

ORIGINAL

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

In the matter of:

STAFF AND TELEDYNE BRIEFING ON STATUS
OF IDVP FOR DIABLO CANYON

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

STAFF AND TELEDYNE BRIEFING ON STATUS OF
IDVP FOR DIABLO CANYON

Public Meeting

Nuclear Regulatory Commission
1717 H Street, N.W.
Room 1130
Washington, D.C.

Tuesday, September 13, 1983

The Commission met, pursuant to notice, at
10:10 a.m.

COMMISSIONERS PRESENT:

- NUNZIO PALLADINO, Chairman of the Commission
- VICTOR GILINSKY, Commissioner
- THOMAS ROBERTS, Commissioner
- JAMES ASSELSTINE, Commissioner
- FREDERICK BERNTHAL, Commissioner

STAFF AND PRESENTERS SEATED AT COMMISSION TABLE:

- S. CHILK
- H. PLAINE
- J. ZERBE
- W. DIRCKS
- H. DENTON
- D. EISENHUT

- W.E. COOPER, Teledyne
- R. REEDY, R.F. Reedy, Inc.
- R. CLOUD, Robert L. Cloud Associates, Inc.
- M. AXELRAD, LNRA
- J. KRECHTING, Stone & Webster

AUDIENCE SPEAKERS:

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L. CHANDLER
J. KNIGHT
R. MATTSO

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DISCLAIMER

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3 of the United States Nuclear Regulatory Commission held
4 on September 13, 1983 in the Commission's offices at
5 1717 H Street, N.W., Washington, D.C. The meeting was open
6 to public attendance and observation. This transcript has
7 not been reviewed, corrected or edited, and it may contain
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P R O C E E D I N G S

1
2 CHAIRMAN PALLADINO: Good morning, ladies and
3 gentlemen. Today we will be briefed by the NRC Staff and
4 Teledyne on the status of the Design Verification Program
5 for Diablo Canyon Unit 1. To clarify the long complex
6 history of this subject, I believe it would be worthwhile
7 to briefly review the events leading up to initiation of the
8 verification program.

9 The NRC issued an operating license for Diablo
10 Canyon Unit 1 on September 22, 1981. Six days later, on
11 September 28th, PG&E informed the NRC that they had found an
12 error in the seismic analysis of equipment and piping mounted
13 on the Unit 1 containment annulus.

14 Subsequent investigation by PG&E identified
15 additional seismic design errors. The NRC Staff also discovered
16 potential significant weaknesses in PG&E's implementation of
17 a seismic design quality assurance program.

18 In response to these findings, the Commission
19 suspended the lower power license for Diablo Canyon Unit 1.
20 The Commission further ordered the Independent Design
21 Verification of all safety-related activities performed under
22 seismic-related contracts prior to 1978.

23 By letter to the Licensee, the NRC Staff expanded
24 the verification efforts to include review of non-seismic
25 safety-related activities prior to 1978, all service-related

1 activities post-1978 and all PG&E internal design activities
2 post-1970.

3 In addition to verification of design, both the
4 Commission order and the Staff letter required the program to
5 address the basic causes of errors and to evaluate the impact
6 of errors on overall plant design and safety.

7 Originally for today we had planned to hear from
8 the Joint Intervenors and State of California. However, we
9 decided to hear only from the Staff and Teledyne today because
10 the verification program is not complete. We plan to schedule
11 a meeting to hear from all parties at a later date.

12 Do any of my fellow Commissioners have any
13 additional remarks?

14 (No response.)

15 All right. Therefore, we'll turn the meeting over
16 to Mr. Dircks.

17 MR. DIRCKS: This is essentially a two-part
18 meeting. The first part will be handled by the Staff, and
19 the second part by representatives of the independent
20 consultant, the Teledyne Corporation.

21 The Staff portion will essentially review where
22 we have been, where we are today, the decision points and
23 depending on the decision points, perhaps an idea of the
24 schedule and timing of where we go from here. I think that
25 will depend on the interaction, I think, between the Licensee,

1 the Independent Design Verification Program, the Staff and
2 preparation of the documents, the SER, supplement to the SER,
3 Commission decision points and the public review.

4 That's all I have. Harold?

5 MR. DENTON: Darrell Eisenhut will make the
6 presentation, but I'd like to make a few opening remarks.
7 We discussed this program with you many times. It's very
8 nearly complete now. We think it has been an effective
9 program and that when completed, it will demonstrate that
10 the plant is constructed and designed in accordance with the
11 application.

12 We issued SER Supplement 18 in August, and that had
13 a number of open items in it, and that was based on informa-
14 tion we had as of June 30th. Since that time, we've received
15 several more responses from PG&E and these are under active
16 review.

17 The company plans to have completed its analytical
18 efforts and modifications for fuel load around the end of
19 September, so with regard to schedules, the company's
20 activities necessary for Phase I will be complete the end
21 of this month. The IDVP will have to look at those and issue
22 its report, and then the Staff would need a period of time
23 after it has the PG&E report and the IDVP report to issue
24 its SER which would clearly close out all the items
25 necessary for Phase I. And I understand the Commission then

1 intends to seek views on that effort.

2 Major modifications have occurred in the plant as
3 a result of this program. I just wanted to mention a few
4 examples. If you go in the containment buildings now, which
5 is where the original error was made, there has been
6 extensive diagonal, horizontal cross-bracing put in. There
7 are over 25 vertical columns, for example, now added in that
8 area that were not there before.

9 With regard to the polar crane, for example,
10 they've added 35 tons of steel to the boxframe. This is
11 one inch steel plate.

12 In the turbine building on the east side, there's
13 over 30 tons of steel cross-bracing added.

14 The primary purpose of these additions are to make
15 sure that the response spectra of the plant is as it was
16 originally designed as opposed to adding structural strength
17 per se, but it was to make the plant perform the way it was
18 designed to perform in the first place.

19 We've had over 30 meetings with the Applicant and
20 the other parties since this program was put into effect.
21 There have been many more meetings in this which have been
22 between IDVP and PG&E, and we've provided over 100 Board
23 notifications in this review.

24 A bit more background. We've put in over 20
25 professional manyears of the Staff in just this effort since

1 we kicked it off a couple years ago. Brookhaven has -- we've
2 obtained the services of Brookhaven for about seven profes-
3 sional manyears, and I understand the IDVP effort is up to
4 125 manyears in reviewing the effort.

5 I wanted to set the stage for how big a program
6 this has been and just reiterate that it's very near
7 completion. There are some open items and we do expect to
8 finish those shortly after receiving from PG&E and the IDVP
9 results and their final reports on the activities.

10 MR. DIRCKS: Could I just make a point about dates?
11 You mentioned the plant expects to have its modifications done
12 by the end of September. Then the Independent Design
13 Verification must pick it up from there and do its analysis.
14 Then we must follow with a supplement to the Safety
15 Evaluation Report, and I think the date we're talking about in
16 that area is somewhere around the 20th, 21st, 20th, 25th of
17 October. And then from that point on, I think you should
18 then consider how you proceed from there; what sort of comment
19 period do you want and what sort of schedules that you may
20 want to set for receiving public comment.

21 MR. DENTON: Our best estimate is that the plant
22 would be physically ready for fuel load, if they had approval
23 to do so, around October 10th. Of course, they would have
24 the modifications for the seismic areas complete around the
25 end of the month. There are some other areas that need

1 to be -- other parts of the plant such as security arrange-
2 ments that need to be put back in place. So our estimate for
3 when the plant would be physically ready is second week in
4 October.

5 With that introduction, Darrell, why don't you
6 walk us through a bit more detail. We do have in the audience
7 a number of the Staff who participated in writing the SER
8 and our consultants who assisted us in that effort.

9 CHAIRMAN PALLADINO: When did you say the plant
10 would be ready for fuel loading?

11 MR. DENTON: My best estimate is second week in
12 October, if --

13 MR. EISENHUT: Yes. We'll give you a little basis
14 of how we get there in just a couple of seconds. If I could
15 have the next slide.

16 (Slide.)

17 This slide is basically a slide summarizing the
18 key points that the Chairman mentioned earlier. This slide,
19 as you may recall, is a slide we've used several times before.
20 This is basically just in outline form the key features that
21 went with the Commission order and the Staff requirements
22 letter of November 19, 1981. And this is where the nomen-
23 clature, Phase I and Phase II, sort of grew from. Phase I
24 was the requirements that had to be done prior to restoration
25 of the lower power 5 percent license; Phase II was those that

1 had to be done above 5 percent.

2 The nomenclature -- just to help you with it for
3 a second -- is the Independent Design Verification Program
4 was concentrating on seismic service-related contracts prior
5 to 1978 because that was where the emphasis really was from
6 the outset.

7 Phase II could have been done at a later time as
8 originally conceived, and covered the three points there
9 focusing on the non-seismic in the same timeframe, then on
10 the PG&E internal QA activities, and finally, an audit that's
11 really an IDVP audit of all service-related contracts
12 post-1978. And that's seismic and non-seismic. So that's
13 really the framework.

14 If I could go to the next slide.

15 (Slide.)

16 Also try to use a -- this slide is actually a
17 slide from SECY 82-414 last fall. It turns out there's just
18 a couple of typos on it when it got retyped that I'll help
19 you with here in a minute.

20 The -- and this was the Staff's proposal of how
21 things had evolved from the late 1981 timeframe to the late
22 1982 timeframe. And recall that the original four items on
23 the previous slides are those denoted here by the circles,
24 circles around the Xs. Those were the original required
25 items. In late 1982, several other additional requirements

1 were proposed by the Staff in 82-414 because of the evolution
2 of this, and some of the items grew out of the IDVP activity.

3 And this was really a listing of how the Staff
4 could foresee the breakdown between the first column being
5 really the items required prior to restoration of the fuel
6 load 5 percent license, and then again, the second column
7 was our proposal for what would be required prior to full
8 power.

9 We used the same terminology, the same nomenclature
10 for those people who have been following this; it makes it
11 a little bit easier.

12 As it turns out in item 11 there's a typo that
13 should have been -- that should be SSR denoted as seismic,
14 service-related contracts. You'll see that nomenclature down
15 at the bottom. But basically, these are the same items as
16 before.

17 MR. DENTON: You'll note on this -- I think,
18 Darrell, maybe you were going to mention -- the pacing item
19 is still the seismic activity that we considered Phase I.
20 And when I mentioned September 30th as to when it would all
21 be completed, that's item A.1. that we're waiting final
22 completion on.

23 MR. EISENHUT: Recall that the Commission last
24 October, November got a proposal from PG&E to split the first
25 column where we had fuel load and low power. The proposal

1 from PG&E was to split that into two steps itself, and
2 hence, the approved three-step process the Commission
3 accepted was a column for fuel load, a column for low power
4 and then a column for full power.

5 The only real difference between the two was
6 that on the fuel load aspects the Staff's proposal, or the
7 finally-approved proposal, was that PG&E must complete all
8 Phase I activities, and the IDVP should issue a status report.
9 That's where we were late 1982.

10 Now I'd like to go on to where we are today.
11 We've added one column to this slide, which is the one on
12 the right, on the Status. And this is really the IDVP
13 status as we understand it, as of a week or so ago. And
14 I'm sure Teledyne, the IDVP in a few minutes will be able
15 to amplify on this.

16 A "C" in the righthand column means that PG&E
17 has completed the activity sufficiently for the IDVP to have
18 been complete, and the IDVP has now completed it, and the
19 Staff is well along and in fact, of all of Phase II which
20 was originally conceived to follow Phase I because of the way
21 we laid it out, the Staff only has a couple of open issues
22 itself and then it would be able to say that this column
23 on the right is also complete.

24 COMMISSIONER GILINSKY: Now, this goes beyond what
25 is in the SER. The SER reflects the situation at sometime

1 earlier.

2 MR. EISENHUT: The SER reflects the situation up
3 through as we had it on June 30th. There was, in fact,
4 some addition since then, so in fact, it certainly has evolved
5 since then. And, in fact, quite a few of the loose ends are
6 being wrapped up.

7 MR. DENTON: Most of the open items that Staff
8 has are still in Phase I. As Darrell said, we only have two
9 open items on Phase II. The remainder of the Staff effort
10 is back on Phase I.

11 MR. EISENHUT: As of today -- we do have to issue
12 a supplemental safety evaluation documenting the closing out
13 of those issues.

14 CHAIRMAN PALLADINO: But where you have a "C", does
15 that mean the Staff has signed off?

16 MR. EISENHUT: No.

17 MR. DENTON: No. That means that the IDVP has
18 done its thing, and our status is as given in the SER.

19 CHAIRMAN PALLADINO: As Darrell said, it doesn't
20 necessarily mean that you've signed off.

21 MR. DENTON: That's right.

22 MR. EISENHUT: That is correct.

23 COMMISSIONER GILINSKY: What you're saying is that
24 the extra things required for Phase II are completed, but --

25 MR. EISENHUT: Not really the extra things. All

1 of Phase II, which was really defined as Items 2, 3 and 4 on
2 this chart, PG&E has now completed and the IDVP has completed.
3 The Staff has not quite completed. As Harold said, we have
4 two open items, I believe it is, as of today. We would then
5 package those and make sure we address them and close them
6 out in the safety evaluation.

7 So Phase II, for all practical purposes, is
8 essentially complete. But also, Phase I, which is the
9 original item that required the suspension of the low-power
10 fuel load license, is not yet complete today. And I'll
11 address that again in a little bit more detail in just a
12 minute, where we are.

13 CHAIRMAN PALLADINO: You are going to discuss the
14 open items.

15 MR. EISENHUT: I'll discuss where we are on the
16 open items. I do not plan to go through safety evaluation in
17 terms of a book report of itemizing our -- we have about
18 30 open items.

19 MR. DENTON: We didn't plan to go through the 30.
20 Rather, we thought we'd close those out in another document,
21 so I don't think -- we didn't want to highlight them. I
22 don't think they're difficult to close. It's just going to
23 take a bit more information and they will be closed.

24 CHAIRMAN PALLADINO: I was interested in the
25 significance of the remaining open items, and the question of

1 whether resolution of these items could result in re-analysis
2 and/or some physical or additional modifications.

3 MR. DENTON: Why don't we go to the next slide.

4 CHAIRMAN PALLADINO: Go ahead. Take that up
5 when you're ready.

6 MR. DENTON: Darrell can talk about the status.
7 The next slide gives you a feel for that question.

8 (Slide.)

9 MR. EISENHUT: And what we tried to do on this
10 slide and the next one is try to give you a status of where
11 PG&E is and where the IDVP is and then where the Staff is,
12 because they are sequential in nature.

13 The first point is the analysis and design work
14 for the entire program; that is, step 1, step 2, step 3,
15 all of the work we have here PG&E believes is about 95 percent
16 complete. They believe the remaining work is primarily
17 confirmatory analyses; that is, they believe the additional
18 follow-up activities by both the IDVP and the Staff will not
19 result in going back and making more modifications in the
20 plant.

21 The analysis and design work for the first group
22 for the fuel load, the key factors, I'll get to in a minute.
23 They expect it to be done by September 30.

24 MR. DENTON: So I think the answer to your
25 question, Mr. Chairman, is I don't expect this 5 percent to

1 reveal any surprises. It might show still occasional need
2 for a different type clamp or a bolt or strengthening of a
3 joint somewhere, but I don't expect surprises to come out
4 of this 5 percent since so much activity has been done. But
5 there are still calculations to be performed.

6 MR. EISENHUT: Yes, you've got to remember the
7 basic -- when we started this program, it was laid out as
8 conceived back in 1981 as there would be an independent group
9 to do a sampling activity; sample structures, systems and
10 components from a seismic review standpoint.

11 PG&E's program is a program that addresses and
12 re-analyzed all safety-related structures, systems and
13 components. So whereas we started with a sampling technique
14 approach by an independent group, PG&E, so to speak, got out
15 in front of that by just re-analyzing from a seismic standpoint
16 all safety-related structures, systems and components.

17 MR. DENTON: They have spent over 100 manyears in
18 this program, just to give you a feel for the scope of the
19 re-evaluation. So we're saying 95 percent of a complete
20 seismic re-analysis of this plant is complete.

21 MR. EISENHUT: And that that activity will be
22 wrapped up within the month.

23 The next bullet there is PG&E's status of the
24 overall modifications resulting from those re-evaluations.
25 They believe they've got 95 percent of the modifications

1 done; 90 and 90 for the three tiers. Remember, they've
2 submitted a proposal of here's a listing of the systems
3 required for fuel load, for criticality, for 5 percent full
4 power, and that is just walking down a system.

5 The next bullet is the bullet --

6 CHAIRMAN PALLADINO: But the modifications that have
7 to be made aren't -- those that have to be made for fuel load,
8 are they distinguishable from those that have to be made
9 before criticality and 5 percent?

10 MR. EISENHUT: Yes, they are associated with
11 different systems. The vast majority of all modifications
12 are in the fuel load category. There are, obviously in
13 the extreme, the turbine building does not need to be
14 completely finished while you load fuel. It could be during
15 fuel loadings, since it's a separate building. So those are
16 the kinds of considerations that go into breaking out systems
17 or buildings that you don't need certainly inside
18 containment.

19 The main thrust is everything inside containment,
20 essentially everything inside containment, all those modifica-
21 tions would be done prior to fuel load, and there would be
22 no ongoing activities, modifications in the containment
23 during fuel loading.

24 The next bullet gives you a little more detail
25 to what Harold commented. The PG&E schedule for completion

1 of modifications. This really should say completion of
2 modifications, 1, 2 and 3. For example, PG&E contends they
3 will have all modifications to all systems, structures and
4 components needed for fuel load done by September 30. But
5 the process is built into it that after the modifications
6 there's an as-built walkdown verification check. That
7 walkdown verification check will be completed by October 7th,
8 and then since the utility had --

9 CHAIRMAN PALLADINO: Where is that said?

10 MR. EISENHUT: In isn't said. It's filling in
11 between the lines. And in fact, that's why this is -- I
12 wanted to make sure we clarified this. The as-built walkdown
13 follows the modifications, and that is about a week later,
14 about October 7th. And in fact, since security -- this plant
15 has an unusual security system, you'll recall, that came
16 through the hearing process. We gave them relief on that
17 extra added security system during the construction with the
18 proviso they re-instate security 30 days prior to ever loading
19 fuel. They re-instated it on September 10th, so really the
20 earliest they could go back and load fuel is now October 10th,
21 and that's sort of the fine structure of how they're
22 proposing to get from here to there.

23 So the utility would argue that the modifications
24 are done, et cetera, walkdowns are complete. By October 10th
25 you'd be prepared to start loading fuel. Corresponding dates

1 if you went down the list would be criticality and 5 percent,
2 the utility would have the walkdowns complete and be ready
3 to go critical on December 9th, and reach full power on
4 January -- arise to full power operation on January 10th.

5 So those are sort of the framework that PG&E
6 is in right now.

7 I should say Harold and I and a number of other
8 staff met with our residents last week, met with the regional
9 staff at PG&E and we went in and got a firsthand check,
10 and in fact, a lot of this work is well along. Some
11 buildings are, in fact, already to the point where they've
12 been cleaned up. They are now to the point inside contain-
13 ment, for example, when we walked through the painters were
14 actually painting up certain pieces. In fact, one of the
15 ways to know what's modified is you can see the new paint
16 versus the old paint.

17 COMMISSIONER ROBERTS: This was actually at the
18 site.

19 MR. EISENHUT: At the site, yes. The IDVP status
20 I'll move to next, and I'll just touch this briefly since --

21 CHAIRMAN PALLADINO: Has the containment building --
22 an annulus re-analysis been completed?

23 MR. EISENHUT: By PG&E there are a couple of
24 pieces that are still pending from the IDVP, and I'm sure
25 that will be one of the items that Bill Cooper will be

1 addressing in a couple minutes, if I can just defer that one.

2 COMMISSIONER GILINSKY: Are you going to go into
3 the Phase I items in greater detail, because if you are --

4 MR. EISENHUT: I wasn't going to go through them --

5 COMMISSIONER GILINSKY: The Chairman mentioned the
6 containment building and I had a question on that.

7 CHAIRMAN PALLADINO: Well, the reason I raised
8 that question is that was one of the fundamental questions
9 that led to the suspension of license, and it's sort of
10 surprising that at this late date it has still not been
11 completed, or at least phases of it may not be complete.

12 COMMISSIONER GILINSKY: Well, at least as of the
13 publication of this SER, I read on page C3-11, it says,
14 "The following items are unresolved: calculation of interior
15 structure, horizontal floor, response spectra."

16 MR. EISENHUT: That's correct.

17 COMMISSIONER GILINSKY: This sounds fairly
18 fundamental.

19 MR. EISENHUT: In fact, there have been -- I
20 think the process going through a lot of the evaluation was
21 that that would be evaluated away and shown not to be
22 problem. I think earlier actually in this year, PG&E
23 embarked on a program of if there's any question it was just
24 a complete redesign, and they are presently going through the
25 modifications. There's a few loose ends on that evaluation.

1 MR. DENTON: We have given a lot of scrutiny to
2 these areas and we are now talking about things like mesh
3 size and doing calculations, and we think they're all
4 confirmatory, but I don't -- I think the reason they are open
5 is they haven't been closed to our satisfaction but I don't
6 think they uncloseable. So I'm not sure --

7 COMMISSIONER GILINSKY: What does it mean that
8 they're open items?

9 MR. DENTON: That means that the Staff has not yet
10 written a final view or that the IDVP has not yet finally
11 closed it.

12 COMMISSIONER GILINSKY: It looks as if the IDVP
13 had not closed it as of the date of this report.

14 MR. DENTON: That's right. So if they haven't
15 closed it, we haven't closed it.

16 COMMISSIONER GILINSKY: But that's a fairly
17 fundamental item. I would have thought you'd start with that.

18 MR. DENTON: They've done the bracing in there.
19 They have the new columns in and they have the diagonal
20 bracing in. The company thinks it's through, Bechtel thinks
21 it's through. It's a question of can they now demonstrate to
22 IDVP's satisfaction that everything has been done right.

23 I would like -- if we could get through one more
24 slide then we could come back to the details. I wanted to
25 give you the big picture first.

1 MR. EISENHUT: And we are going to address that
2 issue. That's one of the key points, I'm sure, in
3 Mr. Cooper's presentation.

4 COMMISSIONER GILINSKY: I'd like to understand
5 that one, and I have a couple of others, too.

6 MR. DENTON: Why don't you go on to IDVP status
7 and then the Staff's status.

8 MR. EISENHUT: All right. As of about a week
9 ago, this was the status when we had a meeting also here
10 in Bethesda to go through the overall status of where we
11 were with these.

12 If I could skip to the second bullet, the way the
13 IDVP has been doing business is issuing interim technical
14 reports, and as of September 2nd they had issued something
15 on the order of 54. Then as a follow-up to any questions,
16 loose ends, they've issued revisions to 25 of those.

17 They also submitted what was termed their final
18 report, but obviously, their final report also had a number
19 of open issues in it, very similar to the Staff report. It
20 was the basic framework of the report, it was something on
21 the order of several volumes and it is, in fact, the pieces
22 are being supplemented.

23 The pieces that are remaining as of about a week
24 or so ago -- and I think this has even changed as of today --
25 there's about six additional ITRs to be issued, one of

1 which I believe was the annulus structure, and revisions to
2 about 12. The last revision was scheduled to be issued
3 about September 30th. And obviously, all those ITRs,
4 revisions address the verification efforts that have been
5 included from both the IDVP sampling technique, and recall
6 that late last year we also built in a separate loop. And
7 that is, where the IDVP effort was expanded to look at things
8 flowing out of the Diablo Canyon project effort. So it was
9 expanded beyond the original sampling to also sort of monitor
10 what PG&E was doing.

11 If I could go to the next slide, which is just
12 a Staff sort of continuation here to the Staff.

13 (Slide.)

14 We issued a safety evaluation Supplement 18 on
15 August 5th. It was the status of June 30th. It identified
16 about 30 open items as of June 30th. PG&E has now responded
17 and has formally submitted responses to most of those open
18 items. There are something on the order of about a half a
19 dozen remaining as of a week ago that we had not yet
20 received. And the Staff evaluation, we're saying that after
21 we get the evaluation from PG&E and then finally the
22 evaluation from the IDVP, we are saying that our evaluation
23 is targeted to be issued three weeks after that last date.

24 So if, for example, on step 1; that is, the fuel
25 load considerations, granted the rest may be complete, but if

1 you start with the fuel load requirement, if the IDVP
2 submits their report on September 30th, we would issue our
3 safety evaluation about three weeks after that. And that's
4 where Mr. Dircks said something --

5 MR. DENTON: Assuming it turns out clean and these
6 open items do turn out to be confirmatory and don't raise
7 new problems.

8 MR. EISENHUT: Certainly. If it raises additional
9 problems we certainly would have to go back in another
10 iteration on those issues. But they're coming down the line.
11 These additional ITRs are coming in every few days. They're
12 not all coming on September 30th.

13 CHAIRMAN PALLADINO: But do I understand that as
14 the proposed resolution of an open item comes in you review
15 it?

16 MR. EISENHUT: Yes, we have.

17 CHAIRMAN PALLADINO: So, have you reviewed -- or
18 how many of the 30 items have you reviewed?

19 MR. EISENHUT: Most of the 30 items. On the order
20 of 20 or so the evaluations were just submitted last week and
21 we really have not gotten into them in that much depth. But
22 we are starting to review this right now. I really can't
23 give you a better answer.

24 CHAIRMAN PALLADINO: Insofar as Staff review is
25 concerned, the 30 items still exist.

1 MR. DENTON: That's right. The technical staff
2 or our consultants may be working on it, but it has not come
3 to the point of an SER, which is what would resolve it.

4 MR. EISENHUT: The next slide is somewhat of an
5 overview.

6 (Slide.)

7 Basically, most of these are taken out of our
8 safety evaluation. The overall design verification effort
9 is nearly complete. We say that in terms of the fact that
10 it started as a sampling of a few pieces, expanded tremendously
11 beyond what we required, or I think what certainly was in my
12 mind back at that time, and the overall effort is nearly
13 complete. The PG&E effort is essentially complete with a
14 few pieces. And remember now the process, you have to
15 remember, that we don't want to over-emphasize or under-
16 emphasis, is that PG&E has got to complete the effort. They
17 do then an as-built walkdown verification check which is
18 required by this program. The IDVP then must be happy, so to
19 speak, with the engineering design. They must, in some cases,
20 do as-built walkdowns. Then the Staff does its evaluation and,
21 in fact, the regional inspectors will do their jobs. So it's
22 a sequential process.

23 But overall, the effort is nearly complete. The
24 scope of the IDVP program and the internal program of PG&E
25 clearly went well beyond our original requirements, as I

1 mentioned.

2 We found in our evaluation that the organizations
3 were originally set up by the Commission's criteria to be
4 independent and competent -- really, competent first,
5 independent second. We found that that has been maintained
6 throughout this process.

7 The fourth bullet is that the IDVP program originally
8 had sampling in Phase I. It has been modified or at least
9 expanded to include looking at the corrective activities
10 that came out of the overall PG&E effort. In addition to
11 looking just at their samples they looked at good things and
12 bad things that came out of the PG&E effort.

13 CHAIRMAN PALLADINO: Are you talking about non-
14 seismic or --

15 MR. EISENHUT: It was really the one above that.

16 CHAIRMAN PALLADINO: What's that?

17 MR. EISENHUT: The fourth bullet here, the sampling
18 was applied -- it's really both the seismic and non-seismic.

19 CHAIRMAN PALLADINO: I thought you did all re-
20 analysis of seismic capability.

21 MR. EISENHUT: PG&E did a complete re-analysis.
22 The IDVP did sampling plus sort of monitoring PG&E in terms
23 of they evaluated, I believe, all errors that came out of
24 the PG&E program, plus they also looked at some "good"
25 things that came out of the PGE effort.

1 In the non-seismic area, remember that Phase II
2 had in it a sampling of a number of systems. It looked at
3 the cross-checking in addition to high energy line breaks.
4 We looked quite extensively to component cooling water system.
5 What errors we did find or what deficiencies we found not
6 significant and they were random.

7 Another consideration, which was not as an
8 original requirement of the Staff but was offered by PG&E
9 after considerable debate, it was offered last fall, was a
10 program on construction QA. That program was undertaken by
11 the ICVP and it has been completed and it came to the
12 conclusion of no programmatic breakdowns in construction QA.

13 As was mentioned earlier, both the programs had
14 in them an element of defining the basic cause. We came to
15 conclusions in our evaluation on the basic cause, and
16 really, we summarized it here to say the unawareness of the
17 magnitude of the seismic redesign over a long period of time,
18 and the need for nut-tight quality control. You can argue
19 this one many different ways because it certainly has many
20 factors.

21 It ultimately, in my mind, gets down to management's
22 awareness and management's understanding of what they were
23 up against. And that really is what the basic cause --

24 COMMISSIONER GILINSKY: Were the errors
25 primarily redesign rather than in original design?

1 MR. EISENHUT: I think in fact -- I'll let
2 Mr. Cooper speak to that in a minute, but I think the bottom
3 line is that, in fact, most errors are focused on redesign
4 activities and work that was originally done prior to the
5 mid, late-1970 reanalysis was, in fact, better quality. In
6 fact, it was good quality. In fact, the majority of theirs
7 were focused on this redesign activity. I think that's sort
8 of the general conclusion. But you might want to ask that
9 to Teledyne.

10 We believe that all significant errors and
11 problems then have been identified, as Harold said. Certainly,
12 we used a posture of no surprises, and our philosophy
13 throughout this in all the debates, discussions, meetings
14 was that clearly this was a surprise to everyone, the
15 magnitude of the problem, the number of modifications that
16 need to be fixed. So I think PG&E's posture, as well as ours
17 I should say, was that they just cannot stand -- and they've
18 used this philosophy -- they cannot stand another surprise
19 anywhere in the plant. Not just in this re-analysis effort.
20 I think that has broad-sweeping implications.

21 CHAIRMAN PALLADINO: Darrell, what's the basis for
22 confidence that adequate sampling was performed for non-
23 seismic and construction QA activities?

24 MR. EISENHUT: If I could, maybe I could ask Roger.

25 MR. DENTON: Let me start with an answer. We

1 picked three systems to take a hard look at, and the Staff
2 could always do more. I don't want to be defensive on
3 sampling, but 20 manyears of your Staff's time is considerable
4 input and we've picked three and looked at three, and let
5 me have Roger Mattson describe the outcome of that.

6 CHAIRMAN PALLADINO: I was more interested in --
7 was your approach -- could it be statistically validated,
8 or was it just --

9 MR. DENTON: No. We never did think that you
10 could --

11 MR. EISENHUT: But remember the origin was that
12 we hadn't identified any problems there. But since we hadn't
13 identified any problems, we didn't want to just ignore it.
14 So we felt that something needed to be done, and remember
15 the original letter/order identifies looking at a sampling
16 of non-seismic and the thought that it would go deep enough
17 to give you a feel.

18 MR. DENTON: And we did have an allegation
19 regarding the design of the component cooling water system.
20 I met privately with that person, we took a transcript of
21 that. We devoted considerable effort to looking into that
22 system and, in fact, before we finished our review we met
23 several more times with that person. So where we had reason
24 to think there was a problem we devoted a lot of time to
25 that issue. And based on that, we extrapolated to what we

1 might find in others.

2 CHAIRMAN PALLADINO: I have read criticism or
3 allegations regarding the adequacy of the sampling program.
4 That's why I was asking.

5 MR. DENTON: I think people have always wanted us
6 to do more, and we've tried to balance the resources we put
7 into it with the payoff. I think the systems we looked at
8 are adequate basis.

9 COMMISSIONER GILINSKY: Could I follow up with a
10 question on sampling unless you have another one.

11 CHAIRMAN PALLADINO: All I was going to say is I
12 didn't mean to cut off Roger Mattson.

13 COMMISSIONER GILINSKY: Let me ask the question
14 and perhaps he will deal with that one, too. This is in the
15 seismic area. I looked at the item of electrical raceway
16 supports. Now, there are apparently 21,000 of them, and you
17 examined -- or, 20 were examined in this review. Two of them
18 turned out to have problems, and in fact, errors classified
19 as A or A-B or B. And that seemed to have been the end of it.
20 It rather surprised me. You took a small sample and 10
21 percent of the items are not as they should be. Perhaps I
22 didn't read this properly, but I don't get the impression that
23 anymore of them were sampled.

24 I may be wrong about that.

25 MR. DENTON: Why don't we have Roger discuss the

1 results of the three systems first, and then whoever prepared
2 the section on raceways can look into that one.

3 MR. MATTSON: I guess I'm answering the Chairman's
4 question on the non-seismic Phase II. Let me start with some
5 facts and then describe a little bit about what was done.

6 It's our understanding that PG&E was responsible
7 for all or part of the design of 10 safety-related systems.
8 So if the universe is 10 where they could have made mistakes
9 in design, we looked -- or Teledyne looked at three; the
10 aux feedwater system, the control room heating, ventilating
11 and air conditioning system, and the 4160-volt power system.

12 In addition to those three of the ten that they
13 looked at completely, they also looked at fire protection and
14 at pipe breaks inside and outside containment.

15 Now, fire protection and pipe breaks have something
16 different than a systems orientation; that is, they tend to
17 cut across systems. So it makes them somewhat broader than
18 the three-tenths sample.

19 A simple way to characterize what Teledyne did is
20 that they did a lot more depth than the Staff does on any
21 other nuclear power plants. They went into much more detail
22 than our standard review plan would ever lead us to go into.

23 Now, as a result of the work on the three systems
24 and the two cross-cuts, fire protection and pipe breaks
25 inside and outside containment, and the allegations received

1 anonymously, a fourth system within the PG&E scope was added,
2 and that's the component cooling water system. We looked at
3 component cooling water three ways. First was according to
4 the FSAR commitments of some years ago; in fact, several
5 years before the Standard Review Plan was ever issued.

6 We looked at it in terms of the regulations; that
7 is, do they generally meet the regulations as we interpret
8 them today. And we looked at it in terms of today's edition
9 of the Standard Review Plan.

10 CHAIRMAN PALLADINO: Excuse me, you use the word
11 "we" and I'm having trouble keeping track.

12 MR. MATTSON: On the component cooling water system
13 I'm talking about the Staff.

14 CHAIRMAN PALLADINO: And the others, was it PG&E
15 or Teledyne or both?

16 MR. MATTSON: Teledyne looked at the aux feedwater,
17 the HVAC for the control room and the 4160-volt power system.
18 We also reviewed Teledyne results for those three systems.
19 But on the component cooling water, we went with the allega-
20 tions, with the FSAR, with the regulations and with today's
21 Standard Review Plan and did a quite thorough review of
22 component cooling water.

23 CHAIRMAN PALLADINO: Did the fire protection and
24 the pipe breaks -- was that by Teledyne?

25 MR. MATTSON: Yes.

1 The changes that were made you've seen for yourself
2 in the Staff SER. Let me just summarize them by saying that
3 they were generally random in nature, did not indicate broad-
4 ranging design problems of the sort that had been found in
5 the seismic area. And sample size was felt to be actually
6 more than adequate for the purpose of the sampling to begin
7 with.

8 Remember that in Phase I we had a known problem.
9 Errors had been discovered. And so the sample was quite
10 thorough. The review that was done in the seismic area.

11 For Phase II the question was given that there
12 was a problem in the seismic area, did it extend into the
13 non-seismic area. And a 40 percent in terms of systems audit
14 plus the fire protection and the pipe breaks inside and
15 outside containment, plus the fact that in all four systems
16 reviewed, we went to more depth than regulation ever goes,
17 in the past. It gives us quite a lot of confidence that
18 Phase II demonstrated that the plant is okay from the non-
19 seismic design standpoint.

20 CHAIRMAN PALLADINO: You said 40 percent and I
21 counted 30 percent. Are you counting the coolant --

22 MR. MATTSON: I'd add the component cooling water
23 even though Teledyne didn't do it.

24 COMMISSIONER GILINSKY: You seem to have come
25 across problems in the electrical design of the auxiliary

1 feedwater system, and the SER says they were satisfactorily
2 resolved. Were they such that you didn't feel any need to
3 look further or expand the sample or -- ?

4 MR. MATTSON: There was one area where we did find
5 a problem that extended beyond the system we were looking
6 at, and we did go beyond that system to look for similar
7 errors in their scope of safety-related systems, and those
8 had to do with the pressure rating of some valves in the
9 aux feedwater system.

10 Teledyne found a method of pressure calculation
11 that hadn't yielded conservative enough design pressures for
12 certain valves.

13 The other changes that were found were small
14 and isolated, so I'm not quite sure specifically what you're
15 referring to.

16 COMMISSIONER GILINSKY: Well, I had just gotten
17 to the valve problem. I was going through the various
18 sections as you were talking.

19 MR. MATTSON: Well, we could list some of the
20 types of changes, but --

21 COMMISSIONER GILINSKY: I guess what I'd like to
22 know is were the errors or areas of concern sufficiently
23 limited that you didn't feel that a larger sample was called
24 for. I gather that's the case.

25 MR. MATTSON: That's right.

1 COMMISSIONER GILINSKY: The question isn't just
2 simply whether problems were resolved.

3 MR. MATTSON: I understand that.

4 COMMISSIONER GILINSKY: In other words, if you're
5 looking at a sample and you have problems in the sample, then
6 you --

7 MR. MATTSON: Let me give you some examples of
8 the changes to make you feel a little better about that. In
9 the 4160-volt power system, an error was found in the design
10 that would have been picked up when the plant was in operation.
11 It's the kind of thing that would have been found later.

12 Now, is that significant enough to ask whether
13 that return rate of finding errors in the design of a system
14 justifies going to the other six out of ten? In our judgment,
15 no. Another example --

16 COMMISSIONER GILINSKY: But you did make that sort
17 of judgment.

18 MR. MATTSON: Yes. The component cooling water --

19 COMMISSIONER GILINSKY: So it's not just a question
20 of correcting the errors --

21 MR. MATTSON: Yes. In the component cooling water
22 system, they found an error in the heat load capability of
23 the heat exchanger. It turned out to be a relatively small
24 error that led to a need to change a tech spec on ocean
25 temperature from 70° to 64°. We had found errors of the type

1 that led to the replacement of --

2 COMMISSIONER GILINSKY: I just wanted to be sure
3 you had made that sort of judgment.

4 MR. MATTSON: Yes. Every change that was made,
5 that kind of judgment was made.

6 MR. DENTON: It was much more of a microscopic
7 look than we normally would do, and it was against the plant
8 which had been reviewed at one time for earlier standards.
9 So when we did a review, --

10 MR. MATTSON: But I think in the component cooling
11 water system we took as our starting position let's review
12 it against today's standards. And even though it was
13 designed and reviewed to earlier-day standards and the
14 staff's views on some of these things have evolved. So while
15 we found some things, they didn't seem to demonstrate a
16 breakdown in those areas.

17 Do you want to discuss this area more?

18 CHAIRMAN PALLADINO: I'm satisfied with the
19 answers to my questions. Do you have more?

20 COMMISSIONER ASSELSTINE: I'd like to hear about
21 the construction QA, Joe, which I think was the second part
22 of your questions.

23 CHAIRMAN PALLADINO: Okay.

24 MR. DENTON: Let me mention, too, since I did
25 mention the allegation that did come in anonymously regarding

1 the component cooling water system, there is another allega-
2 tion that we've not been able to resolve. You'll recall we
3 were provided a number of specific allegations about joint
4 intervenors. That person has refused to meet with us. We
5 don't know the identity, we don't know anything more than the
6 statement of that allegation. It's been referred I think by --

7 CHAIRMAN PALLADINO: What's the allegation?

8 MR. DENTON: There are eight of them and they've
9 been referred to Department of Justice. The joint intervenor
10 has not been willing to set up a meeting between the Staff and
11 that person because he's afraid his identity might be revealed.

12 We've taken a look at those allegations but we
13 don't know anything more than the very statement that they
14 raise. So that's one I have not been able to put to bed like
15 I did the first one because the person raising the allegation
16 is not willing to meet with the Staff.

17 I understand that there has been dialogue between
18 OIA and Department of Justice regarding those issues, but so
19 far as the Staff is concerned, all we have is a few sheets of
20 paper raising the allegations. And to the extent we can, we
21 tried to look at them.

22 COMMISSIONER BERNTHAL: What is the general nature
23 of the allegations?

24 MR. DENTON: Adequacy of the seismic design.

25 Rocking of containment and these issues. The Board, as I

1 understand, --

2 CHAIRMAN PALLADINO: What about containment?

3 MR. DENTON: Rocking of the containment. And we've
4 gone back and satisfied ourselves that it has been considered
5 in the design, so we don't know the specifics of the allega-
6 tion since we can't have a meeting.

7 The Board also has asked that the person who has
8 raised the allegation should come forward in camera with the
9 Board and discuss his concerns.

10 Larry, why don't you discuss the status before
11 the Board? All I wanted to say is we made every effort through
12 various channels to find out more details about these allega-
13 tions and I've not been successful.

14 MR. CHANDLER: The Board did order the Joint
15 Intervenors to provide to it for its initial in camera
16 consideration the information that had been provided to the
17 Department of Justice. Joint Intervenors complied with that
18 and the Board, on September 6th, after its review of the
19 material, directed Joint Intervenors to provide the information
20 to the parties and Board. We have not yet received it. I
21 expect it momentarily.

22 MR. DENTON: I raise it as one area where we've
23 made every effort to get in touch with the person raising the
24 allegation but we've not been successful; therefore, I can't
25 really discuss the allegations anymore than -- .

1 CHAIRMAN PALLADINO: Are the allegations, though,
2 primarily totally on design?

3 MR. EISENHUT: Well, they cover a number of areas.

4 MR. DENTON: We sent them to all the parties and
5 the Commission in one of the Board notifications when they
6 first came in.

7 MR. EISENHUT: And we also had a meeting at San
8 Francisco with PG&E at a meeting open to all the parties and
9 the public where the Staff went through, they took it
10 paragraph by paragraph and we tried to read into it everything
11 we could and went through it at some length. We spent a half
12 day with PG&E and went through these. They addressed some
13 eight items, as Harold said, things like containment tilting,
14 high energy line break questions, systems interactions,
15 annulus steel structure. But under each one it's really one
16 or two sentences, and it really doesn't give you --

17 MR. DENTON: But the point I wanted to make is
18 it's frustrating when I can't talk to the person who raised
19 the allegations. When the allegations regarding the
20 component cooling water system were raised we were able to
21 meet and protect the identity of the person and understand
22 in full technical detail what his concerns were and do an
23 appropriate technical review. That person cooperated by
24 continually to assist us in the review. When all we have are
25 allegations that the containment structure tilting is not

1 properly done, classification of the platform is not proper,
2 its structural steel is not proper, there's nothing I can do
3 other than ask the Staff have you looked at tilting of the
4 containment. But until we get to the person and understand
5 the factors that he's concerned about, I don't know how to
6 address it. So I bring it up as a Staff frustration in
7 trying to deal with allegations when the Staff cannot
8 communicate, even through third parties, in anymore detail
9 than we've been able to.

10 So perhaps this effort by the Board will make
11 available more information, and if new information comes to
12 light, we'll certainly deal with that.

13 CHAIRMAN PALLADINO: I guess there are no legal
14 suggestions that might have been made that were workable.

15 MR. CHANDLER: No, sir.

16 MR. DENTON: And now we'll turn to the other
17 questions about the raceway and your question, Mr. Chairman,
18 about the --

19 CHAIRMAN PALLADINO: QA.

20 MR. DENTON: And the annulus design and the
21 remaining issues there. So, Jim, if you could speak to
22 the questions.

23 MR. KNIGHT: Starting with the raceways, I believe
24 at least, not knowing exactly what section of the report
25 you're looking at, I think I have found the area.

1 COMMISSIONER GILINSKY: C3, 74, 75.

2 MR. KNIGHT: I think what you're seeing reflected
3 there is a pattern that we've seen throughout the process.
4 There was an initial sample taken of 20 out of some large
5 number. That sample showed that there were problems. At that
6 point, PG&E and their internal technical program or corrective
7 action program stepped in and did virtually a 100 percent
8 re-evaluation including re-analysis and redesign where necessary
9 of all supports.

10 Subsequent to that, there was another sample taken
11 to verify that the work was, in fact, accomplished in a manner
12 that was satisfactory. And I should add I think it's
13 singularly significant. We not only relied on that after-the-
14 fact sample; we were, both the IDVP and the Staff, were
15 present in the early stages of the development of the internal
16 technical program, the corrective action program, where we got
17 in on what I would call a real time basis, looked at the
18 way the process was moving, looked at the people who were
19 assigned to it, and the quality if you will of the effort, and
20 had found that to be a good effort, a sound effort.

21 So we have it both I think on the basis of the
22 approach taken and then the final verification.

23 COMMISSIONER GILINSKY: Well, that certainly makes
24 it sound a lot better. I guess I didn't find that in the
25 SER, but if you can point me to that either now or after the

1 meeting, I'd appreciate that.

2 MR. KNIGHT: I think if you go forward to page 78,
3 79, that area.

4 MR. EISENHUT: I should also point out the modifica-
5 tions of those supports is now, I think last week we heard
6 something in the 90 percent inside containment, 92 percent
7 complete, and something on that order outside containment.
8 So they're well along in the rework program.

9 MR. KNIGHT: I think, too, I think it's significant
10 to add much in the same vein as Roger Mattson was saying
11 earlier, that the types of changes that were necessary were
12 relatively minor ones. There might have been a relatively
13 large number, but these were of some types relatively small
14 angle bracing, reinforcement perhaps, that different joints
15 with additional clips, types of things necessary to assure
16 that you, in fact, met the criteria. But in terms of actual
17 hardware and function of the system, relatively small changes.

18 COMMISSIONER GILINSKY: It says here the re-analysis
19 of the electrical raceway supports also considered the effect
20 of any structural response spectra change and so on. Are you
21 saying they re-analyzed all of them?

22 MR. KNIGHT: Yes. I think something to keep in
23 mind. When you see a number like 20,000 and you say gee,
24 they had to do 20,000 separate calculations. Quite possibly
25 not. They fall into groups. There are types, but they looked

1 at each type.

2 MR. DENTON: Another question, Jim, what was
3 the significance of the remaining issues with regard to the
4 containment's annulus, which was the principal structure of--

5 MR. KNIGHT: Yes, and I think the key phrase there
6 related to the calculation of horizontal spectrum, which
7 indeed is a fundamental activity. And there, too, it's
8 something of an artifact of the way this process evolved.

9 The work done on the containment annulus was
10 somewhat unique in that the analytical approach taken was to
11 go in and analytically first add structural members and then
12 recalculate the response of the annulus to see if the response
13 at equipment mounting locations was brought back into the
14 range previously, or as close as possible to the response,
15 previously calculated. If it didn't work, more members were
16 added and the cycle was repeated again. So that it was a
17 highly iterative process.

18 COMMISSIONER GILINSKY: So you were building --
19 they were rebuilding the plant to arrive at the spectrum they
20 were using, rather than recalculating the structural --

21 MR. KNIGHT: That -- yes. And that held in a
22 number of other areas, a number of other structural modifica-
23 tions were made --

24 COMMISSIONER GILINSKY: That's in order to simplify
25 a lot of other -- to avoid a lot of other recalculations?

1 Is that the idea?

2 MR. KNIGHT: I think it's born of several things.
3 One is a number of commitments on the record as to criteria,
4 and approach, if you will, that were previously in some
5 cases adjudicated and in other cases certainly agreed to by
6 the Staff. The economics of equipment --

7 COMMISSIONER GILINSKY: Let's see, wasn't there
8 response spectrum pretty fundamental in that the additional
9 structures, I would think, would affect the response of the
10 upper levels. Does it affect --

11 MR. KNIGHT: Certainly as far as the containment
12 annulus itself. We want to keep in mind the containment
13 annulus can be thought of as an independent structure, not
14 attached to the containment walls.

15 But certainly as you modify the structure, you've
16 got to look at all aspects of that structure. But particularly
17 as you get down closer and closer to detail, whether it's
18 adding, say, just a bit more torsional restraint to a given
19 radial beam. That effect will be pretty local.

20 COMMISSIONER GILINSKY: So what you're saying is
21 that if this isn't quite right, additional members will be
22 put in to make it what it's supposed to be.

23 MR. KNIGHT: Or stiffening of a joint. Again,
24 you're down to relatively small changes to effect local
25 response.

1 MR. EISENHUT: Another of way of saying, I guess
2 is something Jim said, you tune the -- remember this is a
3 steel frame as opposed to bit concrete slabs. It's a steel
4 framework, and what you're doing is tuning that back to the
5 commitment which was to the original design basis.

6 COMMISSIONER GILINSKY: Sort of reverse engineering.

7 MR. EISENHUT: Reverse engineering, because then,
8 the piping, the equipment, the things that are hanging on it--

9 COMMISSIONER GILINSKY: Depend on that other
10 spectrum.

11 MR. EISENHUT: Or depending on the correct spectra
12 that was there originally. So the whole approach is then to
13 tune the structure to match the previous evaluation. And
14 that's why it's been a very --

15 COMMISSIONER GILINSKY: In order to avoid having
16 to re-evaluate everything else.

17 MR. EISENHUT: Yes, but it was really their
18 commitment to rather than bring the original design into
19 question, it was also to go back and meet the original
20 intended design, as Jim said. This has been adjudicated for
21 years and years and years, and I think it's fair to say they
22 also considered it's easier to get back to the original
23 design.

24 CHAIRMAN PALLADINO: So has this annulus work,
25 analysis, all been completed?

1 MR. KNIGHT: The PG&E project has completed their
2 work. The modifications are virtually done. I hesitate only
3 because again, there might -- always this is an iterative
4 process; it almost never ends. But again, a pipe load might
5 come back or some pipe response come back and we say we really
6 need another bolt on that joint or we really need to put a
7 clip angle under that beam to fully meet criteria, to make
8 it calculate, if you want to use that term. So there may be
9 some things like that.

10 But it's down to what, in an operating facility,
11 would be considered normal maintenance type of things to be
12 done. In my opinion.

13 I might add just one thing. This concept of
14 tuning the structure -- as a consequence, and in this
15 particular case we've seen it very graphically illustrated
16 out there. If you look at the size of the structural members
17 that have been put in place, in fact, it has resulted in a
18 much higher structural resistance in general of all of the
19 modified structures and, in some cases, equipment.

20 I would term it in other terms. A great deal of
21 margin beyond design has been added.

22 MR. DENTON: One of the more unusual sights I saw
23 was an I-beam in which the webbing of the I-beam is four inches
24 thick. The dimension of the I-beam, it's maybe a 20-inch
25 I-beam, but the steel thickness of the flange is four inches

1 thick. And the purpose of that I-beam is to keep the
2 vibration frequency of the wall to its original intent.

3 MR. EISENHUT: It's something on the order of a
4 200 square inch cross-section of the I-beams. Five, six
5 hundred pounds --

6 MR. DENTON: Most of the modifications that you
7 find are either diagonal bracing -- mostly are diagonal,
8 occasionally they are fasteners where these I-beams are
9 fastened at one end or another, or where pipes are tied
10 to the I-beam.

11 CHAIRMAN PALLADINO: Has this cluttered up the
12 inside of that plant?

13 MR. DENTON: I thought it was done skillfully.
14 I've been in containments which are far more cluttered.

15 CHAIRMAN PALLADINO: Well, I haven't been to that
16 plant for, what, two years now. When I went through it there
17 were a lot of nice and cleanly designed -- now I picture all
18 sorts of big structures -- I ought to get out there and see
19 it.

20 MR. DENTON: Since it's a large, dry containment
21 they were fortunate in that they had room to put in some of
22 these modifications. If it had been a small containment it
23 would have really been a cluttered design. But I did think,
24 in walking around the plant, that they managed to do it in a
25 way that it just wasn't haphazard. So the bracing tends to

1 still leave access. I thought that it had been done in a
2 manner that minimized the maintenance of it.

3 COMMISSIONER GILINSKY: Are you, in effect, saying
4 that the original spectrum was improperly calculated? The
5 floor spectrum?

6 MR. KNIGHT: In the end, the bottom line, the
7 original spectra were not -- I'm really not trying to
8 embellish it, but just to be sure we're communicating -- the
9 original spectra were not a good characterization of the
10 response of that spectra. And that --

11 COMMISSIONER GILINSKY: Are we talking about the
12 ground spectrum or the floor spectrum?

13 MR. KNIGHT: Oh, no, no. We're talking about the
14 response of the structure, the floor response spectra.

15 COMMISSIONER GILINSKY: Okay. Now, what do you
16 mean by they were not a good characterization?

17 MR. KNIGHT: If you took any particular point on
18 that structure, the actual motion that would occur, given
19 the design earthquake, would be different than that which we
20 now -- well, the original structure would be different than
21 that which was calculated.

22 COMMISSIONER GILINSKY: So they were not properly
23 calculated --

24 MR. KNIGHT: And the only reason I hesitate to just
25 adopt your words is that there were so many things involved

1 in developing those spectra. The actual calculational
2 methodology itself was all right, but there were mistakes made
3 in assignment of mass. They didn't have the right -- the mass
4 didn't have the right spring constants.

5 COMMISSIONER GILINSKY: All right. I didn't need
6 the specifics.

7 MR. EISENHUT: You could say it the other way
8 around. The steel frame structure, the legs, was not designed
9 to match the original calculated spectra. You could say it
10 that way, also. Because the end result is they have now
11 beefed up this steel structure to try to go back to what the
12 original spectrum was and get closer back to it.

13 COMMISSIONER GILINSKY: I'm just trying to under-
14 stand this. If you have a spectrum which was not properly
15 calculated in the sense that some mistakes were made --

16 MR. KNIGHT: Mistakes in the number of the elements
17 needed -- .

18 COMMISSIONER GILINSKY: Rather than recalculate
19 that spectrum to reflect the existing structure, the structure
20 was modified to bring it into line with that spectrum, because
21 so many things presumably depended on that spectrum.

22 MR. KNIGHT: That's correct. You've got all that
23 equipment that's been qualified, some of it is one of a kind.
24 There are a number of economic as well as one might call
25 regulatory motivations.

1 MR. DENTON: Wasn't a good example this wall that
2 had a lot of equipment mounted on it that had been qualified
3 to certain types of spectra -- rather than change it to see if
4 all the equipment could be upgraded somehow, they just
5 restored the wall to result to what it --

6 MR. KNIGHT: Right. And these things usually are
7 stiffness, the type of thing -- .

8 COMMISSIONER GILINSKY: So bringing the situation
9 back into a consistent state, you might say, where the
10 spectra match each other again.

11 MR. KNIGHT: Yes. Where you now have a structure
12 whose response is that which you used in the qualification
13 of the equipment at that location.

14 COMMISSIONER GILINSKY: I see.

15 MR. DENTON: This had completed our presentation.
16 We could answer any other questions.

17 CHAIRMAN PALLADINO: He had raised the question
18 about -- did you do sampling with regard to review of
19 construction QA activities? Again, how do you gain confidence
20 on the adequacy of the sampling you did for the QA activities?

21 MR. DENTON: I don't think we have anyone here
22 from the region, but they carried out an inspection program
23 originally. And then we had as part of this IDVP program,
24 they went to the site and looked and checked the quality
25 of certain construction details.

1 MR. EISENHUT: In fact, as Harold said, Region V
2 is not here. They've been also doing the other piece. They've
3 been going and they've actually been looking at the rework,
4 also.

5 CHAIRMAN PALLADINO: I'm thinking about the
6 adequacy of the sampling.

7 COMMISSIONER ASSELSTINE: My impression was that
8 the sample focused on two contractors that were involved.

9 MR. EISENHUT: It basically did.

10 MR. DENTON: But there was the inspection program
11 to begin with, and it was on the basis of a feeling of the
12 regional inspector that it did not have a breakdown in
13 construction quality that led us not to include that as a
14 part of the original activity. But because it was continually
15 raised, an audit was done by the IDVP in a couple of areas.

16 MR. EISENHUT: Yes. I should say that that was a
17 strictly proposed program by PG&E, so we didn't go in and
18 try to then -- we didn't feel we had the underlying basis
19 to go in and require an expansion of that. We were going to
20 wait for the results that came out of that sampling, which
21 was first undertaken by the IDVP, all the while knowing that
22 we had additional inspectors and we were following the work
23 very closely. So we felt we could see a problem if one was
24 evolving.

25 Remember originally, all through this program,

1 construction quality was not brought into question. It wasn't
2 in our original requirements, but we were very pleased when
3 PG&E came forth and offered it in the IDVP.

4 COMMISSIONER ASSELSTINE: My sense of what the
5 Chairman was asking, my interest, too, was to just get some
6 kind of a sense of how broad that sample was as compared to
7 the magnitude of construction activity. Recognizing that
8 it's an add-on element.

9 MR. EISENHUT: Again, the IDVP --

10 MR. DENTON: I don't think we have anyone today
11 here who could specifically address that. We can cover that
12 next time.

13 COMMISSIONER ASSELSTINE: Okay.

14 COMMISSIONER GILINSKY: Was it the floor spectrum
15 that the Brookhaven group pointed out as having problems?
16 I remember when they were here last time they indicated some
17 differences they were concerned about.

18 MR. KNIGHT: Yes. The end result of the dynamic
19 analysis of the structure from a seismic point of view is the
20 floor spectrum, for both the structure itself and the
21 equipment.

22 The work that Brookhaven did indicated or
23 reinforced, if you want to use that term, the errors that had
24 been identified earlier and the fact that the mass of the
25 structure was not properly assigned, that stiffnesses as

1 characterized by the different joint configurations -- what
2 you're doing basically is a mass spring analysis. But the
3 stiffnesses were not properly characterized. And so as a
4 natural consequence of that, they developed floor spectra
5 which were distinctly different from those that were
6 originally developed by PG&E.

7 The Brookhaven work also pointed out a feature
8 that had not previously been at least focused upon, and
9 that's the propensity of parts of that structure for very
10 local response; that in midspan of beams you got much -- of
11 a given beam, you had a much higher response than one might
12 see averaging over the general area. And that subsequently
13 has been picked up and incorporated.

14 COMMISSIONER GILINSKY: When was the decision made
15 to stick with the spectrum, to modify the structure rather
16 than modifying the spectrum?

17 MR. KNIGHT: As far as I know, once it became
18 clear that a rather comprehensive re-analysis, re-evaluation
19 would be necessary, the decision -- it virtually flowed out
20 of the natural consequences of that decision. I can't --
21 We became aware of it quite early in the process. Exactly
22 when or if, in fact, there was a period of time when there
23 was some other consideration, the Applicant would have to
24 speak to that. The Licensee.

25 MR. DENTON: I think consideration was given by

1 the company at one time to writing on a clean slate and
2 re-analyzing from scratch using all of today's factors that
3 go into the calculation. But since the seismic design had
4 been so litigated and there had been agreement on certain
5 input parameters and how things were done, they decided they
6 wouldn't reopen those issues that had already been settled
7 by the Board; they'd stick with those and then make the plant
8 conform to those commitments.

9 Whereas, if a new plant came in today, it would
10 probably be analyzed and evaluated somewhat differently. But
11 it doesn't mean the result is not satisfactory the way
12 they did it. They met the commitments that were adjudicated
13 by the Board.

14 COMMISSIONER GILINSKY: I was going to ask you
15 earlier when you said errors and problems had been identified,
16 you know, what the chief of these were and what the upshot
17 was. But I gather the way to look at it is the structural
18 changes that had to be made to bring the structure response
19 back into what it was thought to be are a reflection of
20 this analysis.

21 MR. EISENHUT: I think that's a good way to look
22 at it, and that's sort of the way I look at it. In fact, we
23 go through that repeatedly every time to be sure we understand
24 it. But that was completely done across the board of a
25 100 percent recheck of all safety-related things in the plant.

1 That's why we feel the last line here is that
2 while we have some open items in the SER, we believe they
3 are resolvable and we're moving down the line. We'll
4 obviously have to have a supplement, an additional supplemental
5 evaluation to close those loose ends out. And along the same
6 lines as we pointed out in the schedule earlier.

7 But that's basically what Staff -- .

8 MR. DENTON: And my understanding of the way you
9 want to proceed in this case is that you want to make the
10 decision to lift the suspension, so we will provide you an
11 SER that resolves to our satisfaction at least all these
12 open items that were identified, and then you will determine
13 how you'd like to proceed from there.

14 CHAIRMAN PALLADINO: We had asked OGC to examine
15 what commitments we've made and see whether or not the
16 Commission had made a commitment to make piecemeal decisions
17 as opposed to a single one.

18 Incidentally, we want to give enough time for
19 Teledyne to make its presentation. I don't want to cut off
20 questions, but --

21 COMMISSIONER ROBERTS: Let me ask a quick one.
22 On the as-built walkdown, you mentioned a date, October 7th.
23 Is that when it's going to commence, is that when it's
24 going to end? It surely won't --

25 MR. EISENHUT: That's completion.

1 COMMISSIONER ROBERTS: Completion? What is the
2 extent of the NRC involvement in that endeavor?

3 MR. EISENHUT: The region has had a number of
4 inspectors down and has been observing and inspecting the
5 various modifications as they're coming along. So I think
6 they're doing certainly more than their normal samples, and
7 they've been following it very closely.

8 We were out, as I said, at the site last week and
9 they've been auditing --

10 COMMISSIONER ROBERTS: This is something that's
11 going on today.

12 MR. EISENHUT: Yes. And I don't want to leave
13 the impression that it just starts after 30th, because it's
14 a continuum process. That the last modifications are done
15 on September 30th and those last walkdowns are done by
16 October 7th. Again, security drives them to say you
17 couldn't load fuel before September 10th. October 10th.

18 MR. DIRCKS: And I think we just want to emphasize
19 the last Staff action in this first round is around the
20 third week in October. That's when that supplement will be
21 produced. And then from that point on, I think you want to
22 look at schedules for public comment. Then the Staff, I guess,
23 would be asked to answer those public comments, and I'm just
24 telling you that we're -- if you're looking at that schedule
25 you're looking toward, I guess, sometime in December for

1 the resolution or the answering of those comments.

2 CHAIRMAN PALLADINO: Maybe you ought to have OPE
3 and OGC take a look ahead and see what the schedule for
4 input by parties might look like in this case.

5 MR. DIRCKS: And the hearing on these same issues
6 begins around mid-October, too. So there are certain things
7 coming together here.

8 CHAIRMAN PALLADINO: Shall we hear from Teledyne?
9 Who is the representative?

10 MR. DENTON: Bill Cooper of Teledyne would be
11 the spokesman.

12 MR. COOPER: Mr. Chairman, gentlemen, perhaps
13 I could introduce those who have joined me at the table.
14 From your left to right, Roger Reedy, R.F. Reedy, Inc.;
15 Robert Cloud from R. L. Cloud Associates, Inc.; Maurice
16 Axelrad from Lowenstein, Newman, Reis & Axelrad, counsel to
17 the IDVP; and John Krechting from Stone & Webster Engineering
18 Corporation.

19 We've prepared a brief summary of our work and our
20 status here today. The overall objective of the IDVP's effort
21 was, of course, to provide reasonable assurance that any
22 deficiencies in the Unit 1 design were identified and
23 corrected. The purpose of this presentation, which was
24 requested by the Commission, is to provide a summary of the
25 results of the IDVP's efforts to date, and to identify the

1 limited IDVP work which remains to be completed.

2 Since the scope and methodology of the IDVP have
3 previously been approved by the Commission, I will touch upon
4 them only briefly today. The focus of my presentation will
5 be upon the conclusions reached by the IDVP as a result of
6 its unprecedented efforts and the basis for those conclusions,
7 since I assume these are the Commission's principal interests
8 at this point in time.

9 No presentation of the IDVP's verification of
10 construction QA is included since this aspect of the IDVP's
11 effort was not part of the Commission's order or Staff letter.
12 However, we are prepared to answer questions concerning any
13 aspect of the IDVP's activities.

14 I will be using a few slides today, but not all
15 of which are in the reproduced package, to assist in --
16 these slides are, of course, to assist in following the
17 presentation and are not intended as substitutes for the
18 words.

19 By way of background, I'd like to refresh your
20 recollection as to the participants in the IDVP. If we could
21 have the first slide, please.

22 (Slide.)

23 Teledyne Engineering Services served as Program
24 Manager. In that capacity, Teledyne assured that the IDVP
25 was conducted in accordance with the approved program plans,

1 including review and approval of all IDVP reports and
2 conclusions.

3 R.F. Reedy, Inc. performed the design QA audits
4 and reviews and the design office verification of the Diablo
5 Canyon project corrective action program. Robert L. Cloud
6 Associates, Inc. verified the seismic, structural and
7 mechanical aspects of the design process. Stone & Webster
8 Engineering Corporation verified the safety system and safety
9 analysis aspects of the design process.

10 In addition to these major participants, Teledyne
11 retained a number of organizations and individuals to assist
12 the IDVP in specialty areas. Of most importance in this
13 regard was the participation of Professors Holley and Biggs
14 in the civil structural area.

15 In response to the Commission order and Staff
16 letter, IDVP programs plans were established to define the
17 detailed conduct of the IDVP, and these were approved by the
18 Commission.

19 The IDVP -- what has been conducted in conformance
20 with the approved plans? The extensiveness of the IDVP
21 verification effort can be measured by the fact that it is
22 expected to require approximately 120 personyears in total;
23 that we are very near completion is attested to by the fact
24 that more than 97 percent of that effort has been expended
25 to date.

1 In the view of the IDVP participants, the scope
2 of the design work we reviewed was sufficiently broad and
3 the methodology employed in that review was sufficiently
4 detailed and rigorous to achieve the purposes of the IDVP
5 program as set forth in the Commission order and the Staff
6 letter.

7 I will now review the IDVP conclusions as reported
8 in our final report, and briefly describe the basis for each.
9 If we could have slide 4, please.

10 (Slide.)

11 Conclusion 1. The IDVP has been conducted in a
12 technically competent, independent and timely manner and has
13 effectively identified uncertainties in the compliance of
14 the design with license application criteria. Although the
15 scope and depth of the verification effort has been more
16 extensive than originally anticipated, the objective has not
17 changed and the original plans anticipated and provided for
18 the expansions of our efforts that were ultimately required.

19 Although completion of the verification effort may
20 have been delayed by this expansion, the more important program
21 characteristics, technical competence and independence, were
22 achieved.

23 It is essential to recognize that the criteria
24 applied by the IDVP were those of the license application,
25 and that our conclusions were established on that basis.

1 Specifically, identification as an IDVP finding
2 is indicative of a violation of the license application
3 criteria, without regard to whether or not a substantial
4 safety hazard, as defined in 10 CFR 21.3K existed.
5 However, the IDVP did assess whether such a substantial
6 safety hazard could exist even when the license application
7 criteria were satisfied. We identified no such conditions.

8 The effectiveness of the IDVP and some of the
9 basic contributors to that effectiveness are discussed
10 further in Section 6.2 of the IDVP's final report.

11 May I have slide 5, please, which addresses
12 Conclusion 2.

13 (Slide.)

14 Design errors requiring modification or re-analysis
15 of the design have been identified. The basic cause for
16 these errors is the amalgamation of a number of factors.

17 (Slide.)

18 Slide 6 identifies the two basic or root causes
19 identified by the IDVP in addition to random causes. These
20 were the control of design interfaces and documentation and
21 interpretation of design. These are discussed in some
22 detail in Section 6.3 of our final report, but we thought it
23 was more important here today to dwell on some underlying
24 factors which are indicated in slide 7 and are also contained
25 in our final report.

1 Because we concluded that the question of basic
2 cause can only be properly addressed in light of these
3 underlying factors, that in combination contributed
4 significantly to most of the design problems.

5 First, safety-related systems were seismically
6 designed twice to meet two sets of criteria with a substantial
7 time interval between the two design efforts.

8 COMMISSIONER GILINSKY: Can I ask you, do you
9 agree with the view that Harold Denton expressed that the
10 errors were primarily in the redesign rather than in the
11 original design?

12 MR. COOPER: In general yes, sir, and I think
13 you'll see as we run down through this that these underlying
14 factors are indicative of the same thing.

15 The second one is the plant had substantial design
16 work performed as a result of I&E bulletins and the TMI
17 requirements, and of course, those would be much later in
18 the timeframe than the early design work. The design work
19 was performed over a period of 15 years.

20 Seismic design methodology and criteria changed
21 significantly during the 15 years.

22 Nuclear plant design naturally requires the
23 transfer of large amounts of information from one design
24 group to another. Such design interfaces existed in
25 especially large numbers both within PG&E and between PG&E

1 and their service-related contracts. And I might add in many
2 cases where the work was done inhouse during the original
3 design, in the course of some of the backfitting and so
4 forth, some of the more recent work, that was contracted out
5 where it had not been previously.

6 Finally, the design control practices which were
7 acceptable during the period of the initial design process
8 were not consistent with the eventual duration and complexity
9 of the reiterative design process required at Diablo Canyon.
10 To over-simplify it, during the original design process people
11 seemed to know what they were doing; they were working in
12 unison, they were communicating, they were doing all right.
13 But doing all right wasn't sufficient to prepare them, if
14 you wish, for all the subsequent work that had to be done.
15 It didn't develop the documentation in a form that could be
16 adequately interpreted, consistently interpreted. These
17 kinds of things.

18 Of the above considerations, two are unique to
19 Diablo Canyon; multiple seismic designs and a long calendar
20 time. However, the effect of these underlying factors may
21 have been exacerbated by the fact that PG&E was designing its
22 first nuclear plant.

23 CHAIRMAN PALLADINO: Some of the early sketches
24 that we were shown indicated that -- or lacked identification
25 of what was going on. Was that -- I consider that part of the

1 basic design and not the later stuff. So I was wondering,
2 did you find that interfacing was good, even for the basic
3 design?

4 COMMISSIONER GILINSKY: I think you're referring
5 to redesign drawings.

6 MR. COOPER: I think you're referring to Hosgri
7 work, which is post the original design period.

8 CHAIRMAN PALLADINO: I see. So it's all for the
9 redesign where we got into trouble.

10 MR. COOPER: Not uniquely, but in its major impact,
11 yes. We're trying not to say that absolutely everything in
12 the early stages was perfect, because we know that, simply
13 stating. But the general difficulties were those arising
14 with the redesigns, with the backfitting type of things.

15 COMMISSIONER GILINSKY: What you're saying, if I
16 understand you, is that you can get away with less formality
17 as long as things go smoothly, and you've got your team
18 together and can complete your work. But if you run into
19 trouble, you're not going to be able to handle it.

20 MR. COOPER: That's well stated, sir, yes.

21 Conclusion 3, which is slide 8, please --

22 (Slide.)

23 -- talks about the corrective action program being
24 conducted by PG&E and being verified by the IDVP. It's our
25 conclusion that this is a planned and controlled program which

1 has been effective and is expected to continue to be
2 effective.

3 As used in this conclusion, the term corrective
4 action is intended to refer both to the actions taken in
5 the formal seismic-related corrective action program, and to
6 the corrective actions taken in response to the non-seismic
7 generic concerns identified by the IDVP. It is slightly
8 different mode of response by PG&E and the Diablo Canyon
9 project in these two areas and I guess I tried to over-
10 simplify it here by using one word here and then apologizing
11 for using one instead of going into more detail.

12 The corrective action program was related to the
13 seismic type of activities. The design activities of all
14 this corrective action work were conducted under a design
15 QA program which was approved by the NRC Staff as being in
16 conformance with the requirements of Appendix B.

17 The IDVP audited the implementation of that program
18 and found that the program was being implemented effectively.

19 COMMISSIONER GILINSKY: Can I go back to the
20 example of the raceway supports. I was wondering about the
21 small sample involved there in the IDVP. Is it correct, then,
22 that when PG&E went back it basically re-analyzed the whole
23 lot?

24 MR. COOPER: Mr. Knight's response I thought was
25 very descriptive of what happened, yes, sir.

1 COMMISSIONER GILINSKY: Thank you.

2 MR. COOPER: In addition to normal QA audit
3 procedures, the IDVP performed what we called a design office
4 verification to assure that the QA and engineering design
5 process procedures were compatible, and that both were
6 appropriately understood and applied.

7 Finally, the IDVP verified the engineering process
8 apart from the QA program, applying a detailed peer review on
9 a sample basis similar to that performed in the verification
10 of the initial sample and including field verification.

11 The corrective action program provided for an
12 essentially complete re-evaluation of the seismic, structural
13 and mechanical aspects of the design of the safety-related
14 structures, systems and components. As described in detail
15 in the PG&E final report, a considerable number of modifica-
16 tions were made to the containment annulus, to the fuel
17 handling building and to the pipe supports. A lesser number
18 of modifications were made to other structures, and a very
19 limited number of modifications were made to systems and to
20 components.

21 IDVP verification of these activities -- field
22 verification of these activities is complete.

23 The IDVP verification of safety-related systems
24 and safety-related analyses -- the work in the Stone &
25 Webster area -- resulted in four IDVP generic concerns which

1 require the performance of activities by the Diablo Canyon
2 project. A fifth such activity originated from the review of
3 the original PG&E design QA program. These five concerns
4 involve the effects of postulated pipe breaks inside and
5 outside of containment, separation and redundancy of safety-
6 related electrical equipment, and the selection of design
7 conditions for fluid systems and valve operators.

8 In response to an earlier question it was pointed
9 out to you gentlemen that we have done approximately three
10 of the ten systems, and then Staff had followed through on
11 the component cooling water system.

12 A point that may not be clear from that previous
13 discussion is that for all these four concerns that were
14 raised by the Stone & Webster verification in those three
15 sampled systems, we performed additional verification
16 considering all the PG&E design systems to which a concern
17 was applicable. PG&E developed a program which we found
18 responsive to our concern which looked at the effects of
19 that concern across the board, horizontally in all systems,
20 and we verified that work on a sample basis. So that's
21 another way in which we went beyond the original three sample
22 systems.

23 CHAIRMAN PALLADINO: Maybe I misunderstood. I
24 thought you went across the board on all of the systems,
25 just on the sample basis.

1 MR. COOPER: We went across -- the project developed
2 a program for going on a horizontal basis across the board
3 to all systems where the concern was applicable, did their
4 work, and then we sampled the results of that work.

5 CHAIRMAN PALLADINO: Okay, thank you.

6 COMMISSIONER ASSELSTINE: Could you give us an
7 example of that, where you identified something and then
8 traced it through all of the ten systems?

9 MR. COOPER: Well, an example would be the
10 illustration that was given concerning the design conditions
11 or piping systems. In some of the operating modes we found
12 that the pressures and temperatures could exceed those that
13 had been previously stated, as the design pressure and
14 temperature for the aux feedwater system we were looking at.

15 So we identified this concern. The project
16 provided us with a program where they were going to revise,
17 review and modify all their design pressures and temperatures,
18 consistent with what we had found. We looked at the
19 methodology that they developed to do that, agreed with it.
20 We received documented evidence that they had done it; they'd
21 done it for all systems. Here's how the numbers changed, and
22 these new numbers are in the proper documentation that
23 control the future.

24 And it was mentioned that there were some physical
25 modifications as a result of that in some of the other systems.

1 The fourth conclusion and the last which I plan
2 to show you today -- well, the last that we had in our
3 report -- is slide 9.

4 (Slide.)

5 The PG&E and IDVP efforts, when taken together,
6 provide reasonable assurance that the design of Unit 1
7 conforms or will conform to the criteria of the license
8 application. This conclusion, with the exception of the
9 qualification introduced by the phrase "or will conform" is
10 an essential consequence of the first three conclusions.

11 The significance of the projection implicit in
12 the phrase "or will conform" is obviously dependent on the
13 degree of completion of both the Licensee and the IDVP
14 programs. I will address the IDVP status, and I'm sure that
15 the Licensee will review their status at an appropriate time.

16 Our status is best summarized in terms of the
17 interim technical reports which remain to be produced.
18 We expect that future supplements to the IDVP final report
19 will be only for the purpose of summarizing the final results
20 as presented in these remaining ITRs. And the only exception
21 we can see to this general expectation would occur if our
22 remaining efforts identified some major change in our
23 previous conclusions and evaluation.

24 So we still have some interim technical reports
25 to release. That will contain the meat of our work. We

1 expect our changes in our final report will only be for the
2 purpose of including and summarizing those results in our
3 final report. The exception is if we find something that
4 causes us to change our minds with regard to our previously
5 stated conclusions and evaluations.

6 For the reasons I'll present in our summarizing
7 our remaining work, we consider it to be unlikely that our
8 completion efforts would result in such changes.

9 I might add that the four conclusions that we
10 have seen on the screen here today are as they appeared on
11 June 30th. We've done a lot of work since then and so far
12 we see no reason to change any of those conclusions. We
13 don't expect to see any reasons in the small amount of work
14 we have to complete.

15 In our final reviews, we have adopted the practice
16 of issuing an initial version of an ITR, interim technical
17 report, Revision 0, when our verification of an area is
18 essentially complete. That is, when all that remains are
19 verifications of a completion sample of a reiterative
20 design process, and some minor unresolved issues.

21 In brief, issuance of Revision 0 indicates that
22 we are sufficiently familiar with the DCP or IDVP efforts
23 which remain to be confident that these minor unresolved
24 issues will be satisfactorily resolved. Any such issues are,
25 of course, identified in Revision 0, and the Revision 1 of

1 the ITR is issued, one that's remaining, verification is
2 complete.

3 (Slide.)

4 Slide 10 which is on the screen identifies
5 interim technical reports which remain to be published,
6 either as Revision 0 or as Revision 1. There are slight
7 differences in this from what Staff showed you earlier
8 simply because time has passed since the information on
9 which the Staff's slide was prepared. Some of this informa-
10 tion is as recent as 10:00 o'clock last night, as you might
11 see from some of the handwritten numbers as opposed to the
12 typed ones.

13 The first column, of course, identifies the ITR
14 identification number, the tables in numerical sequence of
15 the ITR numbers. The second column identifies the subject
16 matter of the ITR. The last two columns identify the best
17 IDVP estimate as to the date the ITR will be issued.

18 It's significant that there are only three ITRs
19 for which Revision 0 has not yet been issued. It's also
20 significant that we expect to issue all three this week.

21 Further, two of these ITRs address the turbine
22 building and rupture restraints outside of containment,
23 subjects not limiting with respect to fuel loading.

24 There is, of course, a large number of ITRs for
25 which a Revision 1 must still be issued. Again, several are

1 scheduled at a very early date, and all are scheduled to be
2 issued during the month of September 1983.

3 I'd like to return to a discuss which you
4 gentlemen had with Staff earlier today concerning the contain-
5 ment annulus. You'll notice there that we have issued
6 Revision 0 to ITR-51, which is on the containment annulus.
7 That says that we have completed our work including our field
8 verification except for some minor issues which remain to be
9 resolved. We expect these to be resolved satisfactorily.
10 In fact, we expected Revision 1 of that ITR to go to press
11 last night and it did not, and let me tell you what the issue
12 is so you have a feel for the depth of things we're now
13 looking into.

14 The Diablo Canyon project used a particular
15 computer program to size some welds, and they put something
16 together rather quickly quite a while ago to do their
17 approximate calculations to get a feel for what their
18 modifications were going to have to be like; what are the
19 numbers, what's the nature of the beast.

20 That original computer program had some minor
21 errors in it. We have not issued ITR-51 simply for the
22 reason that we know the procedure they're using, we agree
23 with that procedure but we don't yet have from the project
24 the documentation that we feel we need to be sure that
25 that program has been changed and is now being used adequately.

1 It's something that when we get the documentation
2 might take us five or ten minutes to get through with because
3 it's really quite simple.

4 Now, I've used this as an example simply because
5 it came up in the earlier discussion on where we stand in
6 the containment annulus. All these issues aren't quite that
7 simple but our major point is that when we issue a Revision 0
8 we really think we know where we stand, we think we know what
9 needs to be done to complete the job, and we consider it to
10 be minor.

11 CHAIRMAN PALLADINO: Will Revision 1 still be
12 issued for Item 51 in September?

13 MR. COOPER: Yes, sir. We would expect the date
14 that's shown there as Friday of this week -- and I guess the
15 only reason we made it Friday is it allows us to --

16 CHAIRMAN PALLADINO: Oh, this already reflects this--

17 MR. COOPER: Yes, this reflects that. It allows
18 us time to get back home after some other meetings we have
19 scheduled down here this week and read our mail. Other than
20 that, we're ready to go to print.

21 I have one more page, gentlemen. And here I'd
22 like to address -- I think that's all for the slides, thank
23 you. With this one other page I'd like to address the
24 relationship of the IDVP program to the issue of license
25 restoration.

1 The Commission order suspending the Unit 1 low
2 power license required that specific actions be taken to
3 justify restoration of that license. Since only a portion
4 of those requirements were applicable to the Independent
5 Design Verification Program, which I represent today, I
6 will not present a recommendation concerning restoration of
7 that license.

8 It is appropriate, however, that I present a
9 conclusion relative to those activities for which we are
10 responsible under your order. Within the publication of
11 the Revision 0 of our remaining ITRs this week and
12 recognizing that such publications means that the required
13 technical efforts are essentially complete, we are in a
14 position to state that only minor technical issues remain
15 to be resolved.

16 We are knowledgeable of the efforts required to
17 achieve resolution and are confident that final resolution
18 will be satisfactorily accomplished.

19 We consider our state of completion and our
20 results to be consistent with the requirements of the order
21 for consideration of license restoration. We have achieved
22 an equivalent state of completion with respect to the
23 requirements of the Staff letter concerning power ascension.
24 Consequently, we have essentially completed both phases of
25 our program in the manner you requested when approving PG&E's

1 proposal regarding a step-wise licensing proceeding.

2 CHAIRMAN PALLADINO: You use words like
3 essentially and then you said except for minor -- I forgot
4 what you said -- problem.

5 MR. COOPER: Minor issues.

6 CHAIRMAN PALLADINO: Minor issues. Could you give
7 us a better feel for some of the minor issues because whenever
8 there's a condition, we worry about it a little bit if you're
9 an approving body, anyhow.

10 MR. COOPER: Yes, I understand. I think that in
11 a longer version of this talk, we had some of those spelled
12 out in a little more detail. For example, let me illustrate
13 it in terms of our error and open item files that we often
14 use.

15 We still have six out of those 329 that are still
16 open. Four of these we used to follow the generic concerns
17 that originated in the original sample and follow through the
18 corrective action program, and we're just about ready to
19 close all four. There are two that remain.

20 One of them has to do with the design of vents
21 and drains. Some of the vents and drains -- the generic
22 procedure of the project used may not have adequate covered
23 all of the outlying type of configurations on vents and
24 drains.

25 We still have correspondence going back and forth

1 on that issue.

2 The other issue involves an EOI that has to do
3 with the design response spectrum horizontally of the
4 containment internal structure; not the annulus, but the
5 interior structure. There, we reviewed some information
6 they gave us. This happens to be the last file we issued.
7 We reviewed the information they had given us and are
8 satisfied that at and below 140-foot elevation -- which is
9 the operating deck -- that what they've done is perfectly
10 adequate and acceptable to us.

11 They have described to us what they propose to do
12 at the higher elevations, where we do think something needs
13 to be done. We do think something needs to be done there,
14 we know what needs to be done. We think we know what the
15 answers are. If there is any change in the answers we
16 think we know what those answers are going to be. We've
17 reviewed the hardware that exists above the 140-foot
18 elevation and we're convinced that there probably won't be
19 any need for physical modifications, and if there are they're
20 going to be very minor things. The same kind of things that
21 someone else described today as that kind of thing you'd
22 have in a maintenance operation. Put in a bolt, put in a
23 stiffener.

24 CHAIRMAN PALLADINO: These are inside the
25 containment, so you'd want to get them done before fuel

1 loading or --

2 MR. COOPER: Well, it's not up to us to decide
3 when it gets done or not; it's up to us to decide whether or
4 not we agree with the route they're taking.

5 CHAIRMAN PALLADINO: Will this be resolved, then,
6 before one gets to fuel loading?

7 MR. COOPER: I suspect that this one will be
8 resolved very quickly. We received correspondence on it
9 yesterday morning. I haven't had a chance to review it in
10 detail. I don't think all of us have.

11 COMMISSIONER GILINSKY: When you say something
12 needs to be done, what is the nature of the concern?

13 MR. COOPER: Well, there's various possibilities.
14 The question would be either to use a somewhat higher response
15 spectra at those elevations or to justify the lower one they
16 now have by consideration of factors, elimination of
17 conservatism in the analyses, consideration of factors that
18 weren't put into the analysis originally, these kinds of
19 things.

20 But particularly, we want them to say hey, this
21 is a design spectra which we can accept and here's the
22 effectiveness on the equipment in that area.

23 COMMISSIONER GILINSKY: So you're talking about
24 the response spectra at the higher elevations.

25 MR. COOPER: Yes, sir.

1 But these are the two open items that remain.
2 All the other open items are closed. We've done a great
3 deal of field work in the last two weeks. We're still
4 absorbing some of this ourselves. We believe most of those
5 Revision 1s, there's a large number of them scheduled to be
6 issued this week. They probably could have been issued last
7 week except we put emphasis on getting out -- priority on
8 getting out the Revision 0s. So there's only two or three
9 that go towards the end of the month. In each case, we
10 think the items minor, but we're not fully satisfied yet
11 and we're not ready to issue the final revision 1.

12 CHAIRMAN PALLADINO: Do you have more?

13 MR. COOPER: We have nothing more, sir.

14 CHAIRMAN PALLADINO: Do any of your colleagues
15 have more they want to add?

16 (No response.)

17 We're open for any additional Commission questions.

18 (No response.)

19 You apparently did such a great job -- .

20 COMMISSIONER GILINSKY: It was a very good
21 presentation, thank you.

22 CHAIRMAN PALLADINO: We appreciate your coming by
23 and filling us in on the work. I think it is an important
24 contributor to the resolution of problems on the Diablo
25 Canyon plant.

1 Unless there are any other items that should
2 come before us at this time, we'll stand adjourned.

3 Thank you.

4 (Whereupon, at 11:55 a.m., the meeting was
5 adjourned.)

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CERTIFICATE OF PROCEEDINGS

1
2
3 This is to certify that the attached proceedings before the
4 NRC COMMISSION

5 In the matter of: Staff and Teledyne Briefing of Status of IDVP
6 for Diablo Canyon

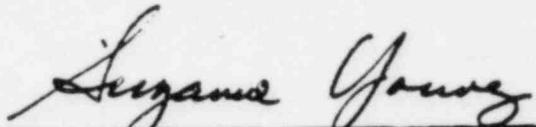
7 Date of Proceeding: 13 September 1983

8 Place of Proceeding: Washington, D.C.

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

11 Suzanne Young

12 Official Reporter - Typed

13 
14 Official Reporter - Signature

BRIEFING
ON
DESIGN VERIFICATION PROGRAM
DIABLO CANYON UNIT 1

D. G. EISENHUT

X27672

SEPTEMBER 13, 1983

SLIDE 1

NOVEMBER 19, 1981 NRC REQUIREMENTS

PHASE I: COMMISSION ORDER

- o SUSPENDED FUEL LOADING AND LOW POWER TESTING LICENSE
- o REQUIRED
 1. RESULTS OF AN IDVP* FOR ALL SEISMIC SERVICE-RELATED CONTRACTS PRIOR TO JUNE 1978

PHASE II: STAFF LETTER

- o ACTIVITIES REQUIRED PRIOR TO DECISION REGARDING POWER LEVELS ABOVE 5%
 2. IDVP FOR NON-SEISMIC SERVICE RELATED CONTRACTS PRIOR TO JUNE 1978
 3. IDVP FOR PG&E INTERNAL QA
 4. IDVP FOR ALL SERVICE RELATED CONTRACTS POST JANUARY 1978

*IDVP = INDEPENDENT DESIGN VERIFICATION PROGRAM

09/13/83

SLIDE 2

LICENSING PROCESS AS IN SECY 82-414

	<u>EL/LP</u>	<u>FP</u>	<u>DURING</u>	<u>STATUS</u>
	<u>DECISION</u>	<u>DECISION</u>	<u>OPERATION</u>	
A. <u>PHASE I (COMMISSION ORDER)</u>				
1. IDVP OF ALL SSR PRIOR TO 6/78 (HOSGRI)	⊗			
B. <u>PHASE II (NRR LETTER)</u>				
2. IDVP FOR NSSR PRIOR TO 6/73 IR		⊗		C
3. IDVP FOR PG&E INTERNAL QA IR		⊗		C
4. IDVP FOR ALL SR POST 1/78 IR		⊗		C
C. <u>OTHER</u>				
5. QA PROGRAM FOR ITP IR		X		C
6. CONSTRUCTION QA		IR	X	C
7. AS-BUILT WALK-DOWN		IR	X	
8. MODS. AS NECESSARY X		X	X	
9. PG&E/W INTERFACE EVAL. X		X	X	C
10. VERIFY HOSGRI SPECTRA X				C
11. IDVP FOR ALL SRR (NON- HOSGRI, PRIOR TO 6/78) IR		X		C

NOMENCLATURE:

- : ⊙ AS ORIGINALLY REQUIRE, NOVEMBER 19, 1981
- X: ACTIVITY TO BE COMPLETED
- SSR: SEISMIC SERVICE-RELATED CONTRACTS
- NSSR: NON-SEISMIC SERVICE RELATED CONTRACTS
- SSR: SERVICE-RELATED CONTRACTS
- IR: INTERIM REPORT, DEMONSTRATING EFFORT SUBSTANTIALLY COMPLETE
- C: ACTIVITY COMPLETED

STATUS

PG&E:

- o ANALYSIS AND DESIGN MORE THAN 95 PERCENT COMPLETE
REMAINING WORK PRIMARILY CONFIRMATORY ANALYSES
ANALYSES AND DESIGN TO BE COMPLETED BY SEPTEMBER 30, 1983

- o OVERALL MODIFICATIONS FOR SAFETY RELATED STRUCTURES,
SYSTEMS AND COMPONENTS (COMPLETION STATUS):
 - 1. FUEL LOAD 95%
 - 2. CRITICALITY AND 5% POWER 90%
 - 3. FULL POWER 90%

- o PG&E SCHEDULE FOR COMPLETION
 - 1. FUEL LOAD SEPTEMBER 30, 1983
 - 2. CRITICALITY AND 5% POWER NOVEMBER 15, 1983
 - 3. FULL POWER NOVEMBER 15, 1983

IDVP:

- o IDVP FINAL REPORT ISSUED
LAST SUBMITTAL TO IDVP FINAL REPORT SCHEDULED
FOR EARLY OCTOBER ON RESULTS OF FUTURE ITRS

- o ITRs ISSUED AS OF SEPTEMBER 2 54
- o REVISIONS ISSUED AS OF SEPTEMBER 2 25
- o ADDITIONAL ITRs TO BE ISSUED 6
- o REVISIONS TO BE ISSUED 12
- o LAST REVISION SEPTEMBER 30

- o ALL ITRs/REVISIONS TO BE ISSUED ADDRESS IDVP VERIFICATION
EFFORTS OF PG&E CORRECTIVE ACTION ACTIVITIES

09/13/83

SLIDE 4A

STATUS CONTINUED

STAFF:

- o SER SUPPLEMENT 18 ISSUED ON AUGUST 5, 1983
(STATUS AS OF JUNE 30, 1983)
- o 30 OPEN ITEMS IDENTIFIED
- o PG&E RESPONDED TO MOST OPEN ITEMS, STAFF REVIEW IN PROGRESS
- o STAFF EVALUATION OF ITRs/REVISIONS TO BE COMPLETED
THREE WEEKS AFTER RECEIPT

09/13/83

SLIDE 4B

STAFF CONCLUSIONS

- o OVERALL DESIGN VERIFICATION EFFORT NEARLY COMPLETE
- o SCOPE OF IDVP AND ITP WENT WELL BEYOND ORIGINAL NRC REQUIREMENTS
- o IDVP ORGANIZATIONS ARE INDEPENDENT AND COMPETENT
- o IDVP SAMPLING IN PHASE I WAS APPLIED TO CORRECTIVE ACTION ACTIVITIES AND IN PHASE II FOR ORIGINAL SAMPLE
- o DEFICIENCIES IN NON-SEISMIC DESIGN WERE RANDOM
- o NO PROGRAMMATIC BREAKDOWN IN CONSTRUCTION QA
- o BASIC CAUSE FOR SEISMIC DESIGN DEFICIENCIES WAS PG&E UNAWARENESS OF MAGNITUDE OF HOSGRI REDESIGN EFFORT AND NEED FOR TIGHT QUALITY CONTROL
- o ALL SIGNIFICANT ERRORS AND PROBLEMS HAVE BEEN IDENTIFIED
- o SER SUPPLEMENT 18 OPEN ITEMS ARE BEING RESOLVED

09/13/83

SLIDE 5

MAJOR IDVP PARTICIPANTS

TELEDYNE ENGINEERING SERVICES (TES)
PROGRAM MANAGER

R.F. REEDY, INC. (RFR)
DESIGN QA AUDITS AND REVIEWS

ROBERT L. CLOUD ASSOCIATES, INC. (RLCA)
SEISMIC, STRUCTURAL, AND MECHANICAL

STONE & WEBSTER ENGINEERING CORPORATION (SMEC)
SAFETY-RELATED SYSTEMS AND SAFETY-RELATED ANALYSES

HANSON, HOLLEY AND BIGGS (HH&B)
CIVIL/STRUCTURAL ENGINEERING

IMPORTANT ELEMENTS OF THE IDVP EFFORTS

1. AUDIT AND REVIEW OF PRE-NOVEMBER 1981 DESIGN QA PROGRAMS
2. VERIFICATION OF INITIAL SAMPLE OF THE DESIGN PROCESS
3. ADDITIONAL VERIFICATION OF SPECIFIC CONCERNS
4. EXPANSION TO INCLUDE ADDITIONAL SAMPLES, ADDITIONAL VERIFICATION OF GENERIC CONCERNS, AND VERIFICATION OF DCP ACTIVITIES
5. AUDIT OF DCP DESIGN QA PROGRAM AND "DESIGN OFFICE VERIFICATION"
6. VERIFICATION OF THE DCP DESIGN PROCESS INCLUDING FIELD VERIFICATION OF MODIFICATIONS

CHARACTERISTICS IMPORTANT TO IDVP SUCCESS

1. VERIFICATION SAMPLES WERE CAREFULLY CHOSEN
2. VERIFICATION EXPANDED TO RESOLVE GENERIC CONCERNS
3. POTENTIAL CONCERNS RECORDED, TRACKED AND RESOLVED IN A SYSTEMATIC MANNER USING THE "ERROR OR OPEN ITEM" REPORTS
4. USE OF INTERIM TECHNICAL REPORTS
5. PEER REVIEW BY DIFFERENT IDVP ORGANIZATIONS
6. IDVP FINAL REPORT SUMMARIZES ITRs AND STATES IDVP EVALUATIONS AND CONCLUSIONS

CONCLUSION 1

"THE IDVP HAS BEEN CONDUCTED IN A TECHNICALLY
COMPETENT, INDEPENDENT, AND TIMELY MANNER AND
HAS EFFECTIVELY IDENTIFIED UNCERTAINTIES IN
THE COMPLIANCE OF THE DESIGN WITH LICENSE AP-
PLICATION CRITERIA."

CONCLUSION 2

"DESIGN ERRORS REQUIRING MODIFICATION OR RE-
ANALYSIS OF THE DESIGN HAVE BEEN IDENTIFIED.
THE BASIC CAUSE FOR THESE ERRORS IS THE
AMALGAMATION OF A NUMBER OF FACTORS"

BASIC CAUSE OF ALL DESIGN ERRORS

THE TWO BASIC, OR ROOT, CAUSES IDENTIFIED BY THE IDVP, IN ADDITION TO RANDOM CAUSES, WERE:

1. CONTROL OF DESIGN INTERFACES, AND
2. DOCUMENTATION AND INTERPRETATION OF DESIGN

FACTORS UNDERLYING THE BASIC CAUSES

1. SEISMICALLY DESIGNED TWICE, TO DIFFERENT CRITERIA, WITH A SUBSTANTIAL TIME INTERVAL BETWEEN THE DESIGN EFFORTS
2. SUBSTANTIAL DESIGN IN RESPONSE TO I&E BULLETINS AND TMI
3. DESIGN PERFORMED OVER 15 YEAR PERIOD
4. SEISMIC DESIGN METHODOLOGY AND CRITERIA HAVE EVOLVED
5. DESIGN INTERFACES IN ESPECIALLY LARGE NUMBERS
6. INITIAL DESIGN CONTROL PRACTICES NOT CONSISTENT WITH EVENTUAL DURATION AND COMPLEXITY OF REITERATIVE DESIGN PROCESS

FACTORS 1 AND 3 ARE UNIQUE TO DCNPP-1. EFFECT OF ALL MAY HAVE BEEN EXACERBATED BY THE FACT THAT PGandE WAS DESIGNING ITS FIRST NUCLEAR PLANT.

CONCLUSION 3

"THE CORRECTIVE ACTION PROGRAM BEING CONDUCTED BY PGandE, AND BEING VERIFIED BY THE IDVP, IS A PLANNED AND CONTROLLED PROGRAM WHICH HAS BEEN EFFECTIVE AND IS EXPECTED TO CONTINUE TO BE EFFECTIVE."

CONCLUSION 4

"THE PGANDÉ AND IDVP EFFORTS, WHEN TAKEN TOGETHER, PROVIDE REASONABLE ASSURANCE THAT THE DESIGN OF DCNPP-1 CONFORMS OR WILL CONFORM TO THE CRITERIA OF THE LICENSE"

TABLE 1
ITR COMPLETION SCHEDULE

<u>ITR-</u>	<u>SUBJECT</u>	<u>SCHEDULED ISSUE DATE</u>	
		<u>REV 0</u>	<u>REV 1</u>
51	CONTAINMENT ANNULUS		0916
54	CONTAINMENT STRUCTURE		0930
55	AUXILIARY BUILDING		0930
56	TURBINE BUILDING	0915	0923
58	INTAKE STRUCTURE		0915
59	LARGE-BORE PIPE		0916
60	PIPE SUPPORTS		0916
61	SMALL-BORE PIPE		0916
63	MISCELLANEOUS (HVAC DUCTS AND SUPPORTS, RACEWAYS, INSTRUMENT TUBING, AND SUPPORTS)		0916
65	RUPTURE RESTRAINTS (OUTSIDE CONTAINMENT)	0916	0930
68	SOILS	0917	0926

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FROM: SECY OPS BRANCH C&R (Natalie)

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Meeting Title: Staff & Teledyne Briefing on Status of IVP for Diablo Canyon

Meeting Date: 9/13/83 Open Closed

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