

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

In the matter of:

TEXAS UTILITIES ELECTRIC COMPANY, et al

(Comanche Peak Steam Electric 50-445 Station, Units 1 & 2)

Pages: 9845 - 9911 Location: Fort Worth, Texas Date: Wednesday, February 22, 1984 + me Please return original to gack matthine, Epv-439 - Distribution: TR 01 0/1 TAYLOE ASSOCIATES Court Reporters stif I Street, N W suite 1006 +ashington, D.C. 20006 202) 293-3950 8402280341 840222 PDR ADOCK 05000445 PDR

1	UNITED STATES OF AMERICA					
2	NUCLEAR REGULATORY COMMISSION					
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4	In the Matter of:					
5	TEXAS UTILITIES ELECTRIC :					
6	(Comanche Peak Steam Flectric : 50-446					
7	Station, Units 1 and 2)					
8	x					
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10	North Main, Fourth Floor					
11	Metro Center Hotel 600 Commerce Street					
12	Fort Worth, Texas					
13	Wednesday, February 22, 1984					
14	The hearing in the above-entitled matter was					
15	reconvened, pursuant to recess, at 8:30 a.m.					
16	BEFORE:					
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18	JUDGE PETER BLOCH Chairman, Atomic Safety and Licensing Board					
19	JUDGE KENNETH MC COLLOM					
20	Member, Atomic Safety and Licensing Board					
21	JUDGE WALTER JORDAN Member, Atomic Safety and Licensing Board					
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	ADDEADANCES.
1	AFFEARANCES:
2	On Behalf of the Applicant:
3	NICHOLAS S. REYNOLDS, Esq. WILLIAM A. HORIN, Esq.
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5	and
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3	On Behalf of Citizens Association for Sound Energy:
4	JUANITA ELLIS, President
5	DR. DAVID BOLTZ
	MR. JACK DOYLE
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7	Dallas, Texas 75224
8	On Behalf of Texas Attorney General's Office:
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2	Also Present:
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	Public Utilities Commission of Texas
5	7800 Shoal Creek Boulevard Austin, Texas 78757

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PROCEEDINGS

JUDGE BLOCH: Good morning.

Mr. Doyle.

MS. ELLIS: Mr. Chairman, before we begin, I would
like to report that we had a conference with the Applicants,
with the Staff and with all parties and with the Cygna
representatives last night for, I think, 12 minutes, and
the Applicants called it as being not as productive as they
had hoped.

We were not able to really come to an agreement;
however, this morning CASE is prepared to continue at least
for a time with the cross-examination questions.

13JUDGE BLOCH: That sounds cryptic, possibly.14What do you mean, you are prepared to continue for a time?

MS. ELLIS: I think possibly until the time that it appears non-productive, at which point we may make some sort of motion, if appropriate. We will just have to see how it goes.

JUDGE BLOCH: Okay. Mr. Doyle.

20 Whereupon,

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NANCY WILLIAMS and

JOHN WARD

resumed the stand as witnesses and, having been sworn
 previously, were further examined and testified as follows:
 WITNESS WARD: Excuse me, Mr. Chairman. Before we

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get into the cross-examination, I feel it is necessary that Cygna make a statement on its position in this particular case and some remarks on the general Cygna effort and what was intended to be because I don't think the record is clear, nor do I feel the understanding of all parties is clear.

JUDGE BLOCH: If there is no objection, I think
we should permit Mr. Ward to go ahead.

8 WITNESS WARD: Thank you. I want to put our task 9 in perspective because, with all due respect to this Board 10 and with full support of the regulatory process that it 11 represents, I don't believe these past two days have really 12 accomplished that objective. With your indulgence, I would 13 like to take a few minutes to do that, and I have written 14 my remarks, so I won't ramble.

15 In the broadest and best sense, Cygna's task is 16 one of quality assurance. Management had no evidence of a 17 major breakdown in the management process at the Comanche 18 Peak project. Indeed, in the May 4th letter which documented 19 that April 13th meeting between Texas Utilities and the NRC 20 Staff, Mr. Eisenhut is recorded as stating, "The Staff does 21 not see any evidence of a major breakdown in quality 22 assurance programs at Comanche Peak."

That same letter cites six prudent management
 initiatives undertaken by Texas Utilities and the NRC to
 assure themselves of the quality of the management and

technical programs at Comanche Peak. First there was 1 an independent design-related inspection that was conducted 2 by Sargent & Lundy. There was a quality assurance evaluation 3 conducted by Mr. F.B. Lobbin. There was the NRC Staff's own 4 SALP evaluation. There was the first of the INPO-type 5 self-evaluation programs. There was the NRC Staff's evalua-6 tions of concerns expressed by Messrs. Walsh and Doyle, and 7 there was the recent NRC Construction Appraisal Team 8 evaluation. 0

These and the ongoing QA programs of Texas Utilities and the overview of the NRC's Office of Inspection and Enforcement formed a basis for the opinion that there was no major evidence of a pervasive quality assurance breakdown. However, each of these evaluations turned up one or more indications that there was a potential for problems, particularly in two general areas.

First, there were a considerable number of design changes outstanding, numbering at one time in excess of 70,000. The construction activities were beginning to overlap the startup and testing activities, and the interface between construction, design control, QC and testing were extremely complex.

Texas Utilities management agreed to engage
 an independent third party qualified in nuclear facility
 design and construction management to assess the technical

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and management adequacy of these areas. The Cygna program documented in our draft final report was designed to provide an assessment of these problem areas.

It was a quality assurance type assessment of the adequacy of the entire management process at Comanche Peak and a technical evaluation of its implementation in the potential problem areas that had been identified.

Cygna selected a qualified team of engineers, 8 analysts and managers who had experience in the complex 9 processes associated with nuclear facility design and con-10 struction, and the majority of whom had performed one or more 31 similar-type evaluations. In the evaluation of the management 12 process, that is, the programs and the procedures governing 13 the design and construction of Comanche Peak, Cygna found no 14 15 reportable deficiencies.

In assessing the effectiveness of this management program as it was being implemented in the specific problem areas, Cygna developed checklists to provide uniformity to our effort and guidance to our technical evaluators. In the performance of this technical implementation evaluation, we needed to assess the design process.

It is important to focus on the fact that this was an assessment of a design and design control process, and it was so structured and performed. In those instances where it was necessary to evaluate calculations, we followed this

general process. First, we assessed the flow of information 1 across the institutional and organizational boundaries to 2 assure ourselves that the engineer or the analyst performing 3 the calculation was using data that was complete, appropriate 4 and accurate. We then assessed the basic assumptions he used, 5 the calculational tools, the methodology, and this included 6 looking at the computer programs to see that they were 7 appropriate, they were properly qualified and had been veri-8 fied. 9

We then assessed the results to see if they were 10 reasonable and consistent with our experience and engineering 11 judgment. We determined that the results were then properly 12 applied in the design process. Finally, we assessed the 13 success of translating the completed design into the as-built 14 and as-installed hardware, and we performed independent 15 calculations only where our experience could not be relied cn. 16 And there were several such instances. 17

With that overview, we are prepared to proceed as 18 outlined by the Chairman yesterday. Ms. Williams will 19 testify as to the technical evaluation process on any issues 20 deemed appropriate. As was evidenced yesterday, there may be 21 areas where qualified engineers will disagree. We are not 22 prepared, nor are we willing, to parade our engineers across 23 this witness stand in order to further demonstrate our dis-24 25 agreement with the conclusions of others. That will not

resolve the issues but will merely serve to prolong these hearings.

We are willing to proceed so that we can identify those technical issues requiring rigorous analysis and/or testing to reach a definitive conclusion.

Before Ms. Williams resumes answering Mr. Doyle's
questions, I would like her to discuss briefly the concept and
the use of the checklist by evaluators. There appears to be
some confusion regarding the level of detail, and I would like
her to demonstrate the depth of the review by using specific
examples.

JUDGE BLOCK: Mr. Ward, I think we could do that, but I would like to assure you that what you stated in terms of the objectives and procedures of Cygna were thoroughly understood by the Board. You stated it in one place. You should be able to do that. I have been impressed by your understanding of the issues here.

18 I am not entirely comfortable with the fact that 19 Cygna is here unrepresented by a lawyer.

WITNESS WARD: Nor are we.

JUDGE BLOCH: I would feel much more comfortable about that if you and Ms. Williams had a consultation with a lawyer who at least advised you that you don't need legal services. It is obvious that the questions you are going to be asked are going to be tough questions, and they will go to

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the validity of the study that has been done. Our job as a board is to hear those questions. There is no way that we can insulate you from the questions that are going to be asked.

5 The only reason you would need a lawyer that I can 6 think of is to make sure that your side is brought out fully. 7 My own judgment is that you and Ms. Williams are capable of 8 doing that, but I'm not sure whether consultation with a 9 lawyer would persuade you that there is wisdom in being 10 represented, as well.

Do you feel comfortable in proceeding now unrepresented by a lawyer?

WITNESS WARD: Yes.

JUDGE BLOCH: Okay.

Yes, Ms. Ellis.

MS. ELLIS: Mr. Chairman, I think there are a 16 17 couple things that should be clarified for the record. First of all, the Board has dealt with the Lobbin Report in one of 18 their orders. The SIT Report and the CAT Report are still --19 the findings have not been completed. Also I would like to 20 21 note for the record that the INPO and Sargent & Lundy reports are not in the record of this proceeding, nor have they ever 22 attempted to be put in the record. CASE would certainly have 23 asked for discovery and cross-examination rights on them. 24

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I just wanted to note that for the record.

1 ljoy8	1	WITNESS WARD: My statement didn't rely on them
	2	as evidence. It certainly would indicate that other evalua-
END 1	3	tions had been performed.
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JUDGE BLOCK: Ms. Williams, I think we do understand the way the check was used, but if you want to make a statement, please do it.

As you do that, you might also wish to comment on the amount of time that may be required to do the further analyses to respond to the kind of questions that Mr. Doyle is going to ask you, particularly the one he's already asked.

WITNESS WILLIAMS: Maybe I should address that first.

11 In this case, back to being represented by legal 12 counsel, I questioned the equity involved in having 13 documents placed before me without adequate time to review 14 them, be that calculations, drawings -- there are studies 15 being put in front of me now; there are errata sheets to 16 testimony that I haven't looked at yet. I fail to see how 17 I can absorb this and answer accurately and completely as 18 possible without the benefit of the time to review the 19 material.

JUDGE BLOCH: Are you suggesting possibly that Cygna needs a continuance and discovery of its own? WITNESS WILLIAMS: By discovery, I'm at a loss for the legal --

JUDGE BLOCH: The ability to obtain analyses that have been prepared by the other parties for your review

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prior to trial.

2 WITNESS WILLIAMS: I believe that that would hasten 3 the process, and that we could arrive at what these general 4 issues are.

Right now, we are looking at very specifics and going through drawing by drawing. We have made the statement that we reviewed these. We feel they are adequate. We're going to get to a point where we are going to disagree on the basis for our judgments.

10 We came prepared to discuss and state what our 11 judgments were, and to the extent possible, what the basis 12 was. If we could discuss what these issues are to identify 13 what the actions are, I think it would be much more timely.

14 JUDGE BLOCH: On the procedure we set forth, there really is a substitute for discovery taking place here. That is that if you see information that you cannot respond to now, what we're doing basically is providing for the continuance you need to do the analysis, and then respond.

19 WITNESS WARD: We understand that. And Ms. Williams 20 is not, I think -- really doesn't understand the term 21 "discovery" nor the delays that that can encounter. We're 22 not looking for that at all.

23 What we are looking for is to identify those 24 areas where we have an honest disagreement between 25 parties -- excuse me; we're not a party -- between us and

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the parties, and then those issues might then become a request for discovery -- could become a request for continuance to perform the adequate analyses and/or testing that was required to resolve those issues in the Board's mind.

JUDGE BLOCH: Okay. Now there is here a question of the role of Cygna when it goes back and does these calculations. I would like to urge --

WITNESS WARD: It isn't necessarily implied that Cygna would be the one to do these.

JUDGE BLOCH: Well, the question is, when you have used your engineering judgment and you are now being asked to back it up to show that it is valid and you work on calculations, I was going to raise a question as to what your role is in doing those calculations.

The natural tendency of human beings that made a judgment is to try as hard as they possibly can to validate that judgment.

WITNESS WARD: Absolutely.

JUDGE BLOCH: I was trying to urge that, as an independent evaluator here, if you do examine the evidence that you have never seen before, these calculations done by Mr. Doyle and others by Mr. Walsh, and you conclude that you are no longer sure about your judgment, we hope that you will come forward and say that, rather than continue to

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stand by the first judgment.

2 WITNESS WILLIAMS: I'm not sure that I'm clear 3 that we've seen calculations or bases for what they are 4 saying.

5 Take the U-bolt, for example. Not given the ability to ask them why they feel there is dissimilarity 6 7 between what we're saying and what the basis for their 8 conclusion is, I'm at a loss to have anything to evaluate 9 or to pass on to my evaluators to evaluate.

10 JUDGE BLOCH: Are you any better position now 11 to comment on the code sections that Mr. Doyle was talking 12 to you about yesterday?

MR. REYNOLDS: Which code sections, Mr. Chairman? 14 JUDGE BLOCH: In particular, there was a code 15 section that Mr. Doyle presented that had to do -- I believe 16 it had to do with space around a pipe. It was an NF 17 section. I don't remember the specific one.

18 WITNESS WILLIAMS: Only to the extent that I have 19 reviewed some aspects of it and would say + at I am very 20 cautious at this point in time of taking things out of 21 context, and that when you take one or two sentences out 22 of these or a select paragraph out of the code, that you have 23 to be very careful on your application, and I need time to 24 evaluate that.

JUDGE BLOCH: I asked if you have had time, so

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that you can now testify about it. If the answer is no, 1 2 say so.

WITNESS WILLIAMS: I will get the answer to that, but that is one area where we feel there were selective sentences chosen, and that's what I mean by out of context.

JUDGE BLOCH: You had a further statement to make in addition to that comment about time. Do you want to make a statement about the use of checklists?

Do you have to make a comment, Ms. Ellis? 10 MS. ELLIS: Before we proceed, I just wanted to 11 note that it might be helpful and we will supply Cygna with a copy of our request for documents. That might give her 12 a better idea of some of the things we have asked for 13 14 specifically. I will hand that to them now.

15 MR. REYNOLDS: That has nothing to do with the 16 issues that are being raised by Mr. Doyle. It would be 17 helpful not at all, it seems to me.

18 JUDGE BLOCH: It certainly won't hurt to hand 19 them the list of documents you requested. It won't give 20 her a specific warning of what's going to be raised, 21 obviously.

22 MR. REYNOLDS: Mr. Chairman, it would have helped 23 Cygna considerably, I would imagine, if CASE had followed 24 the Board's direction to file expected findings of fact 25 which outlined the tack of cross-examination. There is no

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guidance in CASE's pleading at all with which Cygna could prepare for cross-examination. And I thought that was the Board's intent in prescribing the procedure.

JUDGE BLOCH: It was. But as we came close to trial, possibly because of their delays in requesting the documents -- but one way or another, they only were working on the documents on Saturday -- I think actually given the mass of documents to analyze, they did a pretty efficient job in looking at them.

MR. REYNOLDS: That gets back to the timing of the discovery.

JUDGE JORDAN: I gather from your statement,
 Mr. Reynolds, that Cygna did have copies, then, of the
 expected findings of CASE?

MR. REYNOLDS: Ms. Williams, I don't recall.
 WITNESS WILLIAMS: I received that late Saturday
 and was on a plant Sunday morning.

JUDGE BLOCH: Ms. Williams, your statement on the use of the checklist?

WITNESS WILLIAMS: What I wanted to do was to give two examples to show how, yes, the checklists are general, but we do come up with specifics. My intention in doing that is to demonstrate that the depth of the review is not necessarily reflected in the general statements of the checklists, and I have two examples to go

mgc 2-7 1	through very quickly.
2	JUDGE BLOCH: Please.
3	WITNESS WILLIAMS: Turning to Volume 2, Checklist
4	No. PI-03 on flued head, referring to Item 1, geometry input,
5	Subitem (a) says, "Check the computer geometry (wall
6	thickness, lengths of transition pieces), agree with
7	Figure 74-1."
8	Now I would like to refer to our observations,
9	which are in Appendix F of Volume 1. I would like to note
10	that the figure reference in the checklist is off of a
.11	drawing. i.'s a drawing of the flued head. It's a regular
12	blueline drawing. It's not an analytical model.
13	The observation record is PI-03-01. This
14	observation deals with the details of the finite element
15	model used in the evaluation of the flued head.
16	What we identified here was what turned out to be
17	a minor error in the modeling in the connectivity of the
18	elements. It turned out that it was modeled as triangles
19	instead of squares. The only way we could find this out
20	was tracing through the input of the model detail by detail,
21	checking Point A connects to Point B to Point C to Point D,
22	and we went through this model and came up with this one
23	error.
24	Now that is not reflective in the checklist where
25	it just says, "Check geometry."

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Okay. I have one other example. The checklist number in Volume 2, WD-02, Sheet 1 of 10, the corresponding observation in Volume 1 would be WD-02-02 --

JUDGE BLOCH: I take it the observation relates to 5A; is that right?

WITNESS WILLIAMS: That's correct. The point being here that our identification of the inversion, because of the somewhat symmetry associated with the snubbers, was really through measuring each dimension on that pipe support and saying, "Wait a minute. There's a reason they don't match up," and realizing that they were, in fact, inverted, my whole point here being there's a lot more detail in this review, and there are some points that I think I can clarify after reviewing Mr. Walsh's and Mr. Doyle's prefiled testimony, and we would like to do that clarification.

But as far as these other documents being placed in front of me, I feel that we should be given time to review their content before we make a statement.

JUDGE BLOCH: Any time you have that problem, you just tell us, and we will allow you that time.

21 Could you comment onPS-02, Sheet 1 of 4, Item 4, 22 which is marked, "Yes, Satisfactory"?

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1	WITNESS WILLIAMS: Which item, again?
2	JUDGE BLOCH: PS-02, Item 4. Is that correctly
3	marked "satisfactory"? And the same question for Part B of
4	that same item, 4A and 4B.
5	WITNESS WILLIAMS: I see what your question is.
6	I just want to pull the criteria out.
7	JUDGE BLOCH: I believe it's the criterion Mr.
8	Doyle was talking about with you yesterday.
9	WITNESS WILLIAMS: Okay. If you review the section
10	on gaps that is being referred to in Design Criteria DC-2 in
11	Item 4 here, one of the sentences reads, "The support design
12	shall allow clearance for the most severe thermal plus seismic
13	movements of the pipe." It doesn't specify what that clearance
14	is. We did evaluate it and we found it satisfactory, just as
15	we stated yesterday.
16	JUDGE BLOCH: It's my impression that from the
17	testimony yesterday we established that the U-bolt allows no
18	clearance around the pipe; is that correct?
19	WITNESS WILLIAMS: In that case there is no
20	clearance.
21	JULGE BLOCH: How can no clearance be satisfactory
22	to allow for that maximum?
23	WITNESS WILLIAMS: Because of evaluating what those
24	thermal movements are.
25	JUDGE BLOCH: I guess my guestion is whether that

JUDGE BLOCH: I guess my question is whether that

joy2	1	evaluation should be part of an observation as opposed to
	2	being a satisfactory checklist item. If it doesn't allow for
	3	the gap at all, it doesn't seem possible that it complied with
	4	the criterion you set forth.
	5	WITNESS WILLIAMS: I understand what you are saying,
	6	and my comment would be we don't know if there is any thermal
	7	movement at all to that extent or that it is severe, and we
	8	didn't feel that the clamping effects
	9	JUDGE BLOCH: Please consider what you are saying.
	10	The first thing you said is we don't know if there is any
	11	thermal movement at all. I know that.
	12	WITNESS WILLIAMS: You don't know how severe or
	13	the degree.
	14	JUDGE BLOCH: Okay. That's a different question.
	15	Try to be careful about what you say. You don't know about
	16	the extent of the thermal movement. You do know it doesn't
	17	allow for the thermal movement if there is zero gap though,
	18	right?
	19	WITNESS WILLIAMS: But if it is limited, the
	20	effects might also be limited.
	21	JUDGE BLOCH: But isn't that an exception from
	22	your guideline? You are saying it doesn't meet the guideline
	23	but it's okay. That's what I hear from you.
	24	WITNESS WILLIAMS: I understand it might be
	25	clearer for the sake of this report to have documented it

that way, but it does not indicate that we did not review it. JUDGE BLOCH. The question is whether it is marked

4 correctly as satisfactory or unsatisfactory. In other words, 5 if you found that an item does not meet a guideline that is 6 listed in the checklist, but that is okay, you listed it as 7 satisfactory, not as an observation subject to follow-up?

8 WITNESS WILLIAMS: It's not clear to me that it9 doesn't meet that guideline.

JUDGE BLOCH: You haven't explained to me how the language of the guideline permits this result with a zero gap.

WITNESS WILLIAMS: It says allow for clearance for
 the most severe thermal plus seismic. Now, the reviewer
 lcoked at it and felt it was acceptable.

JUDGE BLOCH: With a zero gap and some thermal, how can there possibly be clearance for the thermal? Maybe I don't understand what "satisfactory" indicates, but I thought it meant that you checked against the criteria listed in the checklist and that it met the criteria, not that it was an acceptable design, but you were checking whether it met the criteria listed in the checklist.

WITNESS WILLIAMS: The criteria, we have always
 said, are guidelines, as are the checklists. Now, as to the
 exact interpretation of each of these, we certainly could

3joy4 1	document it different ways. What I'm saying is, yes, it was
2	evaluated and we felt that the interpretation was the
3	effects were minor and that the localized stresses due to
4	that thermal expansion would not be severe to the extent that
5	it would be of concern for the safety of the plant.
8	Based on that, the reviewer checked it as satis-
7	factory. Another way of doing it could be a more literal
8	interpretation of design criteria, I agree.
9	JUDGE JORDAN: But this is the way Cygna does it
10	all the way through?
11	WITNESS WILLIAMS: There is definitely interpreta-
12	tion; that's correct.
13	MR. REYNOLDS: Mr. Chairman, could we ask the
14	witness what the words "if applicable" mean?
15	JUDGE BLOCH: Is the "if applicable" phrase
16	relevant here?
17	WITNESS WILLIAMS: That is one of the statements
18	that allows the reviewer this interpretation; that's correct.
19	MR. REYNOLDS: The point I'm making, Mr. Chairman,
20	is the use to which the U-bolt is put in this design: is it
21	a pipe support or is it merely a clamp?
22	JUDGE BLOCH: I wanted to ask further questions
23	about that. Mr. Doyle may, also.
24	I understand you haven't done the calculations, but
25	I think there may be further questions allowable with respect

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to theadequacy of the engineering judgment that was made here. 1 Mr. Doyle was doing, I think, a good job of cross-examination 2 yesterday. Now, the Chairman does have some questions of his 3 own, and I would like your advice as to whether you would 4 prefer to proceed on this question yourself or whether you 5 would like the Chairman to ask some questions now. 6 MR. DOYLE: Could I ask her one question? 7 JUDGE BLOCH: Please. 8

9 MR. DOYLE: Could you read sentence 1?
10 JUDGE BLOCH: That's of the Cygna criterion?
11 MR. DOYLE: Of the Cygna criterion.
12 WITNESS WILLIAMS: Which section?

MR. DOYLE: 4.1.2.

WITNESS WILLIAMS: Okay, I've read it.

MR. DOYLE: No, out loud.

16 WITNESS WILLIAMS: "The gap shall be provided to 17 accommodate radial expansion and construction tolerances."

18 MR. DOYLE: So we are concerned with the radial 19 expansion of the pipe in that criteria.

20 WITNESS WILLIAMS: We certainly evaluated it, yes. 21 MR. DOYLE: However, there is no notation that 22 this was considered.

WITNESS WILLIAMS: That was my point in walking through the checklist first as observations just a moment ago, that this is not a thorough set of item-by-item

documentations; this is a final report representative of our findings on Comanche Peak.

JUDGE BLOCH: I think you will find in yesterday's record that that was the Chairman's understanding, which I stated yesterday.

JUDGE JORDAN: Are you saying, though, that in the workpaper that this will be demonstrated that there is a lack of meeting of the criteria; that if you bring the workpaper here, it will show us that was the case?

WITNESS WILLIAMS: I do have our hand calculations or field notes. For this particular one I can't attest to the fact that I can pull that piece of paper out. I think this problem is much larger than that, and we are talking about all these evaluations that we were discussing yesterday.

I also understand that this is one of the items in the corrective action plan or the Applicant's response to the most recent Board decision, and as such, has been identified as a much larger problem.

JUDGE JORDAN: The workpapers that the reviewer had in looking it over, will there be -- the questions that he looked at, and the criteria, for example, is obviously one of the things that he looked at, but will that piece of workpaper show us that he did look at that criteria and the reasons why he decided? Will that workpaper -- will you have that to be able to demonstrate it?

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WITNESS WILLIAMS: It will not be that detailed to satisfy your concern in that area, I'm sure.

JUDGE JORDAN: All it would add is that he has looked at and he has checked "satisfactory."

5 WITNESS WILLIAMS: There is more to it. I don't 6 think it's black or white. This particular issue has been 7 something we discussed. We did assess this as insignificant, 8 and this is a much broader issue that I understand has been 9 discussed previously in this hearing, and that the proof is 10 not as simple as this one support. We made a judgment on this 11; one support that it was acceptable.

JUDGE BLOCH: Ms. Williams, what is the extent of Cygna's familiarity with the design decision of the Board?

WITNESS WILLIAMS: We just read it -- well, of the decision, we read it.

JUDGE BLOCH: When?

WITNESS WILLIAMS: Make sure I'm referring to the - JUDGE BLOCH: The late December decision on
 design quality assurance.

20 WITNESS WILLIAMS: We have a copy of that, yes.
21 We did not have it during the review.

JUDGE BLOCH: No, I know that. But did you have it -- one of the purposes of asking that the Applicants make that available to you was our effort to try to give you advance notification of the type of questioning we were sure

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you were going to get.

WITNESS WILLIAMS: That was not our understanding.
It was a piece of information. We felt that we were being brought
here to explain the basis for our report and to arrive upon
whatever issues we could not resolve during the course of
these hearings.

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7 The corrective action plan I saw for the first 8 time last night. I was not aware that there were already 9 activities under way to address these issues, and it seems to 10 me that if they are that global in nature, that discussing more 11 of the details isn't going to resolve it either because we are 12 going to state our opinion just as the other people have 13 stated their opinion previously.

The other thing I didn't know was that it was pullic record that we were doing this follow-on work. Obviously, we are going to come into contact with the work that is being done for these issues during that review, and we will certainly pay strict attention to that and supplement that as we feel is necessary in order to answer these questions adequately.

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JUDGE BLOCH: C: course, if you can answer it more rapidly than the follow-on work, we'd like to know that. If you have to do the whole follow-on work to do it, that's something we'd like to know.

WITNESS WILLIAMS: In some of these cases, that's 5 what we're up against, and unfortunately we've hit on two 6 hard ones right in the beginning. There are some things 7 in the testimony from Mr. Walsh and Doyle that I feel some 8 clarification would help, particularly in the case of the 9 walkdowns. But there are some of these issues that, when 10 11 we read all of these documents we have just been discussing, we could clearly see that we were only scratching the surface 12 13 of it. And the other thing is, the scope of cur review did not necessarily bring us into contact with all aspects of 14 these issues that we read in your decision and in the 15 corrective action plan that the Applicants have submitted. 16

JUDGE BLOCH: With respect to the questions I'm about to ask, if you think you need more research or time to think, please don't answer.

One question I have is, when we discussed Note 1 to Appendix 17, Table -- I believe it's A-37 steel -- it's either A-37 or A-36; I can never keep it straight -- you stated the prohibition was against friction connections loaded in shear. At least that's what we understood by it, and the Applicants understood the same thing. Is that

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1 correct -- prohibition for Note 1 as against friction 2 connections using that bolted material loaded in shear? 3 MR. REYNOLDS: Does she have the document? 4 WITNESS WILLIAMS: No.

JUDGE BLOCH: Okay. Let's see if we can make the document available.

Mr. Ward?

8 WITNESS WARD: A point of information, Mr. Chairman.
 9 The SIT evaluation, was that evaluated before
 10 this Board?

JUDGE BLOCH: We had hearings on it, and the findings that we reached in our design decision were findings that considered what the SIT findings were. We didn't accept all the SIT findings.

WITNESS WARD: I understand. And are we now about to continue that discussion on some of the issues that you did not accept the resolution of?

18 JUDGE BLOCH: What I am going to do now is to 19 question the basis that was given for the engineering judgment that this particular U-bolt was satisfactory. I 20 want to know more about what Cygna now knows to support the 21 judgment that was presented in the report. That's not the 22 question of whether it's ultimately correct. It's the 23 question of whether you knew enough to reach that engineering 24 25 judgment when you reached it.

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JUDGE JORDAN: That's right. We don't expect you to defend the Applicants' calculations. We expect you to defend your saying that everything was satisfactory.

WITNESS WARD: I understand that. I guess my own prediction is that we're plowing the same field that you properly plowed before and will grow the same bitter fruit.

JUDGE BLOCH: If it is that kind of bitter fruit and you say that, we will stop. I mean, we just want to know the extent to which you thought about these issues.

Now the question thatI want to ask about this section is, the prohibition, you say, is limited to friction connections loaded in shear, but the reason given for it is that the steel produces an uncertain clamping force, and my question is whether the same reason given for that prohibition doesn't also apply to the use of the same steel in a U-bolt for the purpose of exerting a clamping force that will prevent frictional rotation, that will cause enough friction to prevent rotation?

WITNESS WILLIAMS: The beginning of your statement again was -- were you correlating that to a clamp?

JUDGE BLOCH: No. Applied to the bolt. But as I understand, the steel being used is the same steel, and it produces uncertain clamping force, so that the ASME Code expressly prohibits its use in a friction connection loaded

in shear.

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Now the question is, is this analogous? That is, even though it's not expressly prohibited, doesn't the same rationale prohibit its use in this other context?

WITNESS WILLIAMS: Okay. Our position on that was that you can also apply that rationale to clamps, and we feel it must be discussed in that context, and we did not evaluate this any further last night, since that is our position on it.

JUDGE BLOCH: Okay. So basically you don't know whether the underlying rationale should also be applied both to U-bolts and clamps. You are saying it's a general practice, and that was really the basis on which you decided you wouldn't challenge it further. That's part --

¹⁵ WITNESS WILLIAMS: I agree it's a general practice.
¹⁶ Yes, that's part of the basis. It's not necessarily
¹⁷ implicit that that's the only basis. We did evaluate the
¹⁸ materials. We did think about it.

¹⁹ JUDGE BLOCH: Do you now have a reason for
²⁰ believing that the rationale on friction connections is not
²¹ applicable to the U-bolt using the same material in this use?
²² WITNESS WILLIAMS: We have not changed our position
²³ on this.

JUDGE BLOCH: I understand you to be saying that you don't have any further rationale on that; is that correct?

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WITNESS WILLIAMS: Not that we have already expressed as of yesterday. There is nothing new I can add to the record on that on our position.

I do think that you ought to discuss it in the context of clamps, though.

JUDGE BLOCH: Okay. Now I understand from Mr. Doyle's previous testimony -- Mr. Doyle, tell me if I'm correct -- that you have worked at a plant where U-bolts were not cinched down around pipes; is that right?

MR. DOYLE: Many of them.

JUDGE BLOCH: Many of them. So at least in your experience, this is not industry practice; is that correct? MR. DOYLE: No, it is not industry practice, to the best of my knowledge. Beyond that, there is a clearance provided in the U-bolt for radial expansion.

JUDGE BLOCH: Now, Ms. Williams, do you know
whether it is industry practice to cinch these U-bolts down
around pipes?

WITNESS WILLIAMS: Our engineers felt that it was, that it was an acceptable approach to developing a clamping force.

JUDGE BLOCH: I'm asking of your personal knowledge, do you know whether this is industry practice? WITNESS WILLIAMS: Of my personal knowledge, no. JUDGE BLOCH: Did the people working for you in

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the course of this review state to you that of their personal knowledge, this was industry practice, particularly with U-bolts now, not box frames or anything of that kind --U-bolts cinched down around pipes?

MR. REYNOLDS: Mr. Chairman, in fairness to these witnesses, I must state that they have come in here with a two-volume report, and now they are being asked the most minute details in that report. It was sprung on them yesterday. I think it is patently unfair to be asking Ms. Williams these kinds of detailed questions without notice that this is the level of detail that she is going to have to be testifying to.

13 JUDGE BLOCH: Mr. Reynolds, it is my opinion that the report is as good as each engineering judgment made in it and no better.

MR. REYNOLDS: I agree with that.

17 JUDGE BLOCH: All we are doing is asking about one 18 engineering judgment made in the study.

MR. REYNOLDS: I agree with that.

20 JUDGE BLOCH: We want to find out the extent and 21 depth of analysis for that judgment.

MR. REYNOLDS: Again, you are talking to the 23 project manager. You are not talking to the engineer who did 24 the job.

JUDGE BLOCH: She said she didn't want to produce



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the engineer that did the job, and we are therefore relying --

MR. REYNOLDS: It is a matter of notice on the issues.

WITNESS WILLIAMS: Our engineers will not provide any further basis on that, and it's not a matter of whether I want them to step forward or not, or that I would want to fly ten people here. It's still going to get down to the point that you are going to have to do a very detailed analysis of this thing to determine whether -- which side is correct. And, in fact, I have some analyses going on back in the office right now.

JUDGE BLOCH: Okay. I just wanted to know the basis for stating that it is industry practice with respect to U-bolts. If you don't know, just say you don't know.

WITNESS WILLIAMS: I personally don't know. You
 asked me about my engineers.

JUDGE BLOCH: They assured you that it was industry practice to cinch U-bolts down around pipes.

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Jimmy follows²⁰

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1	JUDGE BLOCH: Okay, let me as you another
2	question:
3	You said that over time the nature of this material
4	was such that it would relax. What time period do you have
5	in mind for this relaxation to occur?
6	WITNESS WILLIAMS: I can't answer that question
7	right now.
6	We are, as I said, evaluating it in more detail.
9	JUDGE BLOCH: If it is a material that relaxes,
10	isn't it necessary, at least, to have a rigorous maintenance
.17	program to retorque bolts from time to time?
12	WITNESS WILLIAMS: I think before committing to
13	something like that, you should evaluate the extent to which
14	that possibility exists.
15	JUDGE BLOCH: When you think about what the
16	frictional forces that are developed by this U-bolt, at what
17	point in time is it appropriate to consider the frictional
18	forces?
19	WITNESS WILLIAMS: I'm not sure it's clear in my
20	mind how great those frictional forces are in this particular
21	case.
22	JUDGE BLOCH: What is the rotational force that
23	must be resisted?
24	Do we know that from the diagram?
25	WITNESS WILLIAMS: No.

JUDGE BLOCH: How could you decide in your 1 engineering judgment that it was adequate to resist it, if you 2 don't know what the force is? 3 WITNESS WILLIAMS: This gets back to my statement 4 yesterday: 5 We were dealing with an entire set of documents 6 in doing this review, not the information that is before us 7 today, solely. 8 0 JUDGE BLOCH: How do you know it had rotational 10 forces on it, just because you --WITNESS WILLIAMS: I am not sure that -- okay, 11 rotating--it displaces a -- I don't know if that is a point that 12 13 is really important to this question; but: 14 We have the stress analysis in front of us. 15 JUDGE BLOCH: Are we talking about translational 16 forces or rotational forces? 17 WITNESS WILLIAMS: And it should not have -- I'm 18 sorry--that was an engineering detail that's really not 19 pertinent to this disucssion; I really should not have 20 muddied the waters on that, on that technicality. 21 The -- we have the stress analysis there, which gives 22 us the information on displacement loads at the various load 23 points; we had criteria documents; we had specifications; we 24 had allowables; we had manufacturers' catalogs. 25 JUDGE BLOCH: I am just asking:

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1	If the document that was placed in front of you
2	yesterday was shown to you then?
3	WITNESS WILLIAMS: No.
4	JUDGE BLOCH: Thank you.
5	MR. REYNOLDS: Mr. Chairman, may I make a point?
6	I think what you just did was have Mr. Doyle
7	testify about "industry practice". We didn't define the
8	term "industry practice".
9	Then you asked Ms. Williams about "industry
10	practice".
11	What is "industry practice"?
12	There is a serious problem, I think, in the proce-
13	dure which allows the cross-examiner to testify while he is
14	cross-examining; and yet, not subject him to cross-examination
15	on his own testimony.
16	JUDGE BLOCH: Please ask questions of Mr. Doyle,
17	if you'd like, right now?
18	Whereupon,
19	JACK DOYLE
20	having been previously sworn as a witness for CASE, was
21	further examined and further testified as follows:
22	EXAMINATION
23	BY MR. REYNOLDS:
24	Q Mr. Doyle, what do you mean by "industry practice"?
25	A That would be a practice which would be common

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1	throughout the industry.
2	Q Now, when you say that this is industry practice,
3	on what experience do you draw to make that conclusion?
4	A From having walked through numerous sites through-
5	out the country.
6	Q By walking through you can make a judgment on
7	the adequacy of bolts in this configuration?
8	A I would say so, yuh.
9	Q Let's talk about the "numerous sites"?
10	What sites?
11	A FFTF, Washington; Davis-Bessie in Ohio; Comanche;
12	and also in the office designing U-bolts for plants:
13	Russellville, Arkansas; Millstone, Connecticut; andis that
14	enough?
15	Q Are you suggesting that you designed supports
16	for ANO and Millstone?
17	A I beg your pardon?
18	Q You just testified that you were involved in the
19	design of supports for ANO and Millstone?
20	A ANO, I didn't say that.
21	Q What about Millstone? You just mentioned
22	Millstone? What did you do there?
23	A I was designing supports for Millstone.
24	Q For whom? What organization?
25	A Stone & Webster.
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	0	You were the design engineer for success for
		Tou were the design engineer for supports for
2	Milistone?	
3	A	I was one of the design engineers.
4		MS. ELLIS: Mr. Chairman, I think
5		MR. REYNOLDS: Mr. Chairman, may I continue with
ó	my cross-e	xamination?
7		JUDGE BLOCH: Yes.
8		But would you please define "ANO" so that Mr.
9	Doyle can	answer your question?
10		BY MR. REYNOLDS:
11	Q	Arkansas Nuclear-1.
12		If he knows Russellville, he should know ANO.
13	А	I worked for Bechtel on Russellville.
14	Q	And you designed pipe supports there?
15	А	I designed pipe supports in San Francisco for
16	when the	y had the shutdown at Russellville.
17	Q	And Millstone was Stone & Webster, did you say?
18	А	That is correct.
19	Q	Now, you cited Comanche Peak as one of the bases
20	for your co	onclusion of an industry practice?
21	А	No, you asked me where I had been; and that was one
22	of the place	ces I had been.
23	Q	I asked you where you had been that allowed you to
24	derive the	conclusion that this was
25		JUDGE BLOCH: Now. Mr. Reynolds, now you're getting
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1	a little a	rgumentative.
2		You and I both know that he wasn't making a
3	conclusion	about not cinching up U-bolts from here.
4		BY MR. REYNOLDS:
5	Q	What does FFTF have to do with this? Is this a
6	power react	tor?
7	А	It's the government Fast Flux Test Facility up
8	in the Hate	el (phonetic).
9	Q	Where?
10	А	Richland, Washington.
11	Q	Hanford?
12	А	Yuh.
13		And that particular plant they had cinched down
14	U-bolts, an	d we down and uncinched them.
15	Q	Who is "we"?
16	А	The personnel who were designing the supports
17	and taking	care of the task force, the corrective actions.
18	Q	Again, you were a design engineer there?
19	А	I was then what they called the SMART ICE (phonetic)
20	group which	wasI was the original individual that went out
21	on-site and	visually inspected the pipes to determine if
22	there were	problems present.
23	QI	For what organization did you work?
24	A	I was working for Westinghouse, but I was contracted
25	there PDS.	

JUDGE BLOCH: The Board would like to request from 1 the Staff a report on whether or not there was a corrective 2 action program at Hanford to uncinch U-bolts. 3 Was it Hanford or FFTF? 4 WITNESS DOYLE: FFTF. 5 JUDGE BLOCH: FFTF. 6 MR. MIZUNO: May the Staff ask questions? 7 JUDGE BLOCH: Yes, surely. R BY MR. REYNOLDS: 0 Mr. Doyle, why did the FFTF uncinch the bolts, 0 10 11 the U-bolts? A Because in their particular application, when you 12 cinch a U-bolt down onto a rigid frame, it no longer is a 13 two-way restraint; it's a three-way restraint. 14 Beyond that, you get involved with the radial 15 expansion of the pipe. 16 JUDGE BLOCH: I want to ask you, Mr. Doyle: 17 Is it analogous to the use being made at 18 Comanche? 19 Or is the Chairman making a mistake to think that 20 it is? 21 THE WITNESS: It's not exactly analogous; no. 22 It is not analogous to the application we have been discussing. 23 JUDGE BLOCH: So the request I just made may prove 24 fruitless and a waste of time? 25

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1	THE WITNESS: It probably would be, because it
2	was more of an anchorage problem.
3	JUDGE BLOCH: Cancel that request.
4	BY MR. REYNOLDS:
5	Q Therefore, we can strike your citation of FFTF,
6	since your conclusion this was "industry practice"?
7	A No, you can't strike it because while I was on-
8	site, I did not see any of this type of application. Had I
9	have, I would have directed that they be removed.
10	Q Did you look at every support at FFTF? You are
11	under oath, now?
12	A I know I'm under oath.
13	JUDGE BLOCH: You don't have to be argumentative,
14	Mr. Reynolds; he knows he's under oath. He's taking time to
15	testify. He's entitled to the same respect and considerations
16	as all other witnesses.
17	MR. REYNOLDS: I agree with that.
18	THE WITNESS: Could you repeat the question?
19	MR. REYNOLDS: Mr. Reporter?
20	JUDGE BLOCH: "Did you look at every support at
21	FFTF"?
22	THE WITNESS: Of the safety systems, I looked at
23	no, not every support, but, perhaps thousands.
24	JUDGE BLOCH: Would you say your best estimate is
25	"thousands"?

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1	THE WITNESS: That is correct.
2	JUDGE BLOCH: I'm sorry, was there an "s" on the
3	end of that, or was there no "s" on the end of the word?
4	THE WITNESS: It waswell, well over 1,000.
5	JUDGE BLOCH: Okay, thank you.
6	BY MR. REYNOLDS:
7	Q Let's talk about Davis-Bessie. For whom did you
8	WORK there?
9	A I worked for Grinnell throughI have to guess,
10	I worked so many placesTech-Aide, I believe.
11	I believe that was it. I'd have to check my
12	resume to really find out.
13	Q You were the design engineer at Davis-Bessie?
14	MS. ELLIS: Excuse me, Mr. Chairman.
15	I am going to object again. I think this goes back
16	to voir dire. The Applicants have had their shot at that.
17	I think that we're going far beyond what should be allowed
18	in this.
19	MR. REYNOLDS: Mr. Chairman, this is not voir
20	dire. This is cross-examination on testimony that suggested
21	this is industry practice.
22	JUDGE BLOCH: Ms. Ellis, I have to agree with
23	Mr. Reynolds.
24	Mr. Doyle has made a statement that's of poten-
25	tially great importance to us. I am not sure how important it

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1	is in the context of the credibility of the CYGNA finding,
2	I must say.
3	But the question really is whether CYGNA had a
4	basis for its conclusion this is industry practice.
5	Now, I'm not sure how relevant Mr. Doyle's testi-
6	mony is to that question. But it may be relevant for other
7	purposes in this proceeding.
8	Mr. Doyle, you have a comment?
9	THE WITNESS: Yes, I do.
10	One of the things is, we're discussing apples-and-
11	oranges here:
12	The type of support which exists at Comanche Peak
13	that is replacing a clamp, the normal clamp, that is used
14	with a U-bolt, I will state categorically that I, in all the
15	facilities I visited and that's what I was referring to
16	and all the jobs I've worked on, that I've never seen that
17	configuration.
18	I can answer to the anchorage problem when U-bolts
19	are mounted to rigid frames. But as far as the type of
20	U-bolt arrangement which we are discussing here at these
21	hearings, I did not see those at any of the plants on which
22	I worked in the field, or worked in the design groups.
23	JUDGE BLOCH: Okay.
24	MR. REYNOLDS: May I continue?
25	JUDGE BLOCH: Yes.
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1	E	BY MR. REYNOLDS:
2	Q N	low, is this an exclusive list, an exhaustive list,
3	of the plant	s that we're talking about?
4	A N	o, I've also worked petrochemical.
5	Q N	o, I'm talking about nuclear power reactors.
6	A ï	t's fairly complete.
7	Q D	o you know the application of the question we're
8	dealing with	here at Yankee Rowe?
9	A I	don't know anything about Yankee Rowe.
10	Q H	ow about Pilgrim?
11	A I	have never been to Pilgrim.
12	Q S	alem?
13	JI	UDGE BLOCH: No. Wait.
14	MI	R. REYNOLDS: What I intend to do is go down the
15	list of 80 op	perating reactors in the country and establish
16	that	
17	JU	JDGE BLOCH: I remind you that his testimony is
18	limited to the	ne places he's already
19	MF	R. REYNOLDS: Then how can he possibly state that
20	this "industr	y practice" when we're talking about
21	JU	DGE BLOCH: I know, but one of your witnesses
22	stated it was	only on Comanche Peak.
23	MF	. REYNOLDS: I'm sorry?
24	JU	DGE BLOCH: One of your witnesses has stated that
25	it was indust	ry practice; on cross it was determined that he

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1	was talking only about Comanche Peak.
2	He's now stated the basis for his statement. He
3	knows about four or five plants.
4	MR. REYNOLDS: And I submit to you that that does
5	not establish industry practice.
6	JUDGE BLOCH: Well, it establishes, at least, that
7	it's not uniform industry practice to take the other approach.
8	MR. REYNOLDS: All right.
9	JUDGE BLOCH: If it's true.
10	MR. REYNOLDS: Yes.
11	JUDGE BLOCH: And, of course, you can go out and
12	introduce evidence that shows what Mr. Doyle has said is not
13	true. The direct evidence could be quite persuasive.
14	MR. REYNOLDS: Well, Mr. Chairman, this does
15	illustrate the problem I have of allowing the cross-examiner
16	to testify.
17	JUDGE BLOCH: It doesn't, because we gave you
18	cross-examination rights.
19	MR. REYNOLDS: Do you want me to ask for it every
20	time?
21	JUDGE BLOCH: I think it probably would be
22	preferable the way we should proceed is: the testimony will
23	be permitted; we will then take cross on the witnesses; and
24	then after we're done on any statements that were factual
25	that were made by Mr. Doyle, we'll take cross on Mr. Doyle.

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•	1	I don't think we should interrupt in the middle
	2	of the questioning to do it, perhaps.
	3	Mr. Treby, you had questions on this same point,
	4	or Mr. Mizuno?
	5	MR. MIZUNO: I have a few questions for Mr. Doyle.
	6	EXAMINATION
XXXINDEX	7	BY MR. MIZUNO:
	8	Q Mr. Doyle, you stated that youit was industry
	9	practice not to cinch down on U-bolts?
	10	A In those areas of which I was involved.
	11	Now, I cannot state categorically that in every
	12	plant I was in there is no cinched-down U-bolt; that is an
-	13	impossibility.
•	14	Q Right.
	15	in other words, it couldyou thought it could be
	16	a hardware problem in terms ofthey cinched-down on a U-bolt
	17	when they shouldn't have; I realize that.
	18	A Yuh.
	19	Q But you are saying that it's an industry practice
	20	that it shouldn't be done?
	21	A Generally, yes.
	22	Because when you cinch down a U-bolt on a rigid
	23	frame, you have in fact created an anchor.
	24	JUDGE BLOCH: That's based on the limited experience
	25	that Mr. Doyle has; that's correct.
•		

BY MR. MIZUNO:

2	Q Andhow did you determine that that was the
3	practice at that particular time? Is that a design decision
4	that had been made that U-bolts should not be cinched?
5	A Would you repeat that?
6	Q Yes.
7	You indicated that at least at the plants that you
8	worked at, that there was a design decision, essentially,
9	not to cinch-down on U-bolts.
10	Would you please tell me how you came to the
11	conclusion that that was the practice at that time?
12	A Because the engineers with whom I had association
13	were well aware of the fact that once you cinched a U-bolt
14	down, you have effectively created an anchor, if it is
15	attached to a rigid restraint.
16	Q And, in other words, youthere was a conscious
17	decision? This was discussed among engineering, including
18	yourself, and you were in this decision?
19	A Well, it's not a decision. It's one of the things
20	that is known.
21	But II don't understand why we're discussing
22	cinched-down U-bolts on rigid frames. This is not a problem.
23	What we have here is cinched-down U-bolts being
24	used in lieu of a clamp.
25	Q Okay.
1.1	

Let's talk about that right now as we go on. 1 The configuration that we are concerned about here, 2 a U-bolt--I guess the drawing we were shown here--the U-bolt 3 was cinched-down in order to develop a friction force between 4 the U-bolt and the pipe. 5 JUDGE BLOCH: Let's understand Mr. Mizuna's 6 question to be about Case Exhibit 891. 7 THE WITNESS: Yuh, that is right. 8 BY MR. MIZUNA: 9 Q Fine. 10 And your concern is that a U-bolt was used instead 11 of a clamp? 12 A Where it is used as a clamp, in this particular 13 case it is not used as a clamp; it is used as a means for 14 preventing rotation of the box-spring. 15 Q Does a clamp develop a friction force between the 16 clamp and the pipe? 17 If it doesn't, then it's useless for the applica-A 18 tion that's intended. 19 So, therefore, a clamp develops a friction force 0 20 between itself and the pipe? 21 A A clamp develops a friction force --22 23 0 That is its intended function, is it? 24 Is a clamp intended --25 A Right.

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1	J	UDGE BLOCH: We know the question. Let
2	Mr. Doyle th	aink about it and answer it.
3	Т	THE WITNESS: Well, when you say "clamp,"
4	you are talk	ing of a standard blamp?
5	B	Y MR. MIZUNO:
6	Q Y	'es?
7	N	o, I take that back.
8	A Y	ou keep saying "intended function." No, that is
9	not its inte	ended function.
10	Т	he purpose of a clamp is to hold the pipe up.
11	N	ow, if you mean when they tighten the bolts down
12	do they get	a friction force? The answer would be yes.
13	Q L	et me try it again:
14	Y	ou say a clamp is intended to hold up a pipe
15	support?	
16	A N	0.
17	Q N	0?
18	W	hat did you say?
19	A A	clamp holds up the pipe.
20	Q 0	kay. The clamp holds up the pipe.
21	Н	ow does it do it? What is the mechanism by which
22	the clamp ho	lds up the pipe?
23	A W	ell, in the first place, I don't understand
24	why you're c	rossing me; I never discussed clamps.
25	Q W	ell, Mr. Doyle, I'm trying to understand
		방법적 방법을 하는 것은 것은 것이 같은 것이 같이 있는 것이 같이 많이 많이 했다.

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1	if you don't have any concern with clamps, and myI don't
2	want to put words in your mouth
3	A Are you crossing me on a position I have on
4	pipe clamps?
5	JUDGE BLOCH: Mr. Doyle, he's trying to see
6	whether you have a consistent concern about things that are
7	right up against the pipe, and that may cause friction on the
8	pipe.
9	And you're concerned about the U-bolts, and I
10	think he misunderstood you
11	THE WITNESS: Oh, okay.
12	JUDGE BLOCH: and I think Mr. Mizuna's questions
13	are directed at finding out
14	THE WITNESS: Oh, okay.
15	Now, shall I go into that?
16	The mechanism of the two items is first, totally
17	different:
18	With a pipe clamp, you have beaming action between
19	the bolts which tie the two halves of the clamp together.
20	When you get pipe expansion, you get bending in the clamp;
21	because the radial expansion is taken up by bending in the
22	clamp.
23	The stresses which have been determined by the
24	manufacturer are at a controlled level.
25	When you put a U-bolt on thereanother thing about

the clamp is you have a broad contact area; you have a very
wide clamp.
When you go to a U-bolt because there is a
clearance built into the U-bolt to allow for radial expansion,
when you cinch it up one point on the U-bolt touches the
pipe. And there is a base under thereas there is on this
particular exampleyou have line contact on the bottom.
So you have contact with the U-bolt between a point
and the link; there is no broad-beam distribution on the
loading.
BY MR. MIZUNO:
Q Mr. Doyle, let me ask you some questions based on
your long discussion there.
It is your testimony, then, that when a U-bolt
acts upon a pipe it is only at one point, when it's used as a
clamp?
A At one point and one link.
Q Okay.
And your concern is that
JUDGE BLOCH: Would you explain that?
On the drawing here (indicating document) what is
the point you are talking about? It would seem here most of
the bottom circumference.
THE WITNESS: No, there isU-bolts are manufactured
with a built-in clearance; using it as nominal numbers, if you

1	have two-inch diameter pipe that goes into a two-inch U-bolt,
2	you have 2-1/16just for argument's sakeI don't know the
3	exact clearanceit varies.
4	So since you have two different radii, you have
5	only one point; because you have a compound radius there.
6	JUDGE BLOCH: With a little flattening, there will
7	be more than a point, then, in a geometric sense; but it's
8	near the point at which the bottom contact would be made.
9	Is that the idea?
10	THE WITNESS: The contact with the U-bolt; yes.
11	JUDGE BLOCH: Because of flattening, this point
12	may be 1/16 of an inch, ½ of an inch, maybe even an inch,
13	huh?
14	THE WITNESS: If you start getting up that big,
15	then you're in violation of the code which prohibits flattening
16	of the pipe.
17	JUDGE BLOCH: Okay, I understand.
18	In other words, you see a basic conflict between
19	the code prohibition on flattening the pipe, and the develop-
20	ment of severe friction forces to prevent rotation?
21	THE WITNESS: And the induced radial expansion,
22	that is a problem; and the SSE loads, you know: all of these
23	things must be combined to bring out precisely what is
24	happening at that point.
25	There is no doubt in my mind that the initial
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1	point contact will spread out.
2	But this must be addressed.
3	JUDGE BLOCH: Mr. Mizuno?
4	MR. MIZUNO: Yes.
5	BY MR. MIZUNO:
6	Q Is it
7	MR. REYNOLDS: Are you
8	I'm sorry.
9	JUDGE BLOCH: If you want to recross later, we'll
10	get back to you for recross.
11	MR. REYNOLDS: For continuity of the record: is
12	it not addressed at Comanche Peak?
13	I think that's a good question at this point.
14	JUDGE BLOCH: Well, that's a good recross question.
15	Let's let Mr. Mizuno continue his cross.
16	BY MR. MIZUNO:
17	Q Let us assume that you are correct in your
18	supposition that there is a point contact with the U-bolt in
19	this configuration shown on CASE Exhibit 891.
20	Is your concern with the ability of the U-bolt
21	to take that stress?
22	JUDGE BLOCH: Now you're askingI think that
23	question was dealt with. He's concerned about a number of
24	things.
25	He's concerned

1	MR. MIZUNO: I want to talk about just that one.
2	I want to make sure that that is a concern.
3	JUDGE BLOCH: Is that a concern? All right.
4	THE WITNESS: Could you repeat the question?
5	BY MR. MIZUNO:
6	Q Is it one of your concernslet us assume, again,
7	that we have this localized bearing area on the clamp, on
8	the U-bolt; is it one of your concerns that the bolt will not
9	be able to take that kind of stress?
10	A In order for thein order for the bolt to take the
11	stress, we have to know what the stress is.
12	And that is what we don't know.
13	And that would be the stress from the combined
14	loading due to the radial expansion, and the pretensioning,
15	and the design loads.
16	Because one of the things you
17	Q Let me ask you one more question.
18	JUDGE BLOCH: All right. Mr. Doyle was trying to
19	complete an answer, I think.
20	You said one of the things you must?
21	THE WITNESS: I lost it.
22	JUDGE BLOCH: Okay.
23	Mr. Mizuno?
24	BY MR. MIZUNO:
25	Q My last question: when you cinch-down on a U-bolt,
-	

5-21

1	you still have a localized bearing area at only one point?
2	A No, because you will be getting deflection in the
3	U-bolt.
4	You also will be getting elastoplastic deformation
5	in the pipe and the U-bolt, so you will be getting, essen-
6	tially, a flattening.
7	But what area will actually be in contact?
8	In the first place, it is a highly complex problem
9	to determine what the actual area around the circumference
0	of that U-bolt will be in contact with the pipe.
1	We just don't know.
2	MR. MIZUNO: Thank you.
3	That was my last question.
4	WITNESS WARD: Mr. Chairman, I realize we don't
5	have a lawyer, but one of the things Mr. Doyle and I did
6	discuss in the hall: it would be neat if we could sit down
7	over a table and do this kind of thing to find out what the
8	real concerns were.
9	JUDGE BLOCH: I think that would be very helpful,
0	if the Applicant will agree that that will not destroy
1	independence.
2	MR. REYNOLDS: What independence?
3	JUDGE BLOCH: Well, would the Applicant agree
4	that it is permissible for CYGNA to talk with Mr. Doyle,
5	without destroying its independence?

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1	MR. REYNOLDS: I assume the Board would contemplate
2	Applicants would participate in those conversations?
3	WITNESS WARD: I was not suggesting in camera
4	or ex parte, but we'd just like to ask one question.
5	JUDGE BLOCH: Do you want to ask it now?
6	WITNESS WARD: Yes, we have no
7	JUDGE BLOCH: Right in the open?
8	WITNESS WARD: I'll be open in front of everybody.
9	JUDGE BLOCH: Ms. Ellis can object if she'd like,
10	but please ask the question.
11	WITNESS WILLIAMS: I just want to know what
12	supporting analysis you have for this specific instance to
13	support your conclusions?
14	WITNESS DOYLE: I made awhen I observed the
15	drawing, when I observed the calculations, I noted that
16	missing from the calculations was any indication of the U-bolts
17	or potential problems associated with U-bolts.
18	I found that in the checklist or in the observa-
19	tions there was no notation to the fact that this problem
20	was addressed, and engineering judgment was used.
21	I made a rough calculation which would frighten
22	you, so I won't even discuss itassumingthe Board is
23	aware of the calculation we're referring toaccepting the
24	Comanche Peak statement of what pretorque they put into those
25	bolts.

1	If you take
2	JUDGE BLOCH: Let me interrupt, because I think
3	that is sufficient.
4	CASE filed six volumes of findings. The design
5	decision and the portion of the decision that discusses
6	this particular problem references those findings. It's the
7	section that's referenced in the design decision; I think it's
8	chapter XVII. It's one of the highermaybe XXVit's one
9	of the higher Roman numerals in a rather thick volume.
10	But the calculations that Mr. Doyle did were
11	generic and not on this particular support. But they are in
12	that volume.
13	WITNESS DOYLE: And, I might add: they were not
14	precise.
15	WITNESS WILLIAMS: That was going to be my next
16	point.
17	WITNESS DOYLE: No.
18	WITNESS WARD: This is my concern, though, with
19	the line of questioning:
20	He is stating that there will be elastoplastic
21	deformation, there will be flattening, there will be this
22	and he's performed no vigorous analysis to support that;
23	he's using his engineering judgment.
24	JUDGE BLOCH: Okay.
25	I think what he's saying is that he's done some

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1	rough calculations; but the Board has insisted that we must
2	have an answer that is more sophisticated than his.
3	Now, we don't know that he's right. I don't think
4	Mr. Doyle is sure that he's right on a sophisticated analysis.
5	WITNESS WARD: I think we concurred in that,
6	Mr. Chairman; and yet, we're going down this line of
7	asking detailed questions.
8	JUDGE BLOCH: Well, the reason we got there was
9	because the parties insisted on the cross-examination of
10	Mr. Doyle.
11	WITNESS WILLIAMS: I think that was of benefit,
12	because it brought some issues to bear; and we're being
13	considered guilty until proven otherwise because it's not in
14	the checklist.
15	And I am not sure that he has the stress analysis
16	in front of him, that he knew all the facts on the loads when
17	he was doing the
18	JUDGE BLOCH: Now, waitdon't answer him until
19	you've got your own answer; because until you do the
20	calculations, I'm not sure that you know you're right, either.
21	Yes?
22	WITNESS DOYLE: Yes, to make one statement on
23	engineering judgment, I made a judgment c. those U-bolts as
24	used at Comanche Peak. I ran a rough number that included no
25	deformation on the clamp. It was still based on this

point loading, which gives you some extremely high numbers. 1 It was from those high numbers which are not 2 accurate, not precise, and do not contain any of the 3 load distribution due to the various thicknesses of the 4 elements involved, that further study would be required. 5 I did not say that this -- for that matter, on one 6 of the box springs I got some number like 14 tons 7 equivalance side-loading. I know you don't have 14 tons. 8 The Board knows I don't have 14 tons. 9 But when I get a load of 14 tons on a beam 10 then that is a point where I say: this is not a candidate 11 for engineering judgment. If I have to, I'll go finite. 12 13 WITNESS WILLIAMS: Yes. And I think that is a very complex phenomenon. 14 And I am not convinced that the fixed design experience 15 and application of catalogs necessarily reflects an in-depth 16 understanding of the phenomenon we're talking about in doing 17 18 a finite analysis. 19 MS. ELLIS: Mr. Chairman, --JUDGE BLOCH: Well, I think Mr. Reynolds was in 20 21 line? 22 MR. REYNOLDS: I was going to suggest that we take a 15-minute recess and let the parties talk about this, just 23 24 as an experiment in seeing if issues can be resolved that way. And then come back and see what happens. 25

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1 JUDGE BLOCH: That's possible, although, from what I understand from the discussion is it's going to take a 2 3 finite element analysis to resolve it. 4 MR. REYNOLDS: How about a break anyway? 5 (Laughter) WITNESS DOYLE: I support that request. 6 7 JUDGE BLOCH: Ms. Ellis has a brief comment? 8 MS. ELLIS: Yes. 9 I would like to note that Mr. Doyle has prefiled testimony and will have further rebuttal testimony. And 10 everyone will have a shot at cross-examining him then. 11 12 And I think that maybe the time has come to going 13 back to consider maybe a little more formal format here. rather than having Mr. Doyle being cross-examined. 14 15 JUDGE BLOCH: Yes, we could. 16 But what I was suggesting, and I would like you to 17 consider it during the break, is that I don't think it's 18 sufficient on other questions for Mr. Doyle to ask questions; 19 but when necessary, to make statements about his judgments 20 so that the issues can be clearly defined. 21 We will not stop after each set of questions to 22 get cross on Mr. Doyle. 23 We will wait until the end when we will have cross 24 on CYGNA first, and then cross on Mr. Doyle; and it will be 25 more orderly.

101.6	김 동생 성격 방법 전쟁에 집에 집에 있는 것이 같은 것이 잘 가지 않는 것이 잘 잘 했다. 이 가는 눈물을 다 나라 가지 않는 것이 없는 것이 같이 많이 했다.
1	That's the suggestion.
2	MR. REYNOLDS: The only problem I have with that
3	is it places a burden on Staff and Applicants to keep
4	meticulous notes as to what Mr. Doyle said, and to discern
5	whether it's a form of question or statement; so that we don't
6	forfeit our opportunity to cross on that statement.
7	Do you see my point?
8	JUDGE BLOCH: I think we do, but I'm not sure that
9	I'm crying about it.
10	(Laughter)
11	MR. REYNOLDS: That's because you're not Applicants'
12	counsel.
13	(Laughter)
14	But the point is this: If the man is going to
15	testify, we should be permitted to cross-examine him at the
16	time of testimonynot wait until tomorrow or Friday or
17	whenever to cross-examine him.
18	JUDGE BLOCH: I understand the objection.
19	Let's see where the case wants to go. Maybe we'll
20	go the other way anyway.
21	Ms. Ellis?
22	MS. ELLIS: I have one further suggestion, and that
23	is that CYGNA be provided with a copy of the proposed Walsh-
24	Doyle findings by CASE.
25	MR. REYNOLDS: Mr. Chairman, we've had a problem
1	이 정말 방법에 있는 것은 것이 있는 것이 있는 것이 있는 것이 가지 않는 것이 있는 것이 있 같은 것은 것이 같은 것은 것이 있는 것이 없는 것 같은 것은 것이 같은 것이 같은 것이 없는 것이 있는 것이 있는 것이 있는 것이 없는 것이 있

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in understanding what we should be sending to CYGNA, and 1 what we shouldn't be? 2 JUDGE BLOCH: I made a ruling that anything in the 3 public record should be available to CYGNA--that's today. 4 MR. REYNOLDS: That's right. We have been 5 struggling with those over the last several months. And 6 I've sent them nothing except on instruction by the Board. 7 We will provide them with all public documents. 8 JUDGE BLOCH: I think providing them public 9 10 documents is clearly helpful. And the only problem would be discussions about 11 documents; but the documents, themselves, can be provided 12 either by Applicant or by CASE. 13 MS. ELLIS: I don't know if we have extras, if we 14 have, I'd be glad to provide them. 15 16 I'd like to know, also, for CYGNA's benefit that we would have provided you gladly with all of our 17 filings, had it not been for a concern about the independence. 18 JUDGE BLOCH: A 10-minute recess, subject to 19 extension if there are productive negotiations going on. 20 21 (Recess.) 22 23 24 25

JUDGE BLOCH: The Board welcomes the parties back. We understand that there has been a productive negotiating discussion.

In the off-the-record discussions, parties have agreed that Mr. Reynolds may state what the agreement is that was reached by the parties, subject to comment by other parties.

Mr. Reynolds.

9 MR. REYNOLDS: Mr. Chairman, I will try to be as 10 brief as possible. What the parties have agreed to do is to 11 ask the Board to suspend these hearings for the balance of 12 this day. Mr. Walsh and Mr. Doyle will endeavor to prepare 13 lists of issues that they would like to address on cross-14 examination of the Cygna panel and to index that list of issues 15 to the exhibits they intend to use during cross-examination.

We would propose that Cygna then be allowed the remainder of the day and all day tomorrow to evaluate the issues and to prepare for cross-examination.

We would ask the Board to schedule for 8:30 in the morning the welding issues and that we proceed with welding to completion of those issues, at which time, if it is late Thursday, we suspend. If it was Friday sometime, we would go back to the Cygna panel.

JUDGE BLOCH: Mr. Doyle, I'm kind of curious how long this indexing job that has been agreed to will reasonably

6joy2 1 take.

2	MR. DOYLE: My portion of it won't take that long,
3	an hour or so. The problem arises with the Cygna people
4	because I will give them generic areas and index them to the
5	drawings in which these areas are covered. They then have to
6	determine, and they will do this among themselves or by
7	contacting San Francisco, whatever it requires, whether these
8	issues have been addressed, and this is where the time element
9	is involved.
10	JUDGE BLOCH: Ms. Ellis, is the understanding as
11	stated by Mr. Reynolds accurate?
12	MS. ELLIS: Yes. I would like to add to that, we
13	think it is important that we all be available so that we can
14	have further meetings during the afternoon or early evening if
15	we feel it is necessary, if there is anything that needs to
16	be clarified or anything of that sort.
17	JUDGE BLOCH: So you expect to be available for
18	Cygna's purposes.
19	MS. ELLIS: Yes.
20	JUDGE BLOCH: I have not heard any requests for
21	the Board to be available.
22	MR. REYNOLDS: We know the Board's telephone
23	number.
24	(Discussion off the record)
25	MR. DOYLE: May I ask one more point? This

бјоу3	clarification that Juanita is referring to is, when I issue
	2 these generic areas, it is very possib! / that Cygna would
	3 want to know my basis, and we have agreed that all parties
	4 will come together and discuss my reasons for stating this as
	a generic issue, which will give them more of an insight
	6 into what we are after; and they can then answer clearer.
	JUDGE BLOCH: It sounds like an excellent
	arrangement.
	Does Cygna have any comments?
1	WITNESS WILLIAMS: No. We think that's very
1	equitable. I would only ask that if you have any bullets that
1:	would help us on these generic issues, as much as you can,
1:	write them down and then we will get started on them.
1.	JUDGE BLOCH: I didn't understand the second word
1:	you used. Bullets.
16	MS. WILLIAMS: Items. Okay?
• 17	JUDGE BLOCH: I understand their use in typography.
18	WITNESS WARD: I guess the other comment I would
19	like to make is I appreciate the cooperation of CASE, and I
20	think in my experience this may be unique, and I think it
21	will reach a solution in a very timely manner.
22	JUDGE BLOCH: I appreciate the cooperation of all
23	the parties at this point. I think we have got substantive
24	issues to address and this will help us to do that.
25	Does the Staff agree with the arrangement?

ijoy4	MR. TREBY: Yes.
	JUDGE BLOCH: The State of Texas?
	MR. HICKS: Yes.
	JUDGE BLOCH: The hearing is adjourned until
	5 8:30 in the morning.
	(Whereupon, at 11:55 a.m. the hearing was
	recessed, to resume at 8:30 a.m. the following day, Wednesday,
	February 23, 1984.)
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1	CERTIFICATE OF PROCEEDINGS
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3	This is to certify that the attached proceedings before the
4	NRC COMMISSION
5	In the matter of: Station, Units 1 & 2
6	Date of Proceeding: Wednesday, 22 February 1984
7	Place of Proceeding: Fort Worth, Texas
8	were held as herein appears, and that this is the original
9	transcript for the file of the Commission.
10	
11	James Burns
12	Official Reporter - Typed
13	- James Aurus
14	Officia@ Reporter - Signatur
15	Mimie Meltzer
16	Mi
17	Official Reporter - Signature
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