NUCLEAR REGULATORY COMMISSION

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COMMISSION MEETING

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DISCUSSION OF PHASE II REVERIFICATION PROGRAM FOR DIABLO CANYON

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

DISCUSSION OF PHASE II

REVERIFICATION PROGRAM FOR DIABLO CANYON

PUBLIC MEETING

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

Wednesday, October 20, 1982

The Commission convened, pursuant to notice, at 2:00 p.m.

COMMISSIONERS PRESENT:

NUNZIO PALLADINO, Chairman of the Commission
VICTOR GILINSKY, Commissioner
JOHN AHEARNE, Commissioner
THOMAS ROBERTS, Commissioner
JAMES ASSELSTINE, Commissioner

STAFF AND PRESENTERS SEATED AT COMMISSION TABLE:

S. CHILK
M. MALSCH
D. EISENHUT
H. DENTON
W. DIRCKS
R. ENGELKEN
A. KENEKE
W. COOPER
M. REICH

AUDIENCE SPEAKERS:

F. MIRAGLIA

* * *

DISCLAIMER

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P R O C E E D I N G S

CHAIRMAN PALLADINO: The meeting will please come to order. This afternoon we will have a briefing and discussion of the Phase II reverification program for Diablo Canyon.

As you will recall, in November 1981 the Commission suspended the low-power license for Diablo Canyon Unit 1 that had been issued for the plant not long before. The license suspension was based upon uncertainty about the capability of the plant's structures, systems, and components important to safety to withstand the effects of earthquakes. The original requirements imposed upon the licensee necessary to support the reinstatement of the fuel load and low-power license have become known as Phase I requirements. Phase II requirements were identified as those necessary to support the issuance of a license to exceed 5 percent of full power.

The purpose of this afternoon's meeting is to allow the staff to brief the Commissioners on the proposed Phase II program plan. In addition, the staff has proposed to modify the requirements that the licensee must meet in order to have its fuel load and low-power license suspense lifted. The staff will also address this point in today's meeting.

So unless any of my fellow Commissioners have opening remarks, I would suggest turning the meeting over to Mr. Denton.

MR. DENTON: Thank you, Mr. Chairman. I have with me at the table Bob Engelken, the Regional Director of Region V; and Darrell Eisenhut, the Director of the Division of Licensing, who will make the presentation. But I did want to make some remarks before turning it over to Darrell.

I certainly did not foresee the twists and turns that this project would take when we suspended the license last November. It has resulted in an unprecedented level of effort to confirm that the design fully conforms to the application. What I would like to do is to briefly just highlight some of these for you, and Darrell will cover them in more detail.

But my bottom line is that the Phase I program that you have already approved, when coupled with the Phase II program that we advocate today, will in my opinion fully demonstrate that this plant is being constructed and designed in accordance with the application.

In the spring PG&E recognized that the level of effort that they were putting into this effort had to be augmented, and they turned to Bechtel to assist them

in confirming that the design does meet the commitments made in the application. I visited that facility in early September along with Region V. There are now almost 800 employees involved, and the PG&E/Bechtel team intended to reconfirm that the design of this plant meets its objectives.

The size of the independent verification program that we have required is up to almost the equivalent of 100 full-time people when you count Teledyne, Reedy and QA, Cloud, and Structural and Piping, Stone & Webster and some of the Phase II activities that they've undertaken at their own risk.

So that's why I am confident that the program that we are recommending that you approve as Phase II, when coupled with Phase I, can demonstrate the plant meets the commitment. It truly is an unprecedented level of effort to make those findings.

COMMISSIONER AHEARNE: You started out by saying that when it started you had no idea that it was going to lead to this unprecedented level of effort. Is it, in your judgment, that this unprecedented level of effort was required, or has it just grown into it?

MR. DENTON: Well, I admit it was open-ended when we required it, and we were working on an audit program. And in many cases the audit is no longer being

done. A complete seismic reverification program of all safety-related equipment has been undertaken and will be completed as a part of this activity, whereas in the beginning we saw that we audit a system and then based on those results audit another one.

COMMISSIONER AHEARNE: But has the movement been from the audit to this more broad scope one that we required, one that was followed from the findings of the audit?

MR. DENTON: I think it flowed from the findings, yes.

COMMISSIONER GILINSKY: You said there were 800 persons working there, and later you said 100. Could you just clarify that?

MR. DENTON: The effort that we have required by order of the independent design verification program, with Teledyne being an independent contractor, and taken with his subcontractors, total about 100 effective full-time people. That's just the independent verification program. Now, the team that PG&E has put together using their people and the Bechtel people dedicated to responding to the independent design program findings and also doing other activities to confirm that the design is correct is the 800 number.

Perhaps Bob would like to comment to clarify

that.

MR. ENGELKEN: That is correct. I would just like to add one thing. The breakdown on that, I think, is about 550 PG&E people and about 250 Bechtel people.

CHAIRMAN PALLADINO: Harold, could you clear up one point and see if I understood you correctly? Did I hear you say that Phase I will show that the plant will be prepared for low power?

MR. DENTON: I think Phase I --

CHAIRMAN PALLADINO: The reason I ask the question is because I got the implication there is that and some other things that you want to have done before the plant goes to low power and those were not, if I understand it correctly, part of Phase I.

MR. DENTON: That's correct. We are recommending that the distinction from Phase I and II be largely mooted in our recommendation. And in fact, the company's own schedules largely moots the distinction. And by undertaking a safety review, by undertaking a review of the seismic adequacy of all safety-related equipment regardless of the date that the contract was let, for example, means they will complete Phase I and Phase II almost at the same time. And we will go into the dates.

So when I say I have got confidence that this

program will demonstrate whether it meets the commitment or not, I am combining the Phase I with the Phase II, as we are recommending it.

Another very constructive aspect of this has been the involvement of PG&E management. If you recall, we did -- at least I made a carp about that lack in PG&E management early on. That certainly isn't true for the last six or nine months. Mr. Maneatis has taken personal charge of this as vice president, attends all the meetings, has volunteered solutions when we would meet on difficult issues to completely resolve concerns that the Staff had or that other parties may have had. So I am very pleased with the commitment and participation of upper management of the company.

There have been a large number of meetings. We have had at least ten of fifteen meetings since early '82 that have been fully transcribed and transmitted to all the parties. Numerous board notifications, including copies of all those to you. I count almost 35 of them since March. Most of the big meetings, all parties attend, all parties have had a full chance to air their views.

The intervenors have participated in many of these meetings. Our last meeting with them in a full-scale way was September 9. Bob and I spent a full

day going over their comments on Phase II. Their comments have been constructive and productive. I think they've worked toward resolving the issues that they have identified.

We have present in the audience today Mr. Bill Cooper from Teledyne, who has directed the independent verification program. You may wish to hear from him. And I have been informed that since you have made arrangements to hear from the other parties at some later time, there are no legal obstacles to hearing from Mr. Cooper. And since I kind of like to think that they're really working for the Staff more than any other party, perhaps you would like to hear from them today.

COMMISSIONER AHEARNE: In your description of this idyllic history, do I gather then --

(Laughter.)

COMMISSIONER AHEARNE: -- that all disputes are not resolved?

MR. DENTON: Well, many of them have been resolved. The company's approach to many of the concerns that the other parties raised has been to go ahead and do it.

COMMISSIONER AHEARNE: So the parties no longer have disputes?

MR. DENTON: No; I think there are some

remaining disputes. But many of the ones, for example, should you include construction QC on site, I think the company after several meetings on that topic, decided they would do it.

MR. ENGELKEN: Yes. They volunteered to do that.

(Laughter.)

COMMISSIONER AHEARNE: This is an old military term.

MR. ENGELKEN: I don't think I am abusing the word.

COMMISSIONER AHEARNE: I see. It wasn't related to the fact that something like in May you said that you thought it would really be a good idea if they did it?

MR. ENGELKEN: I think it was related to that, yes.

COMMISSIONER AHEARNE: Yes.

MR. ENGELKEN: And the scope of that audit is about what we had in mind. It is under way now at the present time.

COMMISSIONER AHEARNE: It is perceptive of them to be able to volunteer what you had in mind.

MR. ENGELKEN: I would endorse what Harold said about the spirit of cooperation of the parties,

though. It certainly is vastly improved over previous relationships, there's no question about that.

COMMISSIONER AHEARNE: Good.

MR. DENTON: And my comments are about the plan. They are finding breakdowns in design control, but the plan is designed to find them and remedy them. I am talking about the plan, the Phase I that we laid on and the Phase II plan that we are recommending today.

I would like just to observe, too, at least the conclusion I am coming to about the cause for these engineering breakdowns. And they are being found in both the Phase I activity and in the Phase II activity that the program has undertaken at their own risk since summer.

They are finding some significant scattered, many significant scattered areas where the plant does not meet the commitment made in the application; that is, that stresses are above code allowables or above commitments. And we will get in and show you some photographs of these areas and talk about the safety significance of them.

These breakdowns in engineering control seem to me to be related to several areas. Now that we have spent a year looking into them in more detail, one of them is the long period of time during which this plant

was under design. The time interval from the time they started to completed the design here, I guess, was almost a decade with the intervening problems that they had.

Certainly contributing to that problem was the change in the seismic design approach that was required. We changed from design earthquakes and double-design earthquakes to the Hosgri and those kinds of changing in the basic input that permeate the seismic design certainly contributed.

And a third area that I think contributed was PG&E's inexperience in designing a large nuclear power plants. This was one-of-a-kind for them, and they had not established those communication mechanisms inside the plant to assure that the information from one designer with regard to spectrums got to the next designer. So there a lot of the breakdowns I think that occurred were in the design control aspect where there were poor communications within the company.

Darrell will go into how many findings have been made, what classifications they are, and what safety significance they have.

But I did want to indicate that I think this program, the Phase I and the recommended Phase II, is really an unprecedented effort and will provide fully

the level of confidence we are looking for to be assured this plant meets the commitments in the safety analysis report.

With that introduction, Darrell, why don't you begin?

MR. EISENHUT: All right. Thank you. I will try to go sort of one step below that into a little bit more detail, but recognizing that the depth on this and the breadth is quite extensive.

If I could have the first slide, please.

This is an outline of the items that I will try to summarize. First, the purpose is we are here to brief you per your request on the Phase II approval.

I will go through a background, just a brief summary again of itemizing what was in the Phase I order that was issued by the Commission; what items were required by the Phase II letter that was issued the same day; a description of the program and efforts that are under way right today; a brief summary of the results that have come out of the program on Phase I, Phase II, and the construction QA; a description of some of the modifications to date, at least a characterization of what kinds of modifications are being made in the plant; a discussion of some factors that are influencing where we are heading on Phase I, Phase II; a brief discussion

of the program as proposed and our comments on it, the conclusions; and then our bottom-line overall proposal and recommendation.

If I could have the next slide.

This background slide is meant to be a brief summary. It uses some shorthand notation that we have used throughout. The order required an independent design verification program -- an IDVP, as we call it -- for all seismic service-related contracts prior to June 1978.

Recall, at the time of the order the questions related to interfaces, they related to service-related contracts. The focus was prior to June '78. And that was really the full scope of the order that was issued. That order required several reports: a basic cause report, a detailed evaluation at the end, and so several pieces with that scope.

The letter that was issued the same day was identified as items that were necessary but not necessarily all the items that are required, prior to exceeding 5 percent or prior to a decision regarding 5 percent. It was an independent design verification for nonseismic prior to June '78, and that was meant to look to see if it was principally seismic or, in fact, whether it was nonseismic.

There was an IDVP for the PG&E internal QA efforts to look internal to how did the QA work in the company. And there was an audit, which is Item 4 here, of an IDVP for all service-related contracts post-'78. And I say it's an audit, recognizing there's some 400 service-related contracts, so it's auditing from that family of each group.

As I pointed out, both the order and the letter identify that these are the items that were necessary, but they may be subsequently modified based on the results.

The way the program was undertaken. If I could have the next slide, Slide 3.A, please.

We have attempted here to put together in somewhat of a little flow diagram how the program was laid out to work. The IDVP Phase I used three basic contractors: The Teledyne Engineering Services was the program manager. It used Robert L. Cloud Associates, which is the "RLCA" in the middle, and Reedy, R.F. Reedy, which is indicated in the box.

The program basically was one which went through and started off with a sampling technique. It looked at samples. It looked at either doing a check calculation, an independent calculation. It looked at the as-built nature of how the plant laid out. It then

took that sample, screened it against a verification criteria, some yardstick as to whether or not there was a problem, made a decision that it meets those criteria or does not, to make a determination of whether or not additional verification sampling had to come forth.

So at some point you develop what is called an EOI, an error or an open item. An error and open item gets identified before you have determined that it is a particular error; that is, it is sort of a potential finding or a potential error. And there's an iterative process of where the IDVP would go back to PG&E to see if there is additional information that was overlooked, whether there was a misinterpretation of whether or not the EOI, if there was something they just overlooked.

There would then be additional verification or sampling or evaluation to decide whether or not the licensing criteria basically in the design envelope on this plant was met.

If after that process is done they determine that it was not met, it becomes an error, and it becomes one of a different family of errors. There are four or five different types of errors. They try to categorize them at that time.

And this is basically the flow pattern that goes through with the IDVP. It is explained in some

depth in some of the previous documents we have sent downtown. A couple of significant things to note is, first, the number of potential findings -- my terminology; EOIs on this terminology -- is the basic number, it's the basic questions or concerns that come up in the first place.

From that there is a set of identified errors. And generally, the errors are types A, B, C, and D; A/B being the most significant. And you often in the documents that you see in all the reports, you will see them identified as "errors A," "errors B," "errors A/B." And that is sort of looked at as the significant group of these. I will not go into any more depth on those except to index you so that that jargon will continue on.

COMMISSIONER ROBERTS: In your jargon, what is the acronym "ITR"?

MR. EISENHUT: Interim technical report.

MR. DENTON: That is where Teledyne looks at a subject area, and one that I was familiar with was the design of tanks, for example, for seismic stability. And they looked at the sloshing models, inside the tank frm big tanks to little tanks. So they say, here's a methodology we are going to use when we evaluate the original design by PG&E of that tank for seismic

adequacy.

So we and our consultants, Brookhaven, looked at that methodology. And so that's really the methodology used by Teledyne when they go to examine PG&E's original model. And so they documented it in something called an ITR. And they've issued about 30 of them, or plan to issue about 30. There are a number of them already issued.

MR. EISENHUT: That is right. That is sort of at the end of the process on one particular group.

This is the basic framework that was laid out by the order and was labeled as "Phase I."

If I could have the first overlay.

CHAIRMAN PALLADINO: How many categories of errors did you have?

MR. EISENHUT: There are four categories of errors, I believe. The September 24th status report that we sent down actually had an Enclosure 4 in it, and Attachment 4 which defined that open items come out as errors A, B, C, and D. And an A is projected to exceed an operating limit, and modifications or changes and procedures may be required. And it tries to correlate it back to a safety-related feature and whether or not there will be a physical modification likely required, whether there will need to be a procedural modification

required or not.

CHAIRMAN PALLADINO: You used the word "open item." That is different from an error, is it?

MR. EISENHUT: Well, it sort of is. The terminology of an open item or an error, there is a fine distinction. But generally speaking, an open item is one that starts out as an error or open item, it can become an open item until it's resolved, then it might flow into an error or ultimately flows into a closed item. So the terminology there is really not that significant.

MR. DENTON: There have been about 200 findings on Phase I that the company had to respond to. So when they originally sent out, Teledyne had not made a determination of whether it is truly an error in the design or whether they could be remedied by more information.

I think of that 200, 13 of them have been classified as A or B, which means that they are convinced that that design has to be modified or the procedures have to be changed or that something has to happen to make part of the plan acceptable.

CHAIRMAN PALLADINO: The only reason I asked the question was you said it was important for us to understand the terminology.

MR. DENTON: I understand.

MR. EISENHUT: At least at the one level, yes.

The first overlay at the right-hand side there is not laying down, but I think you can see it in the box here. The real Phase II program, as originally laid out, would amend and expand this present structure to include the three items that I mentioned earlier. They are in the box on the right-hand side. You can see on your chart.

The only real basic difference to the structure is that in Phase II -- "SWEC" there is the Stone & Webster Engineering Corporation -- and Stone & Webster is proposed to be one of the principal contractors to conduct the independent verification program for Phase II. It is basically the same structure as proposed for Phase II, with some slight modifications that really do not show up on here in depth.

CHAIRMAN PALLADINO: What is that SWEC?

MR. EISENHUT: "SWEC" is Stone & Webster. It is the engineering corporation. Stone & Webster Engineering Corporation. The slide did not reproduce that well.

COMMISSIONER AHEARNE: Now, Harold had mentioned in the beginning, and the September 24th memo

implies it, that Phase I and Phase II as a sharp distinction is beginning to disappear.

MR. EISENHUT: Yes. If I could reserve on that just for a moment, I will get back to that.

While Phase I and Phase II was proceeding, as Phase II was laid out, the PG&E back earlier this year sometime in the spring time frame undertook what was called an internal technical program. Because of the results that were coming out of Phase I concerning the sampling of different facilities and their implications as to whether they go a lot broader, PG&E undertook with Bechtel an internal program.

And if I could have the next overlay.

The top is meant to graphically just sort of illustrate that there was a Bechtel/PG&E program, the project team, that was undertaken that Harold referred to that is now something on the order of 800 staff members working it. They undertook basically a reevaluation of the seismic design of this facility.

COMMISSIONER AHEARNE: And your acronyms at the top?

MR. EISENHUT: "Internal technical program. In fact, I will reserve on the BIR just for one second. The "ITR" first is the major program that was undertaken to look and reevaluate the entire seismic design of this

facility.

COMMISSIONER AHEARNE: The "ITR" you just said?

MR. EISENHUT: The "ITP." I apologize.

COMMISSIONER AHEARNE: I was trying to find that here.

MR. EISENHUT: It makes it very difficult.

(Laughte.)

MR. EISENHUT: The internal technical program is very broad. It is looking at a reevaluation of the seismic design of this facility. So obviously, the question comes up --

COMMISSIONER AHEARNE: Seismic design?

MR. EISENHUT: This is all seismic, it is all design up to this point.

When the IDVP started out, it did an evaluation, for example, by looking at the seismic analysis of one major structure, one major structure of something, I think there are five at the site. There were questions raised as to whether or not that had inferences that the other facilities should be looked at.

It became sort of a moot point because the internal technical program of PG&E and Bechtel undertook to begin the reanalysis of all five in the springtime, so that the question of whether or not to expand the program to look at more than one structure was not

necessarily the right question any longer because they were being completely reanalyzed from a seismic design standpoint by the ITP.

The question rather came to be that if the independent contractor started off by looking at one facility, what should they do in looking at the rest of the things now that flow out of the PG&E and Bechtel program? So what we worked out in discussions with the IDVP program and PG&E/Bechtel is that the results that flow out of the Bechtel/PG&E program are all given to the independent contractor. All of the errors, the open items that flow out of that program go to the independent contractor for him to audit those and to check through them to be sure that he has confidence that the broader program is in fact doing an adequate job.

COMMISSIONER AHEARNE: Is this in lieu of?

MR. EISENHUT: No. It is over and above the independent program. The independent program is doing its sampling and its evaluation. However, we felt that if you want to have confidence and you are sort of going to end up relying to some degree on the fact that everything had been evaluated, you want to have assurance that the errors that were found are real errors, they were properly treated and properly handled, and, secondly, the items that do not develop into errors you want to have some confidence that in fact the ITP did an adequate job of looking at those to decide that there were no errors.

So the independent contractor ends up evaluating in detail all of the open items that flow from the ITP and he also does an audit of sort of the good issues, the issues that turned out not to have errors. Hence, on this diagram we tried to simply summarize where this all is. The results of the ITP flow into the independent verification program.

MR. DENTON: If I could just say it a different way. We expect the ITP program to give us an opinion on the total adequacy of the design of this plant, including all the things that they originally ---

COMMISSIONER AHEARNE: The seismic design.

MR. DENTON: Well, even more than that later, but we are sticking to seismic for the moment.

COMMISSIONER AHEARNE: But Darrell said the ITP was a seismic ---

MR. EISENHUT: It will be expanded in about eight minutes.

MR. DENTON: Yes, but it has been expanded and we will get into some more areas. We are starting with seismic to start with. So PG&E is committed to do a complete seismic reanalysis of the whole plant, all component systems structures and that is largely what this program is doing. All their findings flow to Teledyne, Teledyne reviews the methods, assumptions and the models as well as the things they had already started and the things that we kicked off with Brookhaven.

CHAIRMAN PALLADINO: The ITP though was not a part of the IDVP?

MR. DENTON: It was not a part of the original order. We didn't require that it work that way. PG&E put it together because of the ---

CHAIRMAN PALLADINO: Did they do that voluntarily or was there something else?

MR. DENTON: Yes. They did it because of the

expanding nature of the questions that were being raised. In other words, there was so much coming up out of the Phase I program that it was leading that way and they have elected to do the entire plant.

MR. EISENHUT: I think it is a point Harold made earlier. The minute the results started coming out that there were real questions about the adequacy being raised of one structure, the program was undertaken by PG&E and Bechtel to reanalyze them all from a seismic standpoint.

In our way of looking at it it sort of made decisions easier because you don't really have to then try to look at the sampling and decide how far to extend it because the program has expanded it ---

COMMISSIONER AHEARNE: It is an issue that I suspect at some later point will come back up again. This was a decision made by PG&E and Bechtel?

MR. EISENHUT: Yes.

MR. DENTON: Well, I would say by PG&E, and I guess they hired Bechtel.

COMMISSIONER AHEARNE: Right, by PG&E, but it was not an NRC requirement.

MR. EISENHUT: It was not an NRC requirement.

MR. DENTON: That is right. In following the Phase I program, which required that if you find

something you expand, and then we were finding and expanding and the company I think came to conclude that the only clear way to cut it off was to go to the complete reverification.

MR. EISENHUT: Now if I could explain the other two boxes at the top.

COMMISSIONER GILINSKY: Let me ask you, Darrell, the 800 people that you mentioned before, they are in this ITP?

MR. EISENHUT: They are in the top.

MR. DENTON: I don't know if they are all in ITP because now there are some other programs. See, some of the Phase II stuff has now gotten picked up also.

MR. ENGELKEN: There is also a corrective action program ---

MR. EISENHUT: --- in the ITP.

MR. ENGELKEN: Yes.

MR. DENTON: The total top box now is 800. Now how they are distributed today, I don't quite know.

CHAIRMAN PALLADINO: When you say the top box, do you mean that one on the left that says ITP or all of those three together?

MR. EISENHUT: There are some PG&E people in the box providing input to the IDVP and there are some PG&E people working on the internal technical program.

I have just been handed a piece of paper which says there are 334 total PG&E people working on the program and there are 451 Bechtel people working on the program.

COMMISSIONER GILINSKY: Who is in charge of that group?

MR. DENTON: Howard Friend from Bechtel is in charge of that group and he reports to Mr. Maneatis. Bechtel has assigned three functional managers under Mr. Friend and then they have blended their organizations together with a Bechtel manager at the top who reports to Mr. Maneatis.

COMMISSIONER AHEARNE: Are you going to say what BIR is?

MR. EISENHUT: Yes. The BIR stands for Bloom Internal Review or Report. So it is a Bloom internal study that was done. It was in fact requested by PG&E. PG&E on their own decided to go back to Bloom sometime earlier this year and to have them do an internal look. There was a report that was recently sent to the staff with the end results of that.

COMMISSIONER AHEARNE: Internal to Bloom or internal to PG&E?

MR. EISENHUT: Internal to Bloom. This is a Bloom internal study, sort of a self-assessment.

Similarly, the one on the right is a QA self-assessment within PG&E. They were both initiated by PG&E, to the best of my knowledge, on their own initiative. They both are sort of self-assessments in my terminology. They are referred to as look-back reports, different reports. They are internal assessments that were undertaken.

COMMISSIONER AHEARNE: And they both were completed?

MR. EISENHUT: The BIR is completed and ---

MR. MIRAGLIA: Yes.

MR. EISENHUT: Both look-back reports are completed.

COMMISSIONER AHEARNE: In that upper three-box, ITP is an ongoing program and the other two are completed?

MR. EISENHUT: Yes, and I will try to characterize the status of those now.

COMMISSIONER GILINSKY: Could you say a word more also about our own involvement. You have the arrow going into an NRC box.

MR. EISENHUT: If I could add one more thing first.

COMMISSIONER GILINSKY: Sure.

MR. EISENHUT: There is a construction QA box

that I don't want to forget. The program that was proposed by PG&E, and certainly the first time I heard any questions about it I believe was about September the 1st, but it was a program to look at an audit construction QA. That program was proposed as an addendum and adjunct, I believe is the word they used, to the Phase II program. They propose that it be conducted by the IDVP and by Stone and Webster.

The point was made by PG&E that they have found nothing explicit that would in fact dictate the need for a construction QA program. However, to put to bed any residual questions, they were proposing this kind of program.

MR. DENTON: Our own effort, Commissioner Gilinsky, started right after the original order when we asked Brookhaven to do an independent analysis of what we thought was one of the more suspect areas where the left-handed/right-handed, or unit Unit 2/Unit 3 arrow was made.

I do have in the audience today Mr. Morris Reich who supervised that study if you would like to hear from him.

COMMISSIONER GILINSKY: I would like at some point to hear from him.

MR. DENTON: We have retained them throughout

this, and I put in I think on the order of four or five full-time people reviewing the adequacy of these ITR's and attending the meetings. We retained Brookhaven to assist us in that and they helped us review the first four or five of them. On an ongoing basis I would guess we are spending $200,000 a year with Brookhaven using their capabilities to assist us in making sure that the process is working properly.

So the way I see it is at the first level we are insisting that Teledyne do this kind of audit and then we are attending the meetings and doing our selective review of their products with consultant help to be sure it is all done properly. I am not counting in my numbers the effort that Bob has put in, which has been considerable.

MR. ENGELKEN: Well, we have been auditing the IDVP and the ITP office activities at both facilities. We have been inspecting the physical modifications done at the site. We have been, as part of our audit of IDVP and ITP, we have been identifying issues that have been passed on with respect to some of the structures and certain of the equipment and fed back into NRR for their consideration and into the IDVP ultimately for their resolution.

I think that is about the extent of the

regional activities. We have had about four men full time in recent months working on the program, not considering a lot of management attention.

MR. EISENHUT: I should say we also have a dedicated project manager who is dedicated just to the coordination of the seismic review program at PG&E, Mr. Hans Schierling, who is here with us today and it is just on this seismic re-evaluation effort.

MR. EISENHUT: If I could go to the next slide.

We kind of summarize these results recognizing they are preliminary and recognizing that these are some observations we have gotten from the IDVP directly.

First, as Commissioner Ahearne emphasized a couple of times, it is just seismic design, Hosgri related, pre-'78 Phase I. So it is somewhat of a limited effort.

The effort is nearly complete, as characterized by the IDVP. For that particular area, if you look at the IDVP plus the internal technical program, it is quite thorough. They have reanalyzed basically all structure systems of components. You do the analysis until you verify that you get the same result you previously had first doing the structure, et cetera, and working through.

We expect that the IDVP will be able to

identify any problems that exist and we expect that problems will be resolved if they are resolvable and they will be resolved to the satisfaction of the IDVP.

There is a feedback loop that ensures that after a problem has been identified it goes to PG&E for resolution. That resolution then goes back to the independent program to ensure that it is resolved to their satisfaction.

MR. DENTON: I think the stress with regard to Phase I, it is nearly completed. Of course, not every modification has been made, but the original scope of Phase I as was ordered has been essentially done by Teledyne and their assistance. They have identified these activities, the company has responded and I think the company intends to fully respond to all the identified open items with what their plans are to remedy those areas that are required by about the middle of December and a little over a month later Teledyne would expect to be able to wrap up and issue a final report on their conclusions with regard to Phase I.

CHAIRMAN PALLADINO: On your Figure 3 in the paper you identify other things that you are going to require in addition to Phase I items prior to startup.

MR. DENTON: Yes. We will turn to those next to complete Phase I.

CHAIRMAN PALLADINO: You mentioned the interim report. Is that the interim report on Phase I?

MR. DENTON: I guess I don't know what page you are on, Mr. Chairman.

COMMISSIONER AHEARNE: Figure 3.

CHAIRMAN PALLADINO: Figure 3.

MR. EISENHUT: The interim report relates to Phase II and not Phase I.

CHAIRMAN PALLADINO: Well, it says under "Prior to Fuel Loading" "Interim Report - See Note."

MR. EISENHUT: The parentheses there is meant to relate to Items 1, 2 and 3 under Phase 2 and we are going to get to that in just one moment.

CHAIRMAN PALLADINO: I see. Okay.

MR. DENTON: It may not have been accurate.

CHAIRMAN PALLADINO: Now you say all the Phase I items are going to be reported in a report by Teledyne.

MR. DENTON: With the recognition that there could be some modifications required in Phase I that we might permit to be deferred to somewhat later than that date. But the action that is required and the corrective action will have been evaluated and a thorough understanding and a write-off by Teledyne that that is a satisfactory resolution of the design differences would be completed by that date.

Now we will have to see what the final changes are. For example, in the refueling building they are having some troubles and having to redesign some of the I-beam connections and this kind of thing. Well, that might be an area which we would be willing to let them have a little bit more time during low-power testing to complete those changes. But the completion of the design adequacy would all be done in the time frame I described for Phase I. It will be done in December by PG&E they think and Teledyne will need roughly a month or a little longer to completely audit those results. Then we would need some time after we have got the final report to be sure we were happy with the final resolution on Phase I.

CHAIRMAN PALLADINO: You mentioned interim report several times and I was interested in when it was going to come.

MR. EISENHUT: Could I have slide 11. It is the same as figure 3 but simplified slightly.

CHAIRMAN PALLADINO: All right.

MR. EISENHUT: This basically is figure 3 with shorthand a little to fit on the one page. The circles here are meant to note what was originally in the order under Phase I and the circle was where the requirement was previously for the letter in Phase II.

The Phase I program, as Harold just mentioned, is proceeding. It is expected that we will have the vast majority of all the technical information and technical errors will be identified by December and the final report is targeted for a write-off through the cycle with Teledyne by January 25th.

CHAIRMAN PALLADINO: This is the report on Phase I?

MR. EISENHUT: Phase I.

COMMISSIONER AHEARNE: Is it strictly Phase I?

MR. EISENHUT: On this chart it is. There are some other bullets which also will be complete by January 25th which I will get to in such a second. I am just walking down the list.

MR. DENTON: What we are going to tell you in a moment is that Phase I and Phase II will essentially all be completed at the same time.

COMMISSIONER AHEARNE: Can you tell us if it is going to be one report?

MR. EISENHUT: No, it is not one report.

MR. DENTON: No.

MR. EISENHUT: Because there are different contractors, it is two separate entities at the present time.

COMMISSIONER AHEARNE: Two separate reports.

MR. EISENHUT: Two separate reports.

MR. DENTON: There may be more than two. There will be perhaps a lot of reports the way this is going, but we would have from Teledyne the review of that corporate organization on the Phase I activities in that time frame if we meet these schedules. Now we will also have a lot of other things which are Phase II.

CHAIRMAN PALLADINO: There will be a Phase I separately.

MR. EISENHUT: It is billed as a final report on January 25th. Now if you look at Phase II, the report to address items 2, 3 and 4 on this slide is also due to be completed by January 25th.

CHAIRMAN PALLADINO: That is where it says IR?

MR. EISENHUT: It turns out it is not the IR. The interim report is what we propose requiring prior to a fuel load decision. An interim report is that the effort should have proceeded to the point where it is substantially complete to the point where there are no major surprises. It turns out that the entire effort is projected to be completed by that same date.

CHAIRMAN PALLADINO: Is there a final report on Items 2, 3 and 4?

MR. EISENHUT: A final report is also projected by Janaury 25th.

CHAIRMAN PALLADINO: All right, and what is this interim report then? You say you want an interim report before you allow a fuel loading?

MR. EISENHUT: If the effort is not complete.

MR. DENTON: We sent this up with the thought ---

CHAIRMAN PALLADINO: Are you trying to say that fuel loading may occur before you get the final report on things that you want?

MR. EISENHUT: On Phase II.

COMMISSIONER AHEARNE: Let me just ask a couple of questions and see if I can understand.

What are you getting on Phase I?

MR. DENTON: Everything you ordered.

(Laughter.)

COMMISSIONER AHEARNE: No, I am not asking that. I am asking what are you getting? You are getting a single report?

MR. DENTON: I don't want to say single. I don't know how many reports, Commissioner.

COMMISSIONER AHEARNE: Who is going to be providing you with ---

MR. DENTON: Teledyne.

COMMISSIONER AHEARNE: Teledyne will provide you with a report or reports that will come from

Teledyne and will on Phase I as originally defined or Phase I plus?

MR. DENTON: It will be at least as originally defined. With seismic design being completely redone, I imagine it will be plus. But as a minimum it will include the order.

MR. EISENHUT: Well, Teledyne has taken the position, and certainly they may speak for themselves here, but Teledyne took the position in doing Phase I that they have done an evaluation listed as Item 9 and they did the evaluation listed as Item 10 because they felt it was appropriate to make that an item before the Phase I effort would really make a good technical basis.

COMMISSIONER AHEARNE: But you will get something from Teledyne?

MR. EISENHUT: Yes. It will be a write-off for Phase I and it will include some other items.

COMMISSIONER AHEARNE: Fine, and you expect that to come in ---

MR. EISENHUT: They projected yesterday January 25th.

COMMISSIONER GILINSKY: Can we hear from Teledyne?

MR. DENTON: Yes, sir.

COMMISSIONER AHEARNE: Let me just finish.

MR. DENTON: If I could clarify this point a bit. When we were putting together what we thought we needed to make a decision to recommend to you the resumption of the licensing, we said we need as a minimum Phase I and we need enough of Phase II completed, Phase II being all these things we had ordered, plus all these other things that they have now volunteered that we can be completely confident that there are no surprises left in this plant.

Now what has happened as the schedules have shifted since we have reached that sort of philosophical position is they have largely merged. So that in fact the case now, as Darrell was saying, is that we had said interim report just as a philosophy a month ago as when we put the paper together, but the dates and the way the company is being able to do it is in fact you are getting I think in essence all of the Phase II things we had in our letter at the same date.

COMMISSIONER AHEARNE: Now the reporting on Phase II will also be from Teledyne?

MR. DENTON: Yes.

MR. EISENHUT: Yes.

COMMISSIONER AHEARNE: So you will also then be getting at some stage a final report from Teledyne on Phase II?

MR. EISENHUT: Yes, and the final report was projected as of yesterday as January 25th also. It is sort of evolving, the dates are.

COMMISSIONER AHEARNE: Fine, but this would be a separate report or reports that would be covering Phase II and possibly some other items?

MR. EISENHUT: Yes.

COMMISSIONER AHEARNE: Now in this context of Teledyne doing these two things, is it Teledyne who will be submitting an interim report?

MR. DENTON: Yes, Teledyne is the IDR.

COMMISSIONER AHEARNE: Your last item is your interim report.

MR. EISENHUT:

COMMISSIONER AHEARNE: Is that also bei submitted by Teledyne?

MR. EISENHUT: It would be if this structure were maintained. Let me explain. When we laid out what do we really need prior to a fuel load decision, we didn't have the January 25th dates and we weren't aware they were coming the same date.

COMMISSIONER AHEARNE: So are you saying that when you wrote this you had in mind that along with the January 25th Phase I you would at a minimum need some additional report that you label an interim report?

MR. DENTON: Yes.

MR. EISENHUT: Which demonstrated the effort to be substantially complete such that there would be no surprises in Phase II.

COMMISSIONER AHEARNE: So this is more what you would require and it is not what they have now said you are going to get?

MR. EISENHUT: This is what we would propose as the requirement. They are projecting as of yesterday that these things may actually occur sooner on Phase II.

MR. DENTON: We originally were willing to wait on Phase II, but the findings of Phase II are, in my view, just as safety significant as Phase I and that is what led us to that.

COMMISSIONER AHEARNE: One last question. You had said, Harold, that the difference between I and II has been mooted, your phrase.

MR. DENTON: Yes.

COMMISSIONER AHEARNE: And I gather that from the memo that came up on the 24 that there was enough modifications of scope that it may really be hard to still maintain that distinction. Nevertheless, you are saying that whatever you receive on January 25th will be able to be characterized as here is a batch that covers Phase I and here is the other batch that covers Phase

II; is that correct?

MR. DENTON: I wouldn't want to put a lot of faith in any particular date. We have not reviewed their schedules that they have projected.

COMMISSIONER AHEARNE: I was just trying to get it clear in my mind because the paper itself seemed to be working its way towards a blurring of any distinction between I and II, but yet your reporting coming in you are saying will maintain ---

MR. DENTON: That is because of the progress that the company and Teledyne have been able to make, if you accept the scope of Phase II as we have recommended it. They progress they are making is that they are going to complete them essentially at the same time.

MR. EISENHUT: If I just comment on one thing he said though. I would characterize it a little differently. It is not a blurring of Phase I and Phase II as much as a blurring of when you would require the results from the two, and that is what was meant by the blurring of the two.

COMMISSIONER AHEARNE: But Harold's term in the beginning the difference between the two has been removed.

MR. DENTON: Let me say it another way.

COMMISSIONER GILINSKY: John, will you explain

what it is that you are concerned about so we can understand.

COMMISSIONER AHEARNE: Well, I am trying to understand. At some point we will eventually turn to what is it that is required to reinstate the low-power license and what is it that is required to go above five percent. At some previously discussions and order and such there seemed to be this distinction maintained between I and II. The staff is characterizing well we need not worry about that, everything is coming in on the 25th.

Past history leads me to be skeptical of what will actually come in and how complete things will be. So I suspect at some point we may have to revisit is there really a difference between I and II, and I was just trying to get clear why there was no longer any difference and some of the things we had once thought were going to be needed for II would now have to be needed for I and what was the situation. I am trying to understand.

MR. DENTON: I think in the meetings all parties, including the staff, have come to the same conclusion that we don't want any surprises. Therefore, based on what is being found in Phase II, it is essential to essentially complete Phase II by the time

any license is restored so that there is no possibility of finding the next day a major defect.

So that has been the stated objective for the company, we have adopted the same view here, and I am sure the other intervenors would like to go that far. Then the schedules just worked out so that in essence they are going to get the previously identified Phase II think done in the same time frame. So at the party level, the parties to the proceeding, it has come around to just about completing items 1 through 11 here, except for the modifications, prior to a decision.

CHAIRMAN PALLADINO: But, Harold, we are going to have to face a Phase I. That is, we are going to have to lift the suspension on fuel load and low power if everything is all right. There are certain items that have to be done before that and I still picture that as Phase I.

Then you are going to have some other items that you are going to say have to be done before you are allowed to go above five percent power. I still picture those as Phase II. Then you are going to allow some things to go on after operation, and even though we didn't give it a particular phase, I separate those out from those required to lift the suspension and authorize any further power level.

So I think we do need to make sure, even though the dates now are predicted to be the same, that we are going to get sufficient information to make our decision. That is why I was saying, all right, even though right now on the items that you have listed as Phase II items, you have said you wanted an interim report. Do I gather now that you don't really expect an interim report because you expect the July 25th date to be met in the final report.

MR. DENTON: That is correct.

MR. EISENHUT: Could I make a comment here.

When we sketched out the table, you have got to go back to generally what the thought process was a year ago. The problem then we believed was seismic related, it was Hosgri related, it was pre-'78 and it was service-related contracts. That generally was the thing. Why I said earlier that they have sort of merged together is that we now believe that there is no real distinction pre-'78/post-'78.

CHAIRMAN PALLADINO: I appreciate that.

MR. EISENHUT: Then it automatically flows why we require a report or a substantial evaluation. It has evolved. The utility even states there is no real distriction between Phase I and Phase II in the sense of there is no sub-function pre-'78/post-'78. That notion basically is gone to the best of my knowledge in all parties. Seismic and non-seismic the same way.

CHAIRMAN PALLADINO: But Phase I was not defined, at least it hasn't become known as pre-'78.

MR. EISENHUT: Oh, absolutely.

CHAIRMAN PALLADINO: I read somewhere where you said it is the things you need for low power.

MR. DENTON: Let me try to explain ---

COMMISSIONER GILINSKY: Wait, there is ---

CHAIRMAN PALLADINO: Why don't you let me finish a whole paragraph.

(Laughter.)

COMMISSIONER GILINSKY: All right.

(Laughter.)

CHAIRMAN PALLADINO: Now I have lost my place.

(Laughter.)

CHAIRMAN PALLADINO: The point I was trying to make is you listed, and I guess it was on page 11, you listed certain things that have to be done before you allow fuel loading.

First I have to get your attention.

There are certain things you said you are going to need before you can go to fuel loading and low power and I see them listed there. One of them says interim report on some Phase II items.

Now my question is are you saying I no longer need to look for an interim report because we are going to get a final report in time on those? That was my basic question.

MR. DENTON: It was our intent to require at least an interim report. If they can provide a final report, fine. So if you look down that column, prior to a fuel load low-power decision, they were intended to be the items that we would require as a minimum, and as a minimum it would be at least an interim report on Phase II and schedules may work such that it would be a

final.

The same way down on Item 5. We want an interim report on the QA program and an interim report on non-seismic service related contracts. Where the checks are we wanted the activity complete. So that column was intended to be our minimum set, and I think by talking about where they actually are in schedules may have led to the confusion.

CHAIRMAN PALLADINO: Now if it turns out that they make the January 25th for the Phase I report but they miss the January 25th date for the final report on Phase II, would that hold up the fuel loading and low power?

COMMISSIONER AHEARNE: It would have to on this.

COMMISSIONER GILINSKY: Well, it sounds like what they are saying is that in view of what has been discovered as a result of the preliminary looks they really want to see it all and happily the company seems to have decided the same thing.

CHAIRMAN PALLADINO: I was just trying to understand.

COMMISSIONER AHEARNE: Well, let's see now, Commissioner Gilinsky just said that you wanted to see it all.

CHAIRMAN PALLADINO: No, that is if they get the final report.

MR. DENTON: No, I said what I said. I want to see enough of it to be sure that there were no surprises.

COMMISSIONER AHEARNE: Do they know what "enough" is?

MR. DENTON: They intend to do it all.

COMMISSIONER AHEARNE: I understand that. That is not my question. My question would be would they know ---

MR. DENTON: No. None of know because we don't know what is going to be uncovered in that program yet. So I wanted to reserve how much was enough because they keep finding things. So I am unable to define today exactly what the scope of the interim report would be, but I was hoping that by the time we got that close to completion that the difficulties in those areas would be clear enough that we could come to agreement.

CHAIRMAN PALLADINO: Harold, to make sure I have an understanding, under Phase II, the "B" category, where it says "Interim Report," you are going to look for a final report and if you don't get the final report by the date you said, you are still either going to want an interim report or we wait for the final report?

MR. DENTON: I would be happy with an interim report and a finding by Teledyne that based on all they had seen it was unlikely that the remaining little bit of activity was going to clear up anything major.

What I wanted to do was avoid the chance of a major surprise being found later in the Phase II and I would want Teledyne's opinion on that as we get down toward January and they have completed more of Phase II. That is sort of what the company proposed to us that they had completed and we said, fine, that sounds like a good idea.

COMMISSIONER AHEARNE: I am puzzled. For those items 2, 3 and 4 are you saying that you don't need anything for your staff to review and all you are looking for is a Teledyne finding?

MR. DENTON: No, sir. I am looking for a lot of information.

COMMISSIONER GILINSKY: Presumably that would be reviewed just the way everything else is reviewed.

COMMISSIONER AHEARNE: That is what I thought, but then ---

COMMISSIONER GILINSKY: Well, I mean I think he was saying what he wants from them.

MR. EISENHUT: Right. Clearly this was meant to be a requirement column independent of schedules.

COMMISSIONER AHEARNE: But it is actually you want something that your staff can review?

MR. EISENHUT: Oh, certainly.

COMMISSIONER AHEARNE: Therefore, if they do not get the final report done, then they need more that just Teledyne telling you that there are no surprises.

MR. DENTON: We wanted to be able to assure you that enough work under Phase II had been done that it was very unlikely that remaining activity was going to uncover errors of major significance.

Then there are the others. Some of the other items were recommended by other parties to the proceeding. Some of the others PG&E did on their own initiative and I guess some they did at the urging of some of the other parties. But since they agreed to do some of these, we have indicated what we would like to see on the other items even though they were not a part of Phase I or II in the original proceeding.

COMMISSIONER AHEARNE: Now the interim report column for No. 6 and 7, is that a separate interim report from the one you have just discussed?

MR. EISENHUT: Well, it would be, depending upon the timing. On those two items, for example, construction and QA, before we would go with the decision part of fuel to full power, we would want to

have the benefit of a substantial completion of the program and a report from the IDVP that we can review.

COMMISSIONER AHEARNE: In this January 25th, that is not at the moment considered that that is also going to be in?

MR. EISENHUT: No, it has its own independent line schedule, which all of these do.

MR. DENTON: Then the next column were things that I thought could be postponed and done during the low-power testing and completed such as a walk-down and things that could be ---

COMMISSIONER ROBERTS: Could you elaborate on No. 7. What do you mean, "Ask Bill for walk-down"?

MR. DENTON: Bob, would you like to cover that one?

MR. EISENHUT: Well, that item is an item that for modifications that are done in the plant as a result of this program, you want a final as-built check, the final as-built check to ensure that the modification that is put in place is in fact like the modification that is on the design paper.

MR. DENTON: I was proposing to defer that to be done during, say, the low-power testing program and completed before any ---

COMMISSIONER ROBERTS: I just wanted to

understand. I am not attacking.

MR. DENTON: Then, finally, we thought there could be some items that could be deferred on out into operation if we could make a determination that they were not important to safety during that period for whatever reason, such as the example I gave in the refueling building might be something that could be deferred.

COMMISSIONER AHEARNE: In the walk-down then that you are deferring, these would not be areas where operation would then make it difficult to do a walk-down.

MR. EISENHUT: That is correct, it would not be. In fact, as part of the previous items, there is in fact a complete walk-down check of the plant. This line item is only for those modifications. So as part of the proposal it would be that the systems of course that are needed for various operations or that are prohibited from having access to are taken care of.

MR. DENTON: So I think it is fair to characterize this, as what our recommendation is, we are requiring more than we envisioned in Phase II at the time, but the reason for doing it is based on the results that we have seen from Phase II and recognition by PG&E and Teledyne that these are important and that a certain amount of these things need to get done and

completed so that we don't have any surprises.

COMMISSIONER GILINSKY: Are you going to tell us about what has been found up to now?

MR. EISENHUT: Yes, sir. If I could go back to slide 4A.

CHAIRMAN PALLADINO: I still have to clear up one point and it is not a very complicated question. Do you define Phase I now as those items that have to be completed before fuel loading in low power? It has nothing to do with 1978 or anything else. That is what this says.

MR. DENTON. In my terminology I still think of Phase I as being what the Commission ordered Phase I to be. I mean that is the activities that were ordered and that is what I mean Phase I to be.

CHAIRMAN PALLADINO: But see, your paper says "The original requirements needed to support a fuel load low-power decision have become known as Phase I, whereas items origially requiring completion before a decision regarding power levels greater than five percent were defined as Phase II."

Is that what you mean here on this table?

MR. DENTON: By Phase I then on that table are those original items defined as necessary, and I use Phase I and Phase II the way they were originally

defined recognizing that we are now modifying our recommendation.

CHAIRMAN PALLADINO: I appreciate that.

COMMISSIONER GILINSKY: I think that is a clearer way of putting it. We originally said we would need as much of Phase II as turned out to be necessary on the basis of what turned up, you know, in Phase I.

MR. EISENHUT: The key there is the original.

COMMISSIONER GILINSKY: Yes.

CHAIRMAN PALLADINO: Why don't you go ahead.

MR. EISENHUT: On slide 4A the only item I wanted to point out again, as I think was mentioned earier, there were about 200 EOI's, errors on open items, sort of preliminary findings. Thirteen of those turned out as either A's or B's, A's and B's as defined as we mentioned earlier. They are the more significant items that require either modifications to the plant, modifications to the procedure or some detailed evaluations.

COMMISSIONER GILINSKY: We are informed of all the EOI's, I take it?

MR. EISENHUT: Yes.

COMMISSIONER GILINSKY: And someone on our staff keeps track of them?

MR. EISENHUT: Yes.

MR. ENGELKEN: We get biweekly reports.

MR. EISENHUT: They come in in the semi-monthly reports that go to all the parties. They were also summarized. The September 24th memorandum summarized the status and resolution of all the open items.

MR. DENTON: We have some slides of some of the modifications that have been made just to show you the type of changes that have been made and we will get to those in just a moment.

MR. EISENHUT: The next slide, 4B. Basically these are the preliminary results to date on Phase II. Phase II looks, as was characterized yesterday, like sort of a vertical slice. The proposal is to look at three systems, one of them being the auxiliary feedwater system and I will get the other two, plus some analytical calculations.

COMMISSIONER GILINSKY: Does the ITP program also use this terminology, A, B ---

MR. EISENHUT: Yes, essentially the same terminology. They are roughly compatible. However, they are not directly one to one.

COMMISSIONER GILINSKY: You went over that Phase I slide pretty fast.

MR. DENTON: You had asked about hearing from

Teledyne. Since these findings are Teledyne's, maybe this a good time to hear from Bill Cooper on the 13 A and B's.

COMMISSIONER GILINSKY: Well, I would be delighted.

CHAIRMAN PALLADINO: Who is the representative, Bill Cooper?

MR. DENTON: Bill Cooper is managing the program.

CHAIRMAN PALLADINO: Bill.

(Mr. William Cooper comes to the Commissioners' table at this point in the proceedings.)

CHAIRMAN PALLADINO: I gather the matter we want you to address is the preliminary results on Phase I and Phase II. Is that what is desired?

(Commissioners nodding in agreement.)

MR. COOPER: Mr. Chairman, I think I can address these with this slide and the following slide that Mr. Eisenhut has prepared.

I apologize for the complicated alphabetical soup that you have had to be thrown into in this presentation. It is partially nomenclature by committee and has partially grown that way. I would suggest that in our discussion today we use terms more normal to the industry such as potential findings, observations and

findings, and I will try to relate them in those terms which may be simpler for you.

I believe that Mr. Eisenhut has already done this in essence in that he said in Phase I there have been essentially 200, approximately 200 of our open item reports which are the potential findings that I would refer you to.

At the time Mr. Eisenhut prepared this slide on Phase I there were 13 of those approximately 200 that had been identified as items which would ordinarily in the program be called findings; that is, they are of significance, design criteria or operating limits are exceeded, physical modifications, changes in operating procedures or more realistic calculations or retesting are required. At the time this slide was prepared there were 13. There has been another one identified subsequently. So that at the present time there are 14 such items.

With respect to Phase II ---

COMMISSIONER GILINSKY: Before you go on to Phase II could you give us some examples of EOI's that didn't make it into the 13 and tell us what some of the 13 are?

MR. COOPER: With respect to those that did not make it into the 13, you must remember that in this

program we have used a very low threshold of identification for potential errors in the sense that the IDVP would generate an open item report on the subject to identify in public that this was an item of concern to us before we could really find out additional information required to evaluate the item. Many of them we would look for other findings, like we had just been looking at the wrong drawing, that there was a different drawing that explained it that we hadn't known about previously. That is an extreme, but it is typical of a fairly large number of those that could be immediately closed as soon as additional work was done.

There are a large number of items which were deemed to be what we would ordinarily term an observation in this program, an item which was an error or it was a deviation from procedures, but of no consequence with respect to whether or not the component met the licensing application criteria.

COMMISSIONER GILINSKY: Could you give us just one example.

MR. COOPER: Yes. Let us take the calculation of stresses in a given component. Our programs requires that an open item report be issued if the independent calculation made in our program gives a calculated stress result differing by more than 15 percent from

that in the original design computation. That reporting of a 15 percent difference is independent of the level of that stress versus the allowable level of that stress.

For example, perhaps we were computing that the stress was 33 percent of allowable and the utility had reported that the stress was 50 percent of allowable. We would have to report an open item on that. We would have to do this not because of concern about that specific aspect, but to indicate to us a tracking of potential generic concerns. That same error applied elsewhere in the stretcher could have resulted in a violation of licensing application even though it did not here.

So we had to report it and we would pursue the aspect that led to the difference and we would identify why is there a difference. Having identified why there was a difference, we could then identify whether this was something of potential generic concern beyond that particular sample.

In every such case we would issue what we called an error "C" report for that. It was a difference between the two calculations, but it was not one which in and of itself was of significance relative to the licensing criteria.

COMMISSIONER GILINSKY: What about the 13 or

14, what are they like?

MR. COOPER: With respect to the 13 or 14, the majority of these call for the review, re-evaluation or reanalysis of the various building structures that are on the site from the viewpoint of seismic evaluation. Our original sample was just the auxiliary building. We reviewed that which, by the way, does contain the fuel handling building as a portion of the auxiliary building the way things are sometimes reported. So there are either four or five safety related structures on the site.

Our specific sample was the auxiliary building. We looked in particular areas in other buildings. We identified concerns with respect to the development and control of the original definition of the effects of the earthquake. The internal technical program has of course then proceeded from this to look at all these buildings in considerable detail.

There were others. Another illustration would be a valve, for example, that we found there would have to be a support added to that valve to get the stresses in the piping so they would meet the licensing application criteria. So the question would be all right, not just modify that valve by putting on those supports, but does the addition of supports to such

valves, is the valve still known to be sufficiently qualified for the service.

COMMISSIONER GILINSKY: What was the result of your analysis of the auxiliary building, or is that complete?

MR. COOPER: The results that we performed of the auxiliary building identified a number of differences in excess of 15 percent. The term "interim technical report" has been used here. I perhaps could clarify one point in the presentation.

We use the interim technical reports as a mechanism for reporting a result or even a preliminary result on a group of problems, on a particular group. There will be about 30 of these in Phase I. It was an earlier estimate at least. We are starting to issue those. It happens that the particular interim technical report on the auxiliary building has been issued. It reports the results of our analysis of that building.

Our original plan was to carry that to a comparison between our analysis and the utility's analysis of that same building. However, as their internal technical program developed, it looked like that this was not an efficient step to pursue because the old utility analysis that we would be comparing with no longer had anything to do with what was going to be

in service at the site. It was going to be re-evaluated So we published this particular report. When we received the internal technical programs's evaluation of the auxiliary building we will do verification of those corrective actions they have undertaken.

COMMISSIONER GILINSKY: Do the differences between your calculation and the original calculation then propagate into differences onto piping systems and so on which are now subjected to different motions?

MR. COOPER: Yes, sir, they could, and this is of course part of the work that the internal technical program is going through. Depending upon the extent of their reanalysis and re-evaluation of the auxiliary building, they may or may not have to define new floor response spectra which would be applicable to the various pieces of equipment.

Whether they do or do not, they will be reviewing the qualification of that supported equipment to make sure that it is qualified to the appropriate definition of the floor response spectra and we will be verifying their corrective action to make sure that they have done this in an appropriate way.

COMMISSIONER GILINSKY: When you said there were 15 percent differences, were you talking about

floor response spectra that you had developed?

MR. COOPER: It could be at almost any level in the computation. At times there would be a 15 percent difference, say, in the stiffness of the "A" beam in entire structure. We would still have to issue an open item report. That is the reason in Phase I that 200 is such a large number. I mention that to contrast it with something we will see in Phase II on the numbers.

COMMISSIONER GILINSKY: Well, I was trying to understand what you did in the auxiliary building. Was it just the structure or did you pursue ---

MR. COOPER: I just mentioned the structure, but in addition we pursued large bore piping, pipe supports and small bore piping and its supports. We pursued various types of equipment, electrical equipment qualified by analysis and by test, pumps and valves.

I am going beyond just the auxiliary building here, but sampling throughout the plant. Tanks have been mentioned, HVAC equipment, HVAC duct supports and conduit supports. We sampled all of the equipment.

The initial sample we undertood included all these various equipments for the plant that had been believed to be qualified for the Hosgri event and these are defined in considerable detail in the original program plan.

COMMISSIONER GILINSKY: I realize that sampled many systems, but in the auxiliary building itself when you found differences in the response of the building did you pursue that to investigate the effect on piping systems within the auxiliary building?

MR. COOPER: In our initial sample we only pursued whether or not the evaluation had been done correctly for the spectra that had been defined for that sample. Then, in addition, we carried a separate item in our scheduling, and it is an item on which we expect to be issuing an interim technical report in another week or so, just on the definition of the spectra themselves and the concerns we had with respect to those original definitions.

So we pursued the seismic from the viewpoint of was the environment defined correctly. Then we also pursued, assume the environment is defined correctly, was the component properly evaluated relative to that defined environment.

COMMISSIONER GILINSKY: Let me just pursue this I suppose ad nauseum to some of you, but what I got from you saying that there are 15 percent differences in some places in auxiliary building analysis was that the environment of the piping in that building may not have been chosen properly. That then throws in the question

of the calculation on the piping and whether or not they had been done correctly for the assumed environment.

MR. COOPER: Both were looked at.

COMMISSIONER GILINSKY: Okay.

CHAIRMAN PALLADINO: Do you want to go on.

MR. COOPER: If I could have the next slide which is Phase II. Near the top of this slide it is mentioned that there are 39 technical concerns anticipated to date on Phase II with an estimated number as of yesterday that this will total in the high 50's. First, 50 is much smaller than 200.

COMMISSIONER ROBERTS: Excuse me for interrupting, but do the technical concerns in Phase II equate to, whatever the acronym is, in Phase I?

MR. COOPER: No, sir, not directly. That is the point I am trying to make is that the issuance of ultimate item ---

COMMISSIONER ROBERTS: A technical concern is not the same thing as an EOI?

MR. COOPER: It is, but the issuance of an EOI is signaled in a somewhat different manner in Phase II than it was in Phase I. In Phase I we were dealing with some very specific numerical quantities, much more subjective than some of the items being considered in Phase II. In Phase II we didn't have the preciseness of

15 percent defined.

COMMISSIONER GILINSKY: Let's see, did you say it was more subjective than Phase I?

MR. COOPER: I am sorry, sir, at this point I am not sure which I said.

(Laughter.)

MR. COOPER: Let me say it a different way that may be more understandable anyway. In Phase I we were looking at seismic effects on a broad spectrum of equipment and we were looking at the definition of things that are always numerically and on those numerical definitions we put a 15 percent criteria.

In Phase II we are taking more of a vertical look at all aspects of three specific systems, plus two technical calculations. Many of these things cannot be defined in such numerical terms. So we don't have the arbitrary type of 15 percent signal on Phase II as we had on Phase I and one would expect to result from that a smaller number of open item reports to issue.

The reason I emphasize this is I have a great deal of difficulty all along with people counting these numbers without understanding the numbers. I am trying to say that 50 and 200 are apples and oranges and you must be careful when you compare them.

To date of these some 39 concerns issued, five

of them have been identified as being significant, as being what we would ordinarily call as findings. At the present time there are seven such potential findings. What happens here is that Stone and Webster or the other organizations in reviewing this work, and these happen to be from Stone and Webster, make a recommendation to us at TDS concern how they believe we should disposition this particular concern.

We review it. If we concur, we will issue error report. If we do not concur, we will state our reasons why, take it back to Stone and Webster and discuss it in more detail.

The point is that the total of those two numbers 12 is something like the 13 we had on the previous slide. Now I really believe we are comparing equal kinds of significance. They are findings which are significant relative to the licensing application with respect to the plant.

I have I have been of some use in trying to identify these that are all seismic. These are all non-seismic. Now in the future there may be some Phase II seismic related items. I just don't want you to misunderstand that.

COMMISSIONER AHEARNE: Could you say a few words about what you are doing with the Brookhaven

Report that was passed on to you?

MR. COOPER: Yes, sir. We are in the course of reviewing the Brookhaven Report and at the same time we are reviewing the utility's report. It is actually a Blume analysis that is identifiable by the term the '81-'82 Blume Analysis. It is the latter that the utility would presently use in their continuing work related to the containment annulus.

Both of these reviews are in progress. The statements that I will make are not intended to indicate final conclusions. We have issued two so-called open item reports expressing concern about two specific aspects of the manner in which the Blume '81-'82 Analysis was conducted. We are continuing to pursue these as well as our detailed review of the various reports.

By letter of last week which went to Mr. Maneatis with copies to all parties, our letter 170, we explained in somewhat more detail what our concerns were about these particular two open items. In our letter which is project number 55-11, No. 174, dated October 15th, which is last Friday I believe, at least I know this letter was mailed last Friday to Mr. Denton with copies to all parties, we gave a preliminary view of the Brookhaven Report and of the URS/Blume 1981-1982

Analysis.

We expressed therein that we consider it possible that the present Blume Analysis may not provide adequate results for evaluation of the annulus structure or the attached components. We state that we presently consider it possible that the Brookhaven Model B may provide a valid solution for the annulus structure, including floor response spectra. However, the Brookhaven Report may not provide for a proper evaluation of the piping itself.

Our review is far enough along to make these rather broad preliminary conclusions, but, as I say, we are continuing with the detailed work. We would expect to have these reviews done in schedules consist with the other schedules that have been presented to you here today.

COMMISSIONER AHEARNE: Just to follow that one a step further, if you reach the conclusion that the Brookhaven work is a better description than what PG&E has done, what then happens?

MR. COOPER: Well, we already have identified as an error the previous evaluation of the annulus region, and at some time or another we are either going to have to verify and accept the utility's proposed solution or we are going to have to continue to report

this as a non-resolved error, which I am sure would impact the process.

COMMISSIONER AHEARNE: So the steps that you see is having the utility coming back to you and saying that they either disagree and here is why or they have redone their work and here is something else for you to look at.

MR. COOPER: Either of those are possibilities.

COMMISSIONER GILINSKY: When you are talking about an error in the analysis of the annulus, you are talking about what now?

MR. COOPER: We are using the term "error" here to identify a concern with the evaluation of the annulus that has been reported to date. This happens to be what we call an error class A or B; that is, we are unable to determine whether the error can be reconciled simply by additional calculations or whether physical modifications will be required.

COMMISSIONER GILINSKY: Can you say something about the nature of the error?

MR. COOPER: The nature of our concern at the moment as we have identified has to do with some of the detailed methods used in doing the dynamic analysis represented by the Blume Report.

COMMISSIONER GILINSKY: What is the date of

the Blume Report?

MR. COOPER: It is the so-called 1981-1982 Report. I don't know the specific date on it.

MR. DENTON: Any other questions for Dr. Cooper?

COMMISSIONER GILINSKY: I would like to hear from the Brookhaven people at some point. I don't know whether this would be an appropriate time to hear from them.

MR. DENTON: I think since we are talking about this area that now would be the time.

COMMISSIONER GILINSKY: Thank you very much.

CHAIRMAN PALLADINO: Thank you.

MR. DENTON: Mr. Reich of Brookhaven, could you maybe come up and respond to questions about your activities.

(At this point in the proceedings Mr. Reich joined the Commissioners at the table.)

MR. DENTON: We had contracted with Brookhaven very early this year or late last year to do this independent calculation for us and I think we provided the Commission with a copy of their report and we also provided it to Teledyne for use in their determination of adequacy of their design.

COMMISSIONER GILINSKY: I wonder if you could

summarize it.

CHAIRMAN PALLADINO: Would you identify yourself.

MR. REICH: I am Morris Reich of Brookhaven National Laboratories.

In addition to the report itself, we also had a meeting at Brookhaven. It was held on the 27th of July where we tried to clarify all the questions developed by Teledyne with respect to the report.

COMMISSIONER GILINSKY: I wonder if you could just start by telling us a little bit about how many people at Brookhaven are doing this work and just briefly what their background is.

MR. REICH: I have a division which is called the Structural Analysis Division. This division has been doing structural work and seismic work for years at Brookhaven. It goes back to work that we did on our HFBR. We started working on that design and then later on we worked on pulse reactors and various internal machines which were being designed at Brookhaven. In the early 70's that work sort was petering out and we started in a lot of work for NRC under contract.

On this project itself we have over here several people with us who are working on this. One of these is Dr. Philippacopoulos who is sitting over there

who is a civil engineer. We have Professor Miller who is from City College. He works with us full time this year. He is on sabatical. We have Dr. Bezler who is doing the piping work. Others at Brookhaven are Dr. Subudhi who is involved with the piping, Y. K. Wang, and we have such people as Professor Curreri who is an expert on dynamics and he works part time at the laboratory. In addition to this, we have other personnel that have been involved in structural work for years which we call upon on particular occasions.

COMMISSIONER AHEARNE: The gentleman mentioned though in the staff paper, Paul Bezler.

MR. REICH: Yes, Paul Bezler is right here. He is part of this team. It is misspelled in there, by the way. It is B-e-z-l-e-r.

COMMISSIONER GILINSKY: Could you briefly describe the analyses you have undertaken and what your results are.

MR. REICH: Right, I will go over that.

I would like to have page 3, please.

This is sort of a task outline of the work evolved at Brookhaven. As you can see, I have divided this into sort of initial assignments, the first set of assignments. As I will go to the other slides you will see I have a second set of assignments and a third set

of assignments.

The initial work assignments essentially were that we were requested to partake at the meeting where the PG&E contractors discussed the so-called diagram error and that was back in the beginning of October of last year.

We were then asked to participate with the staff at the audit which was held in San Francisco. Now at this audit we looked over a lot of the prints dealing with the annulus structure and questions pertaining to the masses and weights came up at this meeting and we presented our comments pertaining to the audit to NRC. We did get some data pertaining to the structure itself at this meeting, how the structure looked and some idea on the analysis that Blume performed of the structure. We had a report from Blume dated 1979.

Once we came back from this, NRC asked us to carry out an independent vertical floor response spectra analysis for this Unit 2 containment structure. At the request of NRC we were told to make a three-dimensional analysis and we shouldn't look for any simplifications and carry out a full three-dimensional analysis. We told NRC that we did not have at the time enough prints and data to such a thing and that we needed certain structural drawings, we needed ideas on connectivity and

we needed to know exact details on every piece of girder and I-beam that went into these floors. There were four floors here and there was a lot of equipment between these floors.

We notified NRC about this and these drawings started coming in to us sort of slowly at the beginning. Sometime late in November we got a set of drawings, we got further drawings in January and the final set of joining drawings really came in to us I think it was the 17th of March.

Now when we had the set that came in in January it allowed us already to model basically the floors themselves. We had enough details about the beams, but we did not have enough details about the connectivity. So, therefore, in discussing this with NRC we decided first to model this with shear joints at all beam and column connections because we didn't know really how they were connected.

Once we finished that NRC told us well, suppose it wasn't connected this way, and we said, okay, we will model this slightly different because looking at the drawings you could possibly connect these differently. We said it looks to us that there is a possibility that the first and second floors could be connected differently and unless we have the joining

details we won't know that for sure. Thus, we requested them.

Until the drawings came in we modeled these several other ways and we described these as a Models A, B and C. Finally when the drawings came in the closest to reality were really Model B. In other words, the first and second floors were moment connections and the third and fourth floors were shear jointed type of connections.

In addition to developing an independent vertical spectra, we were also requested by NRC to analyze two piping systems. The drawings for these came to us I think the 27th of December. We were closed, but we were working on this at the lab and we got these drawings. Luckily someone was there or else it would have gone back. NRC got a copy of them about a week or two later. These were for the two pipine systems, for piping systems 4A-26 and 6-11. These are numbers designated by PG&E. These are their piping systems.

There was enough information in this to carry out analysis on these systems. These systems included drawings which also showed, for instance, details which were different than the design. In other words, somebody had marked them up and said that in the actual detail there were some changes on these drawings. So

the way we designed them were as-built. I will talk about this in a moment.

In addition to developing the spectra with the methods which we had at BL, the NRC also told us let's check out and see if we get a spectra with a code which is available to the public domain and see if you get the same results, if you could develop a spectra using the same model and get the same results, which we did. We used, for instance, the McDonnel Douglas Code which we rented time on and we got the same results or very close. So we verified the method on a different type of code and we got the same type of result by doing that.

Could I have the next slide, please.

The second phase essentially was to use model "C" where we just changed another floor, and, as I told you, eventually it turned out that that wasn't the correct model and "B" was the correct model.

The next item was to carry out a confirmatory run on the original two-dimensional PG&E model, and that is basically the one described in the 1979 report by Blume.

In addition to that, NRC asked us instead of doing piping using a uniform response spectra for the input, to carry out the piping and use multi-input analysis. Since we had the spectra for each point on

the stucture we did that. We added that on and did that and evaluated that to the Class 2 classification, the ASME Class 2.

Finally, for the 2-D model we also verified the spectra there using the McDonnel Douglas Code just to see if we would get the same spectra and we did with very close results.

The 2-D results that we were getting did not match the model that we got. Now the model that we were using essentially came from the visit that we made. At that point PG&E supplied to Dr. Philippacopoulos a copy of the input which they used for that model, but it wasn't clear what the boundary conditions really were and we were not getting the same results, the same type of spectra and the same types of peaks or frequencies. There were differences. We therefore requested the complete input-output listing from the Blume 1979 run and when we put in identical boundary conditions we did get a matching result for the raw spectra. That was basically the third set of analytical drawings.

The final item that we did is write a report on that.

COMMISSIONER GILINSKY: Let's see, what was the significance of this intermediate mismatch? Were you not using the same inputs as they were using?

MR. REICH: That is right. In their method they left out the masses of the structure. I will go into that in a moment.

CHAIRMAN PALLADINO: How much longer do you plan.

MR. REICH: As long as you want me to.

(Laughter.)

COMMISSIONER GILINSKY: I guess I would like to hear this.

COMMISSIONER AHEARNE: Are you asking for a contract report or are you asking for the significant findings?

COMMISSIONER GILINSKY: This would be for checking up on the calculations for this and I would like to know what they are designing and what their conclusions are.

COMMISSIONER AHEARNE: You are asking what are the findings and conclusions?

COMMISSIONER GILINSKY: Well and then whatever detail is needed to make them convincing.

CHAIRMAN PALLADINO: Well, this is not a meeting in which we are going to delve into contractor reports. I think it is appropriate to get some feel that our independent contractors are confirming or not confirming. We are already overtime and I wanted to ask

the staff also how much more time they foresaw, because if it is going to be much longer we ought to take a break.

COMMISSIONER GILINSKY: Well, let's find out. It sounded like we were just getting to more important things I gathered.

MR. REICH: I can review for you the findings in about ten minutes or so if you want.

COMMISSIONER GILINSKY: I would certainly like to hear that.

MR. REICH: Let me have slide No. 5. I will review the findings for you giving you the three-dimensional results for the spectra, the pipe results and the 2-D Model. We will sort of do it the way we did it actually at Brookhaven.

COMMISSIONER AHEARNE: Now you are talking about the '79 Blume Report. What relationship does that have to the '81 that Dr. Cooper was talking about?

MR. REICH: I have never seen the '81 Blume report. So I can't comment on that.

MR. MIRAGLIA: I believe the '81-'82 Report from Blume is their response to the detection of the differences.

COMMISSIONER AHEARNE: I see.

MR. REICH: Now essentially we found the floor

response spectra which was generated by our models did not agree with those which were given in that report.

COMMISSIONER GILINSKY: This is with your 3-D model?

MR. REICH: Yes, and we compared this three ways. It is not so easy to compare a 3-D model with a 2-D model. We compared it three ways. I will go into that if you are interested.

Now what we found were both frequency shifts and differences in peak spectral acceleration magnitudes. So there were differences in both things which are the important things in the seismic analysis.

Now this was the case for all the three models. As I told you, we did three model studies, A, B and C, and it was the case for all of them. Now the results for the top floor, however, were consistently conservative. Blume's results for the top floor were always conservative and I will show you more or less why that is so. Those always exceeded the acceleration magnitudes which we had.

On the third floor, by the way, it was always the opposite way and we will talk about that soon.

On the other floors that is not the case at all. For some frequencies the results from Blume were conservative and for others they were not at all

conservative and there was no trend.

Could I have the next slide, please.

That sort of of were the basic 3-D results, that there was a mismatch and they did not match up.

Let's go to the piping for a moment. As I told you, we looked at two problems, PG&E No. 6-11 and PG&E No. 48-26. Here we looked, as I mentioned to you also previously, at envelope response spectrum methods; in other words, where we said from our analysis we had response spectrums for each point on the structure since we did a 3-D analysis and we took an envelope for each floor. We also did an independent support motion response spectrum because we had the individual attachments and the individual point spectrum.

We also used a PG&E spectra which we got in the package which PG&E sent us, and that one, by the way, was entitled "New Hosgri-5 Mass Spectrum." In other words, it wasn't the same one which was in the Blume Report. It was different. We checked it and we found it was not the same thing that was in Blume's Report.

The next slide, please, page 7.

CHAIRMAN PALLADINO: Do you have a report on these findings?

MR. REICH: Yes, and it is very detailed.

MR. DENTON: I provided that.

CHAIRMAN PALLADINO: I was wondering how far in detail we need to go at this point.

COMMISSIONER GILINSKY: Well, I would like to hear these major findings.

CHAIRMAN PALLADINO: I don't mind hearing the major findings, but I do think we ought to keep it just to the major findings.

MR. REICH: Yes, that is all I am going to report on.

Now our models, let me say this, differ somewhat from the PG&E models. The differences are due, as I mentioned to you, that we used as-built dimensions and there was some other errors made in the PG&E modeling in the pipe bends. They modeled the gentle bends as elbows which is not the case and which you shouldn't do.

COMMISSIONER GILINSKY: You mean as sharp bends?

MR. REICH: They modeled them as elbows which they are not and that changes the frequency of course and then it depends on your spectra is and so forth what the effects are. Also, they used an overlap procedure in one of the problems. Now that overlap procedure we checked and that wasn't too bad. It satisfied certain

criteria which are developed later on in the 1980 report though. It was developed before they did their analysis.

Now our frequencies differed from the PG&E estimates and our forces using our own models and their own spectra did not match and the differences are probably due to the differences in modeling.

Now the support forces when we used our own independently developed spectra and theirs of course exceeded them because the spectra that we developed was different. It was higher. The envelope spectra was higher.

Page 9, please.

This is the final one. Essentially the outcome of this study was that ASME Class 2 evaluations which we performed using the uniform response spectra method, which is the acceptable method right now, for one problem they exceed surface level D stresses at two points. That is problem 6-11. For the other problem, problem 4A-26, they did satisfy the level D requirements. So for one problem they did not and ---

COMMISSIONER GILINSKY: Are only the level D requirements relevant here?

MR. REICH: Well, the level D requirements are the Hosgri Fault requirements.

Now I will not go into the independent support

because that is not an acceptable method right now. I will skip that one.

Now I will turn to the next slide which is page 10 and wind up the talk with the 2-D model that you asked me to.

Now as I mentioned to you, we had uncertainties about the data and we made parametric studies and we could not correlate those results with the '79 report results. Therefore, we got this listing on the 24th of April essentially.

The next page, please, 11.

Now when we made a confirmatory run with the exact input data which was identical to this, the raw spectra which we got in digitized format was similar to that which they sent us, which we got from them. It was similar to the one that we got from PG&E.

Now we noticed over there that the broadened spectra which was associated with the structural frequency corresponded with the raw spectra values sent to us. However, in the lower spectrum frequency range there was a somewhat smoothed spectra and we just reported that to NRC. In other words, in the lower frequency range they were smoothed and at the higher frequency ranges there were peaks and they were bounded.

The next one, please.

This one shows why we couldn't match it of course and you can see the differences here. If you look at the total weights in the Blume model you can see for each floor, the 101 foot level, the 106 foot level and 117 foot level and 140 foot level, the total over here, as you can see, which Blume had used was 1.5, and you can see the units, K-sec^2/ft. The actual one, if you count together everything, is 3.08. Now there is a big difference. In other words, it is almost half. The masses, there was an error in the masses. This comes from the Blume prints. The same is true if you go to the next floor which is 4.54 versus 2.68. If you multiply these numbers by 32.2 you will get ---

COMMISSIONER GILINSKY: Let's see, I guess I am left a little unclear. What does this add up to? You said earlier there were differences in the responses in the structure and in the next to last line I thought you were saying using the same input they were coming together.

MR. REICH: If you put in the exact same input that they did with the exact same value efficients and the same masses you will get the same answer.

COMMISSIONER GILINSKY: But you are saying the input was wrong?

MR. REICH: Yes, that is what we are saying.

That is why we couldn't match. Before we got the input from them we didn't understand that these things were missing.

CHAIRMAN PALLADINO: Whose input was wrong? They gave you the wrong information or they were using the wrong ---

MR. DENTON: Their original data input was incorrect and that is why you were able able to match it using the correct actual data, but I think it was the findings of Brookhaven plus the Teledyne findings, plus the company's own findings in this area that prompted them to commit to a complete seismic reanalysis of all structures, including this area. So eventually they will get it reanalyzed and try to convince Teledyne and us that they have now done it right.

CHAIRMAN PALLADINO: I see.

COMMISSIONER GILINSKY: Let me sure I understand the point the Chairman is asking about. I understood you just now to say you checked out the calculating methods, but the weights that were used as inputs to the calculation originally were not the correct weights that should have been used for that structure.

MR. REICH: According to the prints that we got.

COMMISSIONER GILINSKY: The result of this, as Mr. Denton is saying, is part of what led to a wholesale reanalysis.

COMMISSIONER AHEARNE: And I gather from Dr. Cooper that they have done a new estimate, but that there still is a difference between that and the Brookhaven ---

COMMISSIONER GILINSKY: I see. So that remains to be resolved one way or another.

MR. REICH: There is just one more slide that I would like to show you.

The next one, please.

This is also pertaining to the difference and why we couldn't get these 2-D models to match. The steel fabricator drawings show that the member connections used in that report do not represent the actual field conditions also. From our parametric studies which we did we knew that the floor spectra results would be altered significantly by the connectivity. So that is another reason why we couldn't match it. Of course we found this out later on. You always get smarter after you know the answers.

(Laughter.)

MR. REICH: Again, as I mentioned to you, the 2-D results were checked with the McDonnell Douglas Code

and the results of the spectra were perfect, right on the button.

That is basically it.

CHAIRMAN PALLADINO: Well, thank you, Mr. Reich.

COMMISSIONER GILINSKY: Thank you very much.

MR. DENTON: Our remaining presentation is probably 15 minutes.

CHAIRMAN PALLADINO: I am going to suggest a five-minute break.

(Whereupon, a brief recess was taken.)

CHAIRMAN PALLADINO: Ladies and gentlemen, I wonder if we could start to take our places, please.

Indicate the general subject areas you are going to cover and then let's proceed.

MR. DENTON: The only two subjects left is we wanted to show you some slides of the physical modifications.

COMMISSIONER AHEARNE: You have slide called "Phase II" that was up and just let me just ask you two questions on it.

I was going to ask Darrell, but I gather I won't.

(Laughter.)

COMMISSIONER AHEARNE: That is the trouble

with breaking in meetings.

(Laughter.)

COMMISSIONER AHEARNE: The first comment on on it was "undertaken prior to NRC approval." Would you discuss what that meant.

MR. DENTON: They undertook that somewhat like they did Phase I. The proposed a Phase I and then began to implement it recognizing that it had not been approved by the Commission. They submitted a proposed Phase II and then jumped right into executing it recognizing that the Commission had made no decision regarding its adequacy. So we just wanted to stress that point.

COMMISSIONER AHEARNE: I see. Are you formally saying that they did it at their own risk, but you feel it is appropriate?

MR. DENTON: I had not intended to say any more than they did it at their own risk. Our scope for Phase II is what is in the paper.

COMMISSIONER AHEARNE: Well, are you saying though that the Phase II program that is being done is what you believe ought to be done?

MR. DENTON: We have described the Phase II program that we recommend and that is in the paper.

COMMISSIONER AHEARNE: But you then believe

that if what you recommend is done that Phase II will be done adequately?

MR. DENTON: I guess I don't know where you are going with this.

COMMISSIONER AHEARNE: I am trying to focus on this word "approval."

MR. DENTON: I mean by that NRC Commission approval and I just wanted to flag that we have not approved the Phase II program and we awaiting your approval of a program.

COMMISSIONER AHEARNE: But you are recommending that the Phase II program which you have described be approved.

MR. DENTON: Yes, sir.

COMMISSIONER AHEARNE: Down there at the bottom you have "implicit questions with respect to overall QA." What does that mean?

MR. EISENHUT: Let me try to explain that. There has not been any specific item that would point to construction, but there have been questions concerning the overall QA adequacy. The number of problems that have been found from Phase I and the number of problems from Phase II have cut across many, many aspects. It is indicative of a general breakdown in QA and that is all I meant here by the "implicit." The obvious question

can be asked concerning the actual construction of the plant and the utility saw it the same way, you know, and volunteered this program.

MR. DENTON: Bob had taken a real interest in this aspect and maybe he would like to talk about it. As a result of discussions, the company expanded the program.

MR. ENGELKEN: With respect to the QA for construction?

MR. DENTON: Yes.

MR. ENGELKEN: We felt that in light of the Reedy Report and in light of our findings when we initially did some inspection work out in the region following the discovery of the error in the use of the diagram, we found that there were discrepancies in the QA program. What gave us concern I think was an apparent lack of top management involvement in the implementation of QA at least in certain areas.

This did cast some sort of a shadow over the general area of QA, quality assurance, and this had been an issue raised by the intervenors. It had been raised by the intervenors in hearing or prior to the hearing and it was denied as a contention, as I recall it, but it was a lingering concern with them.

I thought that I didn't want to be in a

position, since we had been inspecting that plant through its construction, of defending the QA for construction. I thought it was appropriate for part of the reverification program to cover quality assurance for construction even though our inspection program had indicated that the construction QA program was an adequate program and was at least average and perhaps better than average than the program that we had seen for construction at other facilities. But we did feel that it would be a further reassurance that there were no serious consrruction errors built into the plant.

COMMISSIONER AHEARNE: So that your recommendation though, which as I recall was sometime around May, was not based upon known but unwritten conclusions that Region V inspectors had reached?

MR. ENGELKEN: That is correct. It was just further assurance which we felt was appropriate. The recommendation, incidentally, was made to Mr. Denton by me in a memorandum dated March the 29th. That letter subsequently became public and was picked up by other parties and given some emphasis.

COMMISSIONER AHEARNE: On September 15th of this year you wrote a letter to Harold and you made a comment in it. You say that "We offer the following comments and questions." No. 3, and this is from

Enclosure 6, but in No. 3, you asked the question "Should the scope of the Phase II program plan be re-examined?"

You go on to say that the Reedy findings, "Their combination with the licensee audit findings suggests the possibility of broad programmatic deficiencies in the licensee's design program and certain of their contractors. Based on this, it may be appropriate to re-examine the scope of the initial verification sample defined in Phase II."

Could you expand on that a little bit and then, Harold, could you comment on, you had just previously said you felt that what you have proposed is correct and whether it meets Bob's concerns.

Bob, could you expand on that?

MR. ENGELKEN: I think that we are principally talking in terms of the numbers of contractors that would be sampled with respect to QA audits and we simply made the suggestion that perhaps this should be considered in evaluating the Phase II program plan. I think that we made the suggestion to NRR and Mr. Denton for their consideration and I think perhaps for the consideration of the IDVP if Mr. Denton agreed that it was something that they should consider.

COMMISSIONER AHEARNE: So you are saying that

you were primarily looking at expanding to check more contractors?

MR. ENGELKEN: I think that was my understanding.

COMMISSIONER AHEARNE: But your comment also has "the possibility of broad programmatic deficiencies in the design program."

MR. ENGELKEN: Well, that was another consideration. Yes, the way the audits were conducted, if there was no formal QA program, then the Reedy organization did no further review of the QA program, but reviewed the practices that were actually applied. I think the suggestion here is that without further reviewing the formal QA program, then all of the known deficiencies may not be detected.

I also think that we had somewhat of a legal problem with the wording in the letter which suggested that all contractors would be reviewed and the proposal by Reedy was to just review certain ones. I don't think that we had any real technical problem there. It was more a problem of whether it met the wording of the letter.

MR. DENTON: We sent Bob's letter and identified the concern to Teledyne and it is one of these details we propose to straighten out in their

program. Their program can expand and we haven't quite straightened that one out.

COMMISSIONER AHEARNE: Just a minute ago I asked you with respect to approval on whether or not the Phase II program that was here is what you were proposing we approve, and I thought you said yes. Now Bob has said that he didn't think the Phase II program was adequate in two regards. So now I am not sure whether it is up to Teledyne to decide whether or not ---

MR. DENTON: No, it is not up to Teledyne. I just wanted their opinion. It is an issue that remains to be fully developed. We don't have a difference. Bob concurred in what we were recommending. All these programs tend to be a little bit open-ended and this is one we will have to straighten out a bit.

COMMISSIONER AHEARNE: Let me go back to Bob then. I read this letter of yours saying that you felt that you weren't ready to concur in Phase II.

MR. ENGELKEN: I didn't consider it in those terms. We were asked for comments on the proposed plan. These were some of our comments and it was for consideration by NRR and if they agreed with us, and I am not sure whether they agree with us or not at this point.

Then I think it was something for them to

pursue with the IDVP. But I don't it was written in the spirit of nonconcurrence with the proposal.

COMMISSIONER GILINSKY: Just trying to be helpful.

MR. ENGELKEN: Right.

MR. DENTON: On page 8 of our slides we have pointed out that the program we are recommending that you approve includes certain things and it includes additional sampling verification if required. We are taking a snapshot today and Bob and I will no doubt solve this one before we get back to you. It is just one that we have not been able to get enough information on. But the fact that the program includes QA and it includes additional sampling, as Bob suggested, if we decide it is required. We just haven't had a chance to straighten out all the details.

COMMISSIONER GILINSKY: Can I ask you, when this is all done are you going to turn out a safety evaluation?

MR. DENTON: Yes, sir.

COMMISSIONER GILINSKY: And that is what you are going to submit to us, as SER which would form the basis of a decision?

MR. DENTON: Yes.

COMMISSIONER GILINSKY: Or we hope in four

months to make a decision.

MR. DENTON: I would propose next then to have Bob describe the nature of the modifications that are being made as a result of the IDR and he can show a few slides to illustrate the kinds of changes that are occurring in the plant.

MR. ENGELKEN: Before I do that, I would just like to make one clarification. Earlier in the meeting we discussed the numbers of PG&E and Bechtel people involved and there was some confusion about that. The numbers that I had given you were obtained just prior to the meeting and they were corrected by someone else during the course of the meeting. So there was confusion as to which was the correct set of numbers.

We made an effort through the licensee, through PG&E to obtain the really correct numbers and they are 451 Bechtel people and 334 PG&E people for a total of 785, and that is as of the 1st of October.

I would like to have slide 5, please.

As of September the 15th the total number of modifications performed at the site are about 445 or 444. The breakdown is that 257 pipe supports were modified, 43 other supports, such as raceway supports ---

COMMISSIONER GILINSKY: Now these are as a result of what, as what flows out of the 13?

MR. ENGELKEN: Most of these flowed out of the ITP, the internal program.

COMMISSIONER GILINSKY: Rather than the Teledyne program?

MR. ENGELKEN: Yes. Some of them did flow from the IDVP.

CHAIRMAN PALLADINO: I think you make a point in the paper that most of the modifications came out of the ITP.

MR. ENGELKEN: That is correct. They started early, you see. They started their program I believe in March, early in March. It was a rather aggressive program and they had a rather low threshold for determining what required modification.

MR. DENTON: It is not surprising to me because the independent audit promoted in fact this complete reverfication, and that is just overwhelming now, the amount of ---

CHAIRMAN PALLADINO: Yes, I think that was one of the beneficial results of this approach because you got the ITP.

COMMISSIONER ROBERTS: Question just to get some reference. How many pipe supports are there?

MR. ENGELKEN: Oh, there are thousands.

MR. DENTON: Four or five thousand off the top

of my head, but I don't know for sure. Maybe one of the inspectors would have a better guess.

MR. COOPER: In the order of 15,000 in the whole plant.

MR. DENTON: Sorry. I gave you a number for an eastern plant I guess.

(Laughter.)

COMMISSIONER GILINSKY: That is for two units.

MR. ENGELKEN: Modifications to other supports such as raceways or instruction sensors and things like that, 43. There were 38 modifications in the annulus structure and 6 miscellaneous, for a total of about 444.

If I may have slide 6A, I believe we have a photograph.

COMMISSIONER GILINSKY: Can I just ask you since you have got the annulus there. I wondered, did Teledyne pick up this problem with the weights as well?

MR. DENTON: During the break I was informed that at that November meeting that Mr. Reich mentioned, at that Bechtel made the decision to redo the annulus. When Brookhaven was checking that '79 report PG&E was already redoing it and that is what resulted in the so-called '81-'82 report. So they had made the decision to reanalyze it.

COMMISSIONER GILINSKY: Did anyone other than

Brookhaven pick up the incorrect weights?

MR. DENTON: I don't remember.

MR. MIRAGLIA: In response to the audit that the staff attended in October of '81, we requested mass data from the utility in order for Brookhaven to do its independent modeling. In trying to come up with that mass data PG&E reported discrepancies in the mass data. So it was detected. I don't know who came first, but as a result of that kind of activities in about November of '81 PG&E reported errors in the mass data.

MR. ENGELKEN: Region V's initial audit in early October picked up discrepancies in the weights and we passed that information along in our report to NRR. I believe that was the first detection of discrepancies in the weights.

CHAIRMAN PALLADINO: Okay, can we go on.

MR. ENGELKEN: This is a modification which shows a raceway support in which the vertical braces didn't meet the acceptance criteria for allowable stress for the revised seismic loads. The angle braces which you see there were installed to stiffen the vertical members.

Now this is a situation which was encountered rather frequently in which it was easier to modify the installation than to go through a sophisticated

calculation to justify the design and this was done in many instances, just the simply addition of the diagonal braces. Sixteen of those supports similar to that one are included in that number that I gave you.

(At this point in the proceedings, at 4:30 p.m., Commission Gilinsky left the Commissioners' table.)

MR. ENGELKEN: Slide 6B is a picture of a small bore piping piping support located in the containment annulus. It is a non-safety related line in the primary water supply to the reactor coolant pump seal stand pipe and it is a typical example of a support that was modified to provide sway stress in place or rod hangers in order to provide bi-directional seismic restraint in the vertical direction. That is a typical modification of a small bore piping system.

Slide 6C is a mechanican snubber located in the annulus area of the containment building. It is a restraint line for the component cooling water return header. The review for the reoriented revised Hosgri spectra showed that the diagonal brace, which was a structural angle, did not meet the stress criteria and so the angle was replaced by tube steel that is shown in the slide.

Those are three examples of what we considered to be typical modifications. I toured through the site

the last time with Harold and I generally was impressed with the rather minor nature of the modifications on the whole and a lot of them almost of a superficial nature where they were just small brackets welded on to provide additional support to existing braces.

CHAIRMAN PALLADINO: You say they were superficial. Do you mean they really weren't necessary?

MR. ENGELKEN: Well, I am not saying that, no. I am saying that you got the feeling that the plant perhaps still would be standing in relatively good condition if those modifications had not been made, but it was just an intuitive feeling. I am not saying that they weren't necessary to meet criteria or anything of the sort. I am simply saying that intuitively when you walk through the plant you are looking for rather significant major modifications to structures and that sort of thing. That is not the kind of thing that you saw. The kind of thing that you see is the sort of thing that we showed you in the pictures and I think those are rather typical.

COMMISSIONER AHEARNE: That would track then with the Phase I report that has been handed in. It says "It is the considered judgment of the project that the design of the structure systems and components without modification would not fail to perform their

intended safety functions." It goes on to say "The modifications identified are relatively minor in nature." So that sounds consist.

MR. ENGELKEN: That sounds like a reasonable assessment to me, yes.

CHAIRMAN PALLADINO: Is another way of putting it that this total reverification program so far hasn't found many things that needed correction?

MR. ENGELKEN: I think I would prefer to say that it hasn't found things of a serious nature.

MR. DENTON: I would say it has found numerous examples where code allowable yields have been exceeded, but in most of those findings it has been by very small amounts and required simply modifications to correct them.

COMMISSIONER AHEARNE: Are you saying that the yield has been exceeded?

MR. DENTON: No, the allowables.

MR. ENGELKEN: In some cases perhaps yield.

MR. DENTON: The yield, but not very many.

MR. ENGELKEN: But not to the point where it would fail.

MR. DENTON: There is considerable debate in the mechanical engineering society about how much margin there is beyond the allowables and as a regulatory

approach we require that you meet code allowables.

COMMISSIONER AHEARNE: Yes, I understand. I was just picking up on the word.

MR. ENGELKEN: That concludes my discussion.

MR. DENTON: I propose then to go to slide 8. Commissioner Ahearne, you asked what were we recommending and I wanted to get to this slide to just be clear what we had in mind when we said this is what we recommend the program include, and I will turn it back to Darrell.

MR. EISENHUT: Well, most of this has already been touched upon. Just in a package, the Phase II plan as presently submitted has a sampling technique. It looks at three systems and a vertical slice through those systems. It looks at the design chain and how the process proceeded. It has some QA audits and it also has additional sampling verification if required.

COMMISSIONER AHEARNE: That is the item that Bob had suggested and perhaps you ought to look at it.

MR. EISENHUT: Yes, and we are looking at. And it also largely depends on the results coming out of the previous samples and it may well dictate a larger sample.

COMMISSIONER AHEARNE: I gather though from his letter that they are saying that from the results

they have seen already they suggest that you should have a larger sample.

MR. EISENHUT: That is an item that we are evaluating. We just haven't resolved it yet at this point.

COMMISSIONER AHEARNE: If you reach the conclusion that a broader sample is required, would that be likely to have an impact on the schedule that you had already talked about?

MR. EISENHUT: Well, likely. It is hard because we really hadn't looked into the schedule in much depth. The schedule is sort of working along as an end point by itself.

MR. DENTON: I think if we can get by the hurdle of what should Phase II be, then we could straighten out the pieces of the puzzle such as that.

MR. EISENHUT: Again here, the finding of this slide is that we think the program as laid out in conjunction with the other work that is going on provides an adequate identification scheme and evaluation whereby there would be a good understanding of the causes of the problems.

MR. DENTON: In fact, I think in the interest of time this about completes our presentation. We have a few more slides, but we have talked about those items

quite a bit and we can turn to any remaining questions.

We recommend you approve Phase II as we described it and I understand you are going to hear from the other parties in this area.

CHAIRMAN PALLADINO: I presume we are going to hear the other parties before we take any action.

COMMISSIONER AHEARNE: Yes.

CHAIRMAN PALLADINO: Is there any date in the applicant's mind as to when he thinks he will be ready for fuel loading? Do you know of any? I was interested in how it relates to these dates that you gave us earlier about the various reports.

MR. DENTON: These dates came from the applicant. He is here and I guess we could ask him to answer.

CHAIRMAN PALLADINO: Well, I was thinking if a report is due January 25th, then presumably they could fuel then.

COMMISSIONER AHEARNE: Isn't it correct that as far as those aspects having to do with the actual reactor that they were ready to load fuel last year?

MR. EISENHUT: That is correct.

MR. DENTON: Except for these modifications.

COMMISSIONER AHEARNE: So now it is when this process is completed.

CHAIRMAN PALLADINO: I am trying to relate the components of the process to an overall target date.

MR. DENTON: Let me try to characterize what I think Mr. Maneatis' attitude is, and then you could ask him at the appropriate time. It is my understanding that once he is able to respond in his December time frame to Phase I and Phase II, he has satisfied himself that the plant is safe to operate. Then the time after that is from his standpoint the time required for the independent design review process and the staff to confirm that judgment.

He is not going to make a finding that the plant is ready until this kind of mid-Decmeber time frame when he has got the the results of the kinds of activities we are talking about. So he is not proposing to reach such a decision until he has got essentially that kind of information available to him.

CHAIRMAN PALLADINO: But now since you say that before fuel loading to low power you either want an interim report or, if they are ready, a final report, if the time frame were made December, we would be waiting until sometime in January before it would ready, or even later.

COMMISSIONER AHEARNE: They have to review it. January 25th is the target date.

MR. DENTON: We are trying to minimize the time by straying abreast of these issues as they develop, but there is a certain lag between the time the company thinks it has satisfactorily responded and Teledyne concurs and we concur and are able to present you with a proposal.

COMMISSIONER AHEARNE: We have spent a lot of time talking about January 25th. Let's suppose that is met and that is a clear report or set of reports. Is there a similar clear set of reports that would track with items in 6 and 7? Another way of asking the question is is it clear what you require to be done prior to a full-power decision?

MR. DENTON: We have master schedules that have that kind of detail. I don't know what the end date is for those two interim reports. Maybe Frank or someone could find it. I think it was envisioned by the company that that column of activities would be completed prior to their need for a full-power decision.

CHAIRMAN PALLADINO: I think he was asking is it clear what is wanted?

MR. EISENHUT: I think the same thing holds there as we indicated on the others.

MR. DENTON: Construction QA is just beginning. So in fact we don't know any of the findings

yet. So it is kind of hard to define that end point.

COMMISSIONER AHEARNE: Let me put the question somewhat differently. We have in front of us a series of requests, motions and such, and underlying or intertwined in it is the question of what will the NRC require prior to certain actions being taken. One is a set of what will be required for low power and another is what is required to go above for the full-power license.

Now at one point when it was Phase I and Phase II, as murkily defined as it was, still one could go and look at an order or a letter and attempt to argue then here is what is required. However, now you have another set down here in this column called "Other" and I am trying to figure out what it is. Let us suppose it is not you who makes the decision, but it is either a board or the Commission who makes the decision, what is it that we look at as a set of criteria that has to be met? I think you are saying that there isn't any yet.

MR. DENTON: There is a proposal to do a certain construction QA program, and that program like the original Phase I program is expandable like an accordion. If you find a lot of problems it goes. I notice in one of our back-up slides it shows that Teledyne expects to complete its QA construction in

mid-December. So by that time we would have a lot of information and we could probably better define this area.

Since at the moment we have a proposed QA program and Bob has concerns about it, I don't guess we are able to quite sharply define the construction QA program.

COMMISSIONER AHEARNE: What I am concerned about is that someone at sometime is going to have to have something explicit to be used as their set of criteria that here is what the NRC requires prior to start-up. You have done here on this line at least four items that are to be done prior to a full-power decision and during operation which means that they have the potential at least for having a murky boundary and that boundary is going to have to be established.

MR. DENTON: We can sharpen that boundary up, that is right. Neither of them flow like Phase I and II from direct letters. They are largely proposals put forward by the company and if you concur with that kind of approach, then we can certainly sharpen it up.

COMMISSIONER AHEARNE: Well, also you were recommending that that be the situation.

MR. DENTON: That is right.

COMMISSIONER AHEARNE: That is really my

concern. I am not sure that at some point we either have to decide ourselves or give direction to boards that here is a set of criteria, and at the moment I don't even know what is being recommended.

CHAIRMAN PALLADINO: Any other questions?

COMMISSIONER AHEARNE: I would like to, since we do have the opportunity, I gather this is views, Marty, as we are talking to various parties; is that correct?

MR. MALSCH: That is true.

COMMISSIONER AHEARNE: Now at a later time we are going to have other parties come in front of us and give their positions; is that correct?

MR. MALSCH: That is correct.

COMMISSIONER AHEARNE: Does that include the licensee at that later time?

MR. MALSCH: I think it does.

COMMISSIONER ASSELSTINE: That was our discussion the last time we discussed it.

COMMISSIONER AHEARNE: Right. So I will hold off on asking any questions of the licensee at this time.

CHAIRMAN PALLADINO: Well, we thank you very much and we will stand adjourned.

(Whereupon, at 4:45 p.m., the meeting adjourned.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

COMMISSION MEETING

in the matter of: PUBLIC MEETING - DISCUSSION OF PHASE II REVERIFICATION PROGRAM FOR DIABLO CANYON

Date of Proceeding: October 20, 1982

Docket Number:

Place of Proceeding: Washington, D. C.

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

Mary C. Simons

Official Reporter (Typed)

Mary C Simons

Official Reporter (Signature)

BRIEFING
ON
PROPOSED PHASE II
DESIGN VERIFICATION PROGRAM
DIABLO CANYON UNIT 1

EISENHUT
X27672
10/20/82

OUTLINE

. PURPOSE
  - COMMISSION REQUEST RE: PHASE II APPROVAL

. BACKGROUND
  - 11/19/81 ORDER (PHASE I)
  - 11/19/81 LETTER (PHASE II)

. DESCRIPTION OF PROGRAM NOW UNDERWAY

. RESULTS TO DATE
  - PHASE I
  - PHASE II
  - CONSTRUCTION QA

. MODIFICATION TO DATE

. FACTORS INFLUENCING STAFF RECOMMENDATION

. PGE PROPOSED PHASE II PROGRAM
  - PLAN
  - CONTRACTORS

. CONCLUSIONS

. STAFF PROPOSAL

. RECOMMENDATION RE: PHASE II

10/20/82

SLIDE 1

BACKGROUND

NOVEMBER 19, 1981 NRC REQUIREMENTS

PHASE I COMMISSION ORDER

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

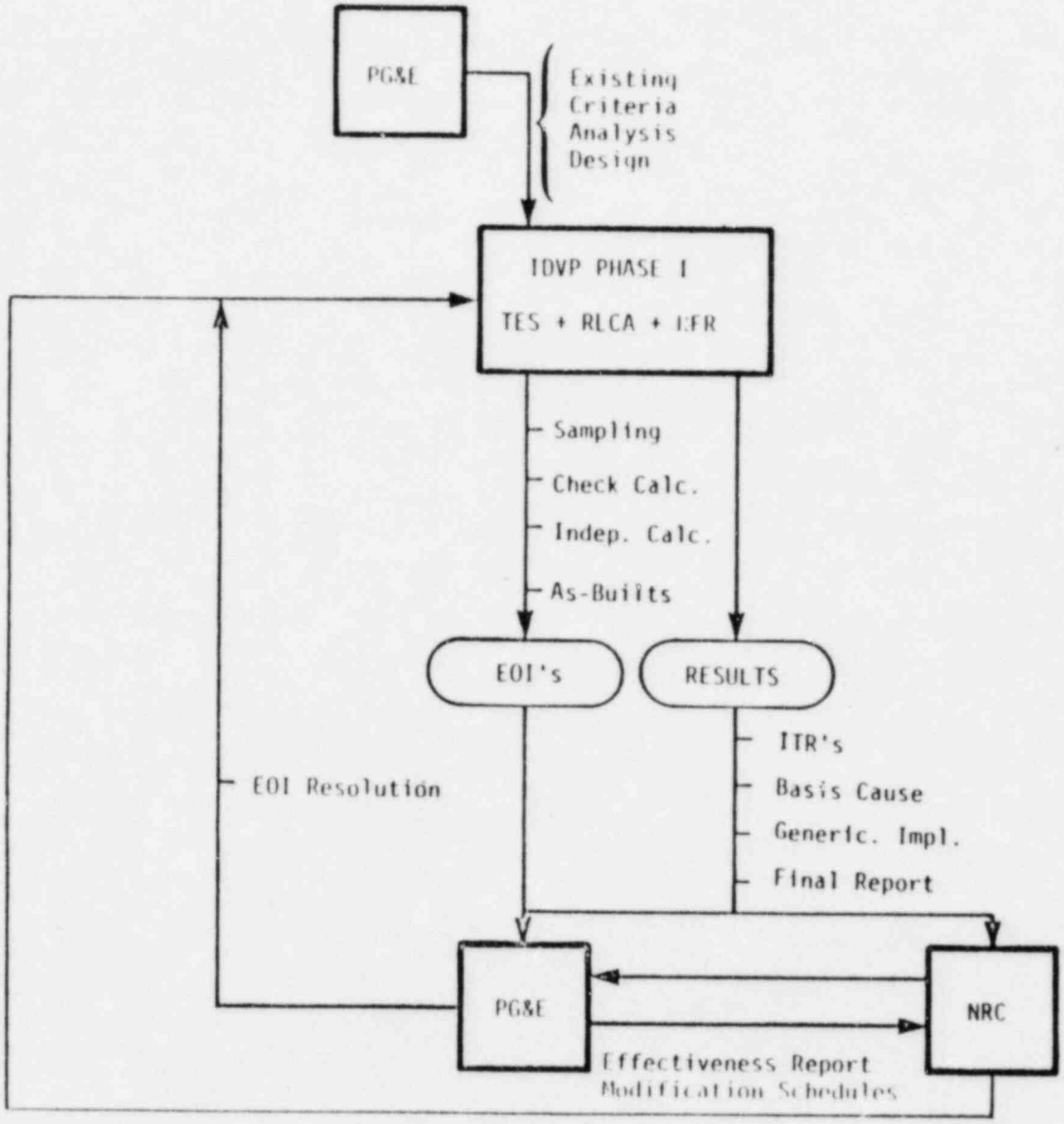
PHASE II STAFF LETTER

- 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 PGE INTERNAL QA
  4. IDVP FOR ALL SERVICE RELATED CONTRACTS POST JANUARY 1978

NOTE: BOTH PHASE I AND PHASE II WERE DEFINED AS NECESSARY, BUT NOT NECESSARILY SUFFICIENT, FOR THE APPROPRIATE APPROVALS.

*IDVP = INDEPENDENT DESIGN VERIFICATION PROGRAM

IDVP/PG&E ACTIVITIES



PHASE I (solid lines)

1. IDVP for all SSER prior to June 78

For each of above

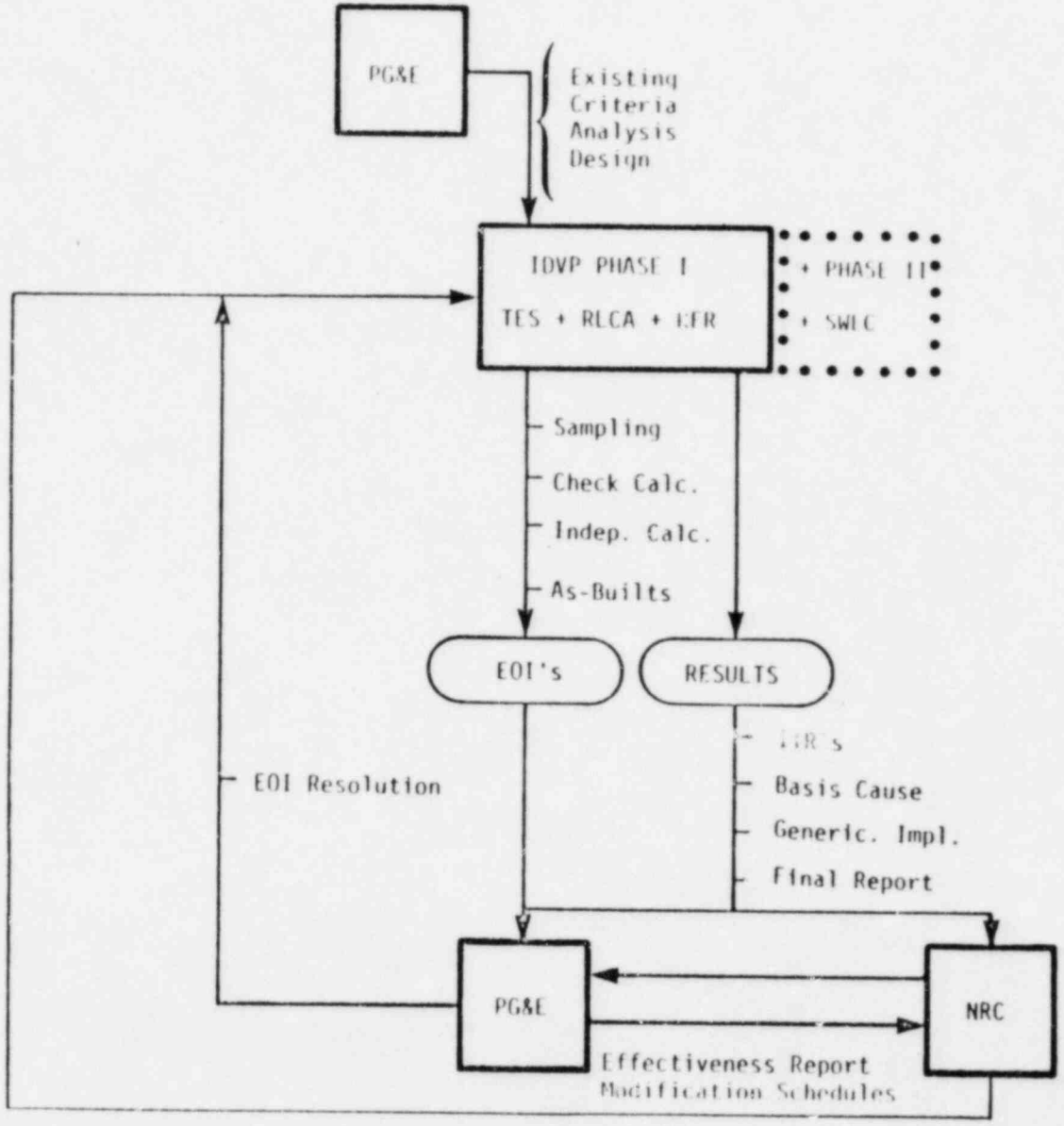
a. Basic Cause Report

b. PG&E Effectiveness Conclusion

c. Schedule for Modifications

10/20/82
SLIDE 3A

IDVP/PG&E ACTIVITIES



PHASE I (solid lines)

1. IDVP for all SSER prior to June 78

PHASE II (dotted lines)

2. IDVP for NSSR prior to June 78

3. IDVP for PG&E internal QA

4. IDVP for all SR post January 78

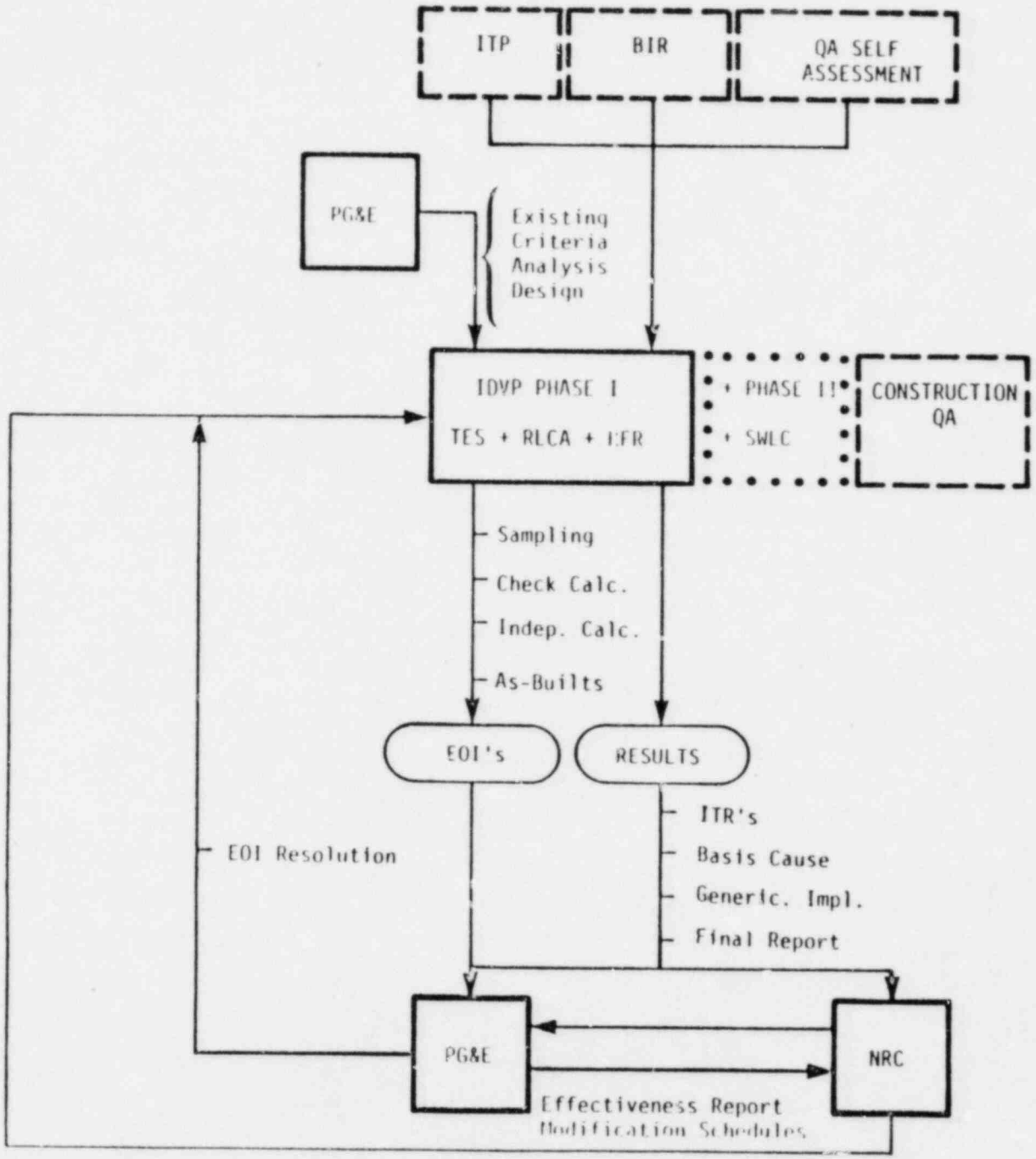
For each of above

a. Basic Cause Report

b. PG&E Effectiveness Conclusion

c. Schedule for Modifications

10/20/82
SLIDE 38



IDVP/PG&E ACTIVITIES

PHASE I (solid lines)

1. IDVP for all SSER prior to June 78

PHASE II (dotted lines)

2. IDVP for NSSR prior to June 78

3. IDVP for PG&E internal QA

4. IDVP for all SR post January 78

OTHER (dashed lines)

Additional activities undertaken or proposed PG&E.

For each of above

a. Basic Cause Report

b. PG&E Effectiveness Conclusion

c. Schedule for Modifications

10/20/82
SLIDE 32

PRELIMINARY RESULTS

PHASE I

(HOSGRI SEISMIC; PRE 1978)

- ASSOCIATED EFFORT NEARLY COMPLETE
- THOROUGH PROGRAM
- EXPECT IDVP TO IDENTIFY PROBLEMS
- EXPECT PROBLEMS TO BE RESOLVED (TO IDVP SATISFACTION)
- IDVP:
  - FINDINGS ARE BROAD IN APPLICABILITY: NARROW IN SCOPE
  - GOOD UNDERSTANDING OF ERRORS
  - ABOUT 200 EOIS: 13 ARE "A/B"
  - EFFORT HAS DONE JOB OF IDENTIFYING ERRORS
- SCHEDULE FOR IDVP (PHASE I)
  - TECHNICAL REPORTS COMPLETED (11/17)
  - COMPLETE ADDITIONAL VERIFICATION (12/15)
  - FINAL REPORT (1/25/83)

PRELIMINARY RESULTS (CONTINUED)

PHASE II

- UNDERTAKEN PRIOR TO NRC APPROVAL
- PRINCIPALLY CHECKS 3 SYSTEMS AND 2-3 ANALYTICAL CHECKS
  - 39 TECHNICAL CONCERNS (ANTICIPATED 55-60)
  - TO DATE, 5 "A/B"; 7 POTENTIAL "A/B"
  - FEWERS EOIS THAN PHASE I; BUT FRACTION SIGNIFICANT IS LARGER
- SIGNIFICANT PROGRESS TO DATE
- IDVP:
  - NO COMMON TRENDS OF ERRORS TO DATE
  - MANY INDIVIDUAL QUESTIONS
- SCHEDULE
  - MOST IDVP TECHNICAL REPORTS TO BE ISSUED NOVEMBER - DECEMBER, 1982
  - FINAL PHASE II REPORT - 1/25/83

CONSTRUCTION QA

- VOLUNTERRED BY PG&E
- NO EXPLICIT FINDINGS TO DICTATE NEED
- IMPLICIT QUESTIONS RE: OVERALL QA
- IDVP SCHEDULE
  - INTERIM REPORT 11/22
  - FINAL REPORT 12/15

MODIFICATIONS TO DATE

. DESCRIPTION

- PIPE SUPPORTS	257
- OTHER SUPPORTS	43
- ANNULUS STRUCTURE	38
- OTHER	6

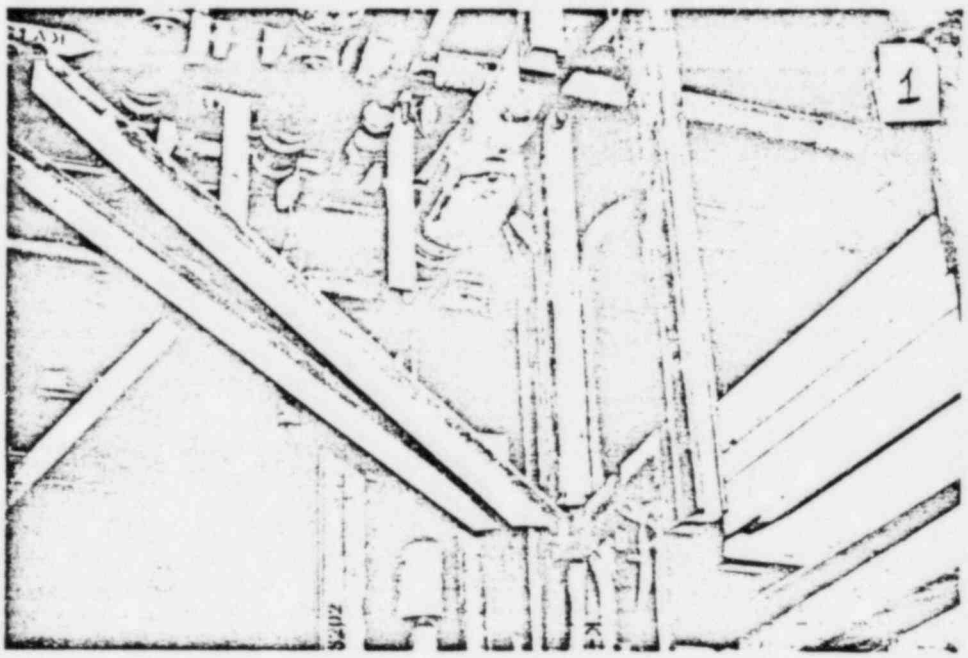
- ADDITIONAL MODS ARE EXPECTED

. CHARACTERIZATION OF MODIFICATIONS
(SEE SLIDES 6A, 6B, AND 6C)

LATERAL RACEWAY SUPPORTS

Raceway Supports

1 This slide shows modifications to a raceway support type S102. The vertical braces did not meet the acceptance criteria (allowable stress) for revised seismic loads. The angle braces (S-6) were installed to stiffen the vertical members. They can be shown to have sufficient capability, through inelastic analysis, to perform their function and pose no threat to safety. However, it is very time consuming to demonstrate this by analysis, therefore modifications were carried out. 16 supports have been revised as shown in item 7, Table 1, Attachment 1 of PG&E's September 15, 1982 submittal.

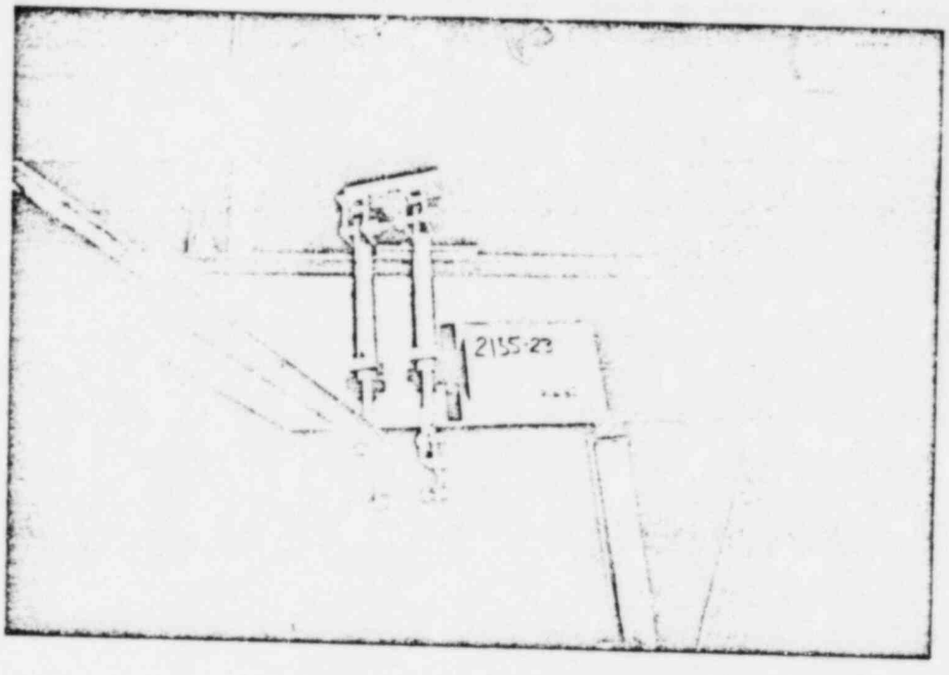


10/20/82
SLIDE 6A

SMALL BORE PIPE SUPPORTS —— CONTAINMENT ANNULUS

2155-23

Small bore support 2155-23, located in the Containment annulus, supports lines 1013 and 3143. Line 1013, a non-safety related line, is the primary water supply to the Reactor Coolant Pump 1-1 seal stand pipe. Line 3143, is the check valve leak test header for the Reactor Coolant System Hot Leg Safety Injection lines. This is a typical example of a support that was modified to provide sway struts in place of rod hangers in order to provide a bidirectional seismic restraint.

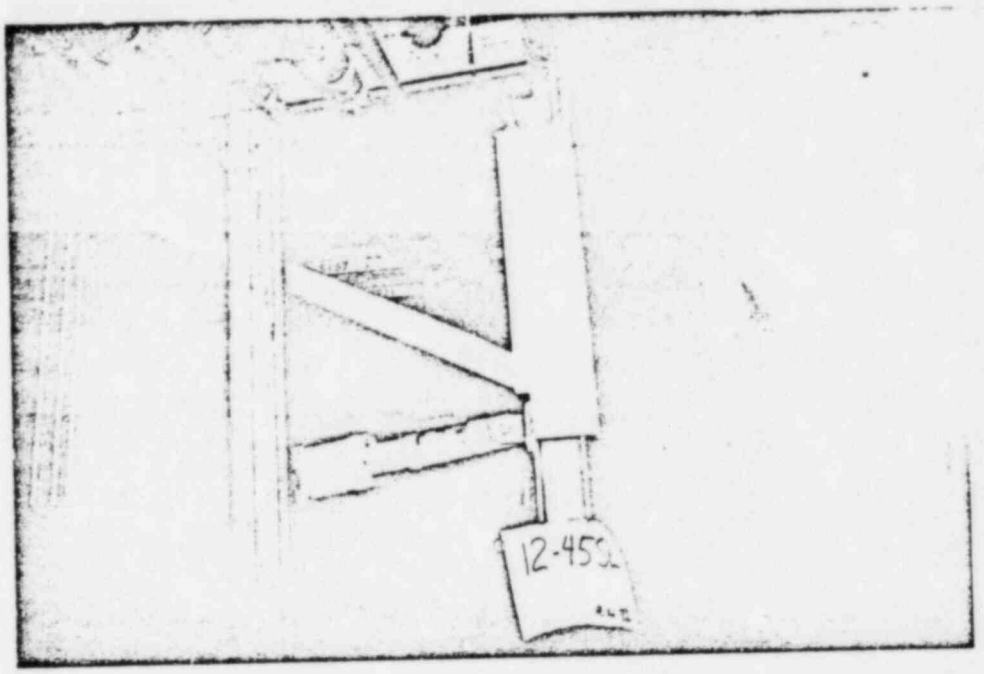


10/20/82
SLIDE 6B

REPLACED DIAGONAL BRACE ——— CONTAINMENT ANNULUS

12-45SL

Support 12-45SL is a mechanical snubber located in the annulus area of the Containment Building. It restrains line 1357, the Component Cooling Water Return Header from the Reactor Coolant Pump Thermal Barrier Labyrinth Seals. The review for the reoriented-revised Hosgri spectra showed that the diagonal brace, which was a structural angle, did not meet stress criteria. The angle was replaced by the tube steel shown in the slide.



10/20/82
SLIDE 6C

FACTORS INFLUENCING STAFF RECOMMENDATIONS

- PHASE I
  - RESULTS TO DATE
  - INTERIM TECHNICAL REPORT FINDINGS
  - BNL INDEPENDENT ANALYSIS
  - STAFF AUDITS/INSPECTIONS
- PHASE II
  - RESULTS TO DATE
  - PRELIMINARY RFR RESULTS
  - IDVP ASSESSMENT OF PG&E INTERNAL QA
- PG&E ACTIONS
  - PG&E CORRECTIVE ACTION PROGRAM
  - BIR REPORT
  - PG&E "LOOK BACK" REPORT
  - PRE 1978 VERSUS POST 1978
  - IDVP AUDIT OF CONSTRUCTION QA
  - AS BUILT VERIFICATION

PROPOSED IDVP PHASE II PROGRAM PLAN

. RESPONSE TO NOVEMBER 19, 1981 STAFF LETTER

. PROPOSED IDVP PHASE II PLAN INCLUDES:

- SYSTEM SAMPLE
  1. AFW SYSTEM
  2. CONTROL ROOM VENTILATION AND PRESSURIZATION SYSTEM
  3. SAFETY RELATED PORTION OF 4160 V ELECTRIC DISTRIBUTION SYSTEM
- DESIGN CHAINS
- QA AUDITS (PROGRAMS AND IMPLEMENTATION)
- ADDITIONAL SAMPLING VERIFICATION, IF REQUIRED

. STAFF FINDINGS

THE PROPOSED PHASE II PROGRAM PROVIDES ADEQUATE IDENTIFICATION AND EVALUATION OF SIGNIFICANT DESIGN ERRORS IN THE SELECTED SAMPLE AND AN ADEQUATE UNDERSTANDING OF THE ROOT CAUSE.

IDVP PHASE II CONTRACTORS

PROPOSED

. TELEDYNE ENGINEERING SERVICES (TES)	- PROGRAM MANAGER
. R. L. CLOUD ASSOCIATES (RLCA)	- SEISMIC, MECHANICAL, STRUCTURAL
. STONE & WEBSTER ENGINEERING CORP.	- SAFETY SYSTEMS
	- CONSTRUCTION QA
. R. F. REEDY INC. (RFR)	- QA AND DESIGN CONTROL

TECHNICAL QUALIFICATIONS:

- SWEC FOUND FULLY QUALIFIED FOR PHASE II
- OTHER EVALUATED FOR PHASE I AND FOUND ACCEPTABLE

INDEPENDENCE OF CONTRACTOR ORGANIZATIONS:

- FROM PG&E: DETERMINED DURING PHASE I, INCLUDING SWEC
- FROM BECHTEL: NO OWNERSHIP BY IDVP CONTRACTORS, VERY LIMITED BUSINESS CONNECTIONS

INDEPENDENCE OF INDIVIDUALS:

- EVALUATED PER OTTINGER LETTER CRITERIA
- ONE CONCERN - REEDY ASSOCIATES ARE EX-BECHTEL
- NO OTHER CONFLICTS

CONCLUSIONS

- MAJOR, THOROUGH PROGRAM UNDERWAY
- PG&E INTERNAL EFFORTS GO WELL BEYOND NOVEMBER 19 REQUIREMENTS
- PROGRAM SHOULD FIND ERRORS AND RESOLVE ANY ISSUES
- ERRORS FOUND TO DATE
  - NOT MAJOR FROM SAFETY STANDPOINT
  - MANY MODIFICATIONS, BUT GENERALLY MINOR
- PHASE II PROGRAM CLOSELY LINKED WITH PHASE I
- SCOPE OF VERIFICATION REQUIRED BEFORE FL DECISION HAS EXPANDED

SUMMARY OF STAFF PROPOSAL

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

NOMENCLATURE:

○: AS ORIGINALLY REQUIRED, NOVEMBER 19, 1981

✓: ACTIVITY COMPLETE

SSR: SEISMIC SERVICE-RELATED CONTRACTS

NSSR: NON-SEISMIC SERVICE RELATED CONTRACTS

SR: SERVICE-RELATED CONTRACTS

IR: INTERIM REPORT, DEMONSTRATING EFFORT SUBSTANTIALLY COMPLETE

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SLIDE 11

RECOMMENDATION

- APPROVE PHASE II PROGRAM
- APPROVE REDIRECTION OF PHASE I/ PHASE II INTERFACE

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SLIDE 12

TASK OUTLINE

INITIAL WORK ASSIGNMENTS

(1) REQUESTED TO ATTEND OCTOBER 9, OCTOBER 9, 1981 BETHESDA, MD, MEETING WHERE PG&E AND CONTRACTORS DISCUSSED THE SO-CALLED DIABLO CANYON UNIT 1 "DIAGRAM ERROR".

(2) PARTICIPATE WITH NRC AT DIABLO CANYON AUDIT HELD AT PG&E SAN FRANCISCO HEADQUARTERS DURING THE PERIOD OCTOBER 14-16, 1981.

(3) PRESENT COMMENTS PERTAINING TO PG&E AUDIT TO NRC.

FIRST SET OF ANALYTICAL TASKS

(4) REQUESTED TO INDEPENDENTLY DEVELOP VERTICAL FLOOR RESPONSE SPECTRA FOR UNIT 1 CONTAINMENT ANNULUS STRUCTURE. MODEL A (SHEAR JOINTS FOR ALL BEAM AND COLUMN CONNECTIONS), AND MODEL B (MOMENT CONNECTIONS FOR 1ST AND 2ND FLOORS).

(5)& (6) REQUESTED TO INDEPENDENTLY REANALYZE PIPING SYSTEMS WITH PG&E DESIGNATIONS NUMBERS 4A-26 AND 6-11.

(7) CARRY OUT CHECK CALCULATION FOR FLOOR SPECTRA USING GENERAL PUBLIC COMPUTER CODE.

TASK OUTLINE (CONT'D)

SECOND SET OF ANALYTICAL TASKS

(8) REPEAT TASK (4) FOR MODEL C (WHERE BEAM TO COLUMN CONNECTIONS FOR 1ST, 2ND AND 3RD FLOOR ARE CONSIDERED RIGID).

(9) CARRY OUT CONFIRMATORY COMPUTER RUN FOR ORIGINAL PG&E 2-D MODEL.

(10)& (11) CARRY OUT MULTIPLE INPUT ANALYSIS FOR PG&E PIPING SYSTEMS 4A-26 AND 6-11 USING SPECTRAL IMPUT FROM 3-D ANALYSIS AND EVALUATE IN ACCORDANCE WITH ASME CLASS 2 CLASSIFICATIONS.

(12) VERIFY RESULTS OF THE SPECTRA FOR 2-D MODEL WITH SPECTRA GENERATED FROM STRUDL (McDONNELL DOUGLAS).

THIRD SET OF ANALYTICAL TASKS

(13) EXTEND 2-D STUDY VARYING THE BOUNDARY CONDITIONS.

(14) REVIEW INPUT/OUTPUT OF URS/BLUME 1979 RUN. USE IDENTICAL MODEL AND COMPARE RAW FLOOR SPECTRA.

REPORT

(15) WRITE REPORT DETAILING RESULTS OF ITEMS 4 TO 14.

RESULTS OF 3-D MODEL STUDIES

- FLOOR RESPONSE SPECTRA GENERATED WITH THESE MODELS DID NOT AGREE WITH THOSE GIVEN IN THE MAY 1979 URS/BLUME REPORT. BOTH FREQUENCY SHIFTS AND DIFFERENCES IN PEAK SPECTRAL ACCELERATION MAGNITUDES WERE FOUND.

- THIS WAS THE CASE FOR ALL MODELS (I.E., A,B AND C) EVALUATED.

- USR/BLUME RESULTS FOR THE TOP FLOOR WERE CONSISTENTLY CONSERVATIVE IN THAT THEY EXCEEDED THE ACCELERATION MAGNITUDES PREDICTED WITH THE BNL MODELS.

- THIS, HOWEVER, IS NOT THE CASE FOR FLOORS ONE, TWO AND THREE. FOR SOME FREQUENCIES THE USR/BLUME RESULTS FOR THESE FLOORS WERE CONSERVATIVE, FOR OTHERS THEY WERE NOT, WITH NO OBSERVABLE TREND.

RESULTS OF PIPING ANALYSIS

- CONFIRMATORY EVALUATIONS WERE PERFORMED FOR PG&E PIPING PROBLEM NUMBERS 6-11 AND 4A-26.

- THE EVALUATIONS WERE CARRIED OUT USING ENVELOPE RESPONSE SPECTRUM METHODS, INDEPENDENT SUPPORT MOTION RESPONSE SPECTRUM METHODS, AND BOTH PG&E AND BNL DEVELOPED SPECTRA.

- THE PG&E SUPPLIED SPECTRA WERE ENTITLED "NEW HOSGRI-5 MASS SPECTRA". A CHECK SHOWED THAT THESE SPECTRA ARE DIFFERENT FROM THOSE PRESENTED IN THE URS/BLUME 1979 REPORT.

RESULTS OF PIPING ANALYSIS (CONT'D)

- BNL MODELS DEVELOPED FROM PG&E AS-BUILT DRAWINGS WERE FOUND TO DIFFER FROM THE PG&E MODELS.

- THE DIFFERENCES WERE DUE TO THE USE BY PG&E OF DESIGN DIMENSIONS WHICH DIFFER FROM THE AS-BUILT DIMENSIONS AND IN ERRORS MADE BY PG&E IN THE MODELING OF PIPE BENDS.

- AN OVERLAP PROCEDURE WAS USED IN THE MODELING OF PROBLEM 4A-26. THE EXTENT OF OVERLAP USED IN THE PROBLEM SEEMS ADEQUATE IN THAT IT MEETS THE INTENT OF NUREG/CR 1980.

RESULTS OF PIPING ANALYSIS (CONT'D)

- BNL PREDICTIONS OF SYSTEM FREQUENCIES DIFFER FROM THE PG&E ESTIMATES.

- BNL SUPPORT FORCE VALUES OBTAINED USING BNL MODELS AND PG&E SUPPLIED SPECTRA DO NOT MATCH. THE DIFFERENCES ARE PROBABLY DUE TO THE DIFFERENCES IN MODELING.

- SUPPORT FORCES CALCULATED USING BNL PIPING MODELS AND BNL 3-D MODEL B ENVELOPE OR INDEPENDENT SPECTRA EXCEED PG&E CALCULATED VALUES. THE MAJOR CAUSE FOR THIS IS THAT MODEL B SPECTRA EXCEED THE SPECTRA USED BY PG&E.

RESULTS OF PIPING ANALYSIS (CONT'D)

- ASME CLASS 2 EVALUATIONS PERFORMED USING THE UNIFORM RESPONSE SPECTRUM METHOD INDICATED EXCEEDANCE OF SERVICE LEVEL D STRESSES AT 2 POINTS IN PROBLEM 6-11, WHILE PROBLEM 4A-26 SATISFIED SERVICE LEVEL D REQUIREMENTS.

- ASME CLASS 2 EVALUATIONS PERFORMED USING THE INDEPENDENT SUPPORT RESPONSE SPECTRUM METHODS PRODUCED A REDUCTION IN STRESS LEVELS IN PROBLEM 6-11, BUT AN INCREASE IN STRESS LEVELS FOR PROBLEM 4A-26.

- FOR THIS PROCEDURE, PROBLEM 6-11 SHOWS SLIGHT OVER-STRESSING AT ONE POINT AND 4A-26 STILL MEET REQUIREMENTS.

RESULTS OF 2-D MODEL STUDIES

- DUE TO UNCERTAINTIES IN SOME OF THE PERTINENT DATA, VARIOUS PARAMETRIC STUDIES FOR THIS MODEL WERE PERFORMED. NONE OF THESE, HOWEVER, CORRELATED WELL WITH THE URS/BLUME RESULTS GIVEN IN THEIR MAY 1979 REPORT.

- WE THUS REQUESTED THAT NRC OBTAIN A LISTING OF THE COMPUTER INPUT/OUTPUT FOR THE RUNS USED TO GENERATE THE SPECTRA GIVEN IN THE URS/BLUME REPORT.

- THIS INFORMATION WAS RELAYED TO US BY PG&E ON APRIL 24, 1982.

- A CONFIRMATORY BNL COMPUTER RUN WITH INPUT DATA IDENTICAL TO THAT USED BY URS/BLUME YIELDED RAW FLOOR SPECTRA SIMILAR TO THOSE SENT TO BNL (IN DIGITIZED FORMAT) BY PG&E ON APRIL 24, 1982

- THE BROADENED SPECTRA ASSOCIATED WITH THE STRUCTURAL FREQUENCIES PRESENTED IN THE MAY 1979 REPORT CORRESPOND WITH THE RAW SPECTRA VALUES SENT TO US IN APRIL 1982. IN THE LOWER SPECTRA FREQUENCY RANGE, IT SEEMS THAT THE SMOOTHED SPECTRA WERE OBTAINED BY THE USE OF RAW SPECTRA VALUES.

MASS EVALUATIONS (K-SEC^2/FT)

ELEVATION	URS/BLUME DATA						DATA FROM DRWS. TRANSMITED TO BNL				
	FRAME 1	FRAME 2	FRAME 3	FRAME 4	FRAME 5	TOTAL	CONCENTR	DISTR.	SUB TOTAL	STRUCTUR	TOTAL
101'	0.29	0.29	0.28	0.36	0.30	1.52	1.13	0.55	1.68	1.40	3.08
106'	0.63	0.43	0.31	0.69	0.70	2.68	2.53	0.30	2.83	1.71	4.54
117'	1.25	1.07	1.24	1.55	1.50	6.71	3.04	4.50	7.54	3.89	11.43
140'	8.72	7.95	9.18	10.49	10.55	46.89	30.71	2.89	33.60	34.15	67.75

FINDINGS

- A REVIEW OF THE STEEL FABRICATORS DRAWINGS SHOW THAT THE MEMBER CONNECTIONS USED IN THE 2-D URS/BLUME MODEL DO NOT REPRESENT THE ACTUAL FIELD CONDITIONS.

- THE PARAMETRIC STUDIES CARRIED OUT AT BNL WITH THE 2-D MODEL SHOWED THAT THE FLOOR SPECTRA RESULTS CAN BE SIGNIFICANTLY ALTERED BY MEMBER CONNECTIVITY.

- AS WITH THE 3-D RESULTS, THE 2-D BNL SAPV RESULTS WERE VERIFIED WITH A STRUDL-McDONNELL-DOGULAS COMPUTER RUN. A GOOD MATCH FOR THE MODAL FREQUENCY'S AND THE FLOOR SPECTRA WERE OBTAINED.