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NUCLEAR REGULATORY COMMISSION  
Contention 5 Panel Meeting With TUGCO

Carmen Gooden, CSR, PPR

February 7, 1985

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*Carmen Gooden*  
2727 BUFFALO DRIVE  
ARLINGTON, TEXAS 76013  
265-3481

PENNS. CO. BALDWIN N.J. 07002 FORM 404

1 UNITED STATES OF AMERICA  
2 NUCLEAR REGULATORY COMMISSION  
3 CONTENTION 5 PANEL

4  
5 CONTENTION 5 PANEL MEETING WITH TUGCO

6 Thursday, February 7, 1985  
7 Arlington, Texas

8 This meeting was commenced at 1:00 p.m.

9 PRESENT:

10 EDWARD L. JORDAN  
11 Director, Division of Emergency Preparedness  
12 and Engineering Response  
13 IE

14 RICHARD VOLLMER  
15 Deputy Director, IE

16 ALAN HERDT  
17 Chief, Engineering Branch  
18 Division of Reactor Safety  
19 Region II

20 ROBERT WARNICK  
21 Chief, Projects Branch No. 1  
22 Division of Reactor Projects  
23 Region III

24 JAMES SNIEZEK  
25 Director  
Regional Operations and Generic Requirements Staff  
Executive Director's Office

ASHOK THADANI  
Chief, Reliability and Risk Assessment Branch  
Division of Safety Technology, NRR

BOB MARTIN  
Director  
Region IV Office

VINCE NOONAN  
Director of the Comanche Peak Project

STEVE TREBY  
Office of the Executive Legal Director

1 JOE SCINTO  
Office of Executive Legal Director

2 CLYDE WISNER  
3 Public Affairs, Region IV

4 JOHN BECK  
TUGCO

5 MICHAEL SPENCE  
6 President of TUGCO

7 TONY BUHL  
ENERGEX

8 JOHN GUIBERT  
TENERA Corporation

9 JOHN FRENCH  
10 DELIAN Corporation

11 HOWARD LEVIN  
TENERA Corporation

12 WOODY STROUPE  
Technology for Energy

13 MARTIN JONES  
Self-employed

14 JOHN HANSEL  
15 Evaluation Research Corporation

16 MONTE WISE  
Wise and Associates, Incorporated

17 ALSO PRESENT:

18 TERRY G. TYLER  
19 Energe Associates

20 FRANK A. DOUGHERTY  
TENERA Corporation

21 JOE GEORGE  
TUGCO

22 JOHN MERRITT  
23 TUGCO

24 D. C. PURDY  
Gibbs and Hill, Incorporated

25 DICK RAMSEY  
Texas Utilities Services Incorporated

1 DAVID FIORELLI  
2 Texas Utilities Services Incorporated

3 JACK REDDING  
4 TUGCO

5 DON DAVIS  
6 TENERA Corporation

7 PAUL FREEMAN  
8 TP&L

9 MS. JUANITA ELLIS  
10 Citizens Association for Sound Energy

11 MR. JERRY ELLIS  
12 Citizens Association for Sound Energy

13 MS. BILLIE GARDE  
14 Government Accountability Project/  
15 Citizens Association for Sound Energy

16 MS. DOBIE HATLEY  
17 GAP/CASE/Whistleblower

18 THOMAS HENDERSON, JR.  
19 Government Accountability Project  
20  
21  
22  
23  
24  
25

PROCEEDINGS

1  
2 MR. JORDAN: The purpose of this meeting is to obtain  
3 information from the Texas Utilities Generating Company  
4 related to Contention 5 by the Hearing Board. A similar  
5 meeting was held with the Citizens Association for Sound  
6 Energy this morning. This information will be combined  
7 with other information collected by the Panel to form the  
8 basis for the NRC staff determination regarding  
9 Contention 5. I read into the meeting record this morning  
10 the text of Contention 5, and I won't do that again. The  
11 Court Reporter can simply extract it from that earlier  
12 discussion.

13 "Contention 5: The Applicants' failure to  
14 adhere to quality assurance/quality control  
15 provisions required by the construction permits  
16 for Comanche Peak, Units 1 and 2, and the  
17 requirements of Appendix B of 10 CFR Part 50,  
18 and the construction practices employed,  
19 specifically in regard to concrete work, mortar  
20 blocks, steel, fracture toughness testing,  
21 expansion joints, placement of the reactor  
22 vessel for Unit 2, welding, inspection and  
23 testing, materials used, craft labor  
24 qualifications and working conditions  
25 (as they may affect QA/QC), and training and

1 organization of QA/QC personnel, have raised  
2 substantial questions as to the adequacy of the  
3 construction of the facility. As a result, the  
4 Commission cannot make the findings required by  
5 10 CFR 50.57(a) necessary for issuance of an  
6 operating license for Comanche Peak."

7 I will introduce the members of the Panel once again,  
8 however. This Panel was established by the NRC Executive  
9 Director's Office on December 24, 1984, to evaluate  
10 Contention 5. The membership of the Panel was revised on  
11 January 16th of 1985.

12 The membership is comprised of the following persons,  
13 drawn from various NRC Offices.

14 I'm the Panel Chairman, Edward L. Jordan. I'm  
15 Director of the Division of Emergency  
16 Preparedness and Engineering Response

17  
18 Dick Vollmer, Deputy Director, Office of  
19 Inspection Enforcement

20  
21 Al Herdt, Chief of the Engineering Branch,  
22 Division of Reactor Safety, Region II

23  
24 Robert Warnick, Chief of the Projects Branch,  
25 No. 1, Division of Reactor Projects, Region III

1 Jim Sniezek, Director of Regional Operations and  
2 Generic Requirements Staff, Executive Director's  
3 Office

4  
5 Ashok Thadani, Chief of Reliability and Risk  
6 Assessment Branch, Division of Safety  
7 Technology, NRR  
8

9 I would like to introduce the other NRC  
10 representatives.

11 Vince Noonan is Director of the Comanche Peak  
12 Project and Bob Martin is Director of Region IV  
13 I&E Office. Our legal advice is on his way back  
14 from lunch, I believe.

15 This Panel is working closely with and reports its  
16 findings to Vince Noonan, Director of the Comanche Peak  
17 project. We draw support and assistance from the NRC  
18 staff who are responsible for conducting reviews,  
19 inspections and investigations.

20 The purpose of the Panel is to evaluate in an  
21 integrated manner the information developed by the staff  
22 which bears upon quality assurance/quality control and  
23 overall plant quality. In doing so, we're going to make a  
24 staff determination regarding 10 CFR 50.57(a) as related  
25 to Contention 5, and we will provide Panel testimony

1 before the Comanche Peak Atomic Safety and Licensing  
2 Board, if required. The Panel is considering findings  
3 from past and current NRC staff activities and applicant  
4 actions including results of the following reviews: the  
5 Region IV inspections, the Construction Assessment Team  
6 inspections, Office of Investigation findings, Technical  
7 Review Team inspections, Enforcement Actions, Special  
8 Review Team inspections, the systematic assessment of the  
9 Licensing Performance reports, staff analysis of the CYGNA  
10 report, and staff summary of the Hearing Record.

11 The Panel is reviewing material prepared by staff  
12 reviewers; compiled data; discussions with staff  
13 reviewers, the applicant, and CASE; and the Site Review.  
14 The Panel is reviewing the results of work by others  
15 rather than doing independent direct review.

16 As discussed earlier with Jack Redding and John Beck,  
17 the Panel requested this meeting with TUGCO to receive  
18 information to be considered in Panel determinations. The  
19 Panel would ask questions of TUGCO representatives to  
20 clarify the members' understanding.

21 This meeting is scheduled from 1:00 to 6:00 p.m., and  
22 we will afford an opportunity for CASE to make a brief  
23 comment at the end of this meeting. In order to use the  
24 time effectively, I have asked John Beck to moderate TUGCO  
25 discussions within the meeting time restraints.



1 I remind the participants that the Panel is  
2 endeavoring to cover a very large volume of information  
3 directly related to Contention 5. We request specific  
4 rather than general comments. Any new information would  
5 be directed to Vince Noonan, Director of the Comanche Peak  
6 Project.

7 There is an attendance list for the meeting  
8 participants at this table.

9 As you are aware, the meeting is being transcribed  
10 and copies will be provided to parties in the hearing and  
11 to the Public Document Room. Additional copies can be  
12 obtained from the Public Document Room by calling  
13 1-800-638-8081.

14 To establish a clear record, each speaker should  
15 identify his or her self and that's particularly important  
16 because on this side of the table the Court Reporter  
17 cannot see us, so I'll ask the Panel to please identify  
18 yourself when you ask a question. With your indulgence,  
19 the Panel will interrupt your discussion to clarify a  
20 discussion point.

21 So with that, I'll turn it over to you.

22 MR. BECK: Thank you very much, Mr. Jordan. The  
23 President of TUGCO, Mike Spence, would like to open our  
24 presentation with a few remarks.

25 MR. SPENCE: Thank you, Mr. Jordan. I would like to

1 introduce at the beginning, with your indulgence, some of  
2 our key Comanche Peak staff members here in the audience:  
3 Bill Clements, TUGCO's Vice-President of Nuclear  
4 Operations and Quality Assurance; Joe B. George, TUGCO  
5 Vice-President and Project General Manager at Comanche  
6 Peak; and John Merritt, the Assistant Project General  
7 Manager at Comanche Peak, are with us today.

8 To my right, as you know, is John Beck, our Manager  
9 of Licensing for TUGCO. John will moderate our  
10 presentation today and introduce the speakers that we have  
11 arranged to make presentations.

12 On behalf of TUGCO, let me say that we appreciate the  
13 opportunity to provide input to the Panel today on matters  
14 relevant to Contention 5, especially to update you on the  
15 initiatives that we're considering and taking and the  
16 status thereof, related to the quality issues identified  
17 by the TUGCO Review Team over recent months.

18 I would say that we have yet to complete the final  
19 formulation of our detailed program in response to these  
20 issues and have yet to complete the schedule for resolving  
21 them, but -- and, of course, as that program and schedule  
22 come toward completion, we will promptly notify the NRC of  
23 that matter.

24 Comanche Peak has been down a rather rocky road in  
25 the last several months. I think it might be of benefit

1 to put that somewhat into context by saying that the  
2 construction of Comanche Peak has been underway for 10  
3 years now, with a construction permit having been issued  
4 in December of 1974. As familiar as you gentlemen are  
5 with the complexity of a large nuclear construction  
6 project such as Comanche Peak, you will, of course, no  
7 doubt recognize that over that 10-year period of time,  
8 from time to time there have been construction engineering  
9 deficiencies to arise. We believe that we, as those have  
10 been identified, have progressively worked toward  
11 resolving and clearing up the deficiencies. In fact, my  
12 staff advised me that over the 10-year life of the  
13 project, there have been something in excess of 17,000  
14 nonconformance reports issued at Comanche Peak to put it  
15 in some sort of content.

16 As we begin receiving the findings in the potential  
17 safety issues from the Technical Review Team, I must  
18 advise that I viewed these issues as matters of extreme  
19 concern from the point of view of their potential safety  
20 implications on the Comanche Peak project. As a result,  
21 it caused me and my company to initiate a critical self  
22 evaluation of Comanche Peak and our program at Comanche  
23 Peak.

24 The team of third-party industry experts that we have  
25 assembled here today to make presentations to you

1 concerning their efforts in addressing these Technical  
2 Review Team issues is indicative of the degree of concern  
3 that I and my company place on these matters and our  
4 commitment to aggressively address them, analyze them and  
5 resolve them.

6 As President of TUGCO, I want to assure you that I'm  
7 committed to a program that objectively investigates and  
8 evaluates each of the concerns reflected in the TRT  
9 report, including a determination of the causes and the  
10 generic implication of each. As we conclude our efforts,  
11 we intend to have documented evidence that will satisfy  
12 each of the concerns raised. Although, as I said, our  
13 plan is still in the formulation stages and in all  
14 respects is not complete, it is clear at this juncture  
15 that our efforts most certainly will include  
16 reinspections, reanalyses, documentation reviews, and some  
17 hardware rework.

18 Also, I would point out that as a part of this  
19 critical self-assessment that I and my staff are going  
20 through, we have also taken measures to improve the  
21 communications between all levels of management and  
22 employees at TUGCO so that all of our employees have a  
23 better understanding of our commitment to quality. We  
24 continue to be sensitive to the need to communicate this  
25 to our employees, TUGCO employees as well as the employees

1 of our contractors.

2 Our eight-point program was a major positive step in  
3 the direction of improving communications of the  
4 commitment to quality, and I can discuss that program in  
5 depth with you, if you wish. I also recognize the  
6 importance of communications being two-way. We consider  
7 feedback from our employees to management to be very  
8 important, and in part our eight-point program is designed  
9 to encourage that feedback. By way of another example,  
10 Mr. Clements, who I introduced to you, recently sent a  
11 copy of the TRT's January 8th report on QA/QC findings to  
12 all lead QC inspectors at the Comanche Peak Project for  
13 reading by their QC inspectors. Certainly we'll welcome  
14 any feedback that these inspectors have as they read that.  
15 We're also actively pursuing ways to enhance feedback from  
16 all employees at Comanche Peak in other ways. By way of  
17 another example, we recently established a Safe Team  
18 Program at Comanche Peak employing the same, a very  
19 successful concept that was successfully implemented by  
20 Detroit Edison at the Furney Nuclear Project. The Safe  
21 Team provides employees with access to an organization  
22 whose sole purpose is to receive safety concerns from  
23 employees on site. It includes an open-door policy to all  
24 our employees and is designed to provide feedback to each  
25 employee who has come forward with a safety concern. We

1 believe that the Safe Team will further enhance the free  
2 flow of information up through our management from our  
3 employees who do have safety concerns.

4 With those initial comments, I'd now like to turn the  
5 balance of our introduction and program over to Mr. Beck  
6 who will introduce our speakers.

7 MR. BECK: Thank you.

8 MR. JORDAN: Mr. Spence, could I ask you a question?  
9 You were focusing on examining the TRT findings. Are you  
10 going to examine other NRC findings comparable to the rest  
11 of the review that the NRC is doing with this Panel?

12 MR. SPENCE: Yes, sir, we are, and I believe Mr. Beck  
13 will address that somewhat.

14 MR. SNIEZEK: May I interject something right here?  
15 I have several questions that I'd like to ask now so that  
16 the presenters can cover them as they give their  
17 presentations. One of them is: We've heard this morning  
18 that the Safe Team approach may not be working too well.  
19 I'd like to get whatever feedback you have on what you  
20 have found regarding how well the Safe Team approach is  
21 working and any problems you see with this.

22 MR. SPENCE: Can I address that now because I don't  
23 believe it would fit into --

24 MR. BECK: Go ahead.

25 MR. SPENCE: I wasn't here for very much of this

1 morning's session so I didn't hear specific comments, but  
2 we literally just implemented the Safe Team program just a  
3 couple of weeks ago. I don't remember the exact date, but  
4 it was in -- since the middle of January -- and we're in  
5 the implementation stage. The Safe Team manager reports  
6 directly to me, and I have stayed in close contact with  
7 him. I certainly think it would be premature to conclude  
8 that the program doesn't work because it is brand new. We  
9 have been running a number of site supervisors through the  
10 program in the way of orientation to familiarize them with  
11 the program so that they would be in a position to advise  
12 their employees on taking the opportunity to visit the Safe  
13 Team program. As far as conducting exit interviews,  
14 although I have no specific reports on how many, I would  
15 guess that there have been a relatively small number of  
16 exit interviews conducted by the Safe Team program because  
17 of its relative newness.

18 MR. SNIEZEK: The other thing that I had heard this  
19 morning is that CYGNA was not authorized to follow up on  
20 some issues where they have identified problems. Could  
21 someone address to us what you know about that and if, in  
22 fact, CYGNA has not been authorized to follow up on some  
23 areas.

24 MR. BECK: Why don't we pick that up a little later?

25 MR. SNIEZEK: That's fine.

1 MR. BECK: If there are no other questions at this  
2 juncture, this afternoon I'm going to review the  
3 development of our response to TRT concerns; review the  
4 key features of the plant itself; and introduce the third-  
5 party experts who have the development, management and  
6 review responsibility within the scope of the plant.  
7 These gentlemen will be providing a discussion of their  
8 particular scope responsibilities and a detailed  
9 discussion of selected TRT issues, giving the status of  
10 where they are today. They will illustrate for you how  
11 we're implementing the key features of our program.

12 When the NRC issued the initial TRT findings last  
13 September, Mr. Spence created the Comanche Peak Response  
14 Team to provide an evaluation and response to the TRT  
15 issues. The initial organizational structure contained in  
16 Revision Zero of the Program Plan -- and I use Rev Zero  
17 because it was clearly recognized at that time that this  
18 was a dynamic process and that there likely would be  
19 changes in the plan -- it provided for an efficient and  
20 comprehensive examination of the TRT findings and was thus  
21 populated largely by TUGCO personnel who were familiar  
22 with the areas of concern.

23 The first revision of the Program Plan incorporated  
24 the principle of outside objectivity, an organizational  
25 structure of the Response Team, by adding third-party,



1 previously uninvolved experts to the Senior Review Team  
2 and replacing the TUGCO Issue Team Leaders with outside,  
3 previously uninvolved experts.

4 We also enhanced the Program Plan by putting more  
5 emphasis on root cause evaluation and generic  
6 implications. The first revision also added the  
7 contribution of input from other sources as appropriate,  
8 such as the ASLB proceedings. Mr. Spence has recently  
9 further changed the composition of the SRT so that the  
10 membership is composed of individuals, none of whom have  
11 had prior involvement in the issues being reviewed. I am  
12 the only employee of TUGCO on the Senior Review Team, and  
13 I'm currently serving as Chairman of that body. My  
14 colleagues on the Senior Review Team and the Issue Team  
15 Leaders I'll introduce in a moment. I should point out  
16 that my association with TUGCO in this context was  
17 initiated last April when I joined the firm.

18 At the suggestion of the Senior Review Team, Mr.  
19 Spence has also added to the scope of the review  
20 responsibility the issue of design-related QA/QC. These  
21 changes will be incorporated into Revision Two of our  
22 Program Plan and the design QA/QC concerns will be added  
23 to the responsibility of Mr. Howard Levin who will be the  
24 Issue Team Leader for design QA/QC, as well as the civil,  
25 structural and mechanical responsibilities he's had to

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21 changes will be incorporated into Revision Two of our  
22 Program Plan and the design QA/QC concerns will be added  
23 to the responsibility of Mr. Howard Levin who will be the  
24 Issue Team Leader for design QA/QC, as well as the civil,  
25 structural and mechanical responsibilities he's had to

1 date.

2 The objective of this change is to enable the Senior  
3 Review Team and the Comanche Peak Response Organization to  
4 make an integrated evaluation of QA/QC including the  
5 design, construction and inspection of piping supports and  
6 piping systems.

7 I would like to emphasize an important principle that  
8 we've used in this evolving development of the plant, and  
9 that's objectivity. This is manifested in the fact that  
10 we have three outside Senior Review Team members, that all  
11 of the Issue Team Leaders are from outside the company.  
12 Calculations and evaluations did not, indeed performed by  
13 third party, receive third-party review. All inspections  
14 will be by a third party or overviewed by a third party.  
15 Any testing other than pre-op testing and nondestructive  
16 examination that's done as a result of our investigations  
17 will be done by a third party. The key features of the  
18 Program Plan are to evaluate TRT and other issues to  
19 determine the root cause or causes, to evaluate the  
20 generic implications, to determine collective  
21 significance, to prescribe corrective action, and to  
22 prescribe actions to preclude future occurrence.

23 I'd like now to introduce the other Senior Review  
24 Team members, starting with Mr. John Guibert, who after  
25 serving as an officer in the U.S. Navy Nuclear Power

1 Program, held a number of positions with the Nuclear  
2 Regulatory Commission for a period of six years. He has  
3 been a consultant to the Nuclear Utility Industry for the  
4 past four years, emphasizing areas of system and thermal  
5 hydraulic analysis and design of nuclear power plants,  
6 operating safety performance and management.

7 Another member of the Senior Review Team, Dr. Tony  
8 Buhl, brings 18 years of solid nuclear technology  
9 experience to the Senior Review Team, including positions  
10 with the Oakridge National Laboratory, the Nuclear  
11 Regulatory Commission, and consulting activities,  
12 including responsibility for such programs as the Industry  
13 Degraded Corps Rule Making Program, Head Corps.

14 Mr. John French, at the end of the table, has over 20  
15 years of experience in areas of operations management,  
16 with particular emphasis on the performance and  
17 supervision of operations, engineering support  
18 organizations and training.

19 Turning now to the Issue Team Leaders, Mr. Howard  
20 Levin, who will be the first presenter in a few moments,  
21 brings over 10 years of professional experience to his  
22 task as the Issue Team Leader in civil and mechanical and  
23 the newly designed QA/QC areas. Mr. Levin in his  
24 consulting practice most recently served as a project  
25 manager for the Midland Independent Design and

1 Construction Verification Program; which, incidentally, I  
2 served on when I was with TERA Corporation as a principal  
3 in charge of this effort.

4 Mr. Martin Jones, back to my right, has over 22 years  
5 of electric utility experience prior to his role as a  
6 Senior Consultant to the industry. Mr. Jones had years of  
7 experience in the electrical engineering and QA/QC field,  
8 including the post of QC manager for the B. C. Saunder  
9 Nuclear Unit of South Carolina Electric and Gas Company.

10 Mr. Monte Wise, President of Wise and Associates, has  
11 over 27 years of nuclear experience, including management  
12 positions in nuclear operations. He was plant manager of  
13 Lacrosse BWR, and has extensive experience in QA/QC. He  
14 most recently served as start-up manager for the Waterford  
15 Steam Electric Station.

16 Mr. E. P. Stroupe brings over 20 years of experience  
17 to the task of Issue Team Leader for the coating areas.  
18 He's held posts at the General Electric Company, Wylie  
19 Labs, and currently is Director of Technical Services  
20 Division of Technology for Energy Associates. He's in  
21 charge of the coating area, and as we're awaiting the  
22 SSER, he will not be making a presentation today. The  
23 other gentleman will.

24 And finally, Mr. John Hansel's professional career  
25 spans over 30 years in the management of large complex

1 programs for major energy and aerospace projects. He is  
2 currently President of the American Society for Quality  
3 Control and is a registered professional quality engineer  
4 and an ASQC Certified Quality Engineer. He is the Issue  
5 Team Leader for QA/QC.

6 I'd like to emphasize for the Panel our Comanche Peak  
7 Response Team goal, and it's fairly straight forward and  
8 simple. We're going to address all matters necessary to  
9 deal with the TRT concern. We're going to assure an  
10 integrated TUGCO response to these concerns. We'll  
11 dynamically expand, as required, our program and you'll be  
12 hearing more as the Issue Team Leaders address these  
13 specific areas in that regard. We have objectives and  
14 highly qualified people to manage this effort. We will  
15 document the effort in such manner that the NRC staff can  
16 complete its independent evaluation of Comanche Peak.

17 Without further ado, we'll get to the meat of the  
18 afternoon's presentation by starting with Howard Levin who  
19 will provide you an update of his current status and  
20 description of his program.

21 MR. JORDAN: I think I'd like to ask a couple of  
22 questions. You identified at the last that your goal was  
23 to address all the matters that deal with the TRT concern.  
24 Are you going to do an independent review of the TUGCO  
25 activities as such rather than someone else's findings or

1 a set of allegations that are being followed up on? Maybe  
2 that's the wrong set.

3 MR. BECK: In the context that we're addressing  
4 initially the TRT concerns, certainly that's the evolution  
5 and condensation, if you will, of a number of allegations,  
6 presumably all of the allegations that have been dealt  
7 with in that context, and clearly requires a response. As  
8 I indicated earlier, Mr. Spence has asked us to look into  
9 the design QA/QC area which is not a specific generic  
10 concern of TRT. It's focused mostly on the construction  
11 end, but that will be evaluated and that will lead us into  
12 an expansion in some regard. As the SRT considers all  
13 matters, it's an open forum. These gentlemen have not  
14 been known for their bashfulness in examining these  
15 issues, and we fully expect them to speak their minds at  
16 all times and they have. So as necessary, that will be  
17 done. We're not limiting ourselves to any particular set  
18 of data. We're certainly concentrating at this juncture  
19 on TRT issues that are before us. That's a rather heavily  
20 loaded plate at this point, and it's being looked at very  
21 carefully.

22 MR. THADANI: The part that's not clear to me is the  
23 role that Tony Buhl and John Guibert and Frank are  
24 playing. You describe as your leaders and what they will  
25 be doing. I'm not quite sure what their role is

1 specifically. Are you going to get into that?

2 MR. BECK: I'll be happy to right now, and I could  
3 have gone much deeper into that. It's contained in our  
4 Program Plan which I presumably made available, but let me  
5 illustrate the role the Senior Review Team serves. The  
6 Issue Team Leaders are responsible to the Senior Review  
7 Panel, the four of us at this point in time, and in that  
8 context they develop their programs and they iterate with  
9 the Senior Review Team as to the applicability, the  
10 adequacy, whether or not it, in fact, has hit the mark; so  
11 it gets that input from people who are not deeply involved  
12 in the specific technical issues as we go along. The  
13 Senior Review Team will have responsibility for performing  
14 the ultimate examination with regard to generic  
15 implications, iterating with the Issue Team Leaders with  
16 regard to root causes, assuring ourselves that any  
17 interactions that might be involved or required between  
18 Issue Team Leaders are, in fact, incorporated. For  
19 example, there's a lot of obvious interaction between the  
20 QA/QC area and the other more technically oriented  
21 disciplines that requires and, in fact, gets that kind of  
22 consideration in an overall context. In turn, the Senior  
23 Review Team is responsible directly to Mr. Spence,  
24 President of TUGCO, who directed that this organization be  
25 put in place to address those concerns that we have to the



1 company. We, I hope, illustrated what the role of that  
2 body is, a Board of Directors, if you will, a very  
3 actively involved one in this effort.

4 Any other questions in general?

5 Howard?

6 MR. LEVIN: My name is Howard Levin. This first  
7 viewgraph is a listing of the TRT issues that are under my  
8 responsibility. As you can see, it's on the three  
9 categories as defined by the TRT, the civil/structural,  
10 mechanical and miscellaneous areas. This afternoon I wish  
11 to highlight four specific program plans we have developed  
12 in response to these issues that, in my opinion, would  
13 highlight the breadth and depth of the initial activities  
14 that I believe are indicative of the way we are  
15 approaching each of these issues, not only in these areas  
16 but in other areas of the TRT Response Team Review by  
17 other Review Team Leaders.

18 Just a brief word on how we're organized to do this.  
19 In many ways, as you can see through this format, our  
20 organization parallels that of the TRT itself. But in  
21 addition to that, we have issued coordinators for each of  
22 these issues that report directly to me, and they are  
23 responsible for implementing the action plans that have  
24 been developed. In my presentation today I'll follow a  
25 general format where I will, for sake of completeness,

1 describe the issues very briefly -- I'm sure that most of  
2 you are aware -- provide some background as necessary that  
3 may help us better understand the issue, and then most  
4 importantly describe the initiatives that we've developed  
5 to address these issues, and lastly a brief word about  
6 where they stand on the status of the specific efforts.

7 MR. VOLLMER: Howard, could you mention the amount of  
8 people that are involved in this particular activity?

9 MR. LEVIN: Okay. There are people, as you'll see as  
10 we go through the action plan, resources coming from a  
11 variety of sources, but from the standpoint of a third  
12 party at this point in time, estimate off the top of my  
13 head is that there's an approximate uniform loading of  
14 about 10 or 12 people. We need -- now it's important to  
15 understand the nature of the efforts to this point. It's  
16 primarily been in the development and identification  
17 issues. We plan to expand that as necessary to execute  
18 the plan.

19 MR. JORDAN: I'll mention that we'll put a copy of  
20 the slides in with the transcript.

21 MR. LEVIN: The first issue that I will highlight  
22 today is maintenance of air gap between concrete  
23 structures. Just so you know what is coming on the  
24 agenda, I will also discuss concrete compression  
25 strengths, seismic design of control room ceiling

1 elements, and those all being civil issues, and the  
2 mechanical issue of improper shortening of anchor bolts in  
3 the steam generator upper lateral supports.

4 As you are aware, the concern expressed by the TRT  
5 was related to the extent and location of the debris  
6 between concrete structures. Related to that was an issue  
7 of the effectiveness of the quality control program,  
8 specifically, record retention; follow-up for potentially  
9 unsatisfactory conditions; and most important, the  
10 consistency of that condition, the as-built condition,  
11 with that assumed in the analyses and design bases for the  
12 plant.

13 Just in the way of background, there were two forming  
14 methods utilized on the project, the first being  
15 rotofoam -- we have an example of that; go ahead and pass  
16 it around the table -- this material is placed against a  
17 concrete structure that provides a formwork for the next  
18 structure. Typically at the plant a two-inch gap is  
19 provided and that rotofoam helps to provide that gap.  
20 Steel slipforms were also used. There was a point in time  
21 where a decision was made to discontinue the use of  
22 rotofoam in favor of the slipforms, and I will just  
23 briefly describe how that occurred. I believe it was back  
24 sometime in 1977 Gibbs and Hill notified Brown and Root  
25 that rotofoam, in fact, should be removed from the gaps in

1 terms of final condition, and at that point in time  
2 rotofoam had been used. There was an effort to remove a  
3 significant portion of that rotofoam, and thereafter steel  
4 slipforms were utilized, primarily because it was an  
5 easier way of having an air gap in the final condition.

6 From an engineering point of view, why are we  
7 concerned about rotofoam? It appears to be a very soft  
8 material. How could that affect the structures? But the  
9 fact is that it is not a problem if it's in small  
10 quantities and localized areas. If it were left totally  
11 in the gap, it may invalidate some of the assumptions used  
12 in the seismic analysis in that even a soft material for a  
13 broad area could provide some interactive forces between  
14 the structures that were not considered. So for purposes  
15 of consistency with that which has been assumed in the  
16 analysis, back in '77 a decision was made to remove it.  
17 Hence the issue: Was it all removed? And I'll get back  
18 into that in a minute.

19 This viewgraph shows a plan of the power block. The  
20 lines with the elevation, designation, really show the  
21 interfaces between the buildings, typically there's a two-  
22 inch gap, and the concerns are really directed in each of  
23 those areas. In a few moments we will be showing a video  
24 tape of some inspections that have been made at the point  
25 that Frank is indicating. But before that, what I'd like

1 to do is get back into the initiatives and put those  
2 inspections in the proper time frame.

3 This is a flow or logic diagram that has been a tool  
4 in the execution of the implementation of these program  
5 plans. What we see here are the initiatives that we have  
6 identified, the parties who are responsible for some of  
7 the work, the interrelationship between those initiatives,  
8 and also a logic which assists us in making decisions as  
9 information is generated. I show this as an example.  
10 We've generated one of these for each of the action plans,  
11 and we have others that we may discuss if the Panel would  
12 like to hear about them.

13 The centerpiece of the initiatives focuses on a  
14 program to profile the current as-built condition in the  
15 gaps, and after consideration of a variety of methods, we  
16 decided to use video equipment as a means of inspecting  
17 the gaps. This work is being done by Southwest Research  
18 Institute -- excuse me -- it's being overviewed by  
19 Southwest and there's a constant vigilance of that entire  
20 operation by Southwest. At this point in time, we're just  
21 getting started with that effort and, in fact, we have  
22 found debris in the gap and we'll discuss the nature of  
23 that.

24 Let me address for a moment what we're after.  
25 Basicaly we're trying to piece together information.

1 There was a variety of existing information documentation  
2 that was created during construction, and from  
3 construction documentation, quality documentation,  
4 inspection records that are available, we will have new  
5 data that is available; and what we're trying to determine  
6 is in way of cause. Was this related to a failure to  
7 remove the rotofoam in the first place? Were the  
8 inspections adequate? What was the effectiveness of the  
9 documentation program? We believe that the pieces of  
10 information that we have knowledge of where slipforming  
11 was -- rotoforming and slipforming was used, the records  
12 that existed and the record that we're now creating  
13 through the video inspection will help us do that.

14 Finally, and the most important thing: We will have  
15 a profile of the as-built condition. We will take a look  
16 at that profile and reconcile that with that which was  
17 assumed in the design. And depending upon the outcome,  
18 one of two options may be considered. It may be  
19 reconciled, in fact, analytically or it may be removed,  
20 and that decision will be dependent upon what we find in  
21 this inspection program.

22 Right now I'd like to show you a video tape of one  
23 inspection. It is between the Auxilary Building and the  
24 Fuel Building. I'd like to point out that the video  
25 record itself is not the quality document -- before you go

1 on with it, sir -- not the documentation of record. The  
2 process is one where a camera is on a mast and the camera  
3 is used to help people see what is in the gap. In the  
4 process of going down, a written documentation inspection  
5 log was created. On the way up, we created this record as  
6 a confirmatory step.

7 Okay. What we see is a crack that's approximately  
8 two inches in dimension laterally. We have a depth of  
9 field of somewhere between three and four feet. You'll  
10 hear some audio on this indicating what elevation we're  
11 at. You can see some sort of debris or tape.

12 (Audio portion of video: "We're at elevation  
13 836 10.")

14 MR. HERDT: Was this area slipformed or rotofoam?

15 MR. LEVIN: This area was rotofoam. So you see right  
16 there there's a piece of rotofoam and it's in a larger  
17 scale on the screen than it appears. I believe the  
18 largest dimension is eight inches. So it's quite a bit  
19 larger. I believe this particular piece is about eight  
20 inches square. In the original removal process, high  
21 pressure water injection was used as a means for breaking  
22 up the --

23 (Audio portion of the video: "The debris is at  
24 842 10 inches.")

25 MR. LEVIN: The object you see in the background

1 helps people find and identify and get some perspective in  
2 the inspection. What you see there is loose tape on the  
3 side of the wall.

4 (Audio portion of the video: "You are now at  
5 elevation 866 10 inches.")

6 MR. LEVIN: Okay. The object you see on the top of  
7 the screen is a gauge that is used to help actually define  
8 the dimension of the gap.

9 (Audio portion of the video: "These bolts are  
10 at elevation 882 4 inches.")

11 MR. LEVIN: I guess I failed to say, as we go along  
12 the perimeter there are approximately 465 feet at least as  
13 you go around the building. The walls vary anywhere from  
14 50 to 120 feet and this process goes in elevation down and  
15 we do it every several feet. At each location  
16 approximately an hour of video tape was videoed so there  
17 is going to be a very long record.

18 MR. VOLLMER: Is what you see so far represented  
19 typically by this or are there some areas that there are a  
20 lot more debris or what?

21 MR. LEVIN: In the upper elevation that is typical.  
22 What you find down at the bottom at the grade, you do find  
23 more debris. It tends to be crushed and crumbled because  
24 it just remained there after the process. It's not solid  
25 and in rotofoam it would appear to be kind of fluffy, and



1 you may find other objects like little pieces of wood or a  
2 variety of things. And in many cases, at least in one  
3 case, and we're just getting started, that could be  
4 several feet deep, okay? Or maybe, you know, 100 to 120  
5 feet total elevation.

6 MR. SNIEZEK: Was this already QC inspected  
7 previously?

8 MR. BECK: Yes.

9 MR. SNIEZEK: Previously signed or authorized --

10 MR. BECK: Okay. There are inspection reports that  
11 were issued and inspections conducted in this area. One  
12 of the issues -- there are two issues surrounding that.  
13 In one case, at least to my knowledge, unsatisfactory  
14 conditions were indicated on this report so we wanted the  
15 issues we needed to look into, how that eventually got  
16 reconciled, the fact that that occurred. Another issue is  
17 just a simple ability to locate all records. We're not  
18 sure if these were the only incidents. We have to confirm  
19 as a third party are these the only inspection records  
20 missing, that type of thing. That's where we got back  
21 into utilizing the information we did have that was old  
22 and the new that was developed and trying to piece this  
23 puzzle together to try to find out just how did it happen.

24 MR. LEVIN: One last point on this: NRC staff  
25 members or consultants were at the site on January 21st to

1 witness some of these evolutions.

2 The second issue that I will highlight is that of the  
3 seismic design of Control Room Ceiling Elements. There  
4 are three key points brought up by the TRT, one having to  
5 do with the seismic design adequacy of the ceiling itself,  
6 the second being that of the interaction between non-  
7 seismic or seismic Category II items with seismic Category  
8 I items, and lastly the adequacy of non-safety-related  
9 conduit two inches in diameter and under. I just wanted  
10 to point out here that just for purposes of program  
11 management that issue is being dealt with in another  
12 action plan, that of the electrical conduit support issue,  
13 and unless there are questions I probably will not spend  
14 too much time on that. I will address the first two  
15 points in this presentation.

16 An isometric sketch showing the control room ceiling  
17 elements: We have two different general types of  
18 elements, that of the unistrut structure which is the  
19 primary support structure and miscellaneous architectural  
20 features such as the egg tray diffusers and miscellaneous  
21 other items. I want to point out that the primary  
22 unistrut structure creates a grade, is vertically held up  
23 with rods and in addition to the rods you'll see some  
24 diagonal lines. Those are representing the aircraft cable  
25 and this was the means that the Utility chose to meet the

1 Reg Guide 129 requirements in terms of interaction between  
2 seismic and non-seismic items. They provided a vertical  
3 restraint system.

4 That's an actual photograph of Unit 1. You can see  
5 that there are three distinct portions of the ceiling.  
6 Directly over the control panels -- we'll call it a lower  
7 ceiling -- that overhangs slightly beyond the panels and  
8 get more direct lighting over the panel. There's a sloped  
9 portion previously made up of gypsum board and upper  
10 ceiling that provides general lighting in the control  
11 room. I understand that the Panel may have had an  
12 opportunity to actually see some of this. It would be  
13 meaningful to you.

14 When the TRT reviewed this issue, one of the concerns  
15 that they raised was that of the architectural features,  
16 the diffusers and miscellaneous other items, and the  
17 degree to which they were positively restrained and had  
18 the potential for potentially striking and operating; and  
19 I wanted to just mention that that is, I believe, a valid  
20 concern. Experience in real earthquakes indicates that,  
21 in fact, a few of these are apt to fall and, in fact, that  
22 recognition is the cornerstone of some design changes that  
23 have been contemplated. Those changes fall into two  
24 areas: Number one, the architectural items and we'll show  
25 you a little mock-up of what some of those changes would

1 be; and secondly, providing some additional horizontal  
2 restraints to give a little grid structure and unistrut  
3 structure to limit the possibility of interaction above  
4 the ceiling.

5 What we see here is a mock-up showing the structural  
6 tees -- Frank and Terry are holding support wires in a  
7 previous configuration. Many times they were just typical  
8 residential construction and they were just simply used.  
9 We are now providing positive wraps there. They're nylon  
10 wraps for each that will be attached to each diffuser  
11 panel, and most importantly, there's a positive connection  
12 at each intersection point between the cross members and  
13 horizontal members. What happens in a real earthquake is  
14 that the lateral members tend to separate and things drop  
15 through, so now we're kind of eliminating that  
16 possibility.

17 You will recall from my earlier comments the existing  
18 ceiling that is gypsum board on the sloped ceiling. There  
19 was a concern raised by the TRT that the gypsum board  
20 could dislodge, pieces could fall down. As part of the  
21 redesign, the metal pan item that Frank is holding will  
22 replace the gypsum board. We'll get into that in a  
23 minute. The cable that he's holding is already a key  
24 component in the design, and as we go through some photos  
25 in a moment, you'll see that in the existing or original

1 design concepts, extensive use of aircraft cable was used  
2 to provide vertical restraints so we didn't have the  
3 system globally fail. That is retained and -- maybe  
4 that's enough to say about that.

5 The last initiative in the area, generally in the  
6 area of architectural features, and somewhat divorced from  
7 the control room ceiling is the degree to which these  
8 types of items and other items were addressed in the  
9 Comanche Peak Damage Study. And what this study was was a  
10 detail walkdown to go through the plant and identify  
11 seismic interactions, and what we plan to do as a third  
12 party is to review the methodology for that program, key  
13 assumptions, test the implementation by actually going to  
14 some of those records in some cases, and in other cases  
15 going out there and independently noting the interactions  
16 ourselves and then comparing that to what was originally  
17 established.

18 MR. SNIEZEK: As I understand, this was done  
19 throughout the plant.

20 MR. LEVIN: There was a damage study program as part  
21 of the original design evolution at the plant, that's  
22 correct.

23 MR. SNIEZEK: At what stage was that?

24 MR. LEVIN: I believe it started in '81 time frame;  
25 is that right? I can't answer that directly.

1 MR. SNIEZEK: About that era?

2 MR. LEVIN: I believe so. Can you confirm that?

3 (UNIDENTIFIED): The Damage Study started around '80,  
4 '81, and continued right on up to the present.

5 MR. THADANI: What was the scope of the study? Did  
6 that include fairly thorough studies and then a walkdown  
7 by teams with some focus on what sort of things they were  
8 looking for?

9 MR. LEVIN: You have the general idea. Criteria and  
10 methodology for actually conducting these walkdowns was  
11 established, and support of those walkdowns, those various  
12 analytical investigations and assumptions made as to what  
13 these teams should be looking for and what they should  
14 document. But we're going to review the basis for those  
15 assumptions and those analyses as input into the study and  
16 then selectively test the implementation to see that in  
17 effect it was implemented as planned.

18 Go to the second photo now. What we see here is a  
19 view of the unistrut structure and vertical restraint  
20 system. The open area to the left is an area where the  
21 sloped ceiling has been removed, and that's in preparation  
22 for the placement of the metal pan.

23 This is another view of the same thing. You can see  
24 it in more detail. You can see the aircraft cable which  
25 provides redundance, restraints for the other vertical

1 supports that Frank is pointing to. The primary purpose  
2 of that is to support the lighting fixtures and ultimately  
3 the diffusers.

4 This is an inside view of the sloped portion of the  
5 ceiling. The black members provide a frame to which these  
6 horizontal running purlin are attached, and this is the  
7 existing -- well, the original design configuration. The  
8 dry wall is screwed into those horizontal running purlin.  
9 You can see a fan of aircraft cable at each truss fixture.  
10 We have a series of these that pick up, in effect, all the  
11 pieces. You can see how they're attached positively to  
12 each of the horizontal purlin, and that's the original  
13 design that you're seeing right there.

14 This is an area that we noted in our initial  
15 investigation. The duct work that you see there runs  
16 around the entire perimeter of the control room in back of  
17 the lower ceiling, and as part of our early efforts, we  
18 wanted to go above the ceiling and look for interaction.  
19 This is one possible interaction that we'll be viewing  
20 further. That is the possibility of -- that unistrut  
21 piece right there -- of actually puncturing the duct work  
22 and as I mentioned earlier, another key to the design  
23 efforts will be to limit restraint of the ceiling in terms  
24 of the swags such that interactions like that are  
25 eliminated, don't exist.

1           This is a view -- the completed portion is in Unit 1;  
2 the portion of the sloped ceiling, the portion that is  
3 open, is in Unit 2, and you can see the metal pan going in  
4 to it. With that, I'm completing that discussion unless  
5 there are other questions.

6           MR. THADANI: Can you give me a reference to that  
7 study?

8           MR. LEVIN: The Damage Study? I can get one for you.  
9 I can't do it off the top of my head.

10           The next issue that I will be discussing is that of  
11 concrete compression strength. As you recall, there were  
12 allegations investigated by the TRT of falsification of  
13 quality records. Those allegations were in the areas of  
14 cylinder tests, the slump tests, and air entrainment  
15 records. There have been, to my knowledge at least, two  
16 NCR investigations, one originated by NRC Region IV and  
17 TRT itself, that looked at this; and I guess the  
18 impression based upon the records that were available was  
19 that the evidence did not suggest falsification of records  
20 took place. However, it was the opinion of the TRT that  
21 some quantitative evidence of that was necessary to  
22 provide additional confirmation. It was that that we  
23 focused our efforts. The cornerstone of that effort, in  
24 fact, is a semi-nondestructive testing program. This  
25 program relies upon use of a Schmidt hammer. The Schmidt



1 hammer provides an empirical test of concrete strength --  
2 Terry is passing one around -- we can demonstrate it if  
3 you'd like. What I wanted to indicate is that TRT  
4 identified a period that was in question where these  
5 records allegedly may have been falsified, and that period  
6 being between January '76 and February '77. The approach  
7 that we have taken is to select a sample, randomly  
8 throughout the plant, of concrete surfaces to test and  
9 also select a sample outside of this period, six months  
10 outside of the period, thus creating two populations of  
11 new concrete data. These populations and the test results  
12 that we obtained will be statistically compared and  
13 ejected to discern any meaningful differences from an  
14 engineering point of view. It's important to point out  
15 that this effort is being conducted entirely by Southwest  
16 Research Institute, a third party, and they report those  
17 results directly to me.

18 We're utilizing the services of two statistical  
19 consultants in this effort, one an individual,  
20 Dr. Veneziano of M.I.T., and additionally that of Jack  
21 Benjamin and Associates.

22 In the way of status, I indicated that we have two  
23 populations and a total of 200 test locations that will be  
24 tested, 100 in each. We've completed 107 tests. We  
25 expect to be finished with this effort today. On

1 January 7 the NRC staff and consultants visited the site  
2 to witness preparation, and we see one such area on the  
3 slide in back of you. That's an area that has been  
4 prepared. The preparation requires removing the initial  
5 surface down to a depth of approximately a quarter inch,  
6 and that hammer is used ten times in the ASTM. The  
7 following tells one what to do with those readings and how  
8 to deal with them mathematically, but essentially it's an  
9 averaging process. It creates a reading, a Schmidt hammer  
10 number, which could conceivably be converted to empirical  
11 data back to strength. What we're doing statistically is  
12 just comparing the hammer numbers and not going directly  
13 to strength at this point in time.

14 MR. SNIEZEK: Two questions. Going back to the  
15 background slides, the quote that evidence suggests  
16 falsification results did not take place.

17 MR. LEVIN: That's a quote out of a TRT letter.

18 MR. SNIEZEK: With that quote why did you go with a  
19 testing program?

20 MR. LEVIN: It was suggested by the TRT. They were  
21 looking for -- they were looking at records and from those  
22 records they didn't find evidence, but to provide a more  
23 quantitative basis, I think it was their opinion that  
24 generating this data would settle the issue conclusively.

25 MR. SNIEZEK: Did you agree with that?

1           MR. LEVIN: Yes. Just in terms of initial results,  
2 we have 107 tests complete. Today we should have the  
3 remaining 10. The initial results suggest that, in fact,  
4 these populations both are normally distributed. We  
5 aren't able directly to discern any differences between  
6 the two; however, we're going to verify that  
7 statistically. That's just on a straight visual  
8 observation. It is just that looking at it as a layman,  
9 which I myself am in the statistical area, one doesn't  
10 really see any differences, but we'll confirm that. We've  
11 taken a look at three different methods of doing that  
12 comparison and providing that confirmation, that the  
13 populations are similar or dissimilar or whatever the case  
14 may be.

15           The last issue that I'll be discussing is that of  
16 improper shortening of anchor bolts in the steam generator  
17 upper lateral support. The primary concern expressed by  
18 the TRT centers around that of the structural adequacy of  
19 the as-built condition. In a more horizontal sense, they  
20 also express the concern of the adequacy of other drilled  
21 and tapped locations and suggested that bolt cutting  
22 procedures and field installation procedures be reviewed  
23 as part of the program; and related to this is the  
24 question of the effectiveness of the QC program in terms  
25 of record retention for the initial inspection program.

1           Maybe what we could do is put the sketches up, Frank,  
2 right now. I want to show you what we're talking about  
3 here. This is a sketch of one upper lateral support.  
4 There's one of these in each of the four cubicles that  
5 provide restraints to the steam generator in the event of  
6 a blow down or a seismic event. The bolts and the  
7 engagements that are in question -- Frank, you might point  
8 to where they're located and get to the next sketch.  
9 Basically, the bolt provides positive connection between  
10 the beam and the base plate which is cadweld into the wall  
11 off to the right, Section AA. You can see a circle there,  
12 a drill in top location. The requirement by design was  
13 that these threads be two-and-a-quarter inches in depth.

14           Go to the next one. The first step that has been  
15 taken in terms of determining whether or not adequate  
16 engagement existed was to go inspect the UT. Those  
17 inspections have been completed and, in fact, we've  
18 confirmed that in certain inspections that the bolts do  
19 not have the full engagement as shown on the design  
20 drawing. The decision has been made to correct that  
21 deficiency and get the as-built condition in conformance  
22 with the drawings.

23           Another part of our effort is to identify other areas  
24 in the plant where connections may have relied on drilled  
25 and tapped-type configurations. We plan to identify those

1 areas, select a sample from those different kinds of  
2 configurations, inspect them to assure that adequate  
3 engagement exists, and certainly evaluate anything that  
4 comes out of that program.

5 MR. SPENCE: Mr. Jordan, in response to your earlier  
6 question, I think that's an example of how we're going  
7 beyond TRT findings as we see something that warrants a  
8 further investigation. The interaction piece that Howard  
9 mentioned earlier with the control room ceiling and the  
10 unistrut and duct work is another example of people going  
11 in with their eyes wide open and further exploring.

12 MR. SNIEZEK: A couple of questions regarding that.  
13 What percentage of the samples that you found did not have  
14 adequate penetration and did you determine what the root  
15 cause of that was?

16 MR. LEVIN: There are a total of 144 bolts total on  
17 four restraints. Thirty-six bolts have full engagement.

18 MR. SNIEZEK: What was the range?

19 MR. LEVIN: The range varied from approximately an  
20 inch of engagement up to the full two-and-a-quarter, and  
21 it's fairly uniformly distributed in the ones that did  
22 not. The vast majority, I'd say, Jim -- I don't have the  
23 data in front of me -- were between two inches and two-  
24 and-a-quarter inches, as I recall, in terms of engagement.

25 In terms of your second question on root causes, as

1 we take these bolts out -- that has not occurred to  
2 date -- we're going to look in the holes. Part of the  
3 allegation was that the reason bolts are short is that  
4 someone cut them. The reason they were cut is because  
5 debris was in the hole. When we take the bolts out, we'll  
6 determine what, if anything, is in the hole and if that  
7 may have been root cause, but I want to indicate that  
8 we're not just stopping there. There's a variety of other  
9 reasons, probable reasons as to what may have led to this  
10 event.

11 MR. JORDAN: Is this an area where there was supposed  
12 to have been a QC inspection?

13 MR. LEVIN: This is an area that I would expect there  
14 to have been. It is unclear at this point in time whether  
15 or not there was QC inspection. The records, Jim, have  
16 not been located to date. People that were involved at  
17 the time believe that they may still exist and various  
18 people in TUGCO are trying to locate those records, so I  
19 guess I can't really fully answer that question.

20 One last point. The representative of the staff -- I  
21 believe it was an NRC consultant -- visited with us on  
22 Wednesday and has reviewed just the general initiatives  
23 that were taken in this area.

24 With that, maybe I can summarize. As I started off  
25 my presentation, I believe that the initiatives that we've

1       portrayed here in these four areas are representative of  
2       just in general what we're doing in other areas. We have  
3       a combination of third-party inspection activities going  
4       on, design-review activities going on, review of  
5       documentation; and it's through a combination of those  
6       types of activities that we're going to piece together the  
7       answer to the TRT question. At this point I'd say the  
8       bulk of the activities are projected for completion at the  
9       end of March-April time frame. As you are aware, it's an  
10      iterative process. The logic diagram shows that when you  
11      can get to certain points in time, you make decisions.  
12      You can go down other paths that can change that. There  
13      could be selected issues that could trickle beyond that  
14      time frame. We'll just have wait and see. That's when  
15      the majority of efforts will be complete, by that time  
16      frame.

17           MR. THADANI: I have again another question. My  
18      understanding of the team you put together and the scope  
19      of the work this team is doing: Example - the ceiling in  
20      the control room. TRT has identified this -- I forget  
21      when but it wasn't that long ago -- and we were at the  
22      site a couple of days ago. We did look at the control  
23      room and as you showed in your photographs, a lot of work  
24      has already been done, so presumeably you were working on  
25      this issue well in advance of the TRT suggestions or

1 whatever you want to call it. Is that a correct  
2 understanding on my part or am I confused about that?

3 MR. LEVIN: I don't believe so. I think you may be  
4 shocked on how much work can be done when you apply those  
5 resources. Of course, the issue was identified before my  
6 personal involvement, but it, in fact, was a TRT effort  
7 that initiated the activities that you witnessed.

8 MR. BUHL: I believe that particular issue was  
9 identified in the September TRT report.

10 MR. LEVIN: In that regard, it's TUGCO design  
11 organizations that are the focus for that work. We're  
12 completing a third-party evaluation of those efforts, and  
13 monitoring it as it goes along; and it followed the normal  
14 design process that's in place and the procedures for  
15 installation are following normal site procedures.  
16 There's also a design review completed as part of the  
17 normal process at this site. Ours is an overview of that  
18 even.

19 MR. VOLLMER: Howard, I'd like, if you would, to go  
20 over how you, to what extent you went back and looked at  
21 original design documents or the evolution of design as  
22 you approach certain of these problems, for example,  
23 something to do with the conduit support or any of the  
24 seismic issues. There may have been changes made over the  
25 life of the project in which design criteria may have been



1 lost, bent or somehow not taken account of.

2 MR. LEVIN: That's a good question and a good example  
3 of an area where there's been significant evolution,  
4 particularly this whole general issue as it's been termed  
5 in the industry as seismic two over one and general  
6 interaction of items. That's a relatively new issue in  
7 terms of the recent focus. The extent we've gone back is  
8 really a function of the necessity to try to determine  
9 cause. In many ways the process that occurred back then  
10 is not necessarily important to our primary need to come  
11 to some conclusion on the quality of the product, but the  
12 process tells us something about what the cause may have  
13 been for the issue identified by TRT. So I guess I would  
14 just generically answer that by saying we go back  
15 retrospectively only to the degree that we need to support  
16 that root cause evaluation. We also go back to try to get  
17 the historical perspective that allows us to define  
18 initiatives and get started in the first place, but most  
19 of these efforts are focused on -- I think we prioritize  
20 things. The first effort is to evaluate the existing  
21 condition, and its confirmation with commitment, and then  
22 lastly to try to get some input into cost.

23 MR. VOLLMER: It seems to me in some of these issues  
24 you either have to look now at design adequacy by analysis  
25 or go back and see the history of design to find out

1 whether or not your end product is satisfactory,  
2 particularly if there's any concern about design -- call  
3 it assurance, if you will, or design capability, along the  
4 way.

5 MR. LEVIN: There's a --

6 MR. VOLLMER: Pipe support, for example, which is not  
7 one of the issues highlighted here.

8 MR. LEVIN: As far as TRT issues, there's only one  
9 issue that is involved in piping and that has to do with  
10 the installation of the main steam pipes. I'm not  
11 clear -- I'm trying to answer your question as best I can,  
12 Dick, if you would give me a little more --

13 MR. VOLLMER: I guess you have answered it.

14 MR. LEVIN: For example, let's take the control room.  
15 Maybe the control room ceiling is an example where the  
16 original design had a primary support system, but to meet  
17 Reg Guide 129 and avoid an interaction, interaction being  
18 the possible fall of the ceiling and impacting safety-  
19 related equipment or operators, cable was provided.  
20 There's a design analysis that shows sizes of the cable,  
21 how many you need and all that. We'll be taking a look at  
22 that, but it's necessary because you need to know that to  
23 look at the new initiatives which are the lateral  
24 restraint system and the tie downs for these architectural  
25 features. It's part of the solution.

1 MR. SNIEZEK: Let me ask one more question. When  
2 you're looking at this stuff and you've had a dozen people  
3 or so working in your area and you compare the as-built to  
4 the design drawings, did you find any substantial errors?

5 MR. LEVIN: Okay. We indicated one case in this  
6 discussion, that being the anchor bolts and the steam  
7 generator. The other action plans where we've made  
8 progress -- and that's primarily in the civil area; the  
9 mechanical issues came later -- really are not directed in  
10 that area. I think some of the mechanical issues may be  
11 closer to that question, Jim, so I guess my answer is that  
12 the issues where we've made significant progress don't  
13 have that as part of the plan specifically, so time will  
14 tell.

15 MR. SNIEZEK: That's really a generic question I have  
16 for each team.

17 MR. BECK: I think we'll hear a lot more about the  
18 electrical area with Martin Jones. The next speaker will  
19 be Martin Jones. He's a Review Team Leader in the  
20 electrical area.

21 MR. JONES: My name is Martin Jones. The areas I  
22 cover are the electrical areas. Identified by the TRT, at  
23 least the ones that I'm responsible for, are nine issues,  
24 basically 1.A.1 through 1.A.5 and 1.B.1 through 1.B.4 as  
25 they're written on the panel. Within this group of nine I

1 have chosen two general areas which span four of the  
2 specific plant items.

3 The first is on concerns revolving around butt  
4 splices for the conductors in the panels, and the second  
5 addresses the problem of redundant cable separation in the  
6 control board, specifically the use of flexible conduit  
7 between redundant trains. These areas were chosen to  
8 present two perspectives to you, one where the primary is  
9 workmanship and inspection in the field, and the other was  
10 toward a design analysis of an identified concern.

11 Items 1.A.2 and 1.A.3 are covered in butt splice  
12 section, Item 1.B.1 and 1.B.2 in conduit separation areas.  
13 There are some other items covered under I Electrical, but  
14 those are structural supports for trays and inspector  
15 qualification and training which will be covered by John  
16 Hansel, so I'm not going to cover those this afternoon.

17 To give you a little bit of background on butt  
18 splices in the control panel, for a couple of years it was  
19 recognized that a number of changes would be required in  
20 some of the control panel wiring, primarily in the Control  
21 and Spreading Rooms, but there were a few of these places  
22 located elsewhere. These were due either to logic changes  
23 or other reasons such as human factors requirements  
24 perhaps or even perhaps TMI additional requirements; or in  
25 some cases it was simply to better be able to train the

1 cable within the panel.

2 Accordingly, the use of AMP -- that's a brand name --  
3 preinsulated environmental field splices were approved.  
4 An FSAR Amendment 144 was submitted to allow for these  
5 changes from standard requirements.

6 Could I have that first slide, please? Would you  
7 pass out those samples, please. There is a difference  
8 between the red and the green wires on those. If you  
9 would like to examine one, I'll get to the reason for the  
10 differences between the red and the green in just a  
11 moment. The issues that were identified by the TRT were  
12 that inspection reports did not indicate that all the  
13 splice installations had been witnessed. Qualification  
14 requirements for these butt splices were not documented.  
15 The butt splices were not staggered to prevent touching  
16 each other in the wire bundles, and the installation  
17 procedures did not require verification of circuit  
18 operability.

19 Second slide, please. We've got a couple of shots of  
20 the inside of some of these panels, and Terry will point  
21 out to you -- it's a little difficult to see that. These  
22 are fairly typical of the panels and they're fairly  
23 typical of the location of these butt splices which are  
24 indicated by blue marks. Here's one other example. If  
25 you'd look just above the sign that he's holding up there,

1 you can see other examples of conductors. I think this is  
2 a better example of how they're staggered so they don't  
3 touch one another. They're at different elevations or  
4 they're separated by intervening conductors or other  
5 circuits.

6 To date we have identified -- we have inspected --  
7 let's put it that way -- 572 of these butt splice  
8 connectors in the Control Room and Spreading Room panels.

9 Can we have the next? These are the initiatives that  
10 we have taken -- broken into phases. This slide covers  
11 the first two. Phase 1 involved retraining cables to  
12 prevent splices from touching one another. This came  
13 about in response to the FSAR Amendment. We agreed to  
14 revise the procedures for tighter control of the  
15 installation and inspection, agreed to go through the  
16 qualification procedures for the butt-splice sleeve for  
17 service conditions, and we also agreed to review  
18 additional inspection reports for splice witnessing. We  
19 reviewed a few of the additional inspection reports. We  
20 found that, indeed, in at least one case splices had not  
21 been witnessed. The documentation indicated that the  
22 splice had not been witnessed.

23 Phase 2 consisted of a third-party inspection of butt  
24 splices in the panels. For this effort we used four  
25 outside inspectors furnished by the ERC Corporation who

1 went completely through 572. We agreed to update and  
2 correct the design documents, to correct any hardware  
3 deficiencies that were found, and to do a third-party  
4 review of all the inspection reports.

5 MR. JORDAN: Was that the entire population then  
6 of --

7 MR. JONES: That's not quite, and I'm going to get to  
8 that in a moment. That's the vast majority of them, but  
9 it's not all of them yet.

10 Now comes the hard part. I've gotten yesterday an  
11 informal summary of what was found as a result of looking  
12 at these 572 butt splices in these panels. I'm going to  
13 give you just this preliminary list which has not been  
14 reviewed. There were 100 splices found which were not  
15 shown on the drawings. There were 143 splices on the  
16 drawings, shown on the drawings, which were not found in  
17 the field. In 24 cases the crimps were made using the  
18 wrong size tool. There were 8 cases where the wrong  
19 sleeve sizes were used. There were about 10 cases, I  
20 believe, of where the insulation that's extruded onto the  
21 splice itself was split, and 3 cases of strand of wire was  
22 curled outside of the barrel. And there were 14 cases  
23 where the crimp itself was improper.

24 There were other deficiencies identified, including  
25 termination of drawing errors where there was no visible

1 dock code on those splices. The splices were not  
2 staggered or the wrong color or the wrong size wire was  
3 spliced into the existing conductor. Outside of the  
4 inspection -- and this gets a little more into what we're  
5 trying to emphasize here -- in addition to doing just what  
6 was specified in procedures on this inspection, the  
7 inspectors were asked to note any other things that  
8 related that they came across and in doing that, we noted  
9 cases of damaged insulation where there were  
10 identification and separation problems in cables, when  
11 there was improper support for the wire bundles, and in  
12 particular where there was improper -- either improper  
13 insertion or over-straightening of the conductor. You can  
14 not tell from looking at it from the outside which the  
15 case is. It's either one or the other.

16 Of course, all of these things that we found are  
17 going to be considered. What we have to consider the most  
18 which may have safety significance are these four, in my  
19 opinion, where the wrong crimp tools were used, where  
20 there was an improper crimp, whether the wrong sleeve or  
21 wire size, and where there was an improper insertion of  
22 depth found.

23 The actual safety significance, of course, depends on  
24 what we find doing some tests on these things and what  
25 functions were involved in those where we did find bad



1 ones.

2 The present status is that we have finished the  
3 Phase 2 inspection in the Control and Cable Spreading  
4 Room. We have a correction to hardware deficiencies.  
5 We've begun a documentation review, that is, the  
6 inspection reports that were associated with all these  
7 splices, and we have identified other butt splices that we  
8 know are located outside of these other panels.

9 In addition to that, we've looked in panels. We have  
10 identified a number of panels, similar panels, where the  
11 drawings showed no splices on the drawings. We've looked  
12 in those panels and where the drawing shows no splices, we  
13 haven't found any in those additional panels. We have not  
14 opened up bundles of cable or anything like that, but we  
15 have looked in a number of panels.

16 May we have the next slide? Obviously, now it  
17 becomes Phase 3 and this Phase 3 will evaluate the safety  
18 significance, determine the need to investigate related  
19 areas; termination might be a good example. We need to  
20 determine the root cause in the QA/QC implication  
21 certainly, and then we need to take long-term corrective  
22 action if needed to resolve this. We have prepared a  
23 little matrix of some of the concerns that we found and  
24 show the corrective action taken now. For example, if the  
25 wrong crimp tool was used, wire strands curled, or the

1 insulation was split, these will be replaced, using  
2 revised procedures certainly. We'll have to go through a  
3 retraining process with the electricians and with the  
4 inspectors in accomplishing that. Where there are  
5 unsatisfactory determinations, these are going to have to  
6 be corrected. At this point I think determination problem  
7 is isolated. There's no long-term action involved. Where  
8 inspections were inadequate, certainly we have to check  
9 the training and certification of these particular cases,  
10 and again procedures need to be looked at, certainly if  
11 some retraining is involved. Where we feel that there may  
12 be insufficient conductor penetration, what we plan to do  
13 right at the moment is to conduct tests on the conductors  
14 that have to be removed for those first three items,  
15 perhaps grind them down and determine whether there was a  
16 correct insertion made. We'll do some pool tests, for  
17 example, where the crimp size was wrong. As I said, it's  
18 difficult by examining a red and green wire. One of those  
19 does have the wrong tool size on it; one has the right  
20 tool size, so we will do some tests on those. But the  
21 important thing is for all these concerns we have to  
22 determine safety significance, and most important to  
23 establish the root causes and the link to the QA and the  
24 QC concerns.

25 To summarize this, this has all been done in

1 accordance with the program plan as we worked on it. The  
2 evolution of the issue has been sort of like this: In  
3 Stage 1 there was a recognition before any inspections  
4 were done that insulation should be improved through  
5 retraining of the conductor and making sure that the  
6 splices were separated.

7 We acknowledge that the splices needed to be  
8 qualified for the operating requirements and if procedures  
9 needed to be -- or installation after inspection needed to  
10 be tightened up, too. To that point, Stage 2 began when  
11 there was a recognition that the documentation wasn't what  
12 it should be, didn't meet the witnesses' requirements. At  
13 this time the third-party reinspection of all the butt  
14 splices is not through yet, but we plan to do them all,  
15 and we have corrected the design drawings to reflect the  
16 two as-built conditions.

17 Stage 3 then becomes recognition that installation  
18 requirements have been met. We have to correct the  
19 immediate concerns. That's under the requirements of the  
20 existing QA program, and evaluate safety significance,  
21 determine the need to expand what we found in other areas,  
22 related areas, and certainly get a good definition of what  
23 long-term corrective actions are going to be.

24 But throughout this process we've also recognized the  
25 need to coordinate the findings that we have with the

1 other disciplines such as the structural, mechanical,  
2 certainly QA/QC folks, and to make sure that we  
3 incorporate into this all of our QA/QC concerns that we  
4 found.

5 This finishes the first presentation.

6 MR. SNIEZEK: I have a couple of questions on this.  
7 Why was it necessary to make splices in the first place?  
8 And you mentioned about the possibility of expanding to  
9 related areas. What type of related areas do you have in  
10 mind?

11 MR. JONES: If you feel, for example, that you have  
12 problems with crimps in butt splices, then certainly it  
13 would lead you to think you may also have a problem in  
14 cable termination, for example. That's my example of a  
15 related type of area.

16 MR. SNIEZEK: Let me ask you this. I think you  
17 mentioned there were other splices not shown on the  
18 drawings. Are you looking at that for related areas also?

19 MR. JONES: That may very well turn into a related  
20 area.

21 MR. SNIEZEK: Why were splices used in the first  
22 place?

23 MR. JONES: The cables had already been pulled, the  
24 foam that goes around the floor to seal the penetration  
25 between the floor and the bottom of the cables had

1 been \_\_\_\_\_ (inaudible) when the modifications were  
2 identified that had to be made for whatever reason,  
3 whether they were human factors or TMI changes, lighting  
4 changes, or whatever reasons these were made. That's my  
5 understanding of the reason for the butt splices being  
6 used, was that it was at that point very difficult to pull  
7 out that cable that needed to be spliced and replacing it  
8 all the way back to the trays. It was just too short when  
9 they made the changes.

10 I've got one more issue.

11 MR. THADANI: What was the make-up of the team in  
12 terms of people?

13 MR. JONES: I was involved. The inspection involved  
14 four outside inspectors who did the direct work, plus  
15 their supervision and their quality engineer preparing  
16 procedures. In addition to that, we got a lot of  
17 information from TUGCO engineering of what the drawings  
18 consisted of, things like that, so all together there were  
19 specifically six worked on it full time, I would guess,  
20 plus others as they were needed.

21 My next presentation is on the flexible conduit cable  
22 separation issue in the panel. Terry has a sample of some  
23 flexible conduits that we'll pass out.

24 A little background on this issue was that several  
25 years ago it became apparent that where cable slack was

1 required in the control board panel so that the equipment,  
2 such as switches or instruments or other items might be  
3 conveniently removed for service or for whatever reasons,  
4 that additional separation methods would be desirable.  
5 Now, with the concurrence of the control board  
6 manufacturer, it was suggested that this stuff, which is  
7 called Servic-Air, is the brand name, flexible conduit, be  
8 installed to provide that separation between closely  
9 located cables within the control board. At that time an  
10 engineering decision was made to provide for the use of  
11 this Servic-Air flexible conduit. And up until now there  
12 have been over 150 sections of this installed in the  
13 panels ranging in length from six inches to several feet  
14 and in diameter from this which is the smallest up to  
15 about two inches. This particular piece was made up so  
16 that it screwed directly into the back of the modular  
17 switches that are used on the control panel. It has a  
18 sort of a grommet and a bushing on the other end. In some  
19 cases where they don't screw into a fitting, they have a  
20 grommet on both ends.

21 Before we go to the slides, the issues identified by  
22 the TRT were that no analysis was performed to allow use  
23 of flexible conduit as a barrier in the control room  
24 panels and that some flexible conduits containing  
25 redundant training cables were separated by less than an

1 inch or were actually touching each other. And that the  
2 cables in the control panel were in direct contact with  
3 conduits containing redundant training cables.

4 The last item was not in accordance with the design  
5 requirements. It was a violation of the design  
6 requirements.

7 Could we have a slide on the panel? To give you an  
8 idea of what it looked like, this is an installation back  
9 on the main control board. We have a couple of sizes  
10 shown there. It's made out of stainless. There's about a  
11 two or two-and-a-half inch diameter and out of this --  
12 it's called ferraplaid (phonetic spelling); I'm not sure  
13 what the plaiding material is -- but these are used  
14 throughout the board and, in fact, this installation that  
15 you see right here is relatively uncluttered.

16 Essentially, under the bench section where there's a large  
17 number of control switches located together, there are a  
18 large number of flexible conduits in that area, too.  
19 Here's another example. You can see a large piece and  
20 these, I believe, are made up back of those modules right  
21 there.

22 The initiatives that we undertook for this were to  
23 provide analysis for the use of the flexible conduit, as  
24 an outgrowth from the analysis is to provide inspection  
25 criteria for third-party inspection of the panels to

1 make sure that everything was in order, and the actual  
2 third-party reinspection of the panels. Now, to do this,  
3 Gibbs and Hill has drafted an analysis of the separation  
4 problems within the control board, and the thrust of this  
5 analysis is to identify circuits where the existing wiring  
6 material and the associated circuit detection such as the  
7 fuses and circuit breakers, whatever, include the need for  
8 any special protection between dissimilar frame; that is,  
9 even if the flexible conduit weren't there, the analysis  
10 would show in these particular cases that it's not needed  
11 anyway. The analysis also identified all other circuits;  
12 that is, the remainder of the circuits where special  
13 separation is required; that is, six-inch separation  
14 between required by the code or the installation of a  
15 rigid barrier of some type or some other method of  
16 providing the separation. As part of that, the inspection  
17 criteria had been withdrawn from this analysis, and it's  
18 being incorporated in the inspection procedures for the  
19 boards; and we are considering running a test of the  
20 wiring materials and the flexible conduits under cable  
21 short circuit conditions to verify the effectiveness of  
22 the flexible conduit as a barrier and possibly to verify  
23 the stated capacity of the casement that's already been  
24 used. Final review of the analysis will also determine  
25 whether we feel like we need to conduct the tests or not



1 or whether the analysis will stand alone.

2 The status right now is as you've seen it, under  
3 consideration. We have not inspected anything yet, but we  
4 are prepared to do that very shortly. We hope to start  
5 sometime about the middle of the month, the inspection  
6 procedure throughout the plant.

7 MR. THADANI: Was this sort of thing within the scope  
8 of the Damage Study or whatever you call it?

9 MR. JONES: I doubt it.

10 MR. THADANI: Was that outside the scope?

11 MR. JONES: Outside. This was inside the main  
12 control boards themselves, so I would suggest it was  
13 outside of the study.

14 Any other questions on either of these two  
15 presentations?

16 MR. JORDAN: It's the consensus of the Panel that we  
17 should take a break at this time.

18 (A break was taken.)

19 MR. JORDAN: Go ahead, Mr. Beck.

20 MR. BECK: Mr. Jordan, there was a question that  
21 arose in the first part of the presentation having to do  
22 with design, design quality, design QA aspects. There may  
23 have been some confusion. I've asked Mr. Levin to expand  
24 a little bit on precisely, I believe, Mr. Vollmer's  
25 question.

1 MR. LEVIN: It will be very brief. I believe there's  
2 two different areas that the question may be directed at,  
3 the first being any design, whether it be design QA and  
4 programmatic aspects of that and design adequacy as it may  
5 apply to our investigation within the TRT issues proper,  
6 and design QA in general which may be even beyond or  
7 somewhat separate from the TRT issues. I guess in both  
8 cases the design QA and programmatic issues will be looked  
9 at, to the extent that those help us understand some of  
10 the causes, but outside -- the point that I wanted to  
11 clarify in particular is that there is a primary emphasis  
12 just simply on design adequacy, and that's a separate  
13 program; although there's not a TRT issue that deals with  
14 piping and pipe supports in general, there's one that's  
15 related to the main steam line. But that general issue we  
16 plan to take a look at, but the emphasis will be to  
17 reconcile the as-built condition with the design. So in  
18 effect we'll be looking very directly at design adequacy.  
19 The knowledge of the design QA process will help focus  
20 some of that effort, but the bottom line will be looking  
21 at that hardware.

22 MR. VOLLMER: How does reconciling as-built with the  
23 design confirm design adequacy?

24 MR. LEVIN: When I say as-built, I'm not referring to  
25 just typically going out and verifying that's what in the

1 field is exactly as is shown on the drawings or in the  
2 specs, but to look at what's in the field, understand the  
3 expected behavior of that configuration, and verify that,  
4 in fact, the behavior as it's expected has been  
5 appropriately represented as such in the design analysis.  
6 So it will be through -- that's why I think it's important  
7 to first start from what's in the field and what's on the  
8 drawings, not from just a simple confirmatory aspect of  
9 dimensions necessarily, but to understand how the system  
10 works and see if it was, in fact, represented that way in  
11 the design analysis.

12 MR. VOLLMER: The implication, I think, is that there  
13 would not necessarily or not likely be any confirmatory  
14 analyses but rather your judgment that that design met the  
15 requirements, functional requirements, specified.

16 MR. LEVIN: That certainly would be a part of it, but  
17 I wouldn't eliminate that as a possibility, that there  
18 would be a need to do some confirmatory analysis.

19 MR. VOLLMER: If the judgment casts doubt on what  
20 was, then you can go forward, but as a matter of routine,  
21 you would not; is that what you're saying?

22 MR. GUIBERT: I can give you one example of where --  
23 for example, there is an issue on the table that Howard  
24 has under his purview that he didn't go into today, and  
25 that's the issue relating to the missing rebar in

1       containment, and one of the elements of the action plan  
2       there is to take a look at the analysis that justifies why  
3       that rebar need not be there; and indeed a third-party  
4       design review of that analysis will be conducted. So  
5       that's an example of one of those cases where we will do  
6       that sort of thing where the nature of the issue and our  
7       resolution or investigation of the root cause or whatever  
8       the deficiency is leads us down that path. You heard one  
9       of the ones that Martin mentioned on this flexible conduit  
10      issue. Well, clearly there should be an analysis which  
11      demonstrates why the use of that conduit is acceptable in  
12      installation. Right now it's not clear to us yet because  
13      we don't have the information as to whether or not that  
14      analysis was there and was adequate, or whether or not it  
15      wasn't there and we need to perform one.

16             Now, that could lead us down either or two paths.  
17      One, it should have been done and wasn't, or indeed  
18      perhaps it maybe didn't need to be done in terms of the  
19      current regulatory requirements and commitments. But one  
20      way or the other, before the Senior Review Team is  
21      satisfied with the investigation of the root cause and the  
22      generic implications, we're going to have an answer to  
23      that question, which ever way that leads us. And I think  
24      that's true -- I can speak for my colleagues -- that's  
25      true of all of these. A number of the action plans have

1 elements in them where we're anticipating potential root  
2 causes and have already expanded the scope of the  
3 investigation beyond that specified by the TRT. There are  
4 others where until we get a better handle on the root  
5 cause, the potential root causes, we are leaving the  
6 option open to ourselves to expand the scope of the  
7 investigation. And, in fact, the program plan, Revision  
8 One, if you get a chance to read through it, one of the  
9 things you will find in there is that the Review Team  
10 Leaders are tasked by the Senior Review Team to, as soon  
11 as they get to a stage in their investigation where they  
12 have reached at least their preliminary conclusion as to  
13 the nature of the root cause, they are to provide that  
14 information and discuss it with the Senior Review Team so  
15 that the adequacy of the scope, depth and breadth of the  
16 individual action plans, can then be relooked at in light  
17 of what that determination is.

18 So what you're hearing here are some preliminary  
19 results and some aspects that haven't necessarily gotten  
20 to that stage in the investigation, but I can assure you  
21 that stage of the investigation is part of the program  
22 plan and you can see it in writing on the record right  
23 now; and we intend very seriously to pursue that.

24 MR. VOLLMER: Since you brought up the electrical  
25 flexible cable, is that a Reg Guide 175 issue or IEEE

1 issue, that particular separation?

2 MR. GUIBERT: It is the Reg Guide 175 issue.

3 MR. VOLLMER: That's the issue there.

4 MR. BECK: Mr. Jordan, I'd like now to introduce  
5 Monte Wise who will be talking about the issue of start-up  
6 testing.

7 MR. WISE: Mr. Jordan, Panel, this part of our  
8 presentation will deal with start-up testing of pre-  
9 operational and pre-requisite testing, as John mentioned.  
10 This portion of the Comanche Peak program starts with the  
11 turn over of systems from construction to the start-up  
12 group and extends to the point to where plant staff  
13 accepts the system as being adequately tested and ready  
14 for operation.

15 As you see on the slide, there are seven TRT issues  
16 that were included in the September 18 letter, and these  
17 issues will be evaluated in SSER 7 to come out soon.

18 I will specifically talk in detail about the issues  
19 one and six, hot functional testing data packages and pre-  
20 requisite testing. I feel that these are most  
21 representative of the carrying out of the program plan  
22 objectives, and I think you will get a good flavor of how  
23 we're handling the testing issues as I go through these.

24 For the hot functional testing data packages issue,  
25 the detailed issues of this item are that -- first of all,

1 17 of the 24 hot functional test packages, test data  
2 packages, were reviewed by the Test Review Team, and the  
3 team found problems with 3 of those 17 packages. The  
4 types of problems they found in those 3 packages included  
5 the fact that not all the test objectives were met and  
6 that retesting that was specified where it was necessary  
7 was not adequate, and that these deficiencies were passed  
8 over by the Joint Test Group in their review and approval  
9 of these test data packages. The Joint Test Group has the  
10 responsibility to review in detail the test results after  
11 it is generated during the original test and approving  
12 that test result.

13       Going into more depth into the issues, one test was  
14 the bus voltage test taking in its scope the 6.98 KV and  
15 480 volt safety-related systems. During this test the  
16 grid voltage, the incoming voltage to the plant, was low  
17 for some reason, and that made the voltage of the system  
18 in the plant lower than was intentioned in the test; so  
19 the transformer taps were reset during the test to bring  
20 the voltage up to within the range of the test. After the  
21 test was completed under those conditions, the matter -- a  
22 test deficiency report was issued regarding the matter,  
23 and engineering in its evaluation decided, determined that  
24 taps needed to be put back to their original position,  
25 that the grid voltage, the incoming voltage, was

1 abnormally low and, therefore, it wasn't the transformers  
2 that were in error but the grid voltage.

3 The primary problem with that determination and its  
4 resolution was that no retesting was specified after the  
5 taps were reset on the transformers. The rationale for  
6 that was that in looking at the data from the tests, the  
7 transformers were transforming properly. They were  
8 reducing the voltage in the amount specified, so the  
9 engineering group felt that the system would be adequate  
10 without additional testing.

11 I'll go into the resolution of these matters in the  
12 next part.

13 MR. JORDAN: Is this a judgment difference on the  
14 part of the reviewers or is there a problem?

15 MR. WISE: No. In this case, now -- as I will  
16 explain in a little bit -- each of these problems, each of  
17 these test packages, is to be reevaluated, has been  
18 reevaluated by the Joint Test Group; and in this case it  
19 was determined that the TRT had indeed called the shots  
20 directly and the test needed to be reperformed.

21 On the second item, another test result package,  
22 prior to the test, hot functional test, three of the  
23 sixteen transmitters, level transmitters on the steam  
24 generators, malfunctioned and had to be replaced with  
25 temporary transmitters. They did not have in stock the



1 sam type of transmitters that were permanent equipment.  
2 The temporary transmitters had the same pressure ratings  
3 and same range and so forth, but were not the permanent  
4 equipment-type transmitters. Those were in place  
5 throughout the hot functional test. They performed  
6 satisfactorily. Later on, after the test, they were  
7 replaced with the original-type transmitters.

8 The problem here was two fold. Reg Guide 186,  
9 Position C3, says that to the extent practical, permanent  
10 equipment will be tested under the conditions, under  
11 operating conditions, and for a period of time that will  
12 essentially allow initial burn-in so that you get rid of  
13 early failures, potential for the equipment. Since these  
14 transmitters were not installed during hot functional  
15 tests, TRT didn't feel that this regulatory position had  
16 been met.

17 The other concern there was that the retest that was  
18 specified following replacement was only a bench test,  
19 cold test, and there was no specified follow-through for a  
20 hot zero load condition test.

21 MR. THADANI: Let me ask you a question: How many  
22 total transmitters there are for level instrument panel  
23 16. Were these three on the same steam generator?

24 MR. WISE: No. Two of them were on the same  
25 generator; one was on another steam generator, so there

1 were permanent-type transmitters on all four steam  
2 generators.

3 MR. SNIEZEK: Let me ask a related question.  
4 According to Reg Guide 168, requirements aside or position  
5 aside, with these three temporary transmitters, would you  
6 have achieved the test objectives?

7 MR. WISE: Yes.

8 MR. GUIBERT: I don't want to preempt you, Monte,  
9 but, Ed, you had a similar -- I think your question on  
10 this related to judgment applies to these two as well, and  
11 my understanding, this is just preliminary input to the  
12 SRT at this time. One of the dilemmas is if you -- my  
13 understanding is if you looked at any operating plan that  
14 was operating for some period of time and had a defect in  
15 a transmitter at this point in time, what they would do in  
16 their replacement would be indeed to replace that channel,  
17 cold calibrate it, and go to operation. If there are any  
18 problems, it would show up when you got to that point in  
19 time. So what in essence they did is typical of what you  
20 would find in an operating plant today. That adds a  
21 dilemma of judgment as to whether or not you reach a  
22 conclusion on that, but to answer your question of  
23 judgment, it's certainly a factor.

24 MR. SNIEZEK: Let me tell you the other thrust of my  
25 question besides determining whether the system test

1 objectives still have been met. The other thrust of my  
2 question was: Are you doing this because the TRT said you  
3 should probably do it and it's easier to do what they say  
4 than do what we really believe is right? That was the  
5 other thrust of my question.

6 MR. GUIBERT: I think in this case, irrespective of  
7 our review program, as it turns out there were some  
8 deferred hot functional tests and they had to reconduct it  
9 so the opportunity was right to take care of this matter.  
10 I believe that's technically correct. So it became almost  
11 a moot point in terms of the ability to resolve the issue  
12 as opposed to arguing the point of which side of  
13 engineering judgment would come out.

14 MR. WISE: I think it's important that when cases  
15 like this come up that experienced technical people do  
16 look at the matter and they do ask the question what  
17 should be done to satisfy this objective of the Reg Guide  
18 and if something can be done possibly, is it practical to  
19 do that? Certainly I wouldn't consider it practical to  
20 perform another hot functional test to achieve this  
21 objective, but since there is a hot functional test period  
22 beyond fuel load and before criticality, then things like  
23 this could have been picked up -- can be picked up at that  
24 time. So I think people need to always think about those  
25 types of things and not just say, "Well, because we didn't

1 do it, it's not feasible to do."

2 MR. JORDAN: Let me ask one other question then to  
3 clarify. Was there a consideration made at the time not  
4 to do a retest or was it overlooked in the process?

5 MR. WISE: No. The issue as best as I can  
6 reconstruct it is it was considered, and it was determined  
7 that since -- that the objectives of the test were  
8 achieved in that 13 other transmitters had performed their  
9 function as they should have, the equipment-type was  
10 tested out; not 100 percent of the transmitters were  
11 tested during the test, but a good percentage of that type  
12 of equipment were subjected to actual operating  
13 conditions, hot functional test conditions, and performed  
14 satisfactorily; and, therefore, it really wasn't going to  
15 probably achieve anything to test those other three units  
16 under hot functional test conditions. That had been done.  
17 That was the rationale that was used to specify the test,  
18 the retest.

19 The third item was a very similar type of condition.  
20 There was one transmitter -- one of the three level  
21 transmitters for the pressurizer -- after the test was  
22 completed in the evaluation of the data, this one  
23 transmitter exhibited some marginal indication at the very  
24 low end of it in the zero to five percent range, and the  
25 transmitter was pulled off and was attempted to be

1 recalibrated on the bench. It could not be. Apparently  
2 there was an anomaly with the transmitters because it  
3 functioned properly in all the range except this very low  
4 end, and the decision was made since it couldn't be -- the  
5 procedure says don't calibrate from zero to one hundred  
6 percent, and it really couldn't be calibrated in this low  
7 range so the decision was made to replace the transmitter.  
8 And here again, the retest did not specify the hot no-load  
9 test, to retake the data that was to be taken during the  
10 hot functional test, pre-op. And here again, as best I  
11 can resurrect, the thinking was since two of the three  
12 transmitters performed very well and this one actually  
13 performed well within its control range, within the  
14 control range of the pressurizer control system, that a  
15 bench test was okay, that the new unit bench calibrated is  
16 satisfactory. And here again, it was considered to the  
17 extent practical, and the decision was made that it wasn't  
18 practical to specify some additional retests.

19 MR. THADANI: You said it was a function adequately  
20 within the control range. Do you include within the  
21 control range as to what might happen to the pressurizing  
22 heaters?

23 MR. WISE: The low cut-outs are above five percent.  
24 As I say, it was above the range; they used the range of  
25 the transmitters.

1 MR. SNIEZEK: Do you have separate transmitters for  
2 the safety function?

3 MR. WISE: I believe these were only for the control  
4 functions.

5 MR. THADANI: Pressurized level: Is any part of it  
6 considered safety? The answer might be no to that  
7 perhaps, because you don't use that for scrap function  
8 anymore, I understand, as I understand Westinghouse  
9 designs.

10 MR. WISE: I'm not that familiar.

11 The initiatives that are being taken for this issue  
12 are that the test results packages, the remaining test  
13 results packages that were not reviewed by the TRT will be  
14 reevaluated using a special sampling plan -- I'll get into  
15 that in more detail in a minute -- and this is being done  
16 by the Joint Test Group and it was felt and this was  
17 discussed last October in Bethesda whether these issues  
18 were discussed with the NRC. It was felt that the JTG  
19 would be a satisfactory body to do these reevaluations  
20 because it requires a very extensive knowledge of the  
21 plant and of the specific procedures that are involved,  
22 and so JTG, even though they did evaluate and approve the  
23 original procedures, are doing this reevaluation work with  
24 the exception that I am also looking at the reevaluations  
25 and approving -- going over what the review was, the

1 issues brought up, resolution of those issues, and the  
2 final decision on the particular test package. Special or  
3 specific guidelines were prepared, put together, and the  
4 JTG is looking them over and we all concurred that they  
5 met the objectives of the concerns of the TRT, and these  
6 include, as you see there, FSAR commitments were satisfied  
7 in each and every test package, the test objectives were  
8 fulfilled and specified in the test. If there are, and  
9 there usually are some type of retest specified or come up  
10 on a test, that those have been properly specified and  
11 conducted; and also that the Reg Guide, Position C3, of  
12 168 is properly applied where it's applicable to a  
13 particular test package.

14 The packages that are being reevaluated include the  
15 three packages that the TRT found problems with, seven  
16 remaining hot functional test packages. There is some  
17 disagreement at this point on those seven remaining hot  
18 functional test packages. We felt we knew which packages  
19 had been reviewed by the TRT and, therefore, in a matter  
20 of process of elimination came up with the seven, what we  
21 felt were the seven remaining. I was informed that there  
22 is some discrepancy there and even though we have  
23 reevaluated seven packages, they apparently are not the  
24 seven packages that totally should have been reviewed. We  
25 may have three more to look at in that category.

1           The next category -- now, again, those ten packages  
2 were all the hot functional test procedures, data  
3 packages. In addition, there are a total of 139 data  
4 packages that had been performed and approved by the Joint  
5 Test Group prior to September 18 when this matter was  
6 called to TUGCO's attention. It was felt --

7           MR. THADANI: I'm losing numbers. How many total hot  
8 functional test packages there are? One hundred and --

9           MR. WISE: Twenty-four.

10          MR. THADANI: Total twenty-four or --

11          MR. WISE: Twenty-four hot functional test packages,  
12 and they reviewed seventeen and so, therefore, there were  
13 seven left. But there apparently is some discrepancy in  
14 the actual ones they looked at, and it appears that four  
15 of the seven that we've looked at, that we reevaluated,  
16 they also evaluated. And so there's some reshuffling  
17 there, regrouping as far as actual test packages that we  
18 have to reevaluate. We should get that straightened out  
19 very soon. It was a matter of communications.

20          MR. HERDT: Just a clarification. Twenty-four tests  
21 are all the hot functional tests that you have or  
22 packages, I guess is the best way --

23          MR. WISE: Yes, and those are the tests that were  
24 specified to be run during the hot functional period.

25          MR. HERDT: This review includes the hot functional



1 testing that has been done recently as well as what has  
2 been done previously? I understood that there was some  
3 hot functional tests done recently; is that right?

4 MR. WISE: Yes. This has nothing to do with the  
5 tests that were run that, you know, a rerun of the hot --  
6 some of the hot functional tests. Some of those have been  
7 deferred because they weren't sufficiently completed  
8 during the first hot functional test. They were planned  
9 originally to be finished up after fuel load and before  
10 initial criticality, but TUGCO made the decision to go  
11 ahead and go through a second hot functional test and all  
12 of those deferred tests -- those deferred tests have not  
13 gone through the JTG so they weren't in those twenty-four  
14 because they hadn't been completed and signed off by the  
15 Joint Test Group.

16 MR. HERDT: So the twenty-four are the tests that  
17 were done some time ago.

18 MR. WISE: In '83, and were finished and reviewed and  
19 approved by the Joint Test Group.

20 MR. HERDT: Subsequently you've run some more tests.

21 MR. WISE: Yes.

22 MR. HERDT: How many more?

23 MR. WISE: I think that there were -- here again, the  
24 number seven, that were deferred; seven hot functional  
25 tests that were deferred until later, and those are

1 identified in SSER Number 6, specifically identified in  
2 SSER Number 6 as deferred tests. At that time they were  
3 planned to be done after fuel load and after that's done  
4 special considerations that had to be taken. They may  
5 have to do some additional testing regarding supports; I  
6 don't know.

7 MR. HERDT: They could do some more vibration tests  
8 or expansion or whatever it is.

9 MR. WISE: Right. But now there are no plans. All  
10 of the deferred tests were completed during the recently  
11 completed hot functional tests.

12 MR. HERDT: What's your plan for reviewing those  
13 deferred tests?

14 MR. WISE: I have no plan at this time in reviewing  
15 those. I think the main issue, the main issue here, was  
16 the review and approval of process by the Joint Test Group  
17 and since the Joint Test Group, since the concerns have  
18 been called to the Joint Test Group's attention, they are  
19 doing things more thoroughly. They are giving more  
20 emphasis to Reg Guide 168 than they may have before. It's  
21 a matter of awareness. TRT called some matters to their  
22 attention. So in my observations, their reviews are -- I  
23 see nothing wrong with the reviews that they are doing  
24 today.

25 MR. HERDT: So you have looked at some reviews that

1 they have done recently to assure yourself that the  
2 sample, I'll call them mistakes or errors, are not  
3 recurring.

4 MR. WISE: That's right.

5 MR. HERDT: That's documented in your review?

6 MR. WISE: That's right.

7 MR. HERDT: Or will be.

8 MR. WISE: Uh-huh.

9 MR. THADANI: I guess just to make sure I understand  
10 your perspective, I got the impression that although you  
11 had identified some problems, three out of the seven, but  
12 you really didn't think that there was any substantive  
13 problem with at least two of the three, or did I read you  
14 wrong?

15 MR. WISE: That's correct. I don't believe that  
16 there would have been any safety significance whatsoever.

17 MR. THADANI: Any of them.

18 MR. GUIBERT: It's premature to determine whether or  
19 not -- as I understand it, Monte, they had to rerun the  
20 bus voltage test so we won't know until we get the results  
21 whether or not having done it the way they did it before  
22 is right -- would have caused a safety problem.

23 MR. WISE: What I've seen to date, I don't feel that  
24 there is -- I don't see any safety significance.

25 Going on to the reevaluation process, as I said there

1 are 139 other test packages that JTG approved prior to  
2 September 18 that are in this population. The plan that  
3 we proposed at the October 23rd meeting last year and the  
4 Rev Zero Reaction Plan was to review -- first of all to  
5 reevaluate 20 of the most safety-significant test packages  
6 as the first grouping. If there was one reject in that  
7 sample of 20, then another 20, again going on up the  
8 ladder as far as safety significance, another 20 would be  
9 reviewed, and if there was one reject in that second 20,  
10 then all of the 139 would be reevaluated.

11 MR. VOLLMER: What would constitute a reject?

12 MR. WISE: That's my next --

13 MR. VOLLMER: If you're going to get to it, all  
14 right.

15 MR. WISE: The basic attributes that are in the  
16 guidelines that are being used here are that all the FSAR  
17 commitments are met. They're specified and met; that all  
18 of the test efficiency reports as applicable have been  
19 properly handled; and all of the test procedure deviations  
20 have been properly handled. These were areas where the  
21 TRT found problems. If there was any problem with any one  
22 of those areas, if testing had to be redone, if proper  
23 retesting wasn't specified in a test deficiency report,  
24 that would constitute a reject.

25 MR. THADANI: Can I ask you specifically, your Issue

1 Number 3 on pressurized level: Would that today be  
2 considered as reject?

3 MR. WISE: Yes, it would be, because special emphasis  
4 is being placed on consideration of Reg Guide 168. If it  
5 hadn't been specified that some additional testing to the  
6 extent practical be done, that would be considered a  
7 reject.

8 MR. VOLLMER: If they did not meet test requirements  
9 or test criteria or objectives and then retested as  
10 appropriate, then that would not be a reject.

11 MR. WISE: Yes, it would be a reject, yes. Any basic  
12 problem with the test that required retesting would be a  
13 reject.

14 MR. GUIBERT: If it had not been identified, if it  
15 had not been properly dispositioned --

16 MR. WISE: That's what I was saying. There was a  
17 deficiency that had not been caught, had not been  
18 specified, and previously prescribed retesting, you know  
19 it hadn't been previously prescribed -- no, it's not a  
20 reject.

21 MR. MARTIN: Before you leave that one point, could I  
22 ask for a clarification? You have said one of the  
23 attributes you look for in the reevaluation criteria is  
24 that FSAR commitments are satisfied. Later you said all  
25 FSAR attributes are looked at. The problem we often run

1 into is that -- I forget -- I believe it's Chapter 14 of  
2 the FSAR describes in general terms the attributes of the  
3 testing program and the primary objectives to be satisfied  
4 during the conduct of the test program, but often buried  
5 within the text of the FSAR are additional statements  
6 about the attributes of a particular system; and oft times  
7 those are not captured in the generalized test  
8 descriptions in the chapter on testing. When you speak of  
9 FSAR test commitments and attributes as described in the  
10 FSAR, is that the consequence of searching the FSAR for  
11 the attributes quoted for that system or merely just  
12 assuring that FSAR Chapter 14 is being satisfied?

13 MR. WISE: It means the total FSAR commitment  
14 pertaining to that test.

15 MR. GUIBERT: This is an example --

16 MR. MARTIN: To the test --

17 MR. WISE: To the test. In other words, the test  
18 that's being reevaluated here. Whatever FSAR commitments  
19 are in the FSAR, whether Chapter 14 or 7 or wherever it  
20 might be, those would be counted and those would be needed  
21 to be satisfied in that test.

22 MR. GUIBERT: I'd like to add a point. I think this  
23 is a good example of some cross talk between issues. To  
24 give you an idea of some of the things we're trying to  
25 look at in terms of that kind of correlation of variables,

1 one of the issues of concern was the containment leak rate  
2 test program, and one of the concerns there is that it  
3 certainly appears on the record that consideration of the  
4 fact that the FSAR should have been updated in a more  
5 timely fashion to reflect the change in the methodology  
6 that was going to be used to conduct those tests was a  
7 problem. One of the things that we're looking at here  
8 specifically, as Monte pointed out, is to kind of track  
9 that down as we look at other test packages and other  
10 parts of the testing program, is to see whether or not  
11 such things as the methodology or attributes that are  
12 reflected elsewhere in the FSAR that relates to how the  
13 test is being conducted. We're looking at that, too, to  
14 see if there are any other examples of that kind of  
15 problem, looking for some implications of one issue to the  
16 other.

17 The results of the reviews, evaluations, so far are  
18 there. The bus voltage test, as I mentioned before, is  
19 being rewritten. There were some other problems with that  
20 test that -- the original procedure itself -- and  
21 therefore it is being rewritten to make it as it should  
22 be, and then it will be rerun when it is reviewed and  
23 agreed to be run.

24 The other two as we've discussed, the transmitters  
25 will be checked under HFT conditions. We also discussed

1 the field that the safety significance of these matters be  
2 prepared to be met at this time; however, we have not  
3 rerun the bus voltage test and can't really say completely  
4 until that's done. I had there that the seven remaining  
5 HFT packages have been reevaluated with no rejects.  
6 That's true for the seven packages that we reevaluated;  
7 however, I can't say that it's finished because it looks  
8 like we still have additional test packages to evaluate.

9 We have been in the process of reevaluating the first  
10 20 samples and the JTG has approved 18 of those. Two of  
11 them are in the final approval process. I have looked at  
12 5 of those 20, and they look okay. Of the 18, 5 and so  
13 forth, there are no rejects in the 20 so far. The  
14 anticipation is that we might not have a reject in the  
15 first 20. We have another type of random sampling program  
16 for the remainder of the tests. In other words, if we  
17 found no rejects in the first 20, that means as we  
18 proposed it on October the 23rd in Rev Zero of the Action  
19 Plans, that's as far as we would have gone; however, in  
20 exploring it further, there was no randomness about this  
21 process, the original process. Somebody could have said,  
22 "Well, since the 20, the first 20, were the most safety  
23 significant, maybe they got some special attention in  
24 their review process." And so we said, "Let's take it a  
25 step further and do some random sampling on the test



1 packages." So what we're going to do if we stop at the  
2 first 20 or if we stop at the first 40, we will take all  
3 of these attributes, the FSAR commitments, the test  
4 deficiency reports, and the test deviation role, and we'll  
5 take those as a total population; and we'll look at those  
6 as a total population.

7 For instance, if there are only five test procedure  
8 deviations, we probably wouldn't throw those into the rest  
9 of the pot there. We would probably go ahead and review  
10 all five of those and then take the categories as a total  
11 population. Whatever the case is, when we have all those  
12 listed, we will do a random sampling program on those as  
13 we specified in our Program Plan, and we've just started  
14 identifying those attributes now.

15 The next issue that I had planned to talk about in  
16 detail is the one on prerequisite testing, and the  
17 specific issues in this case are that, first of all, a  
18 memo was issued by the Start-up Manager that basically  
19 relaxed procedural requirements. This is allowed. In  
20 other words, it is allowed in the start-up administrative  
21 procedures with the Start-up Manager to revise procedural  
22 requirements as long as it's been properly evaluated and  
23 so forth, and then in a timely manner update the procedure  
24 that is affected by the memo. For some reason or another,  
25 a considerable time period went on and the procedure was

1 not changed, was not officially revised as is called for.  
2 The specific thing that this memo allowed was for, on two  
3 types of prerequisite tests -- these are the construction-  
4 type tests -- two types of those tests, the craft support  
5 person in charge of the crew there could sign off on the  
6 initial conditions for that task; in other words, that  
7 equipment was set up properly and ready for the  
8 prerequisite test. The administrative procedure that  
9 governs this type of testing, SAP 21, on other testing  
10 says that the System Test Engineer shall sign off on these  
11 preconditions for the tests. This was evaluated and it  
12 was felt that for these two types of tests, it was  
13 allowable for the craft person in charge to initial off or  
14 sign off on those preconditions.

15 Other issues here are that possibly some other  
16 prerequisite conditions for other prerequisite tests might  
17 be signed by unauthorized craft personnel. Also, that it  
18 could happen in great breadth. It didn't adversely impact  
19 the preoperational test that followed along after the  
20 prereqs, and also were there other memos issued similar to  
21 this one which changed the test requirements and didn't,  
22 in fact, damage the procedures. The specifics of this --  
23 that's in the memo -- and what it did, those are the  
24 start-up administrative procedures that are of interest  
25 here.

1           As far as the details of the specific question of  
2 were other prerequisite test preconditions signed by  
3 unauthorized craft personnel, we have reviewed all of the  
4 prerequisite test data sheets, and we found that there  
5 were other types of data sheets signed off by craft  
6 personnel, unauthorized craft personnel.

7           The question as far as the signing of unauthorized  
8 craft personnel may have occurred for other types of  
9 tests --

10          MR. JORDAN: Can you give us a feel of the numbers of  
11 these that were --

12          MR. WISE: Yes. We're dealing with a total of 36,907  
13 data sheets were reviewed. A total of 3,180 were found to  
14 be signed off by unauthorized craft personnel, and that's  
15 a total of 8.61 percent.

16          Now it wasn't uniform. Some of the prerequisite  
17 tests are more significant than others. These two that  
18 were included in the memo were felt to be such that the  
19 experienced craft personnel could do those initial sign-  
20 offs. In looking at the results, the more important  
21 prerequisite tests were signed off by the System Test  
22 Engineer. Here again, in most cases, we're still in the  
23 process of evaluating this matter, and I can't say what  
24 the overall significance of it is at this point. We will  
25 be evaluating the impact of this on subsequent testing and

1 taking appropriate measures.

2 MR. SNIEZEK: Question: In those cases where you  
3 found the craft personnel had signed off the prerequisite,  
4 was it because they were authorized to do so by that memo  
5 or were there cases outside the scope of the memo where  
6 they also signed off?

7 MR. WISE: There were cases outside the scope of the  
8 memo where they had signed off. To give you an idea of  
9 the types of sign-offs that occurred, one prerequisite  
10 procedure metering device calibration had 35 percent sign-  
11 offs by craft personnel, and here again, I would consider  
12 that a fairly less important prerequisite test.

13 MR. SNIEZEK: Let me ask you a question:  
14 Verification there would normally be checking to see if  
15 you had an up-to-date calibration sticker on the device?  
16 Would that be the type of --

17 MR. WISE: No, it would be: Is the breaker racked  
18 out? If you're going to check a limit setting within the  
19 breaker, is it racked out or is the pump isolated racked  
20 out? The initial conditions for that piece of equipment  
21 or that type of equipment that was retested.

22 A couple of the more important types of equipment and  
23 the results were initial pump operation where you're  
24 checking the line-up of the pump and the breaker rack  
25 again and so forth. Out of 485 data sheets, none were

1 signed off by the craft. All were signed off by the  
2 System Test Engineer, and the same was the case with  
3 system cleanliness and verification data sheets. Zero out  
4 of 244 were signed off by craft people. So it's -- there  
5 was some rationale in the sign-offs. As they say, there -  
6 - as I say there on the bottom line, the question that  
7 we're going to have to answer, and that is what is the  
8 significance of not adhering to a procedural requirement  
9 over a fairly long period of time; and I've looked at it  
10 some. We don't really have it scoped out what we're going  
11 to do, but in the small amount of looking that I've done  
12 so far, I haven't seen any other revisions similar where  
13 procedures were not adhered to, but it's still early in  
14 the game.

15 The status here: We looked at all of the memos that  
16 had been issued by the start-up, and no others were found,  
17 similar conditions. As I said, there were other  
18 prerequisite test preconditions that were signed off by  
19 craft, and we'll have to evaluate the significance of  
20 that. We're evaluating the significance of impact on  
21 other procedures and of not adhering to a procedure.

22 Some concluding remarks regarding my evaluation of  
23 the TRT concerns to date: Until recently, until the QA/QC  
24 items, the letter that had the items, came out, I felt  
25 that I could have finished this in March. I have a

1 question now regarding the impact of concern on document  
2 control on the testing program. That may not be finished  
3 up soon. We don't have that scope yet. We're going to  
4 have to apply the concerns on document control to the  
5 testing program and see what that looks like.

6 MR. VOLLMER: How many people are involved in this  
7 test?

8 MR. WISE: I have myself. I have two issue  
9 coordinators working with me, one a QA engineer. There's  
10 the Joint Test Group; there are five of those people plus  
11 their alternates. So we're working with the statistical  
12 experts where we need statistics applied, and I think that  
13 we may have to expand that some when we get into  
14 evaluating the impact on other testing, prerequisite test  
15 findings here and also the document control.

16 MR. SNIEZEK: Question: Why did the applicant's  
17 program call for sign off of all these prerequisites by  
18 the System Test Engineer? Have you looked into that and  
19 do you consider that really to be necessary, recognizing  
20 it was in their program?

21 MR. WISE: No. In my experience, those types of  
22 sign-offs can be done very appropriately by a craft  
23 supervisor, that is, where it is an electrical discipline  
24 test or a mechanical discipline test, something like that.  
25 It shouldn't in all cases require the experience and so

1       forth of the test engineer to do that, and people here, in  
2       discussing it, agree with me. It's just nobody can  
3       explain why the procedure was not changed to reflect that.  
4       There was -- the reason it was originally there was  
5       that -- the plan was to use very experienced test  
6       engineers which they have done, and the craft people to do  
7       some of the prerequisite testing weren't going to be maybe  
8       as highly qualified as maybe other sites have them, but as  
9       it turns out, the people that they are using are very well  
10      qualified. There's a special group of people who support  
11      and are quite experienced and well qualified, so I think  
12      the conditions have changed from the original plan, but  
13      procedures have not been changed to reflect this  
14      capability and what could be done.

15           MR. SNIEZEK: Maybe I missed it; maybe you said it,  
16      but was that a commitment to the NRC or was that an  
17      internal requirement that the applicant had?

18           MR. WISE: This was an internal procedure. It's an  
19      administrative procedure.

20           MR. BECK: The next speaker will be John Hansel who  
21      will talk about quality assurance/quality control.

22           MR. HANSEL: I'm going to address the QA/QC issues.  
23      I'm going to first address -- we have issue plans 1.B.1,  
24      1.B.2, and addressing the inspector qualification  
25      certification area; 1.B.2 addressing inspector testing.

1 I'm going to discuss those together since they're closely  
2 related, then I am going to talk about at least our  
3 preliminary plans and our approach, that we pretty well  
4 agree on how we will approach the QA/QC issues given to us  
5 in the January 8 letter.

6 As I approach the inspector certification/  
7 qualification area, I'm going to back up briefly and give  
8 you some background information to define the issue. We  
9 approach the solution of these two issues in three phases.  
10 I'll talk about each of those. We did a detailed review  
11 of the files. We then had a special evaluation team get  
12 into looking at those certifications that had any question  
13 whatsoever, and we're now into a detailed evaluation of  
14 persons who we feel are not properly certified or their  
15 certifications are questionable. Then I'd like to tell  
16 you about some other actions that are going on in this  
17 particular area that I think are pertinent.

18 The issue primarily deals with the adequacy of  
19 supporting documentation regarding personnel  
20 qualifications, in training and in their certification  
21 files. A little bit of background: At the time of the  
22 construction permit, TUGCO was committed to Appendix B,  
23 and they verified inspector qualifications at that time  
24 primarily by examination and then a verification by on-  
25 the-job training. In 1981 they committed to Reg Guide



1 158, Rev One, and ANSI 4526. They continued to do the  
2 above which was demonstration by examination and  
3 verification by OJT, but then they started verification of  
4 education and experience. It was not a retroactive plan  
5 to go back and do anything retroactively on those  
6 inspection files.

7 TUGCO has a system that I have not run into before,  
8 but I am quite impressed with it, and that is that the  
9 inspectors are trained and certified to specific  
10 procedures rather than by discipline. An electrical  
11 inspector may be certified to one procedure or to fifteen  
12 or twenty procedures. When you go through such a process,  
13 the actual training for those procedures, the testing for  
14 those procedures and the examination for those procedures  
15 really becomes a pretty good training ground.

16 MR. HERDT: Just a clarification. You're saying like  
17 an electrical inspector would be qualified just to do some  
18 specific electrical inspections, maybe do two or three or  
19 five procedures and no others.

20 MR. HANSEL: That's right.

21 MR. HERDT: Would he also be trained in the quality  
22 assurance program and those procedures?

23 MR. HANSEL: Yes.

24 MR. HERDT: Are all the inspectors trained in, let's  
25 say, how to write NCR's --

1 MR. HANSEL: Yes, that's a part of the training  
2 program; the site's specific procedures, TUGCO procedures,  
3 how to write NCR's, Appendix B requirements; those are all  
4 training requirements.

5 MR. HERDT: So all inspectors would have that  
6 umbrella training and then there would be inspectors  
7 within each discipline who would have maybe special  
8 inspection procedures that they would be qualified for.

9 MR. HANSEL: Exactly.

10 MR. HERDT: And you're talking here of people like  
11 electrical, like civil, not the inspectors qualified to  
12 SNTT18. That's a separate area.

13 MR. HANSEL: That's right. They're excluded from  
14 that, yes.

15 MR. HERDT: Thank you.

16 MR. HANSEL: The plan in Phase 1 was to have the  
17 TUGCO Audit Group review the files for training,  
18 qualification, certification and the recertification files  
19 for all electrical inspectors, both current and past; and  
20 that decision is based primarily on the September 18  
21 letter which at that point in time dealt mostly with  
22 electrical issues. We also looked at the current non-ASME  
23 inspectors. Just for the sake of numbers, if you're  
24 curious, there were 33 current electrical inspectors, 84  
25 past electrical, or historical, and 98 current non-ASME.

1 Based upon the January 8 letter and the implications that  
2 are in there, we have started a review of the ASME folders  
3 to the same criteria that we had previously done. That's  
4 being done by a special evaluation team that is  
5 independent, and I'll address them in more detail in a  
6 second.

7 The result of the TUGCO Audit Group, their review:  
8 They looked at a total of 215 inspectors involving 2,386  
9 certifications. In their review they merely made a go -  
10 no go decision. The data was there or it was not there.  
11 There was no judgment calls. And a certification summary  
12 form was prepared for each inspector to bring the record  
13 up in summary form. It's not necessarily required, but I  
14 had the special evaluation team which reports to me go  
15 back and audit the TUGCO Audit Group effort to satisfy in  
16 my own mind that that effort was proper, and we found  
17 everything in good shape. Out of that reviewed by the  
18 TUGCO Audit Group, there came out 133 inspectors that  
19 needed some additional review and those 133 included 270  
20 certifications for the 133.

21 MR. HERDT: Can you give me an example of what these,  
22 you know -- you said there was some differences in  
23 figures, whatever they were, just so I can have a feel.

24 MR. HANSEL: We found every range you can imagine.  
25 We found indications where a person indicated that they

1 had graduated from high school but they didn't say the  
2 year. We found indications where they had taken a GED  
3 test but we found no evidence of that. We found  
4 indications where there was an inconsistency in the number  
5 of years allocated for experience versus what showed up on  
6 a resume. So any kind of a possibility you could conjure  
7 up you might find there.

8 MR. HERDT: But you didn't find anyone that was not  
9 qualified at all, did you?

10 MR. HANSEL: I'm not finished yet. I'm coming to  
11 that. We had a special evaluation team which consisted of  
12 three outside individuals who were independent, and we  
13 required that they have a minimum of five years'  
14 management, supervisory, QA/QC experience. They  
15 understood this issue. They then were chartered to  
16 conduct a detailed review then of the 133. And where  
17 necessary to ask questions, to go look at other files, we  
18 found the situation whereby with so many certifications  
19 you may have some records in three or four files but no  
20 one file had all the records, so we -- the audit group did  
21 not look for that. They looked and it was not there and  
22 then they went on. So that's part of the reason for the  
23 high failure rate.

24 MR. VOLLMER: What do you mean by "independent" on  
25 this special evaluation team?

1 MR. HANSEL: Non-TUGCO, outside, third-party, totally  
2 independent; no prior exposure to Comanche Peak, no vested  
3 interest. So the SET Team then was charged to review each  
4 of these 133 for the kinds of things you see here, to look  
5 in detail at the experience for any inconsistencies,  
6 education, review the formal training records that were  
7 conducted at the Comanche Peak station, look at OJT  
8 records, results of any written examinations, other valid  
9 certifications in related areas that might apply. We made  
10 certain that consistent criteria was applied for  
11 evaluating related experience, and we actually worked with  
12 TUGCO to develop that criteria. We approved it and the  
13 SET Team used it in the evaluation. That's a highly  
14 subjective area, and you can have a number of people  
15 looking at related experience differently. We made  
16 certain all the SET Team was looking from the same set of  
17 eyeballs.

18 In that review of 133 there is a form filled out for  
19 each inspector that we looked at, each certification and  
20 how we dispositioned each certification. This data is  
21 preliminary, but it's probably not too far off. This is  
22 the results to date.

23 MR. THADANI: Just for a moment: The areas we looked  
24 at included results of written examinations.

25 MR. HANSEL: Yes.

1 MR. THADANI: Does this identify how many times the  
2 person may have taken that examination?

3 MR. HANSEL: In most cases we were able to find that  
4 data. I can't say that it was absolutely 100 percent, but  
5 in most cases we were able to find a good trace in history  
6 on testing and how many times they took a test, and which  
7 test they took.

8 MR. THADANI: And you evaluated that aspect, as well.

9 MR. HANSEL: Yes. So this shows you the results. It  
10 is preliminary, but we do currently have 14 individuals  
11 that we're very concerned about, that have questionable  
12 qualifications, and we're looking at those.

13 On the one current Level 3, that certification has  
14 been pulled until we totally understand the implications.  
15 Where necessary, we're going back and looking at work that  
16 has been accomplished so if we get into the next phase  
17 we'll know where to head.

18 MR. SNIEZEK: Let me ask you a question.

19 Questionable qualifications: Does that mean they did not  
20 have the length of experience or the specified education  
21 or really not qualified?

22 MR. HANSEL: It's records or it could be -- there  
23 were some cases of no high school education, no GED test;  
24 there were also cases whereby we just can't find enough  
25 data in the records to verify that the person was

1 qualified on paper. I'm going to differentiate on that  
2 because -- and again, you can have people who may have  
3 failed a test, but they may be the best inspector in the  
4 world when you get them to the hardware. You'll also have  
5 others who are very good at testing but they may be very  
6 poor inspectors.

7 So we're fast approaching -- in fact, we're into  
8 Phase 3 where we're looking at these 14 and we continue to  
9 look for any other data. Now, incidentally -- let me back  
10 up. On the 114 on the previous chart, TUGCO has put forth  
11 an extensive effort to contact previous employers, to  
12 contact high schools, to contact testing agencies, to  
13 gather data. That data is coming in and the SET Team is  
14 doing a 100 percent review of the update of all 114 of  
15 those records to assure ourselves that we're satisfied  
16 with that, so that there's a complete track back to the  
17 114.

18 Now, in the case of those folks, we're going to  
19 determine the safety-related work that was accomplished by  
20 each inspector, and we're going to put that together in  
21 chronological order. We were able to construct that;  
22 TUGCO was able to. One of those people I do have a  
23 complete history of all inspections conducted in  
24 sequential order from the first day that they were  
25 certified. We're going through the process of determining

1 is that work still acceptable, has it been undisturbed  
2 since its initial inspection, and is it recreatable. A  
3 cable coil, for instance, is not recreatable, a checking  
4 of a voltage meter is not recreatable; so we can't go back  
5 and evaluate the accuracy of the initial inspections.

6 We then plan to take the first 90 days of work that  
7 each of those folks accomplished, and we're going to  
8 establish a minimum sample size of 50. If we can't get 50  
9 in the first 90 days, we'll extend beyond that until we do  
10 get a point of 50, and minimum sample size of 50. So it's  
11 biased. It's the first 90 days of work. If that person  
12 were not qualified, if there was any question, he's most  
13 likely to make a mistake in the first 90-day period.

14 We then plan to go reinspect the work, the sample of  
15 50 or the first 90 days of effort. We utilize third-party  
16 independent inspectors. Those folks work for me, and we  
17 will use the same original criteria that that inspector  
18 used, not the criteria today but the criteria that that  
19 inspector worked to in 1978, '79 or whenever that time  
20 frame might have been. We would then evaluate the results  
21 and look for agreement between the first inspection and  
22 the second inspection. On objective kinds of things that  
23 should be the same today as they were in 1978, we would  
24 look for a 95 percent agreement. On subjective kinds of  
25 things, we would look for an agreement of 90 percent or



1 better. Something that might fall in that category would  
2 be the welding potential.

3 MR. JORDAN: Excuse me. The third-party inspectors  
4 would not be looking at the records. This would be a  
5 blind --

6 MR. HANSEL: It would be blind, starting from scratch  
7 with a blank inspection record of the same criteria that  
8 the person used on the first inspection, so there's no  
9 bias in that respect on the reinspection.

10 If the inspector would have failed either of the  
11 above criteria, we would go for another 90 days of effort  
12 or another minimum sample size of 50, and we would  
13 reinspect and reevaluate to the same criteria. If that  
14 person were to fail, then we would go out and reinspect  
15 all work accomplished by that inspector.

16 Now, in our first look-see, we're going to have cases  
17 where there is an insufficient sample of data for these  
18 inspectors. A lot of them -- not a lot -- several only  
19 witnessed cable pullings, and all the cable pulling was  
20 done hand pulling. There was no mechanical pulling. We  
21 can go look at subsequent testing of those cables to  
22 determine are they in fact functional and operating.

23 So we may have to look for other ways to do this  
24 verification of that person. Another way would be to look  
25 for subsequent inspections by other inspectors of that

1 inspector's work to determine if they found something that  
2 that person didn't and the work has not been done. There  
3 has been a lot of reinspection efforts at Comanche Peak,  
4 so I think that opportunity is there.

5 We could end up in the last-case analysis where there  
6 is just no way to go other than some specially designed  
7 tests or inspections, that we may have to go out and try  
8 to verify the accuracy of that work, if in fact it was  
9 safety significant, and we want to pursue it.

10 Next chart.

11 MR. SNIEZEK: Just a qualification: You're doing  
12 this for 14 inspectors --

13 MR. HANSEL: We're in that process right now. That  
14 number may change if we get some other piece of data, but  
15 right now we're looking at 14.

16 MR. HERDT: What was the job at the laboratory?

17 MR. HANSEL: Which one?

18 MR. HERDT: The one that has a questionable  
19 qualification.

20 MR. HANSEL: What that was was he was a mechanical  
21 and somehow he got electrical Level 3, and he's never had  
22 prior experience at a Level 3 electrical.

23 MR. HERDT: Does the Level 3 do the teaching, do the  
24 certification of others or what?

25 MR. HANSEL: Primarily that's it; training, teaching,

1 OJT, this sort of thing. So we lucked out. He had done  
2 no Level 3 work per se in the electrical areas since that  
3 certification was granted.

4 MR. HERDT: So he didn't certify or qualify any other  
5 inspectors.

6 MR. HANSEL: We pretty well lucked out in that case.

7 Some other related actions that are going on that I  
8 think are significant: As we go through this process, and  
9 we have done a lot of review of procedures and files and  
10 records, we're making recommendations to TUGCO on how to  
11 improve current procedures, how to improve the filing  
12 system and how to improve their testing procedures and  
13 testing control. They have been very receptive of those,  
14 and a lot of actions are taking place. TUGCO on their own  
15 have called in an outside firm and they're developing for  
16 them a computerized system for tracking all  
17 certification/recertification actions. That system is  
18 pretty close to being complete.

19 They also are in the process of developing a bank of  
20 questions by discipline or by function, electrical,  
21 mechanical, civil, and so forth, such that the questions  
22 can be scrambled and mixed up and the inspector could  
23 inspect from day-to-day, first test to retest. And that's  
24 a good process. That system is moving along well and  
25 should be ready by mid-April.

1           They also got an outside consultant in it training  
2 their quality engineers and their Level 3's on how to  
3 better train inspectors. I think that that's a good move.

4           Lastly, on that page they have a system in work now  
5 that's called the Inspection Process Control System.  
6 That's attacking two fronts. They are doing reinspections  
7 of individuals and keeping track of that and developing  
8 control charts, process control charts, to identify where  
9 are inspection mistakes or poor calls are made the most  
10 frequently and trying to understand why, and then going  
11 back to determine do they need training, do they need  
12 visual aids, do they need better inspection procedures, or  
13 what it might be. More importantly in my mind is that  
14 they're analyzing what causes the defects to occur in the  
15 first place, and they're going back to attack the root  
16 cause, be it a vendor, be it construction, be it design,  
17 or whatever. They're going after the cause as well as how  
18 to better inspect.

19           That's it on these two issues. We're pretty well  
20 along the way. We're into Phase 3. We've not conducted  
21 any inspections. I talked to the folks at the site today,  
22 and I would anticipate some of those inspections would  
23 start in about a week, of the reinspections.

24           MR. THADANI: Let me go back to the issue of  
25 examinations. You said you did look at that specific

1 issue to see how many times a person took certain tests  
2 before he passed, or she passed. Suppose you had people  
3 who took two, three, four, five times the same test; how  
4 did you categorize them? No problems?

5 MR. HANSEL: Most of them passed on the first retake.

6 MR. THADANI: I'm talking about ones who didn't --

7 MR. HANSEL: -- pass on the first examination? It  
8 could be -- I really don't know how to get at that. I  
9 don't know if it was inadequate training, whether the  
10 person was nervous --

11 MR. THADANI: Let me just ask you the same question  
12 differently. If he or she were given the same exact  
13 examination today and failed and were given the same exact  
14 examination a week from now and passed, how would you have  
15 categorized that person? As meeting all the criteria or  
16 not?

17 MR. HANSEL: After they pass the test; as meeting the  
18 criteria after they pass the examination.

19 MR. SNIEZEK: Let me put it a little more bluntly.  
20 If I take the same test seven times, the odds are I'm  
21 going to pass it, whether I know the material or not.

22 MR. WISE: It's a good training ground.

23 MR. HANSEL: The way the system is broken down, Jim,  
24 it's very detailed and if you study that training material  
25 long enough and also take the test enough times, you're

1 going to pass it; but the end objective is still met. You  
2 know the material; you know that check list; you know that  
3 procedure.

4 MR. GUIBERT: Jim, we're only in preliminary data at  
5 this point, but my understanding of one of the things that  
6 we need to look at in this record is that fact that things  
7 are done differently here from the point of view people  
8 were trained and tested on specific procedures as opposed  
9 to across the discipline board. And it may be an  
10 attribute of those procedures such that if they had been  
11 broken down on a level such that if you can pass the test,  
12 there aren't too many other attributes you could ask  
13 somebody to question. That needs to be nailed down  
14 before --

15 MR. WISE: The procedures are so short and so  
16 detailed that you can't have a lot of questions on the  
17 same procedure, so it's difficult to scramble. But I will  
18 say this: Looking at it from a quality standpoint, I have  
19 been very highly impressed with the inspection at the  
20 plant, the level of detail. I anticipate that the  
21 inspectors were well qualified and well certified, but  
22 even if they had not been, if they follow those  
23 instructions, they're going to end up with a good product  
24 because the detail in those is some of the best I have  
25 ever seen.

1 MR. HERDT: Have you looked at the SMT TC180  
2 inspectors, their folders and that whole area that I guess  
3 Brown and Root having the ASME stamp and was doing the NDE  
4 on; have you looked at those folders --

5 MR. HANSEL: Not as yet. What we're now starting to  
6 look at, and I think a sampling only; if we detect any  
7 problems or issues, then we'll go on from there, and it  
8 will be a small sampling because it's so much scrutiny and  
9 it's already looked at by an independent party, but we're  
10 now starting to get into that.

11 MR. HERDT: TUGCO has done audits in that area  
12 throughout the length of the construction period?

13 MR. HANSEL: I can't say that for sure. I know that  
14 they have audited, but the frequency I don't know.

15 MR. HERDT: Do you plan to look at those audits?

16 MR. HANSEL: Yes.

17 Next chart. In summary, I think that the approach  
18 we're taking will certainly identify any weaknesses I  
19 think we have in the certification process if paper or  
20 people or whatever -- I think we will and we probably have  
21 identified the inspectors with the questionable  
22 certifications. We'll now go look to see if there is any  
23 safety significance associated with the inspections that  
24 they conducted, and we're certainly, on a continuing  
25 basis, recommending improvements for the program itself.

1 Those are well on their way.

2 If there are no further questions, then I'll advance  
3 on to the --

4 MR. THADANI: I do have a question. Can you tell me  
5 briefly what you mean when you say it has or does not have  
6 safety significance?

7 MR. HANSEL: If you inspect -- you can inspect a  
8 piece of hardware and their many attributes. If you miss  
9 an attribute and I come along later and find it -- and the  
10 inspectors are all different -- you'll never find every  
11 defect with all the inspections; you're just not going to  
12 find them. The key point that you hope out of the  
13 training and certification program is that the inspectors  
14 find most of them and that they certainly find the ones  
15 most critical to you. So to me, the real proof of the  
16 pudding is to take the defects that the person might miss,  
17 look at them, analyze them with engineering to determine  
18 if there is any design or safety significance; will that  
19 defect cause the hardware to not operate in a safe manner  
20 or as it was intended to; functional; weld splatter versus  
21 cracks.

22 MR. JORDAN: Let's take a short break.

23 (A break was taken.)

24 MR. HANSEL: We're now going to address the approach  
25 that we plan to take on the QA/QC issues that we just



1 received in the January letter. I want to address this in  
2 an overall approach first and then we're going to talk  
3 about how we'll approach the programmatic issues, and then  
4 I'll talk about how we will approach the hardware issues  
5 that have been identified. Right now we have some in both  
6 catagories. We will take all of the issues identified in  
7 that letter -- we have taken all of the issues identified  
8 in that letter and broken them down into finite elements,  
9 and we'll be preparing issue plans either for specific  
10 items or for families of items where we think they can  
11 logically be put together. All issues will be covered one  
12 way or the other.

13 If we look at the charts, initially we can take and  
14 put some issues in the programmatic side and we can  
15 automatically put some in the hardware side. Let's look  
16 at the left-hand side first. Just as an example, right  
17 off the bat, they've mentioned within that letter a number  
18 of indications. We have some concerns about the handling  
19 of NCR's, the review for process of 50.55(e) reports, and  
20 audits; and there are others. So those are just examples.  
21 That's not all inclusive at this time. In fact, they  
22 should have put a TBD under there because we may have  
23 other issues come into there at a later date.

24 On the programmatic issues -- and I'll talk a bit  
25 more specifically there in a second -- we plan to analyze

1 those. First off and foremost, did that type of an issue  
2 or concern, did it have any impact on the hardware? And  
3 we're going to make a yes/no, at least an initial  
4 assessment, and I'll talk in a few minutes about how we do  
5 that. Did it have an impact on the hardware, because if  
6 it did, we want to get to the hardware quickly and attack  
7 that issue. If it did, we would move it to the right-hand  
8 side over there under the hardware issues. If not, then  
9 we will look after something else.

10 We will then be analyzing the procedures and all the  
11 background data on specific issues, as well as any generic  
12 implications that may come out of that, to determine if we  
13 should, in fact, fix the procedures in the system to make  
14 recommendations for the future. We'll come back to that  
15 in a second.

16 On the right-hand side it's my opinion and the SRT  
17 agrees that we cannot attack each issue just by going to  
18 the hardware and saying it's right or wrong. We want to  
19 understand how big is it, how bad is it, how significant  
20 is it, does it impact safety, and where in the process was  
21 the weakness that caused the thing to occur. You can end  
22 up, you can have a problem with design; it could have  
23 created that defect in the field; it could have been built  
24 wrong; or it could have been bought to the wrong  
25 specification or manufactured by a supplier improperly.

1 It could have occurred in the translation from design  
2 documents, drawings, specifications, into the inspection  
3 procedures and the training of inspectors that there was a  
4 failure there and that we did not even inspect for the  
5 right \_\_\_\_\_ (inaudible). As we go from design drawings  
6 to inspection documents utilizing quality inspections or  
7 QA-type activities, we could have had a problem there.  
8 Once we get beyond that, if we -- not make the assumption  
9 -- but make the determination that, in fact, the planning  
10 that the inspectors used was proper, then the initial  
11 inspection could have been okay and the hardware was  
12 right, and it may have been disturbed subsequent to that.  
13 Some indications are, for instance, on cotter keys, I  
14 think they were. I can't say that for certain yet, but at  
15 least from some discussions and review it appears that  
16 those cotter keys were all there at one time. They are  
17 not there, so that's another problem that needs to be  
18 fixed. Somehow we need to make certain that the cotter  
19 keys stay in place. So as we go through this and we go  
20 through this kind of review on hardware, we may well  
21 identify some programmatic issues. So you flip back to  
22 the box on the left-hand side. You may have a hardware  
23 issue and you may have a programmatic issue that needs to  
24 be fixed.

25 The logic that we'll be following -- I'm going to

1 talk more on that on another slide -- is to get to the  
2 root cause and to look at the entire process as to where  
3 it occurred in the total process and design all the way  
4 through to inspection and what caused it. As a part of  
5 the process, I have the fortunate or unfortunate benefit  
6 of being the recipient of all the other issues that the  
7 other team leaders are working, QA/QC implications, so I  
8 get to work them all from that standpoint. So where it  
9 says generic implications in the center, we're going to be  
10 looking at the hardware that's been identified, and we may  
11 well end up expanding beyond that if we find generic  
12 implications.

13 Let's go to the next slide. The approach that we're  
14 developing and you're hearing in preliminary form today I  
15 feel will identify safety-significant deficiencies if they  
16 exist out there, and were they caused either by  
17 programmatic problems or were there workmanship  
18 weaknesses -- and when I say workmanship, I'm also talking  
19 about inspection weaknesses. I want to find these  
20 defects. I want to bound them in terms of their  
21 significance, size, the number, periods of time, groups,  
22 shifts, craft, or whatever; but I plan to go to the lowest  
23 common denominator that tells me, "Okay, you're in the  
24 right training now; the problem is here and it's bounded  
25 to here. You can now go work it." Until I get to the

1 hardware and through all the research, I can't do that.  
2 And out of this, initially we will be implementing  
3 corrective actions.

4 On the programmatic side, again in approaching this,  
5 it's my thrust to keep, at least initially, to keep my  
6 eyeballs and my concerns and my thrust on the hardware  
7 because I think that's what we'd really like to assess is  
8 the hardware. We're going to be reviewing and we have  
9 already gathered all the data that we can get our hands  
10 on, and I'm sure there is some more, but we will continue  
11 to do that, every piece of data that we can get concerning  
12 the programmatic issue; and that may be past audit  
13 reports, audit procedures, certification files on  
14 auditors. It may be NCR procedures, it may be files,  
15 whatever; but we're going to gather the data and analyze  
16 it from an historical standpoint. A key point here is  
17 that we want to look for implications on the hardware as  
18 we look at that. Did the problems that have been  
19 identified in those systems and procedures, did they have  
20 an impact on the hardware? If so, then I want to get that  
21 into the hardware side and attack it rather quickly.

22 We go to the bottom of that chart. Let's assume that  
23 there is no hardware impact. Our preference here is to  
24 determine areas where improvements can be made for the  
25 future. I don't see the need at this point in time to go

1 back unnecessarily. We may find cases where it's so, but  
2 we plan to, if there's no hardware impact, I would say  
3 that we analyze the system and the procedure and fix it  
4 from here forward per recommendations.

5 On the hardware side, we're going to follow a  
6 specific logic, and let's look at the next chart for that.  
7 We're taking all of the issues and implications that have  
8 been identified in these three letters -- I think you're  
9 all aware of them -- plus there are some other on-going  
10 actions within TUGCO that we will be looking at plus the  
11 spin off from other Review Team Leaders that have QA/QC  
12 implication.

13 Again we will gather all the data, analyze it, and  
14 we're going to try to bound it and perform by it. When I  
15 say that, are we talking two inches of weld out of a  
16 thousand or two inches out of six? Are we talking  
17 porosity that you have to have a magnifying glass to see,  
18 or are we talking major porosity that I plan to qualify  
19 the defects to determine how significant are they. We  
20 will also be looking, as we go back in the data, to try to  
21 get into a time frame, certainly crafts or inspections,  
22 procedures that were in effect at that time, drawings,  
23 specs, whatever it might be; whatever that analysis leads  
24 us down.

25 Once we go -- and we will probably end up in a high

1 number of cases going to the hardware with independent  
2 third-party inspectors inspecting the hardware, not to  
3 judge what the TRT folks did but to understand from our  
4 own standpoint the significance, be it the major weld  
5 maps, be it major whatever, but we're going to quantify  
6 the discrepancies. We would then turn that to our other  
7 Review Team Leaders and have them evaluate those defects  
8 for safety significance and come back and tell us and tell  
9 the Senior Review Team there is safety significance or  
10 there is not; and I think that that's the key point.

11 Throughout this process we'll be looking for the root  
12 cause and the generic implications. As I indicated  
13 before, we'll be looking for new programmatic issues that  
14 might require some evaluation. When you get down to the  
15 inspection piece of this thing, you can crawl under one of  
16 two trees. The initial QA/QC controls are okay and it was  
17 a pure miss, or they were not okay.

18 So let's go to the next chart. If we find a  
19 condition to where the initial controls and the  
20 certifications and the paper work were all in order and  
21 everything was proper and we have good reason to believe  
22 that the inspection was conducted properly but yet we have  
23 a defect today, then we're going to go look to see what  
24 caused the disturbance to that hardware. Is it a  
25 maintenance action, was it the start-up of the hot

1 functional testing or preoperational testing? We're going  
2 to try to find how that hardware was disturbed and that  
3 it's no longer in its original state. Then we will be  
4 working with the SRT and with TUGCO to define controls to  
5 be put into place to assure that that hardware stays as it  
6 should be per the drawing. That may be special  
7 inspections to go look for all cotter keys. I'm not  
8 saying that will happen, but it could. There may be  
9 special tests. It may be controls put on the maintenance  
10 group in the future. It may be locking up cabinets; I  
11 don't know, but we will attack that to the point that --  
12 we'll stay with TUGCO to the point that controls are put  
13 in place to keep the hardware as it should be. If we end  
14 up in a situation where we find that the original, there  
15 was a problem in the initial QA or QC program for those  
16 first inspections and we find that there was a point there  
17 that did not work, we have a weakness, and we'll be  
18 talking about potential expansions to look at other  
19 hardware.

20 I think throughout this that it's key to point out  
21 also that we'll be looking at the generic implications,  
22 into other types of hardware other than the specific  
23 defects or discrepancies that we're looking at.

24 MR. THADANI: Is that generic implication done for  
25 all of the identified issues or only those issues which



1 are judged to be safety significant?

2 MR. HANSEL: I would say initially it will be for all  
3 of them, and we'll have to research the other generic  
4 implications to determine if, in fact, it could have an  
5 impact on safety. If so, then we better go look. So  
6 we'll not stop just for that. We'll look generically  
7 first, make that determination before the other Review  
8 Team Leaders. If it says it could have an impact, we're  
9 going to go research it.

10 Put the summary chart back up, please. I know that  
11 this is fairly inferior right now, but you realize I've  
12 only had that letter for three-and-a-half weeks or so. We  
13 have advanced to the point we have gathered the data  
14 pretty well, and we're in the analytical stage, not very  
15 far along, I might indicate. I think that the approach  
16 that we've laid out will do just this, the kind of thing I  
17 talked about. I think it's aimed at hardware, and any  
18 conclusions we draw will be based on the hardware. It's  
19 also aimed at fixing the systems and procedures for the  
20 future, and it is certainly aimed at getting at the root  
21 causes and reaching out for any generic implications on  
22 other hardware.

23 MR. THADANI: What is the schedule or do you have it?

24 MR. HANSEL: I have a lot of folks asking me that. I  
25 anticipate finishing the data gathering and at least the

1 initial analytical phase probably in three to six weeks,  
2 but again that's tough to analyze because I don't know how  
3 far I might end up going. That will also include looking  
4 at the -- identifying discrepancies to date. Beyond that,  
5 I can't answer because I don't know how far this thing  
6 might open up. The intent is to get the specifications  
7 and to work them, and to close them out as quickly as  
8 possible, not forgetting the generic implications; but  
9 schedule-wise I can't tell you.

10 MR. VOLLMER: How many people are working on this  
11 activity?

12 MR. HANSEL: Right now there's myself, another fellow  
13 who is a deputy to me who is at the site most of the time,  
14 as well as myself; three quality engineers, and we have  
15 about 20 inspectors on site right now who are working on  
16 Martin Jones electrical inspections, and we're also doing  
17 some cable tray hanger inspections, and we have done a lot  
18 of certification file reviews. We have three SET Team  
19 members who are on site periodically. That's it. And  
20 we're set to bring more on next week to expand into this  
21 analytical phase. Most of the data gathering has been  
22 completed. Now we're ready to break it down to where it  
23 hits the wheel.

24 MR. GUIBERT: It's clear we're going to be doing some  
25 reinspections, and I think what John's laid out for us is

1 a program which will allow us to get our arms around it,  
2 just what's the size and the scope and the breadth of  
3 those reinspections. That's the activity you are  
4 referring to for this three-to six-week period, to get the  
5 properly defined program laid out.

6 MR. VOLLMER: Some of the more interesting will be to  
7 be determined.

8 MR. HANSEL: We're going to have some of those.

9 MR. VOLLMER: Rather than focusin<sup>g</sup> only on the issues  
10 that have been identified.

11 MR. HANSEL: If I find -- for instance, let's say I  
12 find some suspect inspectors in this. I don't think I  
13 will, but let's say I did. I may want to branch out into  
14 other inspections. I may find suspect craft. Maybe I  
15 want to branch out into that. I don't know yet. The  
16 intent is to keep this thing confined, bounded in scope as  
17 far as the significance goes. Every decision that's made  
18 as to how we get through the logic will be documented and  
19 how we get through each case and the analysis for root  
20 cause and generic implication. And I want to look at the  
21 total process; design, construction, QA translation, first  
22 inspection, subsequent inspections, control. I don't  
23 think you can look at a QA system unless you do that. I  
24 plan to look at all of that.

25 MR. VOLLMER: How are you going to look at the design

1 process?

2 MR. HANSEL: If we end up -- when we go out and do  
3 inspections, we'll be going back and pulling the drawings  
4 and specifications. We don't plan to get back to  
5 determine if that design was adequate unless, in fact,  
6 when we get into looking at discrepancies for design  
7 significance, some of the Review Team Leaders may well get  
8 into that; because if you're looking at margins, if you  
9 have welds and you're looking at margins, you may well  
10 have to get back into some of the design bases, some of  
11 the design assumptions, some of the margins.

12 MR. VOLLMER: I characterize that as being a little  
13 different than getting into the design process.

14 MR. HANSEL: Not the design process, but we may find  
15 problems in the design; weaknesses of the design, not the  
16 design process; in a specific design.

17 Any other questions?

18 MR. BECK: Any further input from the SRT members?

19 (UNIDENTIFIED): I'd like to say something, John, as  
20 a third-party member of the SRT and a management  
21 consultant, and maybe I'm biased in that respect, but I'd  
22 like to be sure we haven't lost something in the five  
23 hours, four hours and fifteen minutes of our presentation.

24 The team leaders have done a very thorough job of  
25 presenting to you, as you appreciate, a very small

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NUCLEAR REGULATORY COMMISSION  
Contention 5 Panel Meeting With TUGCO

VOLUME II

Carmen Gooden, CSR, RPR

February 7, 1985

*Carmen Gooden*  
2727 BUFFALO DRIVE  
ARLINGTON, TEXAS 76013  
265-3481

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1 sampling of what we're doing and what we're in the process  
2 of doing. I'd like to be sure you recognize that this  
3 process is being governed, the overall solution and  
4 evaluation is being governed, by a well systematic,  
5 logically thought-out management system. I feel that  
6 those are very, very important, to recognize that, and  
7 that system is based upon root cause determination.  
8 Without proper root causes, many problems don't get solved  
9 properly. We call it Band-Aiding it. We've all seen  
10 examples of that in our careers, I think. With the team  
11 leaders' help the SRT is very dedicated to proper root  
12 cause determination. We haven't gotten there yet in many  
13 cases, as you've seen. We're just getting preliminary  
14 root causes in a few of the issues. I just wanted to  
15 emphasize that the process being applied the SRT feels  
16 strongly about, and my colleagues and myself, the  
17 independent members, feel it's important to get the proper  
18 root cause determination and a proper application of the  
19 system.

20 Also, I don't sit well at five hours in a meeting and  
21 not say anything.

22 MR. BUHL: I'd like to go back to the beginning of  
23 this meeting because I think there are a couple of theses  
24 that have gone through this meeting that need to be  
25 emphasized. First of all, Mr. Thadani asked a couple of

1 questions early on about the role of the three people on  
2 this end of the table and what is it we do; not so much in  
3 the abstract, some kind of definition, but what do we  
4 really do. And Jim and several other people have asked  
5 questions that I would characterize along the lines of are  
6 you only looking at TRT kinds of narrow issues or are you  
7 looking more broadly.

8 First, in the role of what the SRT does, we meet  
9 every Friday and we spend all day listening to the  
10 gentlemen you have heard from today in each of these  
11 various areas; arguing with these people and really  
12 understanding what they do; approving their plans, their  
13 action plans; and getting as best we can to the real  
14 issues. Now as you have heard throughout the day, which  
15 comes really to the second point, and that is: In all of  
16 these you have heard people make statements, John and  
17 Monte and all the people, make statements along the lines  
18 that we're looking at all 114 inspectors, that we're  
19 rewriting these test procedures, that we're doing this  
20 expanded concrete testing. I think if you look carefully  
21 in all these areas you'll find we've gone far beyond the  
22 narrow questions or the questions as they were proposed to  
23 us, and, in fact, we've been encouraged by Mr. Spence and  
24 others to take that -- and the people down here -- this is  
25 the most silent I've ever heard these gentlemen to my

1 left. We've been doing that, and I personally have been  
2 quite impressed by the process. When I first came to  
3 Comanche Peak, and as John indicated earlier, none of us  
4 had worked on Comanche Peak. In fact, as far as I know,  
5 perhaps I hadn't even seen Comanche Peak; but one of the  
6 first things I did was to take the site-specific training  
7 required so that I could go on one of these issues,  
8 whatever it might be, unescorted by TUGCO or anybody else,  
9 and actually look at the situation. My own background  
10 being in the I & C areas for many years -- for example,  
11 last Thursday, not as an inspector but as someone who says  
12 will this thing work and how does it work, I spent a good  
13 bit of last Thursday night looking at some of these butt  
14 splices, not only without TUGCO but without Marty or  
15 anybody else there.

16 So we have, I think, gone that extra step and we are  
17 determined to go that extra step so that we do isolate  
18 these issues, so we do know if they spill over here or  
19 there that we do have exposure. I hope that message has  
20 come across today in the presentation. As John said,  
21 you've only heard a fairly narrow slice of all the things  
22 that are going on.

23 MR. GUIBERT: It's hard to add to what these two  
24 gentlemen have said, but I think there's one other point  
25 that we did not mention today, and that is: While we set



1 standards for the Review Team Leaders in the pursuit of  
2 resolutions of the issues before them to identify root  
3 causes and to make sure that having done so, the generic  
4 implications are pursued appropriately on an issue-  
5 specific basis, we've also reserved to ourselves the  
6 responsibility of performing the collective significance  
7 which, among other things, will allow us to take a look at  
8 the family of root causes and to reassess on an across-  
9 the-board basis whether, indeed, they imply some other  
10 generic implications that may not have been addressed in  
11 the pursuit of an individual action program. There's an  
12 added element that my colleagues and I -- including  
13 Mr. Beck, by the way -- will be looking at as these things  
14 evolve toward individual issue resolution.

15 MR. BECK: I'd like to point out that we fully  
16 recognize that we haven't submitted our final revision, if  
17 you will, to Mr. Eisenhut and Mr. Noonan on any of these  
18 action plans. As you can see, they have been evolving  
19 since last September. In particular, we're awaiting full  
20 input on the SSER's before we submit the final of what we  
21 would characterize at least as our anticipated last  
22 revision. The importance of that, of course, is to make  
23 sure that we've touched all bases that the NRC staff in  
24 its judgment feels need touching. I think at the same  
25 time in that context we perhaps may have proceeded at risk

1 somewhat. The thoroughness with which we have done so, I  
2 think, will stand the scrutiny. In fact, if we need to  
3 add something that we've overlooked in the process, we're  
4 certainly going to do that.

5 If there are any further questions, I'd be happy to  
6 respond to them.

7 MR. NOONAN: While it's important for the Panel to  
8 hear this presentation, of equal importance is it for the  
9 TRT Group Leaders and their staff to hear these types of  
10 things and stay glued to the process as you start moving  
11 through it. With that in mind, I think I will, within the  
12 next week or so, I will set up a series of public meetings  
13 with you and your staff to at least start to bring the TRT  
14 Group Leaders up to speed on some of the things you're  
15 doing, mainly the areas I think you addressed today, and  
16 I'll not only limit them to this but I'll talk about some  
17 of the design problems that we, the staff, have. I don't  
18 have the schedule right now, but I will do that in the  
19 next few days.

20 MR. BECK: We look forward to the opportunity,  
21 certainly.

22 MR. SNIEZEK: I've got one I asked early on about the  
23 CYGNA --

24 MR. BECK: I happen to have a note here. On that  
25 particular issue, Jim, we want to respond to you in

1 writing. It's not a simple question. It comes out as a  
2 rather short sentence, but it involves quite a bit of  
3 material and record; and I think in all fairness we should  
4 look into it far more thoroughly and if we can, in the  
5 matter of an afternoon, call people on the telephone. So  
6 we'll respond to Mr. Jordan as Chairman of the Panel or to  
7 you directly or what? Whichever.

8 MR. NOONAN: We'll decide how.

9 MR. JORDAN: I guess I would want to caution TUGCO  
10 that the questions and comments about this Panel are not  
11 intended to redirect your efforts, the efforts you're  
12 making in response to Vince Noonan's request. We're  
13 trying to gather information from which we can make a  
14 recommendation to Vince Noonan and subsequently to the  
15 Board, so we're trying not to direct your efforts but  
16 understand the scope of the information that exists to  
17 make sure that for the staff all the right questions have  
18 been asked at the right time. So I think the mode would  
19 be to get the material to Vince Noonan, would be the  
20 appropriate thing.

21 MR. BECK: Very well.

22 MR. HERDT: I guess I have just one general question,  
23 but I don't really know how to explain it so let me go  
24 through it. Quite a bit of the purpose of this meeting  
25 was to obtain information from yourselves as it related to

1           Contention 5. Contention 5 has a lot of areas in it as it  
2           relates to the failure to adhere to quality assurance and  
3           quality control provisions required by the construction  
4           permit in many areas. And you talked about some of those  
5           areas. You talked a little bit about concrete; you talked  
6           a little bit about the expansion anchors; and maybe even a  
7           little bit about QA/QC and qualifications. But there are  
8           other areas like mortar blocks, like fractured toughness  
9           testing, some aspects having to do with welding,  
10          replacement of the reactor vessel for Unit 2 that I have  
11          heard nothing about. I guess the feeling that I have and  
12          why maybe some of the questions as it relates to the  
13          team -- why we're always feeling that you have emphasis on  
14          just the TRT findings that you have received in those  
15          three letters that have been sent to you -- is because you  
16          have not talked or even helped us in what information you  
17          want us to look at as it relates to those particular  
18          issues. This morning CASE gave us a long list of areas  
19          for us to evaluate, to look at, to read or at least from a  
20          suggestion point of view to help our deliberations, and I  
21          was hoping in some respect that that would be maybe an  
22          approach that you would take also in these issues because  
23          we're going to have to take a look at each one of these  
24          issues and I have not heard all these issues commented  
25          upon. I'd like a feeling about that, and I guess that's

1 why some of us have felt that you have just focused on  
2 just those three letters and the TRT inspection; you know,  
3 I guess I haven't decided one way or the other with regard  
4 to these areas or any areas in the gathering information  
5 mode, but I don't know if you're planning to do  
6 inspections or audits or reviews in areas that the TRT  
7 didn't touch; maybe some design, maybe some welding, maybe  
8 some other areas, that they did or did not find  
9 deficiencies in.

10 I know I've made a long statement and I'd like a  
11 response to part of it, or maybe you want to think about  
12 that response. I hope you understand that is why, I  
13 guess, we've -- some of us have thought that you've  
14 narrowed or focused on just TRT.

15 MR. BECK: I'll take a crack at it first, and then  
16 I'm sure my colleagues down at the end of the table who  
17 have spent many, many hours deliberating these issues --  
18 clearly the focus for the Comanche Peak Response Team when  
19 it was originally formulated was to respond to TRT issues  
20 where we were specifically directed to do so by  
21 Mr. Eisenhut. The process and the methodology that we set  
22 up to do that is sufficiently broad in its scope that it  
23 will lead, if there is evidence to point us in that  
24 direction, to much wider investigative efforts. In some  
25 cases -- you've heard today with this brief sampling of

1 the individual Issue Team Leader's activity where that has  
2 happened, where there have been other issues that have  
3 come up, and we will focus on them. In the context that  
4 we started with a completely clean slate where we write  
5 new questions grabbed out of the ether, that is not our  
6 scope and not the effort. Starting with Focus 1 to  
7 determine safety significance in the end, if there is  
8 safety significance, or along the root of determining,  
9 finding out whether there is, that scope needs to be  
10 widened in a complete and clear direction to do so. There  
11 are a lot of inputs, I'm sure, available to the Panel in  
12 considering the Contention 5 issue, and the final  
13 resolution or recommendation that you may be making to the  
14 NRC staff. We've had a number of investigative bodies  
15 come in and look at Comanche Peak, the CAT report, the  
16 SAP's investigation; all of these sources have  
17 information, I think, that will be of value to the Panel  
18 in evaluating that totality of input. We'd certainly  
19 encourage you to look at those and look at them very  
20 carefully because the findings in their totality is what  
21 we're primarily interested in.

22 Our focus today is obviously one as a result of the  
23 efforts that have been going forth over these past few  
24 months, initiated by the TRT but certainly not limited by  
25 it.

1 MR. SNIEZEK: Let me add something to what Al said  
2 here and just what you said, John, is one of our  
3 objectives was to give CASE an opportunity to provide us  
4 information regarding the total complex subject of  
5 Contention 5. We want to give you the same opportunity.  
6 If the information that you're satisfied with is what we  
7 have in our report today, and then you have no other  
8 information to give us, then that is what we'll go with,  
9 but that is from your standpoint. Obviously that is your  
10 decision, and we weren't looking at just that SRT type of  
11 presentation. I would hope our communication opportunity  
12 hasn't ended with this meeting either.

13 MR. GUIBERT: I think one of the things you need to  
14 all recognize is that the Comanche Peak Response Team,  
15 i.e., the Senior Review Team, and the Review Team Leaders  
16 and the programs executed were originally formulated to  
17 address the TRT issues and to identify those root causes  
18 and to proceed wherever they took us basically that made  
19 sense in terms of generic implications spinning out of  
20 this. One of the things that is a relatively recent  
21 addition to the charter was described by John Beck in his  
22 opening remarks, and that is that, in particular, Howard  
23 Levin has been assigned the issue of looking into the  
24 design QA/QC aspects, starting in the piping and pipe  
25 support areas which I know these issues are issues of

1 interest to this Panel from your scope of charter. So I  
2 guess from my perspective, for what it's worth, we started  
3 with a set in our charter -- we're going outwards and now  
4 we've added another aspect to it which is relatively  
5 recent.

6 MR. JORDAN: Do you have any comments? Do you have a  
7 closing statement to make?

8 MR. SPENCE: Well, I had made some notes for closing  
9 remarks, but I believe they have all, from one side of the  
10 table or the other, been addressed. I guess the only  
11 thing I might add is that in highlighting our Comanche  
12 Peak Response Team initiatives today, we did not, as John  
13 said, intend to leave the impression that that's the only  
14 issues that we're concerned with. I guess in a broader  
15 context we wanted to make it evident to you that I as the  
16 president of the company and my company take all these  
17 issues as issues of great concern and that we are carrying  
18 out an impressive, responsive, intergraded program to  
19 resolve whatever issues are before us so that I can be  
20 assured and so the agency can be assured that there are no  
21 issues with safety implications left unresolved. That's  
22 the context, the broader context in which we wanted to  
23 make that presentation today.

24 MR. JORDAN: Does the Panel have any other comments?  
25 I indicated to Ms. Ellis, to CASE, that they would have an



1 opportunity to make a closing statement.

2 MS. ELLIS: We'd like to say a few words. I think  
3 Ms. Garde and I would like to say a few things.

4 MS. GARDE: I have two basic comments. One is an  
5 observation that I think is illustrative of one of the  
6 concerns that CASE has about the allegation process and  
7 how it has resulted in allegations given to the TRT, then  
8 given to TUGCO through a letter, and then looked at by  
9 TUGCO as its independent auditors. There was a lengthy  
10 discussion about the problems with prerequisite testing  
11 and about having unqualified -- you confirmed that  
12 unqualified craft personnel signed off for essentially  
13 QA/QC hold points in that process. One of the things that  
14 wasn't addressed, however, was that a very large part of  
15 that allegation was that there was a process on the site  
16 in which unqualified craft personnel did the actual  
17 inspections, did the work, looked at the equipment, then  
18 took that information back to QA/QC personnel who then  
19 signed off the cards. A review of looking at the cards  
20 will indicate QA/QC signatures on the line, but the work  
21 wasn't done by qualified QA/QC signatures. It was done by  
22 craft personnel, and if all you're looking at is for the  
23 signatures of unqualified craft personnel, you're missing  
24 what is the bulk of that allegation.

25 That type of approach and the type of approach that's

1 being taken that I heard today narrows that. You're not  
2 looking at that issue, you're not seeing that that is a  
3 problem. Now part of that may be resolved once the SSER's  
4 are out and the SSER's, I think, will contain a more  
5 detailed explanation than you have now from the NRC  
6 allegation, which leads into my next point. That is that  
7 I appreciate the difficulty that TUGCO is currently in in  
8 this kind of iterative audit process. You have limited  
9 information from the TRT, you've been trying to be very  
10 responsive to the agency, and I think it's certainly a  
11 good step forward that you're going to look at problems,  
12 that you acknowledge that you have some problems, and  
13 you're crafting a program to deal with the problems.

14 I understand that TUGCO and the various people that  
15 you have brought on board have a limited scope to work  
16 with. I think the problem is, though, that we're back  
17 into an iterative audit process on top of an iterative  
18 construction process, on top of an iterative design  
19 process, and the clean slate approach that's really needed  
20 and I think this is what Mr. Sniezek was saying is that if  
21 you have problems in these limited areas, you've probably  
22 got problems everywhere, and if you don't look at those  
23 problems everywhere, then we, if you will, as the loyal  
24 opposition, have no other choice but to say you didn't  
25 look here, you didn't look here, you didn't look here, or

1 go drum up the late-filed allegations that are such a  
2 problem to everybody. Because you haven't looked there.  
3 If you haven't looked there, then you've got to look  
4 there; and I don't think that that's necessarily what you  
5 want, and I don't think that that's the way it needs to  
6 be. You've got extremely qualified people here who know  
7 how to write a program. I don't know if they're  
8 independent; I assume they're competent. I was impressed  
9 with the presentation this afternoon, but you're putting  
10 us in a position of having to ask questions which end up  
11 being, unfortunately, not as productive as I think we all  
12 want this effort to be.

13 All in all, I was very impressed, John, and  
14 Mr. Spence. I think you did a good job in your  
15 presentation this afternoon, and I think you're definitely  
16 on the right track. Hopefully, you know, we'll get  
17 further along when the SSER's have been issued.

18 MS. ELLIS: One of the things, too, along that same  
19 line that we're concerned about is the independent members  
20 of the Panel -- I'm talking now about the applicant's  
21 Panel -- how much control will these independent people  
22 have over the final product? How much control will you  
23 have over what is actually presented? This is something  
24 that we're very much concerned about, and I won't burden  
25 you with the details, but there are reasons for that,

1 because of things that happened in the hearings. This is  
2 one aspect that we're very much concerned about and this  
3 is something that needs to be addressed and needs to be  
4 answered for everybody's benefit so that these guidelines  
5 will be very clear, so that everyone will know the exact  
6 scope of what you have been given to do, any kind of  
7 contracts to do it, any kind of guidelines that have been  
8 given to you. It would be much, much simpler, instead of  
9 our having, as they mentioned, to ask questions about it  
10 and try to drag it out through the process, if those were  
11 presented up front to begin with, to let everybody know,  
12 to put all the cards on the table to start with. I would  
13 urge that you'd consider doing something like that.

14 Another thing I wanted to mention to the NRC team is  
15 that I assume that you're not going to be taking what you  
16 have heard today at face value and that you will be  
17 probing much deeper. This is especially important because  
18 some of the things that have been said here today echo  
19 similar things which were said to the CAT team. The CAT  
20 team came in and found some problems. They came in and  
21 looked and then were gone. They came in and during the  
22 hearings the applicant said we're going to do this and  
23 this and this and the CAT team had no choice really but to  
24 say, okay, if you do all that, we'll be satisfied; and  
25 they went on their way. We don't want the same thing to

1 happen with you, and we're concerned about that aspect of  
2 it. One of the things that is a little bothersome, too,  
3 which is sort of a two-edged sword, and I think it is good  
4 to have the people come in and look at this freshly. That  
5 is a positive aspect, but there is a negative aspect to  
6 that, too, and that is that what we have in many cases are  
7 new people who are speaking from your limited base at this  
8 point in time for what you know at the present time. I'm  
9 sure you're speaking in good faith when you say these  
10 things, but you are new people speaking from that limited  
11 experience, speaking to other people within the NRC team  
12 who also have very limited experience for this. One of  
13 the things that came to mind particularly about that was  
14 regarding the control room ceiling incident. Contrary to  
15 what I think I heard, and I may be wrong about this, but I  
16 understood someone to say that this has just been  
17 identified by the TRT in September. That's not correct.  
18 This was identified some time ago -- I'd have to look back  
19 to see but it was probably a year or two at least -- by  
20 one of CASE's witnesses, Mark Walsh, who had, in the hurry  
21 to testify, given a limited appearance statement and  
22 testified the next day. He did not raise this particular  
23 issue, and so I wanted to have it looked at. He raised  
24 the issue. We sent it in a letter to the Nuclear  
25 Regulatory Commission staff with copies to all the parties

1 so the applicants were on notice from that point on that  
2 that was a problem. The NRC went out and looked at it.  
3 Region IV found that there was no problem, so this is  
4 certainly not a newly raised allegation, and I think you  
5 should be aware that this is one example in particular  
6 that I'm especially familiar with all the background on.  
7 But there are other instances like that. Many of these  
8 things that you're hearing about have been recurring  
9 things that keep coming up again and again.

10 Another thing that I'm a little concerned about is  
11 references to things which have safety significance. This  
12 is something obviously we've heard over and over again in  
13 NRC proceedings because they don't like to look at  
14 anything that didn't have safety significance, but I think  
15 many times that -- there was an editorial recently in one  
16 of the local papers downplaying reports, for instance, of  
17 these little picky things that the NRC was making the  
18 Utility look at, things like cotter pins and stuff like  
19 that, and you have to remember that things like cotter  
20 pins are only what hold the wheels on your tire. So I  
21 think that a lot of times there's a tendency to get away  
22 from the real significance of what appears to be on the  
23 surface minor things, and I think that's one of our  
24 concerns, that this is exactly what had happened at  
25 Comanche Peak; that many times when people looked at

1 procedures and they don't follow them and they say,  
2 well -- on the things where it was really important they  
3 were followed, but on the things where it wasn't so  
4 important, they didn't do it quite right maybe. But that  
5 wasn't really real important. That kind of attitude, I  
6 think, is very dangerous because many times the people in  
7 the field who are supposed to be following those  
8 porcedures, they don't know how to gauge the true  
9 importance of them, and if you encourage people or allow  
10 them to disregard these procedures, then you are placing  
11 them in the position of making a decision that they don't  
12 have any knowledge, any background to make, many times  
13 encouraging them to do that sort of thing.

14 I guess one of the bottom line things that, of  
15 course, continues to be a concern and is very, very  
16 difficult and something which has to be addressed and  
17 addressed thoroughly is the basic underlying question of  
18 why didn't the applicant identify and address these things  
19 earlier? Especially the things which have been identified  
20 to them for a long time. I've said many times in the  
21 press and things like this that if the Utility early on,  
22 when these problems were first identified, said, "Golly,  
23 gee, you're right. We've got a problem here; we're going  
24 to go right out and fix it," we'd have gone away by now.  
25 They'd have had their license; this plant would have been

1 on line. It hasn't happened, and I think it's very  
2 important that the reason that it hasn't happened be  
3 addressed and taken care of.

4 I guess that's about it -- oh, one more thing. I  
5 thought of a few more things that I have to send you, but  
6 I'll send those to you in a letter.

7 MR. JORDAN: Thank you very much, Ms. Ellis. Does  
8 the applicant have any other comments?

9 MR. BECK: Is the Panel going to be looking for other  
10 presentations prior to your end point, whenever that is?

11 MR. JORDAN: We really haven't decided at this point.  
12 I would not be surprised and certainly we will contact the  
13 applicant and CASE if such is needed.

14 MR. BECK: I would just indicate a willingness as  
15 Chairman of the SRT to provide another update on the  
16 evolution of our program if it's desirable.

17 MR. JORDAN: We're both looking at a moving target in  
18 terms of schedule.

19 So from the staff's viewpoint, I appreciate the  
20 presentation you people have made on relatively short  
21 notice. It was very beneficial to us, quite informative,  
22 and with that I will adjourn this meeting. Thank you very  
23 much.

24  
25 (The meeting was adjourned at 5:45 p.m.)



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CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings  
before the Nuclear Regulatory Commission

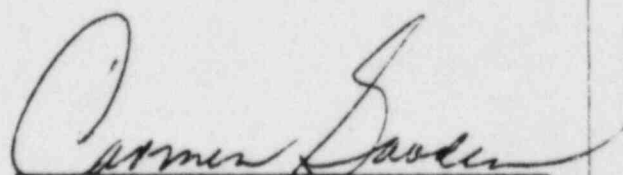
In the Matter of: Contention 5 Panel Meeting  
With CASE

Date of Proceedings: February 7, 1985

Place of Proceedings: Arlington, Texas

were held as herein appears, and that this is the original  
transcript for the file of the Commission.

Carmen Gooden  
Certified Shorthand Reporter

  
Carmen Gooden  
Certified Shorthand Reporter

CPRT PRESENTATION  
TO CONTENTION 5 PANEL  
FEBRUARY 7, 1985

TRT CIVIL/STRUCTURAL, MECHANICAL AND  
MISCELLANEOUS ISSUES

CIVIL/STRUCTURAL

- I. C - ELECTRICAL CONDUIT SUPPORTS
- II. A - REINFORCING STEEL IN THE REACTOR CAVITY
- II. B - CONCRETE COMPRESSION STRENGTH
- II. C - MAINTENANCE OF AIR GAP BETWEEN CONCRETE STRUCTURES
- II. D - SEISMIC DESIGN OF CONTROL ROOM CEILING ELEMENTS
- II. E - REBAR IN THE FUEL HANDLING BUILDING

MECHANICAL

- V. A - INSPECTION FOR CERTAIN TYPES OF SKEWED WELDS IN NF SUPPORTS
- V. B - IMPROPER SHORTENING OF ANCHOR BOLTS IN STEAM GENERATOR UPPER LATERAL SUPPORTS
- V. C - DESIGN CONSIDERATION FOR PIPING SYSTEMS BETWEEN SEISMIC CATEGORY I AND NON-SEISMIC CATEGORY I BUILDINGS
- V. D - PLUG WELDS
- V. E - INSTALLATION OF MAIN STEAM PIPES

MISCELLANEOUS

- VI. A - GAP BETWEEN REACTOR PRESSURE VESSEL REFLECTIVE INSULATION AND THE BIOLOGICAL SHIELD WALL
- VI. B - POLAR CRANE SHIMMING

# MAINTENANCE OF AIR GAP BETWEEN CONCRETE STRUCTURES

## ISSUE DESCRIPTION

- EXTENT AND LOCATION OF DEBRIS BETWEEN STRUCTURES
- EFFECTIVENESS OF QC PROGRAM
  - RECORD RETENTION
  - FOLLOW-UP FOR UNSATISFACTORY CONDITIONS
- CONSISTENCY OF AS-BUILT CONDITION AND SEISMIC ANALYSES

## BACKGROUND

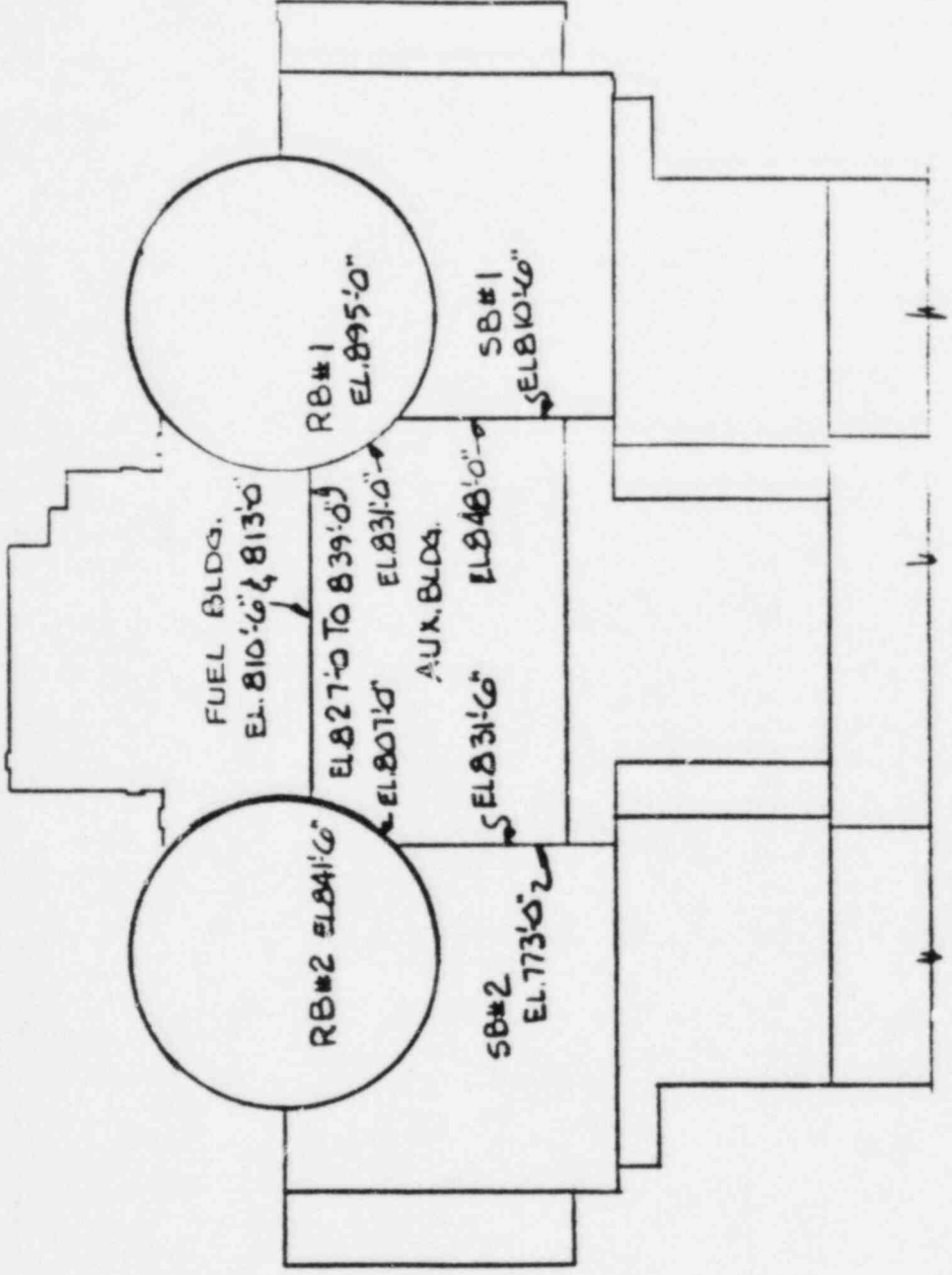
- FORMING TECHNIQUES/LOCATIONS
- HISTORY
- ENGINEERING SIGNIFICANCE OF ISSUE

COMTY. NO	35-1186	OWNER	TEXAS UTILITIES SERVICES, INC.	CHECKED		DRAWN BY	
DATE		LOCATION OF PROJECT	GLEN ROSE, TEXAS	APPROVED		TITLE	
SHT.		OWNER	TEXAS UTILITIES SERVICES, INC.				



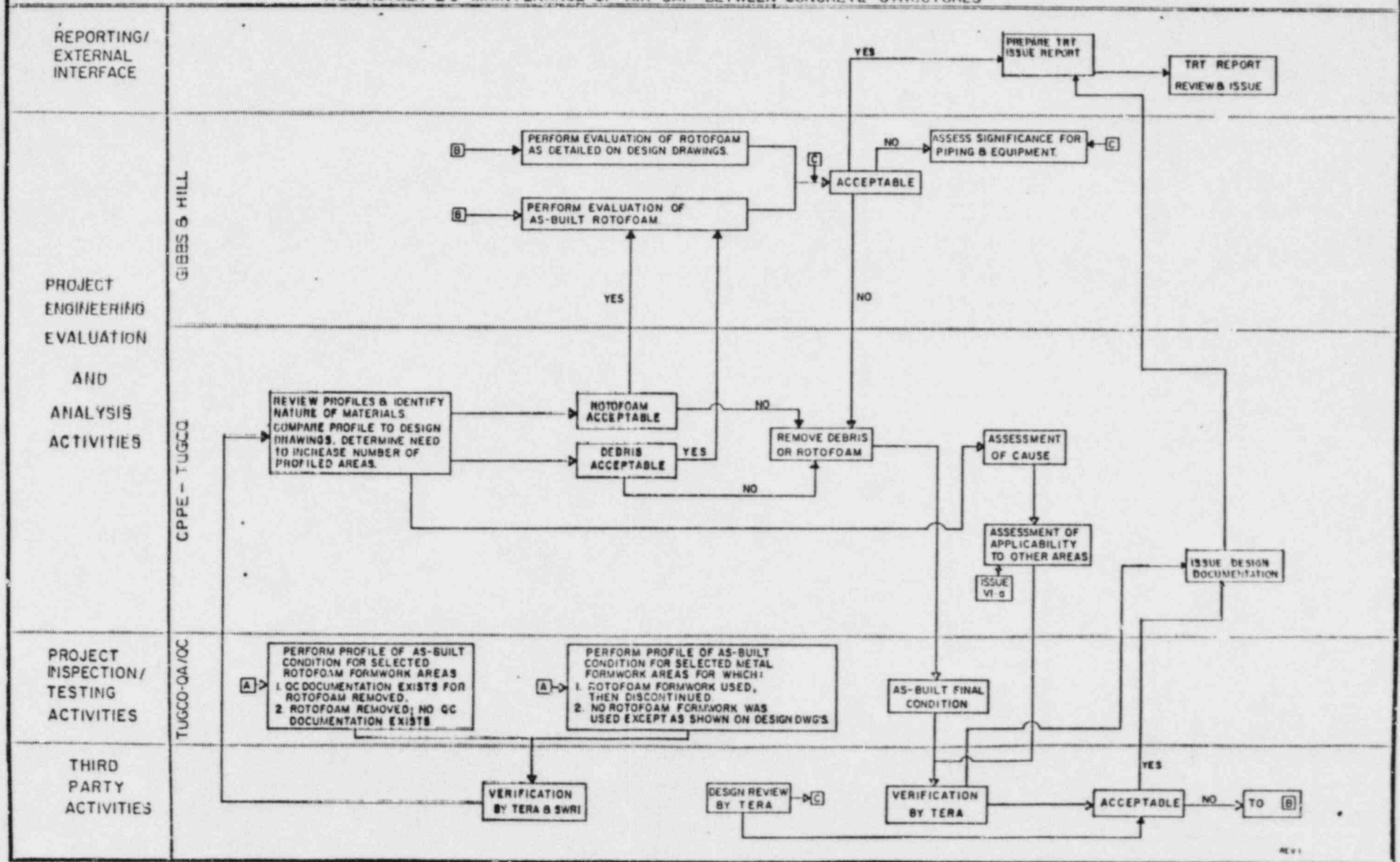
HOUSTON, TEXAS

**Brown & Root, Inc.**



SUMMARY OF CONCRETE WALL ELEVATIONS  
AS OF 11-1-77  
FOAM USED AS FORM AID

ITEM NUMBER II c MAINTENANCE OF AIR GAP BETWEEN CONCRETE STRUCTURES



MAINTENANCE OF AIR GAP BETWEEN  
CONCRETE STRUCTURES (CONT.)

INITIATIVES

- PROFILING OF CURRENT AS-BUILT CONDITION VIA VIDEO INSPECTION
  - OVERVIEW BY SOUTHWEST RESEARCH INSTITUTE
- DETERMINATION OF CAUSE VIA:
  - REVIEW OF CONSTRUCTION HISTORY
  - REVIEW OF AVAILABLE DOCUMENTATION
  - EVALUATION OF AS-BUILT CONDITION
- ASSESSMENT OF DESIGN ADEQUACY OF AS-BUILT CONDITION
  - DESIGN REVIEW OF CALCULATIONS
  - REMOVAL OF DEBRIS (AS REQ'D)

STATUS

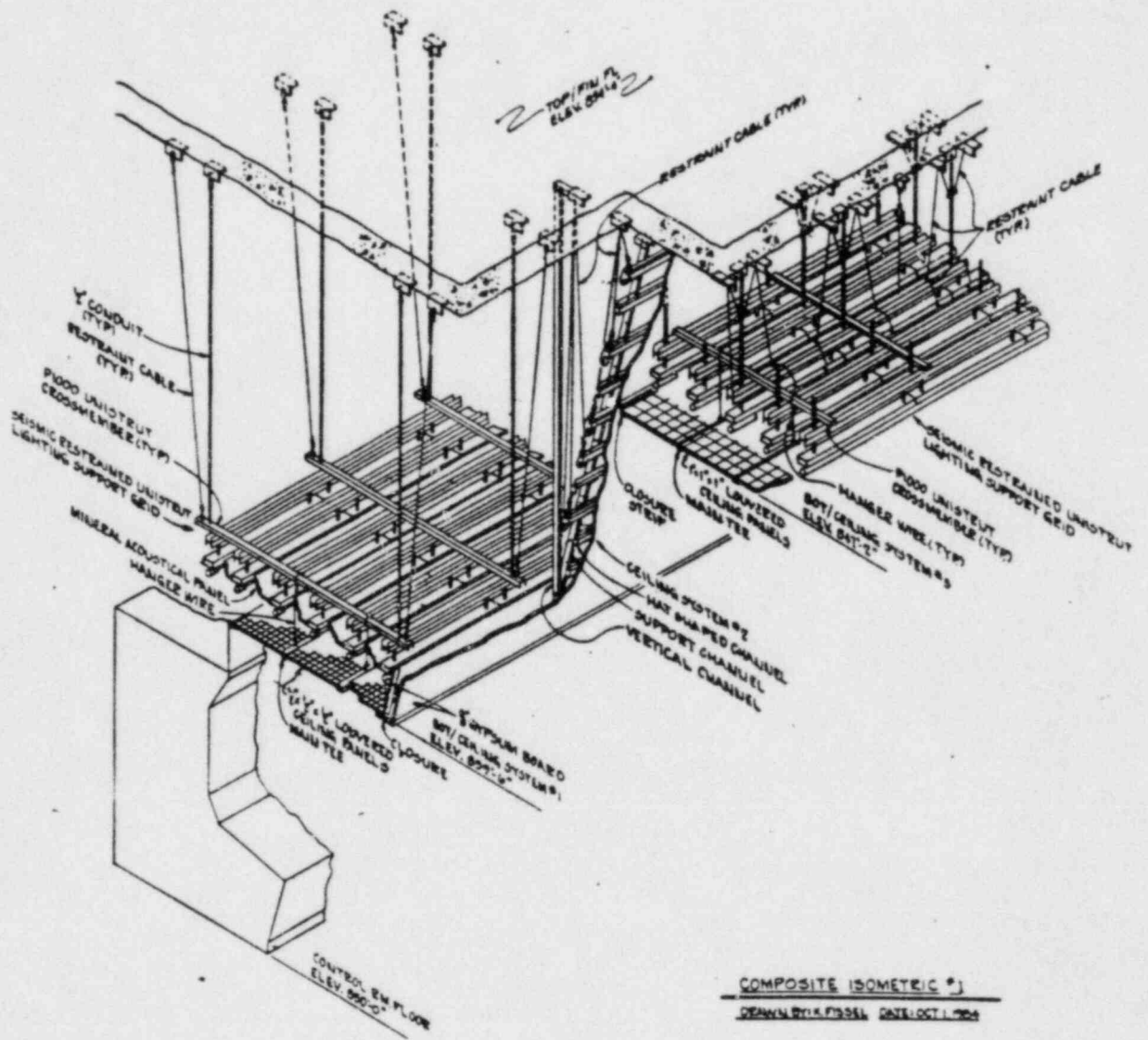
- DOCUMENTATION/HISTORICAL REVIEW COMPLETE
- AS-BUILT (VIDEO) PROGRAM INITIATED
  - 10 L.F./DAY/CREW (1 CREW, ADDING 1 MORE)
  - APPROX. 465 L.F. TOTAL SCOPE
- NRC SITE VISIT TO WITNESS GAP INSPECTIONS -  
JANUARY 21

SEISMIC DESIGN OF CONTROL ROOM  
CEILING ELEMENTS

ISSUE DESCRIPTION

- SEISMIC DESIGN ADEQUACY OF CONTROL ROOM  
CEILING ELEMENTS
  - FUNCTIONAL IMPACT TO SAFETY RELATED  
EQUIPMENT
  - INJURY TO OPERATORS
  
- INTERACTION OF NON-SEISMIC AND SEISMIC CATEGORY II  
ITEMS WITH SEISMIC CATEGORY I  
ITEMS
  - ADEQUACY OF SEISMIC CATEGORY II  
CRITERIA
  - EVALUATION OF ARCHITECTURAL  
FEATURES
  
- ADEQUACY OF NON-SAFETY CONDUIT  
2 INCHES DIAMETER AND LESS
  - ANCHORAGE AND SUPPORT, OR
  - DAMAGE ASSESSMENT





SEISMIC DESIGN OF CONTROL ROOM  
CEILING ELEMENTS (CON'T)

BACKGROUND

- RG 1.29 DESIGN CONCEPT FOR CR CEILING
- SEISMIC CATEGORY I AND II CRITERIA
- DAMAGE STUDY

INITIATIVES

- CR CEILING DESIGN CHANGES
  - ARCHITECTURAL ITEMS
  - UNISTRUT SYSTEM
- ARCHITECTURAL FEATURES/DAMAGE STUDY
  - METHODOLOGY/KEY ASSUMPTIONS
  - IMPLEMENTATION
  - EVALUATION OF ARCHITECTURAL FEATURES/CAT II CRITERIA
  - EVALUATION OF SEISMIC INTERACTIONS ABOVE CR CEILING

STATUS

- SLOPED WALL REMOVED/METAL PAN BEING INSTALLED
- ARCHITECTURAL FEATURES DESIGN COMPLETE
- UNISTRUT LATERAL RESTRAINT SYSTEM IN DESIGN
- ARCHITECTURAL FEATURES DAMAGE STUDY COMPLETE
- MARCH COMPLETION

## CONCRETE COMPRESSION STRENGTH

### ISSUE DESCRIPTION

- ADEQUACY OF CONCRETE STRENGTH
- FALSIFICATION OF RECORDS

### BACKGROUND

- NRC REGION IV AND TRT INVESTIGATIONS  
- PERIOD IN QUESTION: 1/76 - 2/77
- "EVIDENCE SUGGESTS FALSIFICATION OF RESULTS  
DID NOT TAKE PLACE"

## CONCRETE COMPRESSION STRENGTH (CON'T)

### INITIATIVES

- VERIFICATION OF QUALITY OF PLACED CONCRETE VIA TEST
  - RANDOM SAMPLE FOR TWO POPULATIONS
  - SCHMIDT HAMMER TESTING BY SOUTHWEST RESEARCH INSTITUTE
  - STATISTICAL COMPARISON OF TEST RESULTS OF PERIOD IN QUESTION TO PERIOD SIX MONTHS FOLLOWING
- USE OF STATISTICAL CONSULTANTS
  - JACK BENJAMIN AND ASSOCIATES
  - DR. DANIELE VENEZIANO, M.I.T.

### STATUS

- POPULATIONS IDENTIFIED/SAMPLE SELECTED
- 107/200 TESTS COMPLETE
- 47 TEST LOCATIONS BEING PREPARED, REMAINING 46 READY FOR TESTING
- NRC STAFF SITE VISITS
  - JANUARY 7 - PREPARATION
  - JANUARY 21 - TESTING
- MARCH COMPLETION

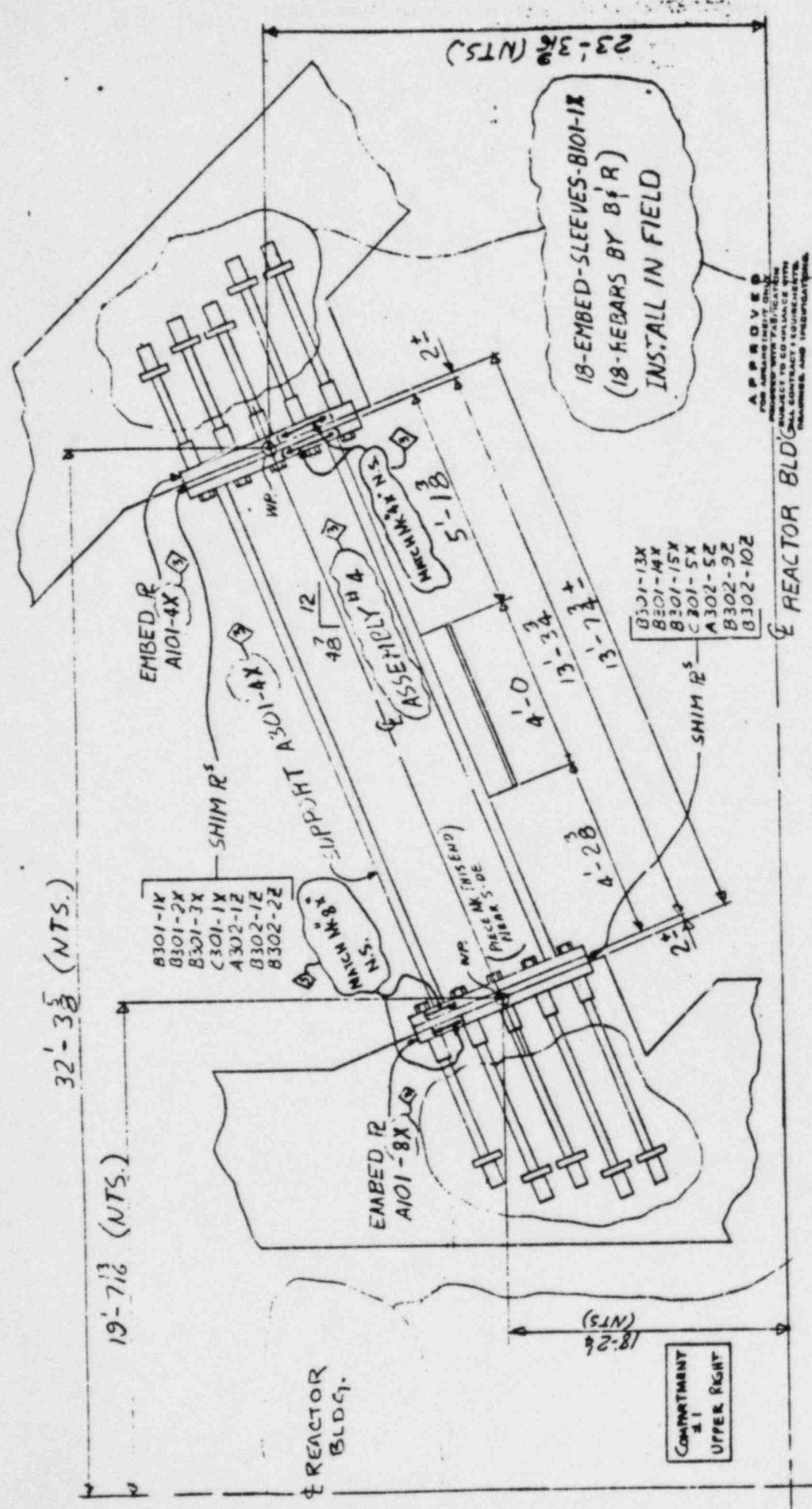
IMPROPER SHORTENING OF ANCHOR BOLTS IN  
STEAM GENERATOR UPPER LATERAL SUPPORT

ISSUE DESCRIPTION

- STRUCTURAL ADEQUACY OF AS-BUILT CONDITION
- ADEQUACY OF OTHER DRILLED AND TAPPED CONDITIONS
- UNAUTHORIZED BOLT CUTTING/ADEQUACY OF FIELD INSTALLATION PROCEDURES
- EFFECTIVENESS OF QC PROGRAM
  - RECORD RETENTION
  - INSPECTION PROGRAM

BACKGROUND

- FUNCTIONAL REQUIREMENTS OF SG UPPER LATERAL SUPPORTS
- SG UPPER LATERAL SUPPORT DETAILS



32'-3 5/8 (NTS.)

19'-7 1/2 (NTS.)

23'-3 3/8 (NTS.)

COMPARTMENT  
#1  
UPPER RIGHT

REACTOR  
BLDG.

- B301-1X
- B301-2X
- B301-3X
- C301-1X
- A302-1Z
- B302-1Z
- B302-2Z

- B301-13X
- B301-14X
- B301-15X
- C301-5X
- A302-5Z
- B302-9Z
- B302-10Z

18-EMBED-SLEEVES-B101-1X  
(18-REBARS BY B1R)  
INSTALL IN FIELD

APPROVED  
FOR AMPLIFYING DRAWING  
ISSUED WITH FABRICATION  
SUBJECT TO COORDINATION WITH  
ALL APPLICABLE REGULATIONS,  
ORDINANCES AND INSTRUMENTS.

REACTOR BLDG.

EMBED R  
A101-4X

EMBED R  
A301-4X

EMBED R  
A101-8X

ASSEMBLY R A

MECH. R'S

SHIM R'S

SHIM R'S

MATCH R'S  
N.S.

WP  
PIECE MK (INSIDE)  
NEAR S. DE

18'-2 1/2 (NTS.)

2'-0

5'-1 3/8

4'-0

4'-2 3/8

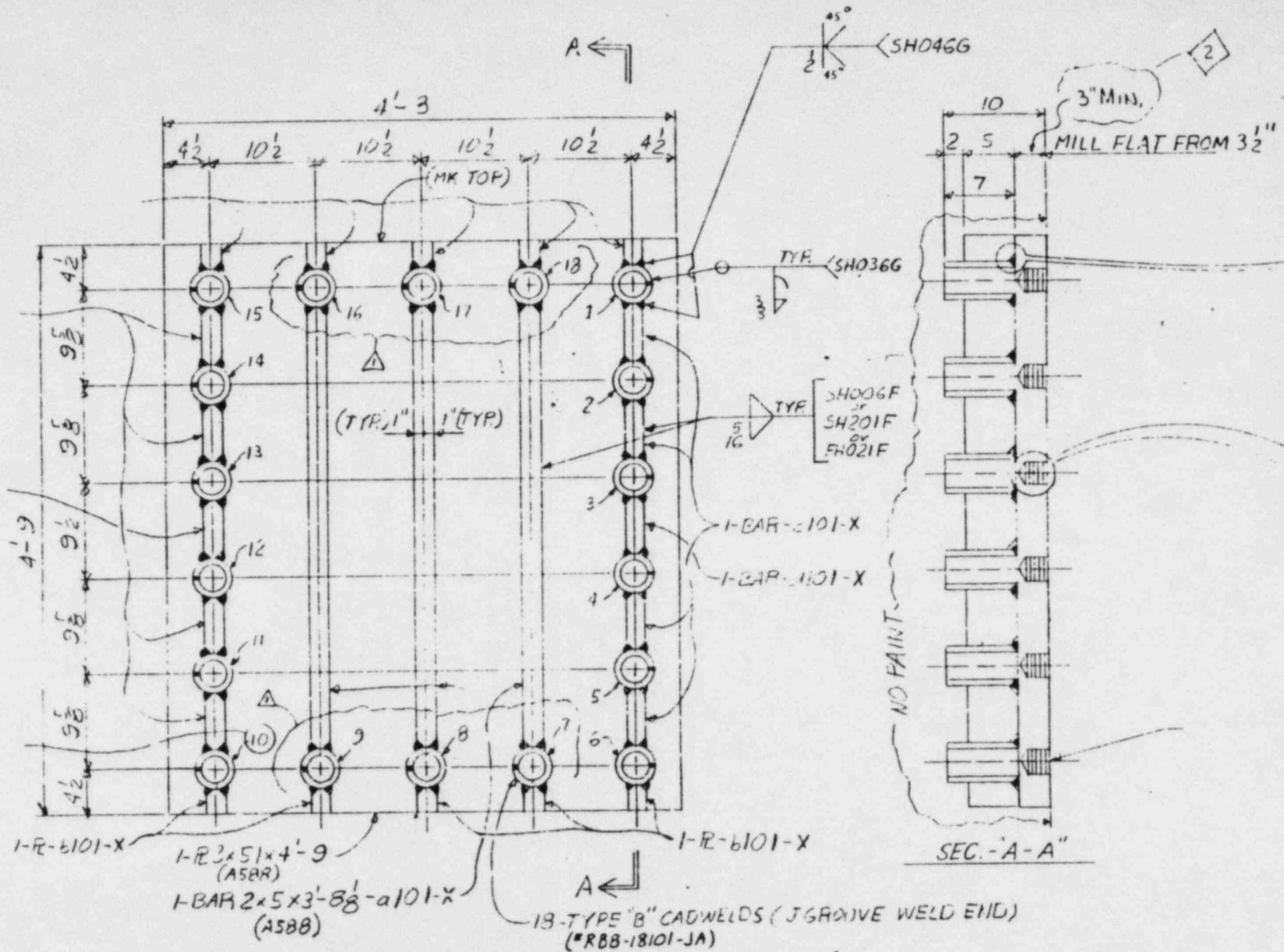
13'-3 3/4

13'-7 1/2

12

48

REACTOR BLDG.



8-UPPER LATERAL SUPPORT EMBED R<sup>s</sup>  
A101-1X THRU A101-8X (ALIKE)

IMPROPER SHORTENING OF ANCHOR BOLTS IN STEAM  
GENERATOR UPPER LATERAL SUPPORT (CON'T)

INITIATIVES

- UT INSPECTION TO DETERMINE  
BOLT ENGAGEMENT
- EVALUATION DESIGN REQUIREMENTS  
FOR SG UPPER LATERAL SUPPORTS
- MODIFICATION (AS REQUIRED)
  - VIDEO OF HOLES
- IDENTIFICATION OF OTHER DRILLED AND  
TAPPED CONNECTIONS
  - SAMPLE SELECTION
  - INSPECTION/3RD PARTY OVERVIEW
  - EVALUATION
- REVIEW OF BOLT CUTTING PROCEDURES AND CONSTRUCTION  
INSTALLATION PROCEDURES

STATUS

- UT INSPECTION COMPLETE
- THIRD PARTY DESIGN REVIEW IN PROGRESS
- MODIFICATIONS TO BEGIN SHORTLY
- NRC SITE VISIT - 2/6
- MARCH COMPLETION



## SUMMARY

- INITIATIVES FOR HIGHLIGHTED ISSUES ARE REPRESENTATIVE OF OTHER ISSUES
- ESTIMATED COMPLETION IN MARCH - APRIL TIME FRAME

## TRT ELECTRICAL ISSUES

- I.A.1 HEAT SHRINKABLE CABLE INSULATION SLEEVES
- I.A.2 INSPECTION REPORTS ON BUTT SPLICES
- I.A.3 BUTT SPLICE QUALIFICATION
- I.A.4 AGREEMENT BETWEEN DRAWINGS AND FIELD TERMINATIONS
- I.A.5 NCR's ON VENDOR INSTALLED AMP TERMINAL LUGS
  
- I.B.1 FLEXIBLE CONDUIT TO FLEXIBLE CONDUIT SEPARATION
- I.B.2 FLEXIBLE CONDUIT TO CABLE SEPARATION
- I.B.3 CONDUIT TO CABLE TRAY SEPARATION
- I.B.4 BARRIER REMOVAL

## BUTT SPLICES IN CONTROL PANELS

## ISSUES

- INSPECTION REPORTS DID NOT INDICATE THAT ALL SPLICE INSTALLATIONS WERE WITNESSED
- QUALIFICATION REQUIREMENTS FOR BUTT SPLICE SLEEVES WERE NOT DOCUMENTED
- BUTT SPLICES WERE NOT STAGGERED TO PREVENT TOUCHING EACH OTHER
- INSTALLATION PROCEDURES DID NOT REQUIRE VERIFICATION OF CIRCUIT OPERABILITY

TRT CONCERNS WITH  
BUTT SPLICES

1. THAT INSPECTION REPORTS DID NOT INDICATE THAT THE REQUIRED WITNESSING OF SPLICE INSTALLATION WAS DONE.
2. THAT DRAWINGS DID NOT REFLECT THE LOCATION OF ALL BUTT SPLICES.
3. THAT THE BUTT SPLICES WERE NOT QUALIFIED FOR THE SERVICE CONDITIONS.
4. THAT BUTT SPLICES WERE NOT STAGGERED SO AS TO NOT TOUCH EACH OTHER.
5. THAT THERE WAS A LACK OF PROVISIONS IN THE INSTALLATION PROCEDURES TO VERIFY THE OPERABILITY OF THE SPLICED CIRCUITS.

BUTT SPLICES IN CONTROL PANELS  
INITIATIVES

PHASE 1

- RETRAIN CABLES TO PREVENT SPLICES FROM TOUCHING ONE ANOTHER
- REVISE PROCEDURES FOR TIGHTER CONTROL
- QUALIFY BUTT-SPLICE SLEEVES FOR SERVICE CONDITIONS
- REVIEW ADDITIONAL INSPECTION REPORTS FOR SPLICE WITNESSING

PHASE 2

- THIRD PARTY INSPECTION OF BUTT SPLICES IN PANELS
- UPDATE AND CORRECT DESIGN DOCUMENTS
- CORRECT HARDWARE DEFICIENCIES
- THIRD PARTY REVIEW OF ALL INSPECTION REPORTS

## BUTT SPLICES IN CONTROL PANELS

## STATUS

- PHASE 2 INSPECTIONS COMPLETE IN CONTROL AND CABLE SPREADING ROOMS
- CORRECTION OF HARDWARE DEFICIENCIES BEGUN
- DOCUMENTATION REVIEW BEGUN
- OTHER BUTT SPLICES HAVE BEEN IDENTIFIED FOR INSPECTION

BUTT SPLICES IN CONTROL PANELS  
INITIATIVES

PHASE 3

- EVALUATE SAFETY SIGNIFICANCE
- DETERMINE NEED TO INVESTIGATE RELATED AREAS
- DETERMINE ROOT CAUSE AND QA/QC IMPLICATIONS
- TAKE LONG TERM CORRECTIVE ACTION

## CONCERN MATRIX

CONCERN	CORRECTIVE ACTION	
WRONG CRIMP TOOL USED	REPLACE	REVISE PROCEDURES RETRAIN ELECTRICIANS
WIRE STRANDS CURLED	REPLACE	REVISE PROCEDURES RETRAIN ELECTRICIANS
INSULATION SPLIT OR IMPROPER HEAT SHRINK	REPLACE	SAME AS ABOVE
UNSATISFACTORY TERMINATIONS	CORRECT	ISOLATED - NO LONG TERM ACTION REQUIRED
INSPECTIONS INADEQUATE	CHECK TRAINING AND CERTIFICATIONS	REVISE PROCEDURES RETRAIN INSPECTORS
INSUFFICIENT CONDUCTOR PENETRATION	CONDUCT TESTS ON REMOVED CONDUCTORS	REINSPECT AND/OR REPLACE
ALL CONCERNS	DETERMINE SAFETY SIGNIFICANCE THROUGH TESTS AND/OR REVIEW OF FUNCTION	ESTABLISH ROOT CAUSES AND LINK TO QA/QC CONCERNS



FLEXIBLE CONDUIT AND CABLE  
SEPARATION IN CONTROL ROOM PANELS

ISSUES

- NO ANALYSIS WAS PERFORMED TO ALLOW USE OF FLEXIBLE CONDUIT AS A BARRIER IN CONTROL ROOM PANELS.
- SOME FLEXIBLE CONDUITS CONTAINING REDUNDANT TRAIN CABLES WERE SEPARATED BY LESS THAN INCH OR WERE TOUCHING.
- CABLES IN CONTROL PANELS WERE IN DIRECT CONTACT WITH CONDUITS CONTAINING REDUNDANT TRAIN CABLES.

FLEXIBLE CONDUIT AND CABLE  
SEPARATION IN CONTROL ROOM PANELS

INITIATIVES

- PROVIDE ANALYSIS FOR THE USE OF FLEXIBLE CONDUIT
- PROVIDE INSPECTION CRITERIA FOR THIRD PARTY REINSPECTION OF PANELS
- THIRD PARTY REINSPECTION OF PANELS

FLEXIBLE CONDUIT AND CABLE  
SEPARATION IN CONTROL ROOM PANELS

STATUS

- DRAFT ANALYSIS BEING REVIEWED BY THIRD PARTY CONSULTANT
- INSPECTION CRITERIA HAS BEEN PROVIDED AND REINSPECTION PROCEDURES WRITTEN
- PHYSICAL TEST OF CABLE AND FLEXIBLE CONDUIT UNDER CONSIDERATION

## TESTING PROGRAM OVERVIEW

- TESTING PROGRAM ISSUES
  - IDENTIFIED IN 9/18/84 NRC LETTER
  - TO BE EVALUATED IN SSER NO. 7
  
- ISSUE SPECIFIC ACTION PLANS
  - \* (1) HOT FUNCTIONAL TESTING (HFT) DATA PACKAGES
  - (2) JTG APPROVAL OF TEST DATA
  - (3) TECHNICAL SPECIFICATIONS FOR DEFERRED TESTS
  - (4) TRACEABILITY OF TEST EQUIPMENT
  - (5) CONDUCT OF THE CILRT
  - \* (6) PREREQUISITE TESTING
  - (7) PREOPERATIONAL TESTING
  
- \* TO BE SPECIFICALLY PRESENTED

2

## HOT FUNCTIONAL TESTING (HFT) DATA PACKAGES

- ISSUES

- NOT ALL TEST OBJECTIVES MET IN THREE OF 17 PACKAGES REVIEWED
- RETESTING NOT ADEQUATE
- OVERSIGHTS BY JOINT TEST GROUP (JTG) WHICH HAD PREVIOUSLY APPROVED DATA PACKAGES

• ISSUE SPECIFICS

(1) BUS VOLTAGE TEST

- TRANSFORMER TAPS NOT IN CORRECT POSITION DURING TEST
- NO RETEST PERFORMED AFTER REPOSITIONING TAPS

(2) STEAM GENERATOR LEVEL INSTRUMENTATION VERIFICATION

- 3 TEMPORARY TRANSMITTERS DURING TEST
- HOT RETEST NOT SPECIFIED

(3) PRESSURIZER LEVEL CONTROL

- MARGINAL READINGS ON ONE TRANSMITTER
  - TRANSMITTER REPLACED
  - HOT RETEST NOT SPECIFIED
-

- INITIATIVES - HFT DATA PACKAGES
  - JTG RE-EVALUATE APPROVED TEST RESULTS PACKAGES
    - USING SPECIAL SAMPLING PLAN
    - USING SPECIFIC GUIDELINES BASED ON TRT CONCERNS
    - GUIDELINES APPROVED BY REVIEW TEAM LEADER AND SRT
    - RE-EVALUATION CRITERIA INCLUDE:
      - FSAR COMMITMENTS SATISFIED
      - TEST OBJECTIVES FULFILLED
      - RETESTS PROPERLY SPECIFIED
      - REG. POS. C.3 OF R.G. 1.68 PROPERLY APPLIED
  - REVIEW TEAM LEADER MONITOR AND APPROVE RE-EVALUATION PROCESS AND RESULTS

- RE-EVALUATION AND SAMPLING PLAN
  - 3 PACKAGES QUESTIONED BY TRT
  - 7 REMAINING HFT PACKAGES
  - 20 PACKAGES AMONG MOST IMPORTANT TO SAFETY
  - SECOND 20 IF ONE REJECT IN FIRST 20
  - ALL REMAINING IF ONE REJECT IN SECOND 20
  - IF NOT NECESSARY TO EXPAND, RANDOM SAMPLE  
AND RE-EVALUATE GUIDELINE ATTRIBUTES IN REMAINING PACKAGES



• ACTION PLAN STATUS

- 3 QUESTIONABLE PACKAGES EVALUATED

• BUS VOLTAGE TEST TO BE REPERFORMED

- TEST OBJECTIVES NOT CLEARLY STATED

- ACCEPTANCE CRITERIA MISLEADING

• OTHER 2, TRANSMITTERS TO BE CHECKED AT PROCEDURE -  
SPECIFIED CONDITIONS

• SAFETY SIGNIFICANCE APPEARS TO BE NIL.  
OUTCOME OF BUS VOLTAGE TEST WILL GOVERN.

- 7 REMAINING HFT PACKAGES RE-EVALUATED

• NO REJECTS

- FIRST 20 RE-EVALUATIONS NEARING COMPLETION

• 13 APPROVED BY JTG

• 5 REVIEWED/APPROVED BY THE REVIEW TEAM LEADER

• NO REJECTS THUS FAR

· ACTION PLAN STATUS (CONT'D)

- FURTHER ACTIONS

· STARTED RANDOM SAMPLING PROCESS

· IDENTIFYING, LISTING GUIDELINE ATTRIBUTES

- FSAR COMMITMENTS

- TEST DEFICIENCY REPORTS

- TEST PROCEDURE DEVIATIONS

## PREREQUISITE TESTING

## • ISSUES

- MEMO ISSUED THAT CHANGED PROCEDURAL REQUIREMENTS
- PROCEDURE NOT REVISED AS FOLLOW-UP
- POSSIBILITY PREREQUISITE CONDITIONS FOR OTHER PREREQUISITE TESTS SIGNED BY UNAUTHORIZED CRAFT PERSONNEL
- IF SITUATION HAD GREATER BREADTH, DID IT ADVERSELY IMPACT ON SUBSEQUENT TESTING?
- POSSIBILITY OTHER MEMOS ISSUED TO MODIFY PROCEDURAL REQUIREMENTS

• ISSUE SPECIFICS

- MEMO SIM-83084 ISSUED MARCH 31, 1933 BY STARTUP MANAGER

• AUTHORIZED ELECTRICAL TEST GROUP (ETG) PERSONNEL TO  
VALIDATE PREREQUISITE CONDITIONS FOR TWO TYPES  
PREREQUISITE TEST PROCEDURES.

• CP-SAP-21 REQUIRES THIS DONE BY SYSTEM TEST ENGINEER

• CP-SAP-21 NOT REVISED TO REFLECT MEMO AUTHORIZATION  
PER CP-SAP-1

• ISSUE SPECIFICS (CONT'D)

- OTHER PREREQUISITE TESTS PRE-CONDITIONS SIGNED BY  
UNAUTHORIZED CRAFT PERSONNEL?

• SEVERAL OTHER TYPES PREREQUISITE TEST PROCEDURES

• SIGNING BY UNAUTHORIZED CRAFT PERSONNEL MAY HAVE OCCURRED  
FOR OTHER TYPES OF TESTS

• PREREQUISITE TESTS PREPARE FOR PREOPERATIONAL TESTS

• WAS THERE ADVERSE IMPACT ON SUBSEQUENT PREOP TESTS?

• INITIATIVES

- MEMO SIM-83084 IMMEDIATELY RESCINDED
  - ISSUED SIM-84220 DATED SEPTEMBER 25, 1984 TO RESCIND
  - SYSTEM TEST ENGINEERS RE-INSTRUCTED REGARDING THE MATTER
  - CRAFT PERSONNEL RE-INSTRUCTED
- ALL STARTUP INTEROFFICE MEMORANDA (SIM) REVIEWED FOR SIMILAR SITUATIONS
- ALL OTHER PREREQUISITE TESTS REVIEWED FOR SIMILAR HANDLING
- IMPACT ON SUBSEQUENT PREOP TESTS BEING EVALUATED
- SIGNIFICANCE OF NOT ADHERING TO PROCEDURE REQUIREMENT BEING EVALUATED

5  
• ACTION PLAN STATUS

- NO OTHER SIMILAR MEMO SITUATIONS HAPPENED
- OTHER PREREQUISITE TEST PRE-CONDITIONS WERE SIGNED BY UNAUTHORIZED CRAFT PERSONNEL
- PLANS FOR EVALUATING IMPACT ON SUBSEQUENT PREOP TESTS BEING DEVELOPED
- PLANS FOR EVALUATING SIGNIFICANCE OF NOT ADHERING TO PROCEDURE REQUIREMENT BEING DEVELOPED

CONCLUDING REMARKS

- PRESENT SCHEDULE TO FINISH FIRST DRAFTS OF RESULTS REPORTS IN MARCH
- DESIGN DOCUMENT CONTROL CONCERNS MAY EXTEND ONE ISSUE
- TO DATE, NOTHING OF SAFETY SIGNIFICANCE HAS BEEN FOUND
- MY OBSERVATIONS INDICATE TESTING WAS PERFORMED BY A GROUP OF EXPERIENCED PROFESSIONAL TESTING PERSONNEL



QA/QC AREA

• SEPTEMBER 18, 1984 LETTER

- I.D.1 INSPECTOR QUALIFICATIONS

- I.D.2 INSPECTOR TESTING

- WILL DISCUSS BOTH TOGETHER

• JANUARY 8, 1985 LETTER

INSPECTOR  
QUALIFICATION/CERTIFICATION

- ISSUE AND BACKGROUND INFORMATION
- PHASE I - DETAILED REVIEW OF FILES
- PHASE II - EVALUATION OF QUESTIONABLE CERTIFICATION
- PHASE III - DETAILED EVALUATION OF PERSONS NOT PROPERLY QUALIFIED
- RELATED ACTIONS

INSPECTOR  
QUALIFICATION/CERTIFICATION

ISSUES:

ADEQUACY OF SUPPORTIVE DOCUMENTATION REGARDING PERSONNEL  
QUALIFICATIONS IN TRAINING/CERTIFICATION FILES.

BACKGROUND:

- AT TIME OF CP, TUGCO WAS COMMITTED TO 10 CFR 50 APP. B.
  - PERFORMANCE DEMONSTRATED BY EXAMINATION, VERIFIED BY OJT
  - 1981 - COMMITTED TO REG. GUIDE 1.58 REV. 1
  - SAME AS ABOVE PLUS VERIFICATION OF EDUCATION/EXPERIENCE
- INSPECTORS TRAINED AND CERTIFIED TO SPECIFIC PROCEDURES/INSTRUCTIONS
  - EACH INSPECTOR MAY HOLD MULTIPLE CERTIFICATION

## ACTION - PHASE I

- TUGCO AUDIT GROUP REVIEWED TRAINING, QUALIFICATION, CERTIFICATION, RECERTIFICATION FILES FOR:
  - ALL ELECTRICAL INSPECTORS (CURRENT AND PAST)
  - NON-ASME INSPECTORS (CURRENT)
  - ASME INSPECTORS (CURRENT)
    - RECFT DECISION BASED ON NRC LETTER DATED 1/8/85
    - CONDUCTED BY INDEPENDENT SPECIAL EVALUATION TEAM (SET)
  
- RESULTS
  - TUGCO AUDIT REVIEWED FILES FOR:
    - 215 INSPECTORS
    - 2386 CERTIFICATIONS
    - CERTIFICATION SUMMARY FORMS PREPARED FOR EACH INSPECTOR
    - EFFORT WAS AUDITED BY SET
  - TO BE REVIEWED BY SET
    - 133 INSPECTORS
    - 270 CERTIFICATIONS

## ACTION PLAN - PHASE II

- SPECIAL EVALUATION TEAM
  - INDEPENDENT
  - MINIMUM 5 YEARS MANAGEMENT/SUPERVISORY QA/QC EXPERIENCE
  - CONDUCTED A DETAILED REVIEW OF EACH FILE
  
- SET REVIEW TO DETERMINE
  - EXPERIENCE
  - EDUCATION
  - FORMAL TRAINING AT CPSES
  - OJT
  - RESULTS OF WRITTEN EXAMINATIONS
  - OTHER VALID CERTIFICATIONS IN RELATED AREAS
  - CONSISTENT APPLICATION OF CRITERIA FOR EVALUATING RELATED EXPERIENCE
  - RESULTS DOCUMENTED FOR EACH INSPECTOR CERTIFICATION, FILES UPDATED

## ACTION PLAN - PHASE II

<u>CATEGORY</u>	<u>REQUIRE RECORDS UPDATE</u>	<u>FURTHER EVALUATION REQUIRED</u>	<u>QUESTIONABLE QUALIFICATIONS</u>	<u>TOTAL</u>
CURRENT ELECTRICAL	25	3	-	28
CURRENT OTHER DISCIPLINES	38	-	-	38
CURRENT LEVEL III	15	1	1	17
HISTORICAL ELECTRICAL	36	1	13	50
TOTAL	114	5	14	133

## ACTION PLAN - PHASE III

### DETAILED EVALUATION OF QUESTIONABLE QUALIFICATIONS

- DETERMINE SAFETY RELATED WORK ACCOMPLISHED BY EACH INSPECTOR IN CHRONOLOGICAL ORDER.
- IS IT STILL ACCESSIBLE, UNDISTURBED AND RECREATABLE?
- DEFINE WORK ACCOMPLISHED IN FIRST 90 DAYS.
- REINSPECT WORK
  - USE THIRD PARTY INSPECTORS (ERC)
  - INSPECT USING ORIGINAL CRITERIA
- EVALUATE RESULTS
  - OBJECTIVE - 95% AGREEMENT
  - SUBJECTIVE - 90% AGREEMENT
- IF INSPECTOR FAILS CRITERIA - INPUT NEXT 90 DAYS EFFORT
  - EVALUATE TO SAME CRITERIA
- IF INSPECTOR FAILS - REINSPECT ALL REMAINING WORK
- INSPECTORS WHO DO NOT HAVE A SUFFICIENT NUMBER OF INSPECTIONS
  - EVALUATE WORK FOR SAFETY SIGNIFICANCE
  - IDENTIFY SUBSEQUENT INSPECTIONS THAT CAN VALIDATE RESULTS
  - PERFORM OTHER TESTS OR INSPECTIONS
  - DOCUMENT HOW EACH CASE IS DISPOSITIONED

## RELATED ACTIONS

- RTL PROVIDE RECOMMENDATIONS ON IMPROVEMENTS TO CURRENT PROCEDURES
  - CERTIFICATION PROCEDURES
  - CERTIFICATE FILES
  - TESTING PROCEDURES & CONTROLS
- COMPUTERIZED SYSTEM FOR TRACKING ALL CERTIFICATION/RECERTIFICATION ACTIONS
- NEW APPROACH TO INSPECTOR TESTING
  - BANKS OF QUESTIONS BEING DEVELOPED BY DISCIPLINE
  - QUESTIONS CAN BE SCRAMBLED
  - SYSTEM OPERATIONAL BY MID APRIL
  - TRAIN TUGCO QE's ON HOW TO TRAIN INSPECTORS MORE EFFECTIVELY
- INSPECTION PROCESS CONTROL SYSTEM
  - EVALUATE INSPECTION ACTIVITIES, STUDY RESULTS, RECOMMEND IMPROVEMENTS
  - INSPECTION RESULTS TRENDED TO IDENTIFY WEAKNESSES
  - RESULTS TRENDED TO IDENTIFY CAUSE OF DISCREPANCY - IDENTIFY PREVENTATIVE ACTIONS



## SUMMARY

### APPROACH WILL

- ENABLE SRT/TUGCO TO IDENTIFY WEAKNESSES IN CERTIFICATION PROCESS
- IDENTIFY INSPECTORS WITH QUESTIONABLE CERTIFICATIONS
- EVALUATE WORK PERFORMED BY THESE INSPECTORS TO ASSESS FOR SAFETY SIGNIFICANCE
- RECOMMEND IMPROVEMENTS FOR CERTIFICATION PROGRAM

QA/QC

(NRC LETTER DATED 1/8/85)

- OVERALL APPROACH
- PROGRAMMATIC ISSUES
- IDENTIFIED HARDWARE ISSUES

PROGRAMMATIC ISSUES				
ISSUE	DID AFFECT IWD		SYSTEM/PROCEDURE REQUIRES FIX	
	YES	NO	YES	NO
NCR 50.55E Audits				

←  
 GENERIC  
 →  
 IMPLICATION

IDENTIFIED HARDWARE ISSUES NRC/TRT/TUGCO					
ISSUE	DESIGN	CONST.	QA	QC ACCEPTANCE	
				INITIAL	POST
Butt Splices					
Locking Devices					
TBD					

APPROACH WILL ENABLE -

SRT/TUGCO TO IDENTIFY SAFETY SIGNIFICANT DEFICIENCIES,

CAUSED BY EITHER PROGRAMATIC OR WORKMANSHIP WEAKNESSES,

BOUND THOSE DEFICIENCIES AND IMPLEMENT EFFECTIVE

CORRECTIVE ACTIONS.

## PROGRAMMATIC ISSUES

### APPROACH

- REVIEW, SUMMARIZE AND ANALYZE HISTORICAL DATA
- DETERMINE IMPACT ON HARDWARE

### • NO HARDWARE IMPACT

- DETERMINE AREAS WHERE IMPROVEMENT CAN BE MADE
- MAKE PROGRAM RECOMMENDATIONS

### • HARDWARE IMPACT

- RECLASSIFY AS A HARDWARE ISSUE AND FOLLOW INVESTIGATIVE LOGIC PLAN

QA/QC  
CONSTRUCTION RELATED ISSUES

GENERAL APPROACH - IDENTIFIED ISSUES

- UNDERSTAND THE ISSUE AND IMPLICATIONS ON QA/QC PROGRAM
  - 9/18/84 LETTER
  - 11/29/84 LETTER
  - 1/08/85 LETTER
- GATHER ALL PERTINENT DATA
- ANALYZE DATA AND INSPECT HARDWARE IF REQUIRED
  - BOUND AND QUANTIFY ISSUE
  - DETERMINE WHEN AND HOW DISCREPANCY OCCURED AND ORGANIZATIONS INVOLVED
- EVALUATE FOR SAFETY SIGNIFICANCE
- DETERMINE ROOT CAUSE AND GENERIC IMPLICATIONS
- IDENTIFY NEW PROGRAMMATIC ISSUES THAT REQUIRE EVALUATION
- CATAGORIZE
  - INITIAL QA/QC CONTROLS OK
  - INITIAL QA/QC CONTROLS NOT OK

QA/QC  
CONSTRUCTION RELATED ISSUES  
(IDENTIFIED ISSUES)

APPROACH - INITIAL QA/QC CONTROLS OK (DISTURBED SINCE INITIAL INSPECTION)

- DEVELOP A DETAILED CORRECTIVE ACTION PLAN
  - SPECIAL INSPECTIONS
  - SPECIAL TESTS
  - DEVELOP PROCEDURAL CONTROLS
  - RETRAINING

APPROACH - INITIAL QA/QC CONTROLS NOT OK

- ADVANCE TO SAMPLE REINSPECTION OF HARDWARE