JUDGE BLOCH: Right now I am trying to figure out
21 for the Board how these conversations, which apparently --
22 according to the testimony are recorded on observation
23 records during site visits, not reflected in the observation
24 records here.

25 WITNESS WILLIAMS: I think I have got to clarify

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1 the purpose of our documents here. While the reviewers are
2 on site, what they are working with are checklists. The
3 checklist associated with this observation is Checklist
4 DC-01-01 in Volume 2 of the draft report. In fact, it's the
5 first checklist.

6 A (Witness Ward) It's Appendix H, and it's the first
7 one, and you will note on that that it indicates the reviewers
8 and all of the people contacted in the Texas Utilities
9 organization.

10 WITNESS WILLIAMS: And also the dates of the review.

11 JUDGE BLOCH: Okay. And somewhere in this there is
12 a statement about the satellite system being worked on?

13 WITNESS WILLIAMS: All this will do is say the
14 reviewer went down there and he found discrepancies, and this
15 is where he records that fact. The next step is we have
16 project reviews internal to Cygna where we discuss all of the
17 issues associated with the checklists, and in this case we
18 decided that it warranted an observation, and we did so on
19 July 29th.

20 The satellites are the next step.

21 JUDGE BLOCH: But is there any indication in here
22 that while -- did this information come to them on site?

23 WITNESS WILLIAMS: Did the observation record come
24 to them on site?

25 JUDGE BLOCH: The information about the satellite

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1 systems.

2 WITNESS WILLIAMS: Verbally.

3 JUDGE BLOCH: Okay. Now, was that relevant to
4 the checklist?

5 WITNESS WILLIAMS: The reason we would ask the
6 question is because we found the problem. The problem is
7 documented on the checklist. It has nothing to do with the
8 satellites, though.

9 JUDGE BLOCH: In other words, you would document
10 here what the problem is but nothing to do with the resolution
11 of the problem?

12 WITNESS WILLIAMS: That's correct, on the check-
13 list.

14 JUDGE BLOCH: That would be kept on a note card
15 or a note that was taken by the individual?

16 WITNESS WILLIAMS: It wouldn't be resolved at
17 that point in time. This observation was not resolved until
18 the second follow-up visit. The only thing that is written
19 is the first page, which is all the information we know, what
20 we think the potential design impact is.

21 JUDGE BLOCH: I just want to know the procedure
22 by which information relevant to the resolution of an
23 observation is recorded for later use. This isn't just a
24 telecon; this is something you may use later. Is there a
25 record made of it and kept somehow by Cygna?

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1 WITNESS WILLIAMS: I am not understanding what
2 you think we are using it. The only thing I would use it
3 for, that piece of information, is to schedule our reviewers
4 to go back down to the site.

5 JUDGE BLOCH: Because you would have to observe
6 the satellite center before you could accept it.

7 WITNESS WILLIAMS: That's correct.

8 JUDGE BLOCH: So the level of formality you might
9 need for that prior to this protocol was not very great.

10 WITNESS WILLIAMS: That's correct. I would keep my
11 own notes because I had to schedule the reviewers, and we
12 would not accept it without going back down on a follow-up
13 site visit.

14 JUDGE BLOCH: Okay. I think we understand the way
15 the documentation process works. I don't see any particular
16 reason to have discovery of that document at this time, given
17 the testimony about the way the actual documentation was done.

18 BY MS. ELLIS:

19 Q A little later you were discussing the DCAs, which
20 I believe you indicated were basically done at that time.
21 CMCs were still in the process. I believe you mentioned that
22 part of your concern was relieved by the fact that they were
23 checking each and every one sequentially. Do you recall that
24 part of your testimony?

25 A (Witness Williams) Yes, I do.

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1 Q Have I accurately stated it? If at any time I
2 misstate it, please let me know.

3 A Okay.

4 Q How do you know that they were checking each and
5 every one sequentially?

6 A By sitting down and reviewing that process with
7 the individuals involved in conducting it.

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2 Q But how do you know that was being done when
you weren't sitting down with them in review?

3 A I think the best answer to that is, the process
4 wasn't complete at the time, and it's still not complete
5 today. What we did was identify the issue, identify the
6 corrective action that the Applicant was taking, and felt
7 that that was an adequate corrective action.

8 Now since the process wasn't done, it's not the
9 point in time when you would follow up on that, so we felt
10 we had done our job in identifying it and agreeing on the
11 resolution and corrective action.

12 Q All right. So you can't really state to your
13 own personal knowledge at this point that each and every one
14 of them has or will be, in fact, checked sequentially; is
15 that correct?

16 A Not without going down for a follow-up audit.

17 Q I believe you indicated that you found no examples
18 of documents missing per se during the review; is that
19 correct?

20 A There is one document they had trouble finding,
21 but I don't recall -- and I can doublecheck this -- that there
22 was a document actually physically missing that we could not
23 obtain a copy of when we requested it for the systems we
24 reviewed. Just to clarify, you understand we are talking
25 about a set scope.

mgc 21-2 1

JUDGE BLOCH: Ms. Williams, would you necessarily have known if one of the members of the team had a problem like that?

WITNESS WILLIAMS: If they couldn't get a document?

JUDGE BLOCH: If it took a long time to get a document.

WITNESS WILLIAMS: Yes, absolutely.

JUDGE BLOCH: They would have told you?

WITNESS WILLIAMS: We track everything on action items listed. It's a very tightly controlled project. We have project reviews on a very regular basis, because that's the only way to check each other's work essentially.

BY MS. ELLIS:

Q Wouldn't the system that you reviewed, as systems that go in a nuclear plant, be one of the relatively simple systems?

A (Witness Williams) For the spent fuel pool cooling system? Is that what you are referring to?

Q Yes.

A We didn't pick the scope. That was something agreed to with the Staff. The reason the spent fuel pool was picked is because it was in the process of being turned over and considered complete. That was the only system to choose from.

JUDGE BLOCH: Ms. Williams or Mr. Ward, that

mgc 21-3

1 wasn't the question. If we could just answer the question,
2 is it a relatively simple system?

3 WITNESS WARD: Yes, I think it is relatively simple,
4 but I don't think the answer could be understood without some
5 amplifying remarks.

6 JUDGE BLOCH: Please.

7 WITNESS WARD: And that is the fact that in
8 attempting to test the design control process, we considered
9 it appropriate to find a system that had been essentially
10 completed, and then test the system, because by that point
11 the design organization should have stopped, and the start-up
12 organization should have taken over.

13 In our search for such a system, this was the
14 system available. The fuel building was the building that
15 had essentially reached the completed stage.

16 In addition, we picked another system which -- for
17 which there were some significant design parameters in the
18 RHR system, to review.

19 BY MS. ELLIS:

20 Q Isn't the RHR system also a relatively simple
21 system, as systems go within a nuclear plant?

22 MR. REYNOLDS: Objection. This goes beyond the
23 scope or recross.

24 MS. ELLIS: I think the Board offered me the
25 opportunity to go into scope as well.

mgc 21-4 1

JUDGE BLOCH: The problem was that the groundrules had been previously violated by the Board and possibly by the Staff.

I did offer you the opportunity to do that. I then offered Ms. Ellis the choice, too.

Does it matter really whether we stop now and come back to it later?

MR. REYNOLDS: No.

(Laughter.)

BY MS. ELLIS:

Q Isn't the residual heat removal system a relatively simple system also?

A (Witness Ward) If you're asking me, that's opinion. I don't think so. It's a system that has demanding design parameters. It's a large system. It has significant components -- heat exchangers, pumps, valves, instrumentation. It penetrates major containment building walls, goes from building to building, has differential kinds of movements.

I think it's a significant system.

Q And the portion that you looked at, was that the major part of that system?

A I'm sorry?

Q The major portion of it, was that what you looked at?

A (Witness Williams) It was a major portion. We

mgc 21-5 1

looked at one train of it.

2

JUDGE JORDAN: Is this the system that has the
3 flued head?

4

WITNESS WILLIAMS: Yes.

5

JUDGE JORDAN: Can you tell me what a flued head
6 is?

7

WITNESS WILLIAMS: Without drawing a picture?

8

(Laughter.)

9

It's a type of pipe support, would be one way to
10 look at it, specialized in nature, and has more stringent
11 code design requirements associated with it.

12

JUDGE JORDAN: It's a type of pipe support, you say?

13

WITNESS WILLIAMS: It does support the pipe at
14 the penetration.

15

JUDGE JORDAN: At the penetration?

16

WITNESS WILLIAMS: Yes.

17

JUDGE JORDAN: Through what? What penetrates
18 through --

19

WITNESS WILLIAMS: The containment wall.

20

JUDGE JORDAN: I see.

21

WITNESS WILLIAMS: In this case, into the sump.

22

JUDGE JORDAN: I see.

23

BY MS. ELLIS:

24

Q So it was your understanding, am I correct, that
25 as of July 1983 the spent fuel system was completed?

mgc 21-6

1 A (Witness Williams) It was in the process of
2 turnover, completed construction.

3 Q In the walkdown that you discussed, were all the
4 items that you looked at in the walkdown accessible?

5 A Could you define "accessible"? As in eyeshot,
6 or in radiation areas?

7 Q I was thinking of one in particular, Section 4
8 of the report, Page 4-18, second paragraph. This specific
9 section has to do with mechanical walkdown, piping and
10 supports.

11 In that paragraph it states, quote, "There was a
12 total of 91 supports on the selected piping system, 48 of
13 whcih were fully accessible for inspection. The configuration
14 and general form of all of the remaining 43 supports were
15 found by visual inspection to be in agreement with the design
16 drawings. In addition, the accessible dimensions of hardware
17 data for seven of the 43 supports were checked," end quote.

18 Were the other items that you looked at in addition
19 to these, were they accessible, or were there also problems
20 with their being not fully accessible?

21 A I'm a little confused. You are asking items of
22 what? You said "the other items."

23 JUDGE BLOCH: I think she means other elements of
24 the plant. In this one particular aspect of the walkdown,
25 you had trouble looking at some things completely, and you

mgc 21-7

1 disclosed it.

2 The question is, were there other elements that
3 you wanted to look at elsewhere that you had difficulty
4 looking at clearly?

5 WITNESS WILLIAMS: In the only other example of
6 that that I can think of, is on the piping when we were
7 checking the geometry. There is a small portion of the
8 system which runs through a wall and comes out in the spent
9 fuel pool, and we, of course, couldn't get access to that.

10 BY MS. ELLIS:

11 Q If some of the items were not fully accessible,
12 then how could you be certain that the as-built configuration
13 was what it showed to be on the drawings?

14 A (Witness Williams) I think you have to take these
15 as two separate items. The pipe supports, what we would do
16 is check that they were the correct type, that they were
17 oriented in the proper direction, that they were located at
18 the proper -- that they were properly located on the pipe.

19 JUDGE BLOCH: Are you remembering a checklist?

20 WITNESS WILLIAMS: I was there, and this stuff is
21 on a checklist.

22 JUDGE BLOCH: Is it one of the checklists in
23 there?

24 WITNESS WILLIAMS: Yes. It's one of the WD
25 checklists.

mgc 21-8 1

2 JUDGE BLOCH: This is a checklist that is
3 applicable for hard to look at supports?

4 WITNESS WILLIAMS: It would be the same checklist
5 as the vother ones. It would be just less accessible type
6 comments --

7 JUDGE BLOCH: You would observe whatever you could,
8 and these were things you could observe, in any event; is
9 that what you are saying?

10 WITNESS WILLIAMS: Yes. And if we couldn't, you'll
11 see that on the checklist.

12 JUDGE BLOCH: Okay, then, let's not bother looking
13 at the specific checklist.

14 You said the checklist was applied to the extent
15 you could, and obviously some of the items could be applied,
16 even when it was hard to look at that.

17 WITNESS WILLIAMS: That's right.

18 BY MS. ELLIS:

19 Q In this specific example, do you recall why these
20 items were not accessible?

21 A (Witness Williams) A couple of them, just due to
22 the height. We would climb up on the piping with belts and
23 such and go as far as we could and access as much as we could,
24 but there were a couple that were way up in a corner or --
25 I would say height was the biggest problem, and it doesn't
mean it's not -- you can't see it; you just can't get to it.

mgc 21-9

1 Q Isn't it likely that a support, for instance, in
2 an area such as that would also be one where, for instance,
3 a welder would have difficulty getting to it, which might
4 in turn increase the possibility of having improper welding
5 done and so forth?

6 MR. REYNOLDS: Objection. It's beyond the scope
7 of this report. It's beyond the scope of this witness'
8 testimony and the report, the review.

9 JUDGE BLOCH: Trying to test the adequacy of the
10 sample? It seems to be a legitimate question.

11 MR. REYNOLDS: Test the adequacy of the sample by
12 asking whether welders might have trouble welding on it?

13 JUDGE BLOCH: I believe the question goes to whether
14 or not the items that were not easily visible were more likely
15 to have defects than the ones that were easily visible.

16 You might want to answer that generally. She
17 specified welding, but I can imagine other things as well.
18 You might want to comment on welding and then any other ways
19 in which you think the sample possibly was skewed by the fact
20 that you couldn't get up to these particular items.

21 WITNESS WILLIAMS: I would say no, that's not
22 necessarily true, because you have to consider first the
23 construction sequence and the fact that there is scaffolding
24 up there, and that they have equipment that we didn't have,
25 you know. The condition we were looking at is not necessarily

mgc 21-10¹

the condition the workers were working under. Not everything gets installed all at once.

BY MS. ELLIS:

Q So there was no method for you to look at those particular items?

A (Witness Williams) Not for us, no.

A (Witness Ward) I think it needs a little bit of explanation there. What Ms. Williams means by "fully accessible," I think she can walk up and put her hand on.

A (Witness Williams) That's correct.

A (Witness Ward) And the remaining 43 that you are talking about that were not reachable were still visible, and the orientation and placement of the support could be viewed.

Her previous point was, in the construction of this system, the fuel building is just covered with scaffolding. It is not difficult for a welder to get up and do the work, nor for the QC and QA inspectors to perform their tests of the work.

When that construction is completed, as this building was essentially completed, all of that scaffolding is removed. Then Nancy, who is quite tall for a woman, was not quite tall enough to touch all of the supports.

Q But for purposes of your particular review, looking at the welding from that distance or, for instance, whether

mgc 21-111 a nut was properly tightened, you could not tell from looking
2 at that whether or not things had been done properly; is
3 that not true.

4 A (Witness Williams) We would not guess. If we
5 could not tell for sure, we would not record it on the
6 checklist.

7 JUDGE BLOCH: Ms. Williams, do you know how the
8 time period for the Cygna observations compared to the
9 Staff's final walkdown observation of the fuel building?

10 WITNESS WILLIAMS: No.

11 I just wanted to make clear that the implication
12 in this paragraph wasn't that we did not look at the
13 remaining 48 supports, and you will be able to tell that
14 when you go through the checklist what we did and did not
15 look at.

16 BY MS. ELLIS:

17 Q For the items that you could not get close enough
18 to place your hand on, how could you be certain of the
19 location of the support, just from a visual look at it?

20 A (Witness Williams) It wasn't in all cases visible,
21 because we were able to shimmy up the pipe, and with a
22 six-foot yardstick or extendable ruler, measure the location
23 of the support from where we were. We just couldn't touch
24 the support.

25 Q Was that true in all instances?

mgc 21-12¹

2 A I would have to go back and check the checklist,
3 and it will tell you which ones we were able to verify and
4 which ones we were not.

5 Q So that is reflected in the report itself?

6 A That's correct.

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1 Q Did you check for the direction of the restraint
2 of the strut when you looked at those?

3 A Yes, that's what I mean by orientation.

4 Q For those that weren't accessible, how did you
5 measure that?

6 A How do you mean, measure? Are you talking about
7 degrees tolerance?

8 Q Yes.

9 A Then we would not make a statement they were
10 able to measure it. But we would be able to tell if it was
11 running north, south, east, west and roughly in the correct
12 orientation.

13 Q Could you tell with sufficient accuracy to say
14 whether it was within, say, five degrees?

15 A I think that depends largely on the angle that we
16 were looking at it from. If you are looking at something in a
17 plane, you have got a much better reference point than if you
18 are looking up at something at an angle.

19 Q So in some instances you might have been able to;
20 in other you might not have been able to?

21 A That's correct.

22 A (Witness Ward) I think it's important to point
23 out, out of the 91 supports, 48 were checked.

24 Q That would be about half?

25 A Yes.

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1 Q I think you mentioned at one point that there was
2 some difficulty for Cygna in trying to get the total drawings
3 and so forth together, all of the documentation packaged
4 together. Do you know or would it be reasonable to assume
5 that the crafts would spend the same amount of time doing
6 that that Cygna did?

7 A (Witness Williams) I guess I'm not quite clear
8 on where you are quoting me. I think I said that we took time
9 to ensure that we had the complete package because that was
10 the purpose of our being there. That was not meant to imply
11 that we had difficulty in doing that.

12 Q All right.

13 Do you know of your own personal knowledge that
14 the craft would spend the same amount of time doing that?

15 A The craft isn't the party that collects the
16 documents together. That's the responsibility of the document
17 control center.

18 Q I understand that, but isn't it a fact that the
19 craft does come to the document control center to get those
20 documents to go out in the field?

21 A Yes. They are just handed the package.

22 Q Might it not also take a significant amount of time
23 for them to wait for the document control to get the package
24 together for them?

25 A I can't answer that. That wasn't part of the scope

22joy3 1 of the review.

2 JUDGE BLOCH: Ms. Williams, on the upper lock-nut
3 program, page 418, was there an adequate procedure for
4 tightening those lock-nuts in existence at the time?

5 WITNESS WILLIAMS: Yes. We have a paper trail on
6 that one that is described somewhat in the observation.

7 JUDGE BLOCH: Also an adequate procedure for
8 QA on the lock-but?

9 WITNESS WILLIAMS: There is a QA check, yes. They
10 did institute a revised procedure to correct that condition.
11 I believe the NRC found it. That history is in the observa-
12 tion.

13 JUDGE BLOCH: So this inspection was after the
14 final walkdown by the NRC Staff on the fuel building, because
15 that's where that was discovered.

16 WITNESS WILLIAMS: Yes.

17 JUDGE BLOCH: Just on the timing of that, do you
18 know, have they tried to implement that procedure already at
19 this point but just missed this one lock-nut?

20 WITNESS WILLIAMS: No, I believe they were in the
21 process of it, and I would have to go back to check my notes
22 because I recall asking a similar question.

23 BY MS. ELLIS:

24 Q Was there also a procedure for backfitting?

25 JUDGE BLOCH: Of lock-nuts?

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MS. ELLIS: No, not of lock-nuts.

BY MS. ELLIS:

Q Of supports, for instance.

A (Witness Williams) Backfitting because of why?

Q For instance, if there were loose jam-nuts, if some of these were inaccessible, how would they go about checking it out?

A They would have the equipment that we didn't have, and they are, they are embarking on a program of going and checking all of that. We didn't go in there with extension ladders and scaffolding and the equipment that Texas would have available if they were committed to a program such as that.

Q You said Texas would have available. You are referring to Texas Utilities?

A Yes.

JUDGE BLOCH: When Miss Williams refers to Texas Utilities as Texas, there is no slight intended to the State of Texas.

(Laughter)

MR. HICKS: I was getting worried about that.

(Laughter)

BY MS. ELLIS:

Q Is it your understanding that only the satellites have control stamps?

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1 A (Witness Williams) It's my understanding the
2 central center does, too, because they can issue documents
3 as well.

4 Q Is it your understanding that only the satellites
5 or the main document control center are supposed to have
6 control stamps?

7 A Yes.

8 Q In discussing the logs, you verified the logs
9 in / . What specific documents did you look at?

10 A The first time that we went through to do the
11 check, I don't have the original list with me. The only
12 document available here is our report which explains what the
13 discrepancies were.

14 JUDGE BLOCH: Mrs. Ellis, were you actually asking
15 about which specific -- You weren't asking for a complete list
16 of the documents, were you? You must have had something else
17 in mind.

18 MS. ELLIS: Sort of generically what did they look
19 at.

20 JUDGE BLOCH: What was the nature of the documents
21 that you were looking at at that time in order to do the
22 check?

23 WITNESS WILLIAMS: The spent fuel pool cooling
24 documents associated with that that we were using in the
25 walkdown.

22joy6

1 BY MS. ELLIS:

2 Q Piping and electrical drawings, this sort of
3 thing?

S2 BU

4 A (Witness Williams) Yes.

5 Q In regard to the probable cause of the problems
6 that you mention in your report, what sort of methodology
7 was used to determine that probable cause?

8 A Project review meetings.

9 Q Between?

10 A Cygna personnel, consultants within Cygna. We
11 felt that was necessary. It's a process that we go through
12 in reviewing the checklists after our reviewers have
13 completed and documented the results.

14 JUDGE BLOCH: As an example, if we look at DC-01-01,
15 you pointed out the probable cause suspected on site was
16 failure to implement procedures. On further investigation,
17 was there an empirical determination of what the cause was?
18 What was the cause of DC-01-01? Where do we find that?

19 WITNESS WILLIAMS: The cause is -- we are looking
20 for programmatical causes.

21 JUDGE BLOCH: Where do we document that on the
22 follow-up observation record, that particular observation?

23 WITNESS WILLIAMS: We still felt that it was a
24 problem with not implementing procedures.

25 JUDGE BLOCH: How do we know that on the follow-up

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1 observation. Where is the conclusion about that?

2 WITNESS WILLIAMS: This is a Revision 1 to the
3 observation record. There is in our files a Revision 0. If
4 you look at Attachment A in the upper right-hand corner, you
5 will see a revision number. It's revised to reflect the
6 follow-up. On our files there is a Revision 0. It's not part
7 of the report.

8 JUDGE BLOCH: How did you conclude, after having
9 talked about it, that the cause was failure to implement
10 procedures?

11 WITNESS WILLIAMS: It was our feeling that they
12 were not implementing procedures to execute proper control.

13 JUDGE BLOCH: You concluded that the procedures
14 were thoroughly adequate but that the problem was implemen-
15 tation?

16 WITNESS WILLIAMS: Yes.

17 JUDGE BLOCH: And when a procedure is not being
18 implemented properly, does that have any implications for
19 other operations on the site? It was their responsibility
20 to know about that. Was there a QA responsibility to know
21 that that was not happening?

22 WITNESS WILLIAMS: I think they did know about it
23 in the sense that they were already initiating the corrective
24 actions that we spoke about earlier on today.

25 JUDGE BLOCH: Okay. And that's the reason the

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1 probable cause was limited to this and you didn't look beyond
2 in the organization? That's why the resolution addresses
3 that?

4 WITNESS WILLIAMS: That's correct.

5 JUDGE BLOCH: Is this typical of the method you
6 would use in reviewing probable cause?

7 WITNESS WILLIAMS: I would say it's representative.
8 We do look at things singularly and cumulatively.

9 JUDGE BLOCH: Were there some of these observations
10 where you found it particularly hard to decide where probable
11 cause was?

12 WITNESS WILLIAMS: Yes.

13 JUDGE BLOCH: Could you just give us one or two
14 examples of that?

15 WITNESS WILLIAMS: In the case of cable trays
16 where we ended up writing a PFR.

17 JUDGE BLOCH; That was hard because you documented
18 it into a more serious category also, and you looked at that
19 very thoroughly.

20 How about the ones that stayed as observation
21 records?

22 WITNESS WILLIAMS: I can't think of any off-hand.
23 If we changed our feelings on follow-up reviews, that would
24 be indicated in a revision to the Attachment A. If we
25 felt that there was a cumulative effect that was not

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1 reflected in an observation, we would write another observa-
2 tion.

3 JUDGE BLOCH: And in each instance did you consider
4 not only what this particular event was but whether it
5 should have been caught by the company?

6 WITNESS WILLIAMS: Yes, in determining the serious-
7 ness of it.

8 BY MS. ELLIS:

9 Q I would like to talk a little bit more about
10 those meetings where you determined all of this. Was Texas
11 Utilities ever consulted regarding any of this? Did you
12 have telephone conversations about them or anything like
13 that?

14 A (Witness Williams) I would ask them for informa-
15 tion. Is that what you are asking?

16 Q Was there anything else that you discussed with
17 them? What the problem was, for instance?

18 A I think that it is hard for me to answer it
19 without looking at the specifics. In the case of DCC -- is
20 that the example you have in mind?

21 Q Let's go with that.

22 A Okay. They did know what we thought. We told
23 them what the errors were. We told them what we thought
24 the seriousness of the consequences were, and then we found
25 out -- we asked them: what, if anything, are you doing about

22joy10

1 this? And from then on in -- we discussed the time line
2 earlier on this afternoon. There were obviously a couple
3 of discussions back and forth on when are you going to get
4 the system operational, when can we send the people down,
5 things along those lines.

6 As far as an assessment as to whether we still
7 think it's a problem, that is entirely up to us.

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1 Q During those conversations back and forth might
2 Texas Utilities have suggested a probable cause?

3 A No.

4 JUDGE BLOCH: When you responded, you responded in
5 the same way you did previously?

6 WITNESS WILLIAMS: Yes.

7 JUDGE BLOCH: Was it ever the case that these
8 telecons were originated by Texas Utilities or Gibbs & Hill?

9 WITNESS WILLIAMS: In response to requests.

10 JUDGE BLOCH: Aside from that, how would it
11 originate?

12 WITNESS WILLIAMS: Okay, not on any technical
13 matters or review matters, but perhaps to ask about a schedule
14 along those lines.

15 JUDGE BLOCH: Purely procedural?

16 WITNESS WILLIAMS: That is correct.

17 BY MS. ELLIS:

18 Q Were there notes taken of those meetings and so
19 forth? Were those during the time frame when the requirements
20 set forth were being applied as far as the--

21 JUDGE BLOCH: I am sure I know the answer to that.
22 That was asked-and-answered, and, I think, pursued in some
23 detail.

24 BY MS. ELLIS:

25 Q Do the satellites as you currently understand it

1 still have access to the manual systems as well as the
2 computerized systems? I believe that was discussed earlier,
3 but I am not sure what the answer was?

4 A (Witness Williams) The answer is yes, for certain
5 types of drawings.

6 JUDGE BLOCH: I am sorry, you are talking about the
7 lots, not the drawings, themselves; is that right?

8 WITNESS WILLIAMS: That's right.

9 JUDGE BLOCH: The drawings are still on cards?

10 WITNESS WILLIAMS: Yes, in aperture cards.

11 JUDGE BLOCH: The aperture cards are microfiche,
12 now?

13 WITNESS WILLIAMS: It's a similar-type process.

14 BY MS. ELLIS:

15 Q And the satellites do have access to the manual
16 systems when an error is found, is that correct?

17 A (Witness Williams) Yes.

18 Q Do you know how far along the satellite system
19 is at this point in time?

20 A No. The only thing--

21 JUDGE BLOCH: That's sufficient.

22 WITNESS WILLIAMS: No. I won't complicate it.

23 JUDGE BLOCH: If you're really going to clarify
24 something that has to do with the question, that's fine. I
25 notice occasionally you try to defend things. We already know

1 you haven't seen anything for a while.

2 BY MS. ELLIS:

3 Q At one point something was mentioned about the
4 "right attitude" in doing the CYGNA report, that it should not
5 be "adversarial".

6 Do you recall that?

7 A (Witness Wade) Yes, I remember that. I made that
8 comment.

9 Q Could you give us a little more detail as to exactly
10 how that discussion came about, or whatever it was--the
11 discussion or memorandum or whatever--and what the context of
12 it was, and how it came up?

13 A There was policy guidance given by me to the
14 project team in light of experience in the past where one
15 design organization has reviewed another; engineers love to
16 come up with the ultimate solution, and frequently enjoy
17 showing another engineer they know more than the first.

18 And in a design review or the verification process,
19 the question is not: is this the best solution?--but: is
20 this an adequate solution to protect the health and safety
21 of the public?

22 And so it was in oral discussion by me to the
23 NCEO Company to the team doing these kinds of studies that
24 their quest was for adequacy of procedures, for conformance
25 with requirements; and not for optimization.

1 Q In the past when these review people or review
2 teams had gone out on projects, had there been any problem
3 between them and the client because they had found what they
4 perceived to be errors, whereas the client might not have
5 perceived it that way?

6 JUDGE BLOCH: Are you talking about prior reviews
7 of the Comanche Peak?

8 MS. ELLIS: Yes.

9 BY MS. ELLIS:

10 Q I am wondering why you even found it necessary to
11 say anything about that?

12 A (Witness Wade) Because in a previous existence
13 in another engineering firm, I had run into this problem
14 between competing engineering firms: one firm anxious to show
15 an owner that it was better than the firm they had selected.

16 There is that natural, competitive, kind of thing
17 between architect-engineering firms.

18 And my goal here was to make sure that none of that
19 had pervaded my people at CYGNA.

20 And so prior to setting the first of these indepen-
21 dent assessments--the one at Grand Gulf--I discussed this at
22 length with the team.

23 JUDGE BLOCH: Is it possible--

24 WITNESS WADE: In the case of CYGNA this was
25 a preventative thing. So far as I know in the three

1 assessments that have been made, there have been no bitter
2 recriminations back and forth about "I gotcha"; "No, you
3 don't".

4 JUDGE BLOCH: Is it possible that the initial
5 observations—the other way of looking at things--might not
6 have been a better way to start?

7 You might have concluded after your engineers
8 had these suspicions and problems in their initial observa-
9 tions that adequacy was achieved. Might it not have been
10 better to encourage suspicion and skepticism in the initial
11 round?

12 WITNESS WADE: No.

13 I think this is a task of a professional engineering
14 review, and the work of a professional; and I think you do
15 it professionally.

16 BY MS. ELLIS:

17 Q Was there ever any discussion where Texas Utilities
18 was referred to being your client, or anything along that
19 line, which might have influenced the people you were talking
20 to to look perhaps more favorably on the work that was done
21 than they might have, otherwise?

22 A (Witness Wade) No, absolutely not.

23 As a matter of fact, just the reverse: if you are
24 going to be a credible consultant, you do a professional
25 job. You do not lean one way or the other. You do an

1 unbiased, professional, assessment.

2 JUDGE BLOCH: Ms. Williams, were there times when
3 the team had questions about whether or not to prepare an
4 observation record?

5 WITNESS WILLIAMS: Yes.

6 JUDGE BLOCH: Would you give us some idea of when
7 that kind of situation came up and how that was handled?

8 WITNESS WILLIAMS: It was handled in review and
9 raised to a higher-level of review team if that was necessary.
10 It was generally based on our assessment as shown in the
11 definitions in the report and whether there was a potential
12 impact on plant safety.

13 WITNESS WADE: I think along that same line I
14 have to add that even when an observation was recorded but
15 then determined to be nonvalid by the project team, that that
16 determination was still reviewed by the senior review
17 committee.

18 JUDGE BLOCH: Well, these discrepancies which don't
19 become observations were reviewed carefully; were they also
20 documented?

21 WITNESS WILLIAMS: They are documented in the
22 checklist as an unsatisfactory.

23 JUDGE BLOCH: Okay.

24 Were there times, also, when the members of the
25 team came to you and said, "should I put it on the checklist?"

1 WITNESS WILLIAMS: No, I find, in general, the
2 tendency is to put a lot more on the checklist.

3 BY MS. ELLIS:

4 Q Were there ever times when anyone on the team
5 strongly disagreed with whether or not anything should be
6 put on the checklist, or whether or not it should be put on
7 the observations?

8 A (Witness Williams) Not on the checklist. As I
9 say, that is basically the reviewer's tool. He puts on
10 it what he feels he wants to put on it.

11 The observations is a team effort, and it is a
12 unanimous decision; and however long it takes us to get there.

13 JUDGE BLOCH: Consensus or unanimous?

14 Do you get to the point where someone just recedes?

15 WITNESS WILLIAMS: I can't think of a time where it
16 got that tough.

17 BY MS. ELLIS:

18 Q In the review were you concerned with the number
19 or volume of design changes?

20 A (Witness Williams) Yes, I think that's why we
21 focused on it.

22 Q And I believe you indicated, did you not, that the
23 number of design changes--correct me if I'm wrong, because I'm
24 not sure of the wording you used--the number of design changes
25 at Comanche Peak was larger than in other projects you have

1 seen?

2 A I think I said it was ranking among the top.

3 JUDGE BLOCH: Off the record.

4 (Discussion off the record.)

5 JUDGE BLOCH: Back on the record.

6 BY MS. ELLIS:

7 Q Who selected the scope of the review?

8 (Witness panel conferring.)

9 JUDGE BLOCH: Ms. Ellis, do you have in mind some-
10 thing that's not already thoroughly documented in the record?

11 Do you want to try to follow up?--because we have
12 some information on how the scope of review was selected.

13 MS. ELLIS: I am not sure that it is clear in the
14 record how it all came about to begin with.

15 Let me give you the general thrust of what I have
16 in mind:

17 BY MS. ELLIS:

18 Q Was the initial suggestion of the scope by Texas
19 Utilities? How was this arrived at? Who arrived at it?

20 A (Witness Williams) We recommended it.

21 Q During your review--

22 JUDGE BLOCH: One second.

23 The RHR was also recommended by you?

24 WITNESS WILLIAMS: It was a recommendation, and there
25 was a meeting at the Commission to discuss the acceptability

1 of it.

2 JUDGE BLOCH: But it came from CYGNA?

3 I thought it came from the Staff. My recollection
4 is wrong?

5 WITNESS WILLIAMS: It was not the meeting--

6 WITNESS WADE: Staff recommended that a review of the
7 design be audited, but the RHR had been in the scope for
8 other purposes. But they had it--I think it was the meeting
9 where it was set that we include the design as part of the
10 program.

11 WITNESS WILLIAMS: Systems parameters.

12 BY MS. ELLIS:

13 Q Did you see any Truesdale bridgmont insert connec-
14 tion with threaded rods during your review?

15 A (Witness Williams) I am trying to envision that
16 in my mind.

17 JUDGE BLOCH: Referring to one sticking way out
18 of the wall?

19 (Laughter.)

20 (The witness panel conferring.)

21 WITNESS WILLIAMS: Is it possible to draw a
22 sketch?

23 JUDGE BLOCH: Off the record.

24 (Discussion off the record.)

25 JUDGE BLOCH: While Mr. Walsh is drawing the

1 sketch, we'll take a break.

2 (Recess)

3 JUDGE BLOCH: The hearing will come to order.
4 Off the record.

5 (Discussion off the record.)

6 JUDGE BLOCH: Back on the record.

7 Mr. Walsh has given the witness a sketch and the
8 witnesses have had an opportunity to examine that.

9 Ms. Williams?

10 WITNESS WILLIAMS: Looking at this configuration,
11 we did not have this type of arrangement. And I got the
12 drawings and I'm just confirming it.

13 (Pause)

14 JUDGE BLOCH: The Board would note there is no
15 motion to insert this drawing into the record.

16 (Pause)

17 MR. REYNOLDS: What are we doing?

18 WITNESS WILLIAMS: If you want me to do this later,
19 I can; but I think the answer to the question is no.

20 JUDGE BLOCH: Yes, you can do it later and tell us
21 in the morning.

22 The witness seemed to be continuing to scan
23 through the drawings, even though she had already answered
24 "no"; it is now understood that she will complete her review
25 during the evening, and correct her answer if it is in fact

1 incorrect.

2 BY MS. ELLIS:

3 Q In the items that you reviewed, did you see any
4 NPSI designs?

5 A I believe these were mostly Grinnell. I would have
6 to confirm that for you.

7 JUDGE BLOCH: Okay, the question was not what they
8 were "mostly," but whether you reviewed any NPSI designs.

9 WITNESS WILLIAMS: I would have to confirm that.

10 JUDGE BLOCH: I would note for the record to
11 relate that to pipes?

12 WITNESS WILLIAMS: Yes, that's right.

13 BY MS. ELLIS:

14 Q In looking through those pipe supports--in looking
15 through those documents, would you be able to tell from the
16 drawing whether it was NPSI or Grinnell design?

17 A (Witness Williams) Not necessarily readily,
18 without looking at some of the catalog part numbers.

19 JUDGE BLOCH: Ms. Williams, did you answer that
20 as to both systems--the RHR and the spent fuel pool?

21 WITNESS WILLIAMS: That's only the RHR right now.

22 JUDGE BLOCH: Because there were no pipe supports
23 in the spent fuel pool system, is that correct?

24 WITNESS WILLIAMS: There is pipe supports, that
25 was the 97, I believe--

1 JUDGE BLOCH: Were there any NPSI support in the
2 fuel pool?

3 WITNESS WILLIAMS: I would have to check on that
4 to make sure.

5 BY MS. ELLIS:

6 Q Could you tell from looking at the drawing whether
7 it was not a PSE design?

8 A (Witness Williams) You are referring to the
9 site group at Comanche Peak?

10 Q (Nodding affirmatively)?

11 JUDGE BLOCH: The representative from CASE
12 indicated with a nod of her head, "yes".

13 (Laughter)

14 WITNESS WILLIAMS: I am only aware of one such
15 design in the scope of our review of the RHR system, and none
16 for the spent fuel pool cooling.

17 BY MS. ELLIS:

18 Q But, could you tell from the drawings--from the
19 drawing--that it was PSE?

20 A (Witness Williams) I would have to look at that
21 drawing and tell you. I do not have that drawing here.

22 JUDGE BLOCH: I am sorry. Is it possible that
23 the drawings do not show the originating organization?

24 (The panel conferring)

25 For a design?

1 WITNESS WILLIAMS: These drawings are reduced
2 copies, I should note; and some of the information is not
3 very clear on them.

4 JUDGE BLOCH: Okay.

5 But, is it possible that the originals, the large
6 ones, do not have any identifying marks for the originating
7 organizations?

8 WITNESS WILLIAMS: We knew when we were doing the
9 review; I just can't tell you right now.

10 JUDGE BLOCH: I don't think the question is what
11 you look at right now. It is--you don't know the proportion
12 of them right now, but you did know when you were looking at
13 them, which group was doing them?

14 WITNESS WILLIAMS: Yes.

15 And I do happen to know there was only one PSE
16 support in our scope.

17 BY MS. ELLIS:

18 Q How did you know that?

19 A (Witness Williams) Because that fact happened to
20 stick in my head.

21 Q Did it come from the original of the drawing?

22 A Yes.

23 JUDGE BLOCH: Did it happen to stick in your head
24 because there was a deficiency?

25 WITNESS WILLIAMS: No, because there was only one.

1 BY MS. ELLIS:

2 Q Would it be helpful for you if you had a large
3 drawing for you to look at, when you indicated those were
4 small, and difficult to tell?

5 JUDGE BLOCH: Ms. Ellis, what are we trying to get
6 at here?

7 MS. ELLIS: We are trying to ascertain from her
8 whether or not she could tell by the drawing who did it.

9 It is our understanding the drawing does not iden-
10 tify, at least in all cases, the originating design
11 organization.

12 JUDGE BLOCH: Okay.

13 Tonight--

14 WITNESS WILLIAMS: I don't think that's true. I just
15 think the information I am working with right here is not very
16 clear; and there are blotches on the paper, and such.

17 And these are not the drawings I used for our
18 review.

19 JUDGE BLOCH: You had discovery? You have drawings
20 on which you can't tell who the originating organization is?

21 All you've got to do is put them in the record if
22 you want to make that point.

23 And why do you want to make it now? What is the
24 relevance?

25 MS. ELLIS: We will handle it otherwise. We will

1 put it in through testimony.

2 JUDGE BLOCH: Before you do it, try to think
3 what it is going to prove to us. If it's going to prove
4 something, put it in through testimony; but not if it won't.

5 BY MS. ELLIS:

6 Q I think a couple of times, at least, in discussing
7 the reviews you mentioned other reviews or audits that had
8 been--I believe you mentioned the SIT report which had been
9 done by the NRC; and I understood you to say, I believe,
10 the SALP report?

11 A (Witness Williams) Wherever I said that, I gave
12 the correct designation of the final chart in our report.

13 I think to refer you to Exhibit 1.1, Section 1,
14 of the draft report.

15 Q Were the CAT report and the SIT reports the two
16 you are referring to?

17 A Excuse me?

18 Q When you were discussing this earlier in your
19 testimony, were those the two you were referring to at that
20 time?

21 A Yes. We do have SALP reviews, but we did not us
22 that as part of it.

23 Q Were there any others that are not listed here?

24 A This is a complete list.

25 END T23 JRB
MM fls

mgc 24-1 1

MS. ELLIS: I believe we have no further questions
on this.

(Discussion off the record.)

JUDGE BLOCH: The State of Texas?

MR. HICKS: I'm confused, too. Am I correct
in understanding that this can just be, if we choose to make
it so, all matters about independence?

JUDGE BLOCH: Independence and voir dire, recross
meaning questions not covered previous to your last
opportunity.

RECROSS EXAMINATION (CONTINUED)

BY MR. HICKS:

Q On the question about the probable cause matters,
in DC-01-01, for instance, you said that you would not --
when you would contact TUGCO about technical questions
while you were reviewing some of the findings that had been
made by the respective -- I don't know the terminology, but
the people from Cygna who went out and reviewed matters,
and you were reviewing those matters, sitting around in a
room discussing them to determine probable cause for the
problem or the observation, you sometimes called TUGCO about
some questions that might arise during that; is that correct?

A (Witness Williams) That's possible. I don't
recall doing it on this one.

Q Okay. I was just using this as an example. Just

mgc 24-2

1 in general, sometimes you would; is that correct?

2 A If we had a technical question.

3 Q Now when you would do that, would you make a
4 telecon summary, like a protocol called for?

5 A Yes, once it was in effect.

6 Q Okay. And those would all be in the file where
7 you maintain them, and Mr. Treby questioned you about that;
8 is that correct?

9 A That's correct.

10 Q You also said, I believe, that when you would make
11 these calls to TUGCO, you would not discuss with them what
12 they thought the probable cause of the matter giving rise
13 to the observation was; is that correct?

14 A That's correct.

15 Q Would it just never come up?

16 A That's our decision to make.

17 Q But in the course of conversation, would there
18 just not be any mention at all of what might have caused
19 this problem?

20 A I don't ever recall there being an instance where
21 there was any discussion on that.

22 Q And could you never tell from what they proposed
23 to do about it what they thought the probable cause of it
24 was?

25 A You could extrapolate that, if they were doing the

mgc 24-3 1

right thing.

2 Q Well, did you all ever use that as an indication
3 to help you arrive at a conclusion about what the probable
4 cuase was?

5 A No.

6 Q Just ignored it?

7 A Yes.

8 JUDGE BLOCH: Did you ever discuss whether the
9 resolution was satisfactory?

10 WITNESS WILLIAMS: That is also up to us. The only
11 thing is, we wanted to make sure that we had all the
12 information that we needed to make that decision.

13 JUDGE BLOCH: I think your answer was no. Was it?
14 Did you ever discuss whether the resolution was satisfactory?

15 WITNESS WILLIAMS: No, not with Texas.

16 JUDGE BLOCH: Okay.

17 WITNESS WARD: That's why it's independent.

18 BY MR. HICKS:

19 Q Now I want to go back to the questions that arose
20 about what gave rise to Cygna deciding to prenotify the
21 Applicant about the documents, I think when you came down
22 in October, the 24-hour notice, the 12-to-24-hour notice.

23 You said, I believe, that your quality assurance
24 people were people that finally said you might as well go
25 ahead and do it; is that correct?

mgc 24-4

1 A (Witness Williams) That's correct.

2 Q Who among the quality assurance people said that?

3 A Paul DiDonato.

4 Q And was it in his instance that you then called
5 Mr. Hutchinson to say, "Here are the documents we want"?

6 A I believe the discussion -- there was some time
7 in between there.

8 The question was, did I immediately turn around and
9 call?

10 Q Not immediately. But was it at his suggestion
11 ultimately that you decided to call Mr. Hutchinson to say,
12 "Here are the documents that we would want to look at"?

13 A I think we reached a joint discussion. We discussed
14 the matter and hear both sides, his side and my side, and
15 decided it was acceptable to present the list, such that they
16 could get the information on backshift.

17 Q Did either of the two of you or Mr. DiDonato, to
18 your knowledge, talk with anybody associated with the
19 Applicant in trying to reach a decision about whether to
20 prenotify?

21 A No.

22 Q To your knowledge, did anyone associated with
23 Cygna contact anybody associated with the Applicant to try
24 to resolve that matter?

25 A No.

mgc 24-51

2 Q Mr. Ward, I was a little confused by part of your
3 testimony about the stricutres you laid down about adversaries
4 trying to make it non-adversarial in this work.

5 Are professional engineers sometimes reluctant to
6 point out to other professional engineers whose work they
7 are reviewing that there is a problem with their work? Is
8 that a common occurrence?

9 A (Witness Ward) I don't think it's common, but I'm
10 sure that there are instances that that is true.

11 Let me correct -- I think the word "adversarial"
12 was inappropriate when I used it in my previous remarks.
13 The point I was trying to make is that I wanted to assure
14 that my people were looking for adequacy of design and
15 procedures and compliance with the regulations, as opposed
16 to trying to optimize the design that they were reviewing:
17 Is it adequate to do the job? Is it adequate to protect
18 the health and safety of the public?

19 Q Is it more common that professional engineers,
20 in reviewing other professional engineers' work, are
21 reluctant to criticize them, to find problems with what they
22 have done or that they are eager to find problems with what
23 they have done?

24 A I think it varies with the organizations. In many
25 organizations, there is a great joy in pointing out the fact
that the other organization has made either an archaic design

mgc 24-6

1 or inadequate design or something that is certainly not up
2 to present-day standards.

3 In some other very conservative organizations,
4 they may even refuse to conduct such an audit or review of
5 another engineer. But in my experience, those engineering
6 firms that take on such a task of assessing a design have
7 no reluctance at all to point out inadequacies in that
8 design, because the purpose is to improve and to correct
9 that particular design where deficiencies might exist.

10 Q If that's so -- and I may not be remembering what
11 you actually admonished people in Cygna to do -- but if that
12 is so, why would you even have needed to admonish them?

13 A Because I didn't want to spend a lot of time
14 trying to resolve the difference between an adequate design
15 and an optimum design in this kind of a process.

16 Q And you were looking more at an adequate design
17 question; is that correct?

18 A The baseline is, is the design adequate to do the
19 job?

20 MR. HICKS: That's all the questions I have.

21 JUDGE BLOCH: Mr. Treby?

22 MR. TREBY: I have no questions on the subject
23 of qualifications and independence.

24 JUDGE BLOCH: Adjournment until 8:30.

25 (Whereupon, at 5:20 p.m., the hearing was
26 adjourned to resume at 8:30 a.m., Tuesday, February 21, 1984.)

CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the
NRC COMMISSION

In the matter of: Comanche Peak Steam Electric
Station, Units 1 & 2

Date of Proceeding:

Place of Proceeding: Fort Worth, Texas

were held as herein appears, and that this is the original
transcript for the file of the Commission.

James Burns

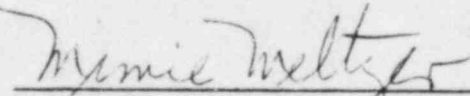
Official Reporter - Typed



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Mimie Meltzer

Official Reporter - Typed



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