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NUCLEAR REGULATORY COMMISSION

PACIFIC GAS & ELECTRIC COMPANY

DIABLO CANYON DESIGN VERIFICATION PROGRAM

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OPE/OGC MEETING

3:30 p.m.
January 13, 1983
PG&E Offices
77 Beale Street
Room 1760
San Francisco, California

C O N T E N T S

P R O C E E D I N G S

MR. FRIEND: I would like to begin, if we may.

This meeting at this time is to try to brief OPE and OGC on some of the facets of our internal program, as well as the Independent Design Verification Program. Some of the members of OPE and OGC have indicated a desire to review more of the detailed paperwork that is involved and we are certainly willing to do that at a time that we can work out mutually with them.

I think as far as introductory remarks that ought to be about enough. Let's turn the meeting over to Gary Moore and his staff, who will give a detailed presentation of the processes that we have been involved with here for the last year almost. Gary.

MR. MOORE: Thank you, Howard.

First off, I noticed on at least some of the handouts that it looks like the order has somehow gotten messed up with regard to how these flimsies were put together. So, if you can somehow check what is up on the screen and rearrange your pile of paper, I would appreciate it.

MR. REYNOLDS: Excuse me, Gary. Do you have separate handouts for this meeting?

MR. MOORE: They are different, yes.

MR. REYNOLDS: Do you have an extra copy?

MR. EISENHUT: Are there any copies?

MR. MOORE: I think the problem was we didn't anticipate -- Howard has asked myself and some of my colleagues to give a presentation that would cover the various processes that are being used both for review and for engineering resolution with regard to the Phase I/Phase II are of design review.

Before we enter into this specific presentation, I would like to kind of overview the remainder of this afternoon's discussion to give the staff and the Commission's staff an idea of where we are going in terms of the presentation.

First off, we will start with the review process itself. I will give a discussion and, hopefully, it will help the audience here to understand better what the project is doing in terms of review activity.

Then Roy Fray, the Verification Program's coordinator, will give a very similar presentation, but will address the Independent Verification Program, commonly known as the IDVP. Then Roy will also describe the tracking, reporting and documenting processes that are used for both programs. They are essentially identical.

Then I will try to describe what in my mind would be an accurate representation of an engineering resolution process. You will have to appreciate it is going to be very general and very abstract. I am trying to make it fit all cases.

But to give better understanding, we decided to use

an example technique and I have selected four specific examples that have come from the Verification Program to try to better explain the engineering resolution process. I have selected -- why don't I stop. Feel free to move, okay?

MR. EISENHUT: Go ahead.

MR. NORTON: You are not interfering with them at all, Gary.

MR. MOORE: Well, if anybody was bothered with moving while I was talking, I didn't want that to throw anybody off.

I have selected two examples from the Phase I scope of work and I would say this is the TG&E Phase I scope, which is a little bit broader than the IDVP definition of Phase I. Specifically, what the project is doing in regards to the engineering resolutions -- the fuel-handling building that many of you saw yesterday -- and that presentation will be made by Dr. White, my assistant project engineer for seismic areas.

Then we will also have a presentation of the Phase I piping and pipe support program. That will be given by Mike Tresler, the engineering group supervisor for piping and then we will shift to Phase II and I will give two specific examples; one, dealing with the pressure temperature analysis that you heard referred to this morning and, also, an example with regard to the fire damper. This is not a significant example, but I think you will understand why I

chose it when we get there.

So, with that overview, I would like to launch right into the Diablo Canyon review slides and I would like to approach that portion of the presentation by giving you a little bit of background outlining the organization on the project that is addressing this program and, in fact, all of the engineering activities on the project, what I feel are the objectives of our review program, the various methodologies that we are using for review and then I make reference to Roy's presentation for tracking and reporting.

I don't think any of this information is new to anyone, but I would just like to kind of go through the chronology a little bit.

The Verification effort really started with the original diagram there back in September, at which time PG&E initiated the Verification activities during October and November through Dr. Cloud's organization and on November 19th, 1981, we received an order from the NRC with Attachment 1, which essentially outlined, at least at that time, what constituted Phase I.

Also, attached to that order was a letter from Mr. Denton that outlined what is now known as Phase II in terms of scope.

Now, the first public document that I could recall that announced PG&E's program with regard to verification was

in our eighth semi-monthly report. In that report we identified our program as the Technical Program. It later became known as the Internal Technical Program and because of where we were in the verification process, its scope had only been directed at Phase I activities.

Later, I think people have used the term regarding Corrective Action Program, which I personally consider a subset of the Internal Technical Program and I think of it as that portion of the program, which is specifically directed at the concerns identified by the independent reviewers. I acquired that definition by usage, I think, is the way to describe it. So, when I say "Technical Program, Internal Technical Program," it is really the same thing.

I will also point out the second place I think where the Internal Technical Program was described was in the overall PG&E management plan, which also contains a description of it.

I would like to move on now to the organization which is performing the Diablo Canyon Project Review Program and specifically, I am speaking to the organization that reports to me as project engineer for Unit 1. I would like to point out a couple of things on this chart. You will see that the Verification Program Coordinator, Mr. Fray, reports directly to me and, as he will point out, he is kind of the pinch point, if you will, between the independent program and

the project.

Then the rest of the organization, I think, looks pretty much like a standard organization that would address design activities for a nuclear power plant. I would like to point out one thing, though. This organization is involved in not only verification activities, but also all engineering activities associated with Unit 1 and if you want to look real close, in some cases we also do Unit 2, where there isn't a lot that is different for Unit 2.

Moving on to the objectives that I consider are the objectives of the Diablo Canyon Review Program -- and I will say "Programs," because they are really different -- these objectives were outlined, as I mentioned earlier, in the overall PG&E management plan.

The first objective was, I think at this point in time, to address technical issues identified as a result of the original annulus problem. Then the second objective is to address issues identified by the Independent Design Verification Program. Now, those of you who are engineers will certainly appreciate my next statement. Any time you are reviewing a complex technical area with engineers, you are almost guaranteed to find other technical issues along the way and that is where our third objective is, that if we find any other technical concern in any of our work, it is picked up as part of this program.

The fourth objective is where we spent quite a bit of discussion this morning and I will try to give it another attempt, I think, at trying to describe what the project activities are with regard to Phase II. I think Dick Anderson was very accurate in his statement that there is a difference between the programs associated with Phase I and Phase II and all morning I was struggling trying to think of a good example. This may or may not be a good example, but I will try.

I think you are well aware of the Verification Program activities associated with Phase I; namely, it is an extensive, complete piping review, structural review, that sort of thing. If I could draw a parallel to Phase II in the high energy line break area, if I was interested in performing the same type of a program as Phase I, I would look at the subject area of high energy line break and I would redo everything associated with that subject. That would be determined break locations, do the pressure temperature analysis, do the rupture restraints, work associated with that, the whole subject.

In Phase II we are not doing that and I think that that is the ingredient that we were having trouble passing on to you folks this morning. In that specific area for Phase II -- and as I said, I will use that as a specific example later on in the presentation -- we are only doing the pressure

temperature analysis associated with that subject area and the reason we are is that we have no need -- we have not determined a need ourselves, the independent program has not determined a need -- to go into those other areas. Now, I like to think of the Phase II program also as an issue-driven program. When we identify an issue in Phase II or the IDVP identifies an issue in Phase II, we address that issue and I will show you how those issues are addressed a little bit later on.

I would like to also point out that there are some activities on the project, and I would like to clarify something, or at least the impression I think Dick left you with this morning, and that was that he said when Bechtel came on the job, they made an assessment. I think Mr. Eisenhut questioned him on how that assessment was made.

I think Dick was referring to the Bechtel engineers, when they came on the job. I would like to point out that as part of this fourth objective, when I became project engineer in January, before Bechtel's involvement, I instituted some work addressed at specific areas of more of the design process than anything else. So, I have had the people formatting design criteria in a format that is very familiar to people today to ease auditing.

In 1968, design criteria was not packaged like we package it today. At least, it was not packaged that way in

PG&E. We also have reviewed calculations to make sure that they are properly checked, that are located, that are properly filed, that sort of thing. So, it is an overall getting ready for, if you will, the Phase II activities that we expected from the IDVP.

Now, in conjunction with that, I will point out that any time you are into those kinds of areas, you are apt to find an issue, and as I alluded to -- I don't say I mentioned all of the issues this morning -- but we did find some issues in that work. The DC breakers are of that nature, the component cooling water system is of that nature and I gave you one other example, that I can't recall right now.

So, those are the objectives for Phase I and Phase II Diablo Canyon Project Review.

Moving on to methodology used, once again I think this will point out the difference. I apologize for the reverse order here. I am trying to relate back on this morning's discussion. "B" is the type of review that is being used in Phase I, where you establish a scope; you identify an established criteria, methodology. You have established the program. Then you go ahead and perform that program and you document the review.

This is well explained, I think, at least in terms of areas of the plant for subject matter of the plant with regard to what we are doing in the structures and in piping.

To a lesser extent, you could also use "B" methodology in terms of what we are doing in the pressure temperature analysis for Phase II, smaller scope.

With regard to "A," this is primarily where we are spending most of the time in Phase II. We get an issue; we review the specific issue that is being addressed and then we are obligated to review that issue with regard to generic implications. Depending on the subject, that could be many, many things. Based on that work, if we identify findings, we take one task. If we identify no findings, we take another task. Obviously, on the project if we find any problems associated with the work, we resolve it and what I have used here is the term, "resolve it by the engineering process," which we will speak to later.

Of course, as part of that resolution process, we are obligated to document that and this documentation can be in the form of documenting as we know it to address open items for audit. It also can be in the form of documentation in terms of new design where the engineering resolution process has resulted in a modification.

Then we anticipate having to prepare that work in some nature in a report.

This is an easy one. This is called passing the buck. Since the two tracking and reporting mechanisms are so similar between the two different programs, I am going to

let my subordinate make that presentation.

I will entertain questions now on this part of the presentation. We are into the IDVP next.

MR. SCHIERLING: Coming back to the question I asked earlier today, the open items that you have identified thus far in your program, in your semi-monthlies, they were the result of the review that was done by Bechtel, PG&E when you took over and probably to some extent it is still going on.

MR. MOORE: Yes.

MR. SCHIERLING: You also said that Phase II is an issue-driven program. How do these issues arise? Don't you have some kind of a program where you review something and the issue comes up and then it falls into this sequence?

MR. MOORE: Certainly. That is what I tried to illustrate by an example. Maybe it wasn't a good example. It is just the scope of the program, if you will. When Dr. Cooper's program identifies a concern -- and by stretching my mind we can speak about a Phase II issue -- a power supply to the control room ventilation system. A concern was raised about common systems that are fed power from both units. There was a concern identified with regard to power.

So, then that is an issue. But then you can look at that issue in a broader sense. Are there any other common systems fed by both units in terms of power? So, it is a program, if you will, to address that concern, versus review

of all systems for all forms of power supply. It is a scale type of thing. And I think it is fair to say it is less structured in Phase II than in Phase I.

We have not identified the needs in Phase II to undertake the extensive program that we committed to in Phase I. It is just based on engineering judgment and need. I think if people were to sit down and review the Phase II issues so far defined versus Phase I issues, I think that would become apparent.

I would like to now pass the presentation on to Roy Fray who will describe the IDVP review process.

MR. FRAY: Thank you, Gary.

I will briefly outline the IDVP review process and then discuss the project's tracking, reporting and documentation. For the discussion of the IDVP review process, I will for the most part be using material or presenting material that has been extracted from the IDVP Phase I and Phase II program plans.

I will parallel Gary's presentation and I will touch on background. I will discuss the IDVP organization briefly, IDVP objectives, IDVP methodology, tracking and reporting, the system that the IDVP utilizes. This may be a little bit repetitive of some of the material that Gary presented on the background, but at any rate the order defined the actions that constitutes the Phase I of the program. The letter defined

those actions that constitute Phase II.

In the time frame of October '81 to February '82 the Robert L. Cloud organization began Phase I efforts. In February of '82 Teledyne Engineering Service agreed to manage the independent program and on April 27th, NRC approved the IDVP Phase I program management plan and in the July '82 time frame, Stone & Webster Engineering Corporation began their Phase II effort.

Then in December of '82, just recently, the NRC approved the IDVP Phase II program management plan.

Next, I would like to just briefly review the IDVP organization. Teledyne Engineering Services is providing program management for the IDVP and, in particular, Dr. Cooper is serving as program manager. Dr. Cooper reports to Mr. Maneatis, executive vice president of Pacific Gas & Electric Company and to Mr. Denton of the Nuclear Regulatory Commission.

TES has three main subcontractors; R. F. Reedy, Incorporated, reviewing QA activities, R. L. Cloud Associates, reviewing seismic, mechanical and structural areas, Stone & Webster Engineering Corporation, reviewing safety systems and analyses and, as you heard earlier today, performing the adjunct construction quality assurance review.

Next, I would like to touch on the IDVP objectives. The Independent Design Verification Program, which you will hear a lot of us refer to as the IDVP today, as defined by

the Phase I and Phase II program plans, is designed to be responsive to the order and letter. The IDVP is designed to eliminate uncertainties in the correctness of the safety-related seismic and systems design. The IDVP will evaluate the significance of any errors that are found and, lastly, the IDVP will determine whether or not the design is in compliance with the PG&E licensing application.

This logic diagram summarizes the methodology which is being used by the IDVP. The IDVP first develops a design chain. That is, they identify the internal and external organizations that were involved with design. They then select and review a generic -- perhaps a better term here is "initial sample" -- which includes performing -- this review includes performing independent sample calculations.

In parallel, they review the quality assurance and design control aspects that were in place at the time of the design. If there are findings, the IDVP then evaluates significant findings and if they are significant, additional verification and/or sampling may be required. Additional verification involves reviewing additional design for a narrow concern. For example: reviewing pumps for NPSH consideration.

Additional sampling involves a complete review of additional designs. An example of that might be reviewing five additional piping problems. If the resolution of specific or generic IDVP concerns involves corrective action by the

project, then the IDVP reviews that corrective action.

Finally, when specific concerns -- that is, the EOI concerns and generic concerns, which would be additional verification or sampling-like concerns -- are resolved, the IDVP review is documented and reports are issued.

Last, I would like to touch on the tracking and reporting that is produced by the IDVP. Rather than get into the details of a complex system, I am going to more or less treat it like a "black box," but I would like to mention a few of the important aspects of the system.

First, it documents concerns that are raised by the IDVP. Each concern is assigned a specific file number and that file is maintained open until the concern is resolved and any corrective action that may be required while the resolution is completed.

Second, it provides for a classification of concerns as an error, A, B, C or D; as a deviation, as a closed item or as an open item for PG&E investigation.

Three, this system provides for information exchange between the IDVP and the project on the IDVP's concerns; that is, the concerns that the IDVP has raised.

Fourth, it provides for the IDVP to monitor the project's internal technical program via the project's semi-monthly reporting.

Last, it provides for reporting of concerns and the

resolution of those concerns to the NRC.

That concludes my discussion of the IDVP review process. Before I go on to describe the projects, tracking, reporting and documenting, I would ask if there are any questions that I could answer or that Dr. Cooper, who is here, could answer?

MR. COOPER: Let me add just one thing that occurs to me in looking at this last one. Whenever there is a transmittal that goes to the NRC, it also goes to what Mr. Denton's letter termed "the designated other party." So, the mechanism for communication there also exists.

MR. KENNEKE: Could I ask one question? In the earlier handout on the schedule, there was a line, line 16, on the actual verification, is that a joint process between the IDVP and the ITP or is it one checks on the other?

MR. COOPER: I would say it is a parallel process.

MR. FRAY: Parallel.

MR. KENNEKE: Parallel process.

MR. COOPER: Their program requires that they do it and then our program, our definition of how we review their corrective action will spell out how we do it. The only qualification is whether it is a sampling basis --

MR. KENNEKE: So, in other words it will be something like the status and final report. There are two lines really involved, rather than a single line?

MR. COOPER: It is part of the review of their corrective action program in the boxes. It is one of the elements in the review of those corrective action programs.

MR. KENNEKE: But they are done independently, not as a cooperative venture?

MR. COOPER: Yes.

MR. SCHIERLING: Roy, I think you also might want to mention that since everything comes under IDVP, that on occasion the NRC also feeds into the IDVP; for example, the Brookings Report.

MR. FRAY: Perhaps an arrow.

If there are no further questions on the IDVP process, I will go on to describe the projects, tracking, reporting and documenting the verification concerns, open items and errors. I will describe the IDVP technical interface. I will identify the project procedures that specify tracking, reporting and documenting. I will describe the project's tracking and reporting and the project's documentation.

This diagram shows the technical interface between the IDVP and the project and that technical interface is the verification group. EOI's is there in open items, which document the concerns that the IDVP has raised and requests for information from the independent program are distributed appropriately to the project's discipline groups by the verification group.

The resolution of EOI's and the response to the requests for information flow from the various discipline groups into the verification group and are then distributed appropriately to the IDVP consultants. And together, of course, with this is a pinch point or focus point. You can see that there is a focusing here and then a defocusing and then the process is reversed.

MR. KENNEKE: The three subcontractors do not send their material through Teledyne?

MR. FRAY: No. They communicate directly with the project. I might say, though, that in general communications from a particular subcontractor to the project and the other way around is copied to the program manager from TES.

MR. MOORE: I think there is an exception to that, though. Correct me if I am wrong, anything of a conclusionary nature from the subcontractor is first put to the program manager and then out to all the parties.

MR. COOPER: Yes, that is true.

MR. MOORE: And not directly to the --

MR. COOPER: They may issue it, but it is only after we have reviewed it and had some documented concurrence sheet in with it. I just might mention, we have an assistant project manager for each of the organizations. They work very closely with them, but we did want to get in the interface step there, have that go through us, but we track it continuously. We get

all the information that we need. We don't ask for all copies of everything, just the things we need.

MR. FRAY: I would like to point out one other thing. I think for slide-making purposes, this interface slide is all of the disciplines that were reflected on the organization chart. For schematic purposes, we are only showing four.

MR. SCHIERLING: Roy, another comment, I think it might be appropriate to talk about how that interface takes place; that it can be through file sheets, meetings and what nature they have.

MR. FRAY: Yes. This slide is oriented toward the paper interface, but it is somewhat applicable to meetings also since the Verification group, in general, arranges and coordinates the meetings between the IDVP and the project in accord with Procedure No. 7.

One last thing I would like to mention --

MR. COOPER: Excuse me. That is true. We have meetings and if those meetings involve conclusionary material, the staff and the designated other parties may attend as observers, but no matter how many meetings we have, our decisions are based upon paper that flows through as paper.

MR. FRAY: I think that is a good point to make, Bill.

One last thing I would like to mention about this slide is that the IDVP is monitoring issues that are raised

in the internal technical program, as Gary mentioned, prior to semi-monthly reports, which goes through the Verification group to the independent consultants.

Next, I would like to identify the procedures that specify the project's tracking, reporting and documenting of concerns, open items and errors.

First, there are the normal quality procedures, which are in the PG&E engineering manual; specifically, 9.1, the nonconformance procedure and 10.1, the discrepancy procedure.

Secondly, there are implementing procedures which have been developed by the Verification group for the Diablo Canyon Verification Program. These were developed specifically for this effort.

Procedure No. 1 describes the steps to be followed, the procedures to be followed for interfacing with the independent consultants.

Procedure No. 2 addresses the steps to be followed in addressing IDVP open item, error and program resolution reports.

Three describes the procedures -- No. 3 is "Item for Review" and this describes the procedures for timely reporting of concerns that are identified internally; that is, in our internal technical program.

No. 4 describes the procedures for responding to the

project's own open items.

No. 5 describes the procedure to be followed in arranging by booking and site visits by the independent consultants.

This diagram shows the relationship between the various tracking and reporting pathways. As I said, there are two basic reporting pathways; the normal quality pathway and then there is also the verification program reporting pathway.

The nonconformance procedures provides for reporting via this normal quality pathway and also via the verification pathway. The discrepancy procedures provide for reporting via the verification pathway, if the discrepancy is of a generic nature. The item for review procedure, as I said earlier, provides for timely reporting, the 14-day time limit to either demonstrate a concern is of no safety significance, or to initiate an open item.

The EOI procedure discusses how the project resolves EOI's that are generated by the IDVP. The open item procedure describes how the project resolves internally identified concerns. Both the internally generated and externally generated concerns are tracked via what we call our commitment control system, CCS, which is a computer-based tracking system. Also, both the internally and externally identified concerns are reported in the project semi-monthly report.

Let me finally add that the verification procedures,

open item, IFR and EOI procedures, are -- they do not replace the normal quality procedures. So, in some instances there is a dual reporting and tracking via these two pathways.

Next, I would like to turn to the project documentation of concerns that have been identified. The resolution process that we use is a two-step process. The first step is resolution and the second step is completion. Resolution of a concern includes the following: a complete understanding of the concern, determination of significance, course of action to resolve the concern, identification and description of any physical modification that will be required and, of course, documentation via what we call our resolution package of these four items.

We use what we call a resolution sheet to provide guidance in assembling this resolution package and this resolution sheet requires description of the concern, significance of the concern, description of resolution, description of physical modification and some sign-offs by project supervisors.

MR. MOORE: I think it is important to point out, if you will notice, there is, under "Description of Physical Modification," a category of questions and that is unique to a resolution report, because at the point in time -- at this point in time, you may or may not know if resolutions are required.

MR. FRAY: Modifications are required.

MR. MOORE: I am sorry. Modifications.

MR. FRAY: Now, the second step is completion and completion of a concern involves these items: completion of the tasks that were specified as part of the resolution, completion of any physical modification that may be required and preparation of a completion package, which documents these two items. And, as Gary mentioned, on the completion sheet there is no longer an option to not answer the question of physical modifications. At this point, you either know there are or you know there aren't and, again, there are a set of questions that are asked, description of concern, significance, description of the completion, description of any physical modification and the sign off.

This concludes my presentation on the project's tracking, reporting and documenting. I would be happy to answer any questions.

MR. COOPER: Roy, just to make thing completely clear -- I am not sure just how much in detail the gentlemen have been involved -- in those resolution sheets with their packages of completion sheets, when they come into the independent program, it is often in response to an open item that we have transferred to PG&E to work on. We will review those transmittals, usually with the assistance of, for example, Stone & Webster, or whoever is appropriate, and if

we agree that the response is probably truly responsive to our questions, then we will issue an open item report back to our subcontractor to continue the process going. In other words we control who has the ball stage in response to these sheets. Then, of course, we have to go through and, although it is called a completion sheet there, if it is an item we raise, it is not completed, so eventually we go through our paperwork to close it.

MR. KENNEKE: You say it is often in response to an item that you have issued. What else might it be in response to?

MR. COOPER: Well, I said it is often in response to an open item transferred to PG&E. They may use this mechanism even though we have not formally taken the concern from our house into their house and transferred it. They may still use this mechanism to feed us information on concerns that we are still working on in our house.

MR. KENNEKE: That is the distinction I was trying to make.

MR. FRAY: To make it a little clearer, there is a certain point in Bill's process where he is looking for input and that point is signified by issuance of a certain kind of report or piece of paper. Often we feel that we have the information that will help him, so we don't wait for that point to arrive. We send the information to him.

Any other questions? Okay. I will turn the meeting back over to Gary.

MR. MOORE: Thank you, Roy.

One point that I would like to just reference back to that last slide, down at the bottom it talks about physical modifications required. First off, as Roy pointed out, we are obligated to make an absolute statement, "yes" or "no," and if we say "yes," and it is a completion report, that is the trigger for the IDVP to go into motion, come to the site and verify the corrective action. That is how this parallels an independent as-built-in process occurs.

MR. KENNEKE: That is different than the --

MR. MOORE: No. That is the same thing. That is the trigger mechanism. I was trying to explain the process.

MR. KENNEKE: Well, that has a starting -- is it starting in mid-February or --

MR. MOORE: It is ongoing. All of these procedures and systems and processes are related to the issues either that are identified by an EOI number or an open item number.

I would like to move on -- now, we have left the review process or processes that are used on the project or by the independent verification consultants and now we are going to describe another process that addresses engineering resolutions.

As I mentioned earlier, I am going to try to, in one

slide, identify at least in my mind what the engineering resolution process is on the project for issues raised in the Verification program.

The first step, and this may seem an obvious step, but it is often very difficult to get past that first step, it is to first fully understand the issue. I know, at least my management, often wonders why it takes us so long to get resolution and closure on an issue. Oftentimes, it is spent here in the first box, because so much of this program is based on paper and the systems and designs are quite often complex and the engineers do not always write the question that they meant to ask and, of course, we don't always write the response that we meant to give. So, we spend a lot of time in that first box. That is my point.

Then, since this is a review process, we have to identify the applicable criteria. This is a little bit different than a normal design process where the engineer is allowed to go out and generate the criteria, if you will, that is applicable to his problem. Here we are kind of given the criteria, if you will. So, it is necessary to identify that and also the methodology that we use. Methodology is whatever you need to do to solve your engineering problem.

As I mentioned earlier in the program, the first thing that is done is investigate and resolve the specific issue that was raised up in the first box. I will go back to

the example I used before. There is a concern expressed with the power supply to common ventilation systems. We need to resolve that concern in a technical sense. After you have completed that step, or oftentimes in parallel with completing that step, you then are obligated to investigate and resolve generic implications associated with the original issue.

Again, going back to my example, I would say investigate all common systems for shared power supply. Then, of course, the last step in the process is to document what you have done. I would like to expand a little bit in terms of what is in the "document for process" box. We have been speaking about a lot of paperwork associated with the Verification program, all of these EOI resolution reports and completion reports and Phase I final reports and Phase II final reports, interim technical reports. We have quite a bit of documentation associated with the Verification program.

But we in the project have another very important product and that is design and if any of this work from this process results in design change, then we have calculation packages prepared. We have drawings prepared. If you need to buy equipment associated with this resolution, you need to prepare specifications and procure equipment and, then, of course, our documentation is then sent to the field or to the materials department to be placed with the vendors and eventually that information ends up at the site and since

Unit 1 is an operating plant, that is a little bit more of an involved process than a plant that is under a CP type of requirement.

We have an obligation to have all changes approved by the plant manager and there is a group on site that does that, called the PSRC's, plant staff review committee -- I believe is correct -- who is the group that insures that we are not changing the licensing basis of the license, I guess, is the best way I can put it. They have a set of regulations that the operator, if you will, must conform to and if they determine that our design is an unreviewed safety issue, then we must seek the staff's approval before that change can be put into the plant. If they determine that it is not an unreviewed safety issue, then we can go ahead and make the change in the plant and then we are obligated to inform the staff, I believe, on a yearly basis that we have made that change in the plant.

Now, the new regulations require us also to indicate that change in the audit. Now, when that change is constructed, if any changes to that design occur as part of the construction process, then those as-built modifications have to come back to engineering, be approved. The documentation has to be modified to reflect that change and reissued. That is how we keep the information at the plant and here in the general office in continual -- hopefully, the same state on the

drawings as is in the plant.

So, that is what I would consider a very general and very abstract resolution design process. Now, to try to drive it home a little easier, I think, I would like to now pass the podium over to Dr. White, who will discuss the first Phase I specific example. That is dealing with the fuel handling building.

MR. FRIEND: I am sorry I interrupted you. The way you discussed the as-built process, it sounded like you could avoid the whole previous process through as-built. I think you can point out there are limited amounts of freedom for as-builts and there are bigger chains that have to come back to engineering.

MR. MOORE: Yes, yes. In fact, on this job there are several breaks. Good point, Howard.

If the design change is not too significant, we have an on-site engineering group that has been delegated the authority to, if you will, approve the design at that point and allow it to be constructed. If it is a significant design change, then it has to come back to the general office before it gets changed.

Bill, would you come up and give a presentation on the fuel handling building?

MR. WHITE: So far, we have been talking about the engineering resolution process in a fairly abstract manner.

What I am going to do now is get down to the nuts and bolts of the whole operation and see how engineering resolves the issues by investigating problems of design modifications and this kind of thing.

As Gary mentioned, the Phase II operation as it stands right now is primarily reacting to issues. That is quite different from the mode of operation of Phase I. It initially was that kind of program, reacting to EOI's and OI's and this kind of mode of operation. It is too the point now where the interaction between EOI's and developing resolutions to them on an individual basis will be more time consuming than stepping back, looking at the entire subject; in this case, the fuel handling building.

It is easier to go through the analysis of the fuel handling building from start to finish and use that as the approach for eliminating or resolving questions that have been brought up, either by the IDVP's or by the internal program.

Now, as the design analysis and design modification takes place naturally we have the EOI's, the individual items, brought up in the background, making sure that the overall process will resolve the individual issues. But it is not being driven by that kind of program. It is looking at the overall design, the overall seismic analysis of each individual building.

Now, from a general step or general review process that we go through for each individual building, it ends up being kind of a four-step operation and these four steps are summarized in the Phase I report in Section 2.1.

Now, the initial step, as Gary was talking about, is trying to get our hands on the issues. The first thing we need to do is to round up the drawings that define the buildings and pull together the assemblage of drawings; in other words, take a look at the fuel handling building. The actual fuel handling building is on a number of drawings. It is not just a single set of drawings and it is necessary to bring this information together and condense it and then go to the field and see if there are any differences between drawings that were used initially to put together the seismic model in this particular case versus the actual structure that is there in the field.

In some cases we come up with minor discrepancies between the actual structure and what is shown on the drawing. These are minor deviations. That is the first step.

The second step is to make sure that the structural model used in the seismic analysis does, in fact, provide an adequate representation of the as-built configuration. So, first, we gather the drawings, digest that information, go to the field and make sure we have a clear picture. Then we review the seismic model to make sure, like I said,

that it is an adequate representation of the as-built configuration.

After that is completed, then we see that the seismic design criteria that was used for the analysis of that particular structure was as indicated in the FSAR and adequately applied. We will get into what that really amounts to for the fuel handling building when we get around to the specific example, but that is one of the steps of the process, to make sure that the seismic design criteria was adequately applied to the analysis of the structure.

The fourth item is to review the assumptions and methodology and input to the overall analysis process. We are also getting down to checking individual members, this kind of thing, for the particular building that we are working with.

Now, if in any of these steps, we end up with the need for analysis and design beyond what was done for the initial design, you end up in an iterative loop. In other words, we do the analysis, modifications perhaps are needed and then you have to ask yourself the question, have the modifications required any revisiting or modifications to the original analysis. In some cases there are; in which case we have to go back to the analysis and reassess the adequacy of the design modifications. Normally, that is the end of it, but on occasion the modifications that were originally

expected will need some fine tuning. So, we go through this analysis and design iteration step until the whole thing is settled down and all of the criteria are eventually met.

So, those four steps and then the analysis and design iteration step is done on all of the Category 1 structures that we have; intake structure, fuel handling building, office building, containment, interior concrete, annulus steel, all of them, the same basic four steps.

Now, when you get to the individual buildings, that is where they have to be modified a little bit to suit that particular building, but in general those are the four steps we go through.

For the fuel handling building in particular, the first thing we did was to take a look at the response spectra that was used as input to the analysis of the fuel handling building and for the people that were in the field yesterday, the fuel handling building was the steel superstructure above the spin fuel pool. If you happen to remember the cover that we were looking at, the fuel handling building is the super-structure supporting the crane above it.

That structure now is supported off the top of the auxiliary building. So, the input motion to the fuel handling building comes from the vibration of the response of the auxiliary building. So, we will take that response back to make sure that was adequately applied to the fuel handling

building.

MR. EISENHUT: Bill, in your example, correct me again now, on the fuel handling building, has the spectra been finalized?

MR. WHITE: Yes.

MR. EISENHUT: Okay. So, you, at this point -- now, you were, in fact, though, proceeding through the analysis previously before they were finalized?

MR. WHITE: Yes.

MR. EISENHUT: Would you just comment on the iterative process you went through?

MR. WHITE: When the EOI process started, there were a few EOI's written again for issues to the fuel handling building. So, people started looking at the overall analysis and design process that was used in developing the structural configuration. When we got involved in the project, the first thing we wanted to do was to have ourselves assess the adequacy of the fuel handling building. So, we started going through the model that was used in the original seismic analysis and also making estimates of the load that we expected that fuel handling building to seek.

I should mention that the estimate of the loads on the fuel handling building is a fairly simply process because it is a low frequency building, has a response factor in the auxiliary building that is fairly insensitive to the actual

response of the auxiliary building itself. The frequency of the fuel handling building is like two or three cycles per second and the peak in the response factor for the auxiliary building is about 10 to 12 cycles per second, very stiff building. So, the auxiliary building is simply passing through the ground motion at these low frequency vibrations.

So, it was very easy to say, okay, I am not sure what the actual response of the auxiliary building is, but I know that that frequency is like 10 CPS. It is not going to affect the response factor at two to three cycles per second. So, we were able to pick up those loads now and put them on a fairly simple model and then assess the adequacy of the design very early in the overall operation, simply independent of the initial response of the auxiliary building.

So, that is what allowed us to start assessing the adequacy of this building before the actual analysis of the auxiliary building was complete. So, that was our next step essentially, was to go through a process of estimating the loads in the fuel handling building and then checking the adequacy of the connections relative to the acceptance criteria and also taking a look at the adequacy of the members.

In some cases we found that the criteria did not appear to be met, based on loads from my hand calculations. We were finding some members were somewhat overloaded, relative to the acceptance criteria. Same thing for connections. This

was based on some preliminary end calculations, but the indication was we needed to take a deeper look into the overall response of the building.

So, from the hand calculations we built a simple dynamic model, taking out one frame, column on the east side, column on the west side and then the roof truss' on top. So, we got a simple model, built a dynamic model of that and then a more detailed analysis of the fuel handling building.

We were still getting indications that the criteria that the project was committed to could not be met. Now, to give you an indication of how far off or how close we were getting to meeting the criteria, if, as an example, we had used the latest code values for connections, which is the 8th edition of the AISC, we were able to show that most of the connections were excellent. However, the code of record for Diablo Canyon is not the 8th edition. It is the 7th edition and there the capacity for bolted connections is less than the values used in the 8th edition. Therefore, we did not meet our acceptance criteria.

Some of the modifications that we are making are for exactly that reason. We would be able to meet the 8th edition, but it is not what we are signed up for. We have gone back to take a look at the modification needed, however, to meet the more stringent 7th edition. So, some of the modifications have resulted from that kind of a situation.

So, as I was mentioning, we went through simple hand calculations, then a simple dynamic model. Still, indications are criteria was not being met and by that time we decided to just go ahead and build a detailed dynamic analysis model of the whole fuel building essentially and use that as the basis for design.

Now, to show you the level of detail that we are looking at for our dynamic model, this is a typical cross section through the fuel handling building. This is supported off the auxiliary building, elevation 140, and that is the top row of the spin fuel pool, to give you an orientation of where we were yesterday.

This is a general configuration of the overall structure. From that, we put together a very simple model of a given cross section. This is typical of what we use on kind of the second stage overall calculations. This can be used to get a good indication of the load on a particular crane, but one of the controlling loading conditions for the fuel handling building is the presence of the crane itself. So, in order to get a good model of the crane and its effect on the structure, you need more than just one crane.

So, the next configuration that was used involved a larger portion of the overall structure and here it is about seven columns at one end of the structure. Here this model can be used with the introduction of the crane loads now to

get a real good indication of the force of the members and the load on a connection, this kind of thing.

After, again, we have made an assessment of the initial load on that portion, then we go into an analysis of the entire structure where here we are able to distribute the load to the rest of the fuel handling building from the crane. So, this is the evolution, if you will, of our analysis of the fuel handling building. Starting off with very simple hand calculations and then moving to a simple 2-D dynamic model, then going to the seven frame model and then finally the entire structure.

This is the kind of steps that you go through or the process that was gone through in the engineering resolution process that had its initiation back at the EOI level, but did not try to react to those specific items. Now, when we get finished with this analysis in design and modification, the actual fuel installation, then we will go back and fill out the little resolution forms and we will check the box on modifications and whatever else is required to finally close out that particular item. But, as you can see, this is, in my estimation, a very thorough analysis of the building and this is the kind of thing we are doing on the others as well.

MR. KNIGHT: Bill, let me just ask -- Donald asked earlier if your spectra were final, if you had the final spectra.

You said, "yes." Has there been any interaction with the IDVP yet on this effort and more specifically -- I say "interaction." Let me define it. Are we in the mode where -- let me back up two steps. One of the commitments in the IDVP is to come back and look at the action, look at the corrective action taken. This is clearly a corrective action.

MR. WHITE: Yes.

MR. KNIGHT: Ergo, at some point, there has to be an interaction between you and they, at which time they will take a look at this process you have gone through and offer their own reaction or opinions on what you have done. Has that process started or is it --

MR. WHITE: It was definitely started. I am trying to remember where we are in that overall process. In the Phase I report, there we have indicated the kind of analysis that we are doing for the auxiliary building, which is -- we have to have that closed out before we can finish up this one, from a real paper point of view. From a practical point of view, they are not tied that close because of the actual dynamic uncoupling of the two. But from a paper step point of view, we need to close out and finalize the response factor of the auxiliary building.

MR. KNIGHT: In your response you say the final spectra, that stuff is done? You have finished your analysis of the aux building?

MR. WHITE: Right. We have finished our analysis in terms of -- we haven't finished our analysis of the low diaphragm. That work right now is in progress, but in terms of generating a response factor, we have done all we intend to do.

MR. EISENHUT: You, therefore, have the -- I guess, go back to Jim's earlier question -- and the IDVP has said they have reviewed or have they reviewed the --

MR. WHITE: They are in the process of reviewing our analysis in support of the response factor.

MR. COOPER: I would like Mr. Denison to respond for the IDVP.

MR. DENISON: Ned Denison, Cloud Associates. I feel No. 8, revision zero outlines the process that we will use to review the fuel handling building. It includes a look at as-built versus drawings. It includes a look at the dynamic analysis through spectra generation and it includes our review of member qualifications.

At this point our review is strictly in the criteria methodology stage; that is, we have reviewed the different supplements to the Phase I final report issued by the DCP. It is our intention to also review the implementation. That work right now on the implementation is somewhere between zero and 10 percent.

MR. KNIGHT: As far as the IDVP is --

MR. DENISON: As far as the IDVP is concerned.

MR. KNIGHT: But as far as the project is concerned, you are ready to do it whenever it needs to be done? I am just trying to get a handle -- I am being a little parochial, but I am looking at -- it is half past January.

MR. MOORE: Phase I is ahead of Phase II a little bit. We have twice weekly what we call administration meetings with the Cloud organization. Those meetings are for them to come over and right now, it looks like about one meeting a week is for civil issues and one meeting a week is for piping issues, and they are continually seeking where we are in our work and when we submit a Phase I report section, if you will, that is the public signal that we are done with an area. At which time they initiate R.F.I.'s for information. We discuss this. We give them like lists of calculations that are completed. We give them a list and they extract a sample of calculations from that list.

I have heard the question of spectra brought up several times. With regard to the Hosgri Spectra, we have that issued under a DCM No. C-17 and that particular design criteria memorandum is in Revision 4 and we, I believe -- don't hold me exactly to this -- but I believe that includes the entire site. Now, you must appreciate we are different on final. If something happens tomorrow, say with the annulus steel, say, to where we are required to change that structure,

then by definition the spectra changes and the final spectra today becomes unfinal.

With regard to DE and DDE, those two design criteria memoranda have been issued, but do not have spectra everywhere on the site.

MR. WHITE: With respect to where we have spectra, we have spectra every place except in the Triven (?) Building and for all of the other structures we have everything.

MR. KNIGHT: We are trying to find places where we can take our relatively limited resources and get the biggest bang for our buck and if we come into a situation where we say, okay, we are looking at the spectra and looking at some other things and say, well, gee, we can't quite understand or quite agree and then are told, oh, yeah, but that changed yesterday, because, you know -- I understand there may be situations where things evolve. We are trying to find that place where the probability is best.

MR. DENISON: I would suggest, Jim, that we have been involved in this Diablo Canyon project in an attempt to integrate the schedules. We are also in the same boat. We are looking for places to come in and conduct a sampling. When those schedules are prepared -- that is strictly an administrative matter -- there will be dates when the Diablo Canyon project is 25, 50 and a hundred percent done with their work and we are choosing those milestones as sampling points.

Certainly, the signal of a hundred percent done, if it is going to come to us, it can certainly come to you. That might be your indication that the building work is done, that the member qualifications have been performed and it is ready to be reviewed.

MR. EISENHUT: Ned, I certainly think that helps, but at the same time, you know, you start with a spectra and the spectra gets finalized and eventually you are out in the -- the project is out in the field making modifications to the facility and some day we are just mortified that someone is going to come along and say, well, gee, the fuel handling building, the superstructure, all the modifications are done and we will say, well, gee, we ought to start reviewing the spectra. And that -- you know, we are just very sensitive. We are here at the eleventh hour with -- and that is why we are looking -- if you can say when something is final and then on those pieces if the IDVP can say they are happy with that piece, too, say to speak, it turns on the staff. I will be leaning on Jim and he knows it.

MR. FRIEND: If we didn't make it clear this morning, I would like to clarify that we will try to do a better job of identifying those areas that we think are final final and ready for IDVP and your own review at your discretion. We understand your need.

MR. EISENHUT: We think that would be extremely

helpful.

MR. KENNEKE: Can I ask as a general matter what kinds of controls are there internal to the project that either present or control new areas?

MR. WHITE: Well, we have a quality assurance program, which essentially is a doer and a checker and that is typical of all of the operations within Bechtel and nuclear power, as far as that is concerned. In addition to that, there is a design verification program on areas where modifications are generated. So, in terms of competence level, in terms of the overall design process, first, you are forgetting all about dotting the "i's" and crossing the "t's" from the QA point of view. First off, you have a structure sitting in the field that was designed originally and if we were coming up with modifications that were causing gross changes within that configuration, we would have to go back and take a very, very close look at our overall analysis of the design process. Either we were way off the mark or originally it was way off the mark. We aren't finding those kinds of things.

So, in general, our analysis is coming very nearly confirming essentially that the original design was quite good. What we are doing now is making minor modifications to that. But to me that is a very valid check on the overall process. And aside from the actual QA operation, which requires,

like I said, a qualified doer and a qualified checker to go through the entire process.

MR. MOORE: Excuse me. I would like to refer you to the agenda. I don't want to steal Mike Jacobs' total thunder here. We have that identified as Step 5 in this program. I don't want to put you off, but that is one of the things that is going to help us assure that new areas are included in this design.

MR. FRIEND: I just wanted to clarify the original work that was done was done to standards and criteria and procedures and processes that were in place in the time frame it was done. The work that we are doing today on the Verification Program is done to standards and criteria for 1982. We think we have a good quality program. We think we have in place all of the procedures and controls necessary to assure that we don't have a recurrence and Mike will tell us in a little more detail about this in a few minutes.

MR. SCHIERLING: One question. I didn't go into the fuel handling building yesterday. Are there any modifications currently being made in the fuel handling building on this issue?

MR. WHITE: Yes. All the modifications on the fuel handling building have been related to the field and they are in the process of installing those modifications; new members in some locations, spacer bars in others, making

modifications to connections, beefing up gosset plates, replacing E-325 bolt with a 490 bolt, in some cases bigger bolts, these kinds of modifications. Those are ongoing right now.

Any others?

MR. MOORE: Thank you, Bill. I believe -- correct me if I am wrong, Jim -- I believe in the hot shot, the center part of the building, they are now about 20 percent completed. 26.

I would like to move on now, as time is getting late -- I would like to have Mike Tresler, the group supervisor for piping, discuss the second specific example of the engineering resolution process and that particular example deals with piping and pipe support design. Mike.

MR. TRESLER: We get five minutes, the way I understand this, so I will move on quickly.

The overhead indicates the steps that we go through in the piping and pipe support review and design process. There are really five major steps. The first step was to establish procedures and criteria and this step, of course, was completed long ago.

The second step was to verify the as-built piping configuration. That is complete.

The next step, once we have the as-built configuration, is to verify the piping analyses that these drawings

are based on. That is about 80, 90 percent complete.

Following that, we verify the pipe support design, using the results of the piping analysis as input, and that effort is also about 80 to 90 percent complete. Any support designs that we find are not acceptable are rejected and new design is prepared.

Following that is the construction process, which is not really one of the steps of engineering. But as part of construction, as-builts are prepared of any minor deviations from our design. Those as-builts are submitted back to the engineering discipline.

Our final step in the design process is to reconcile these as-builts with the calculations and actual design conditions.

To be a little bit more specific in each of these steps, the establishment of criteria actually preceded establishing procedures. In establishing the criteria we made a very thorough review of all of our licensing commitments, which included the FSAR and Hosgri Report.

We also at that time took advantage of the opportunity and actually expanded our acceptance criteria and procedural-type criteria beyond that that we had committed to in the FSAR and Hosgri Report. The reason for that was to minimize questions by reviewers and to assure the success of our review program.

Following that, we established the procedures for our review and in establishing the procedures, we made sure that all of those issues that were raised by the project review, as well as IDVP review, were covered procedurally in our piping and pipe support review effort. Also, of course, we made sure that the procedures covered all aspects of design and criteria for acceptance of that design review.

Following establishing the procedures and criteria, we did review all of the large bore -- "large bore" being two and a half inch diameter and larger -- piping by field walk-down. Any minor differences or major differences -- although I don't believe we found any -- were identified on the drawings and these marked-up drawings, corrective drawings, served as the input to the piping review.

This was done for the large bore. In the case of the small bore piping, that wasn't necessary because the construction drawings served as a basis for the review and those construction drawings, which are small bore piping isometrics, were as-built as a part of the construction process.

Following development of the as-built configuration, we reanalyzed all of our large bore piping and during that reanalysis we not only considered the Hosgri condition, but we have considered DE and DDE thermal and dead load. Also, we do hydrodynamics analysis when appropriate.

The output from this piping analysis, of course, is

primarily the stresses and we compare that with allowables to show acceptance of the piping system. Also, we get valve accelerations as output and we compare those with allowables from the vendors and show acceptance of the valves for operability and integrity.

The nozzle loads, loads on penetrations and containment, are coordinated with the appropriate discipline for recalculation to show acceptance or for comparison of established allowables. That work is in process and coming near completion now.

In some cases we have had to perform analysis with what we term "preliminary spectra," and in a few cases it turned out we have had to perform reanalysis because the final spectra developed was not enveloped by our preliminary spectra. In other cases it was.

In all cases if we used preliminary spectra as input, it is identified in controls such as that analysis is not finally accepted until all preliminary inputs are documented as being final from the civils, as an example, with our spectra.

Following completion of the piping analysis, it is issued to the support group to begin qualification of the pipe support. We perform a review of every pipe support, whether the load has increased or not and each one is qualified as built or redesigned. We have not only, of course, considered

the new loads, but we have considered the other criteria, such as frequency, in this review.

If rejection occurs and new design is required, it is accomplished. There are five levels of review and approval in that process and then it is issued to construction. Following the construction process through, they have a tight control over the building of the supports, such that the support is not signed off until it is inspected and an as-built prepared that agrees exactly with that actual as-built configuration. That is the design that is submitted back to us for our review and formal acceptance.

That, we consider to be a part of our design process and we don't consider the design to be final until we have accepted the as-built drawing.

Along with the process of designing the pipe support and qualifying the support, we also coordinate any loads of any significance with the Civil Department so that they can verify that the structure can withstand those loads that are being put on their structure by the piping system.

Of course, also, we incorporate any as-built information on the drawings and those drawings are issued so that they represent the as-built configuration of the plan.

I have some sample overheads, one of a piping analysis, if I can get that put up now.

MR. CHANDLER: Before we get into the specifics, I

would like to ask just one point of clarification.

MR. TRESLER: Sure.

MR. CHANDLER: Before, when you were talking about your analysis, you indicated you went back to the FSAR commitment, Hosgri commitment. You indicated there were some instances where you expanded on your commitment.

MR. TRESLER: That is correct.

MR. CHANDLER: Could you clarify what you mean by that?

MR. TRESLER: One example which comes to mind is the fact that our review now takes into consideration the loading on the supports that is provided by the rigid range spectrum in the analysis. In other words, previously we had a 33 hertz cutoff for our dynamic analysis and no consideration was given to the loading contribution from frequencies above 33 hertz.

Now, we envelope the ZPA with the tributory mass and with the dynamic analysis and use that envelope load as our design load. That was not a requirement by any of our licensing documentation, but we felt that since we were redoing all of our analyses, we would consider it to make sure it would not come up as an issue.

MR. CHANDLER: That is an example, not intended to be all-inclusive?

MR. TRESLER: No. There are other cases, yes.

MS. BLACK: When you did change these, did you amend the FSAR to describe your --

MR. TRESLER: No, we have not, not in that case. I don't want to say that we aren't doing it, though. We do have a process in-house where anything we do that deviates from the FSAR is communicated to our licensing department and they have a process ongoing to change the FSAR, but we don't do it daily.

MR. FRIEND: Just to clarify, an example might be we didn't do it on some pipes and not do it on other pipes. We did it across the board. It was just a decision we made to implement this reevaluation.

MR. CHANDLER: Thank you.

MR. ANDERSON: I think we also have to point out that this doesn't deviate from FSAR criteria. It may eventually in FSAR upgrading be described as -- it is an improvement.

MR. NORTON: I am not sure you have to describe in an FSAR where you do something more conservative than the material in the FSAR. I don't think there is any such requirement.

MR. CHANDLER: The point is that it is consistent fundamentally with the FSAR.

MR. NORTON: Certainly. It is as conservative.

MR. TRESLER: We are also on record with that in that

it is described in our Phase I final report, which we submitted to the NRC.

As a part of this program that we have gone through, we have, besides experiencing piping support modifications -- we have had a few piping modifications and to put that in perspective, we have modified approximately 200 feet of piping, as far as piping reroute and that is out of about 70,000 feet of piping. So, what has occurred is certainly not a significant percentage of the plant.

What you see on the board is a typical piping analysis isometric. This one happens to be component cooling water to one of the containment fan coolers. We looked at that line during our walk-down yesterday. There has been two modification required by reanalysis. One of those was a deletion of a support which used to be located at Node 80 and I think if you look you can see Node 80 on that "iso."

Also, we had to add a vertical restraint and that was at Node .260 and the support number is 4283R. Now, that is not to say that there aren't other support modifications, but these were the only support modifications that were required because of the piping reanalysis.

If you can give me the next overhead now?

This is one of the supports which had to be modified as a result of increased loads on the support. This is actually a detail of two supports, even though it has one

support number. These are parallel lines very similar in configuration, exactly the same system and fluid conditions.

The two snubbers that you see there used to be granell snubbers and they were 5 kip load rated. We have had to change them to 10 kip snubbers and the associated hardware has been changed also.

This is a typical modification. Other modifications have been resetting spring cans for dead load or thermal consideration, shimming to create a seismic restraint, where we had an excessive gap previously. In other cases we may find that the seismic or thermal movement is greater than previous analysis indicated and we have to open up the gap.

We also have had structural modifications and I think very frequently we have had base plate modifications. As Dick described this morning, I think a fair percentage of those base plate modifications have resulted because of our desire to complete our review and show qualification and so we have used a very simple screening criteria to sort out those that don't require modification, rather than doing finite element analysis in an attempt to save that support.

All of our work that we have done, as I said previously, is done to procedures. All the results of our work is documented and our program, methodology, criteria, procedures, results are described in detail in our internal technical program Phase I final report.

Are there any questions?

MR. MOORE: Thank you, Mike.

I think what you have heard on Phase I reference back to some of my comments before. You see why we characterize that as a program. It is those extensive, detailed, significant analyses that are very complete and thorough, not to say that the other work is not complete and thorough.

What I would like to do now is discuss the first of two specific examples that have come from the Phase II scope of review. The first example deals with the pressure temperature analysis that is part of a high energy line break analysis that is performed on a nuclear power plant.

I will start off with a little bit of background. This analysis is performed to determine the environment of both temperature and pressure from various postulated line breaks. With regard to why we on the project are looking at this, Stone & Webster and the project,in a confirmation of Stone & Webster's work, determined that the original analysis gave non-conservative results.

We had an issue and now the project has undertaken a program to address this issue.

Now, I would like to go through the steps of the resolution process with regard to this issue. First, we must establish a criteria and methodology. Once again, the criteria is per our licensing commitments of the NRC. The methodology

for this particular problem is that methodology used by Bechtel. It has been used on their other nuclear jobs.

Then we have established the scope of reanalysis. Now, here is a case where Stone & Webster had identified a concern in three specific compartments in the plant. You may recall it was in the Turdon (?) Building, Area GE and Area GW. We looked at that specific concern, but when we scoped our project review, we felt there was enough justification to investigate all such compartments. Here is how we are addressing not only the specific concerns, but the generic aspect of that same concern.

The first step in performing the analysis is to confirm the as-built condition and what is important to this analysis with regard to our plant are the specific vent areas, the openings in the compartments, the specific volumes, the volumes of the subcompartments and the surface areas of those compartments. The surface area is important for condensation considerations.

Secondly, we concerned other input date associated with this analysis. A couple of examples, we need to describe the ambient temperature at which you start the high energy line release at; also, what we call blow-down data, the data that is used in the analysis that represents the release of energy into the subcompartments and there are other parameters that go into the analysis.

MS. BLACK: Excuse me. I was looking at what input data did you use. Did you use the expected or the worst case in the case of the ambient temperature?

MR. MOORE: It varied. In regard to the ambient temperature, that is under consideration right now with the IDVP. I believe that the FSAR stated that 70 degrees was used. Elsewhere in the FSAR there are temperatures that are indicated different from 70 with regard to those specific locations. I can't give you a simple answer. I think that you are not always justified in using worst case data in all cases.

MS. BLACK: But if you were going to reanalyze this in your own project --

MR. MOORE: I believe we stuck to the 73, although I am not performing this analysis personally. Our obligation is to be able to justify with support, whatever the assumption.

MS. BLACK: Then you use the assumptions of the FSAR even though you may not agree with them?

MR. MOORE: No. I wouldn't make that statement, no. If we had a problem with a number in the FSAR and could not justify it technically, then we would take steps to correct it.

Then models are constructed and these models are computer models that represent the physical configuration of the plant and then you actually run the model and then

those computer analysis results in output run, which are reviewed and documented. One of the reasons that I picked this example is, number one, I think it is probably the single most significant issue that has been identified in Phase II to date. Number two, it illustrates how design processes relate to other design processes.

This analysis results in an environment. After that information is made available, we as design engineers are then obligated to factor that new information into areas of the design elsewhere in the plant. Specifically, this analysis is used in areas like environmental qualification of equipment.

Even though we have not identified any problems associated with environmental qualification of equipment, because this analysis may change an environment, we then go back and may have to do something in the environmental qualification area.

I think it is very important to recognize that that may result in a modification and I, as project engineer, have problems accepting that particular modification as a modification that was required as part of the verification process. It is kind of an indirect thing.

MS. BLACK: Just one more question, when you consult the new computer model to analyze, why do you use a new computer model? Why don't you use the one that was used originally or

do you always make -- do you just make a judgment at that point?

MR. MOORE: Well, with regard to that specific issue, one of the concerns was how the original code was applied. The original code happened to be a code that was really built for containment, a single compartment, if you will, and when it was applied to the subcompartments outside of containment, what actually occurred when the analysis was performed, a numerical instability occurred. The steady state conditions approached after the pressure. The computer program allowed that pressure to go slightly negative and the model then acted as if cool air came into the room, okay, and it, if you will, pulsated. That cool air ended up dropping the overall environmental temperature. That is why you ended up with your non-conservative results.

The actual case is that that room stayed positive in terms of pressure. Cool air is not brought in and the steady state temperature ends up at a higher level.

So, with regard to why we are using new computer codes is special computer codes for outside containment is a code specifically developed to handle multi-compartment situations. Also, it is a verified code.

MR. EISENHUT: I was going to ask you that question of which code is it and has it been verified. So --

MR. MOORE: Well, the Bechtel guys will have to help me with its name, but it is a verified computer code.

MR. FRIEND: COPATA is the name of the code and it has been verified. It has been verified and used widely by Bechtel. The code, I believe, has been described in a Bechtel topical report to the Nuclear Regulation Commission and in any case it has been used in a number of applications by Bechtel and other nuclear power plants.

MR. MOORE: I think it would be our project statement, Mr. Eisenhut, that it is a verified code. I don't have the report in my hand and I don't want to entertain the alternative.

MR. EISENHUT: That is all right. I was just going to say I have already asked someone to be sure that that is on the --

MR. SCHIERLING: Was that used for outside containment?

MR. MOORE: What was used? The Bechtel code?

MR. SCHIERLING: The Bechtel code.

MR. MOORE: Yes. Okay. Any more questions?

What I would like to do is move on to the last example. This example is not significant in terms of an issue, but it illustrates a point that I would like to leave this room with. I will start with some background.

Number one, the subject just happens to deal with a fire damper. Many of us who toured the auxiliary feed water pump room noticed a damper between the steam-driven pump and

the motor-driven pump room. As a part of the SWEC walk-down procedure in terms of their verification of our work, they were unable to determine the fire barrier rating of that damper prior to their walk-down. Then as many members of the staff noticed, this particular fire damper has what looks to be large gaps in it. Now, here it is supposed to be a barrier and you just look at it and it appears to be full of large cracks, if you will.

So, that is the issue. We received that issue from Stone & Webster and Teledyne. We initiated one of our people on on-site engineering to go out and very carefully inspect the damper and we were able to identify a U.L. rating on that damper. Then we also pursued the issue of gaps associated with that damper and determined two things. The gaps were there for thermal expansion reasons, as a technical explanation of why you had gaps in the damper in the first place.

Then when we confirmed the size of those gaps, they were within the U.L. criteria for that rating. We transmitted that information back to Teledyne and Stone & Webster. They came back out. Basically, we gave them a completion report with no modifications. That triggered them to come out and verify our resolution and completion. They did that. They were able to also confirm for themselves that the rating was on the damper and they also agreed to and confirmed our statement about the gaps meeting the U.L. criteria.

That allowed the IDVP program to close that item as an EOI. So, here we have an issue that was an open item. It was transferred to the project for resolution and it went straight to close.

The message that I would like to leave with you is it illustrates that just because you identify an item associated with Diablo, it doesn't always end up as an error.

MR. FRIEND: Thank you very much, Gary.

MR. CHANDLER: If I could ask out of curiousity, how was that one closed. If I went back to the sheet that you had handed out earlier --

MR. COOPER: It would have been in that line labeled, among other words, "invalid."

MR. MOORE: If I could find my notebook, I could give you the complete package.

MR. COOPER: The summary table.

MR. CHANDLER: You would view that as invalid, rather than resolved?

MR. COOPER: It is resolved in that we got additional information, but it is a bunch of words that we are trying to use to find one word to describe what they all were. We failed to find one word. We had room for about three.

MR. CHANDLER: Thank you.

MR. MOORE: If anyone is interested, I have the complete completion package on that fire damper.

MR. FRIEND: Okay. Are there any other questions of Gary or on the subject that he was covering?

We would like to just try to hurry through our description of the QA program on the verification process and I would like to ask Mike Jacobson to make this presentation. I have asked Mike to move along as rapidly as he can. The hour is getting late and we would like to complete this as soon as we can, but we certainly want to encourage any questions also of Mike.

MR. JACOBSON: Thank you.

On the project quality assurance end of the Diablo Canyon project, today I am going to be addressing the QA program for the verification process and other current work being performed by the Diablo Canyon project team.

The program was developed to cover those activities relating to the verification process and the resolution of items identified by the IDVP. It was not intended to cover all activities on Diablo Canyon, but it was intended to assure appropriate controls over the design process.

Our initial Bechtel involvement, and this was April 1982, was the formation of the integrated project team. There followed a transition period to establish a QA program to be used by a project team. This document was approved by PG&E and by NRC, with some clarifications requested. We subsequently provided those clarifications and we understand that

those are acceptable to the NRC.

We developed and improved the project nuclear quality assurance manual, which is the policy manual, which defines how the committed program is actually put into place and we then reviewed all of the implementing procedures that would be used for compliance with the new program. A number of modifications were made to those procedures as to training of personnel.

Finally, the PG&E QA program that had been in effect prior to the formation of the project team remained in effect during this transition.

The project program is based on Bechtel's topical report, BQ-Top-1-3A, which is NRC approved and, as I mentioned, existing PG&E procedures were modified or supplemented where necessary to mesh properly with this new program. The program complies with regulatory guides and ANSI Standards on QA, as described in the topical and it was also reviewed to assure that it meets the requirements of the PG&E QA program committed to in the FSAR.

I have supplied a list of the regulatory guides that we meet. I am not going to bother to read them.

The next slide summarizes the activities being undertaken by the project team. This is somewhat repetitive of what has been presented before. I would just like to show it for the purposes of how the work is split up. Design

phase activities include the definition of design criteria and the control of design criteria documents to assure that the most current ones are being applied. We have design analysis based on that criteria and design output documents in the form of drawings, design changes and specifications.

The following items are process and IDVP items, which Roy Fray and Gary Moore addressed and also identifying the processing and correcting open items identified from our own internal technical program. We receive in some cases support from the Bechtel staff and specialty groups. The project is also involved in preparing procurement packages for materials and services needed. This includes contract documents and specifying the QA requirements that will apply to that work.

The construction organization that installs the modifications is also part of the project team. The project team receives support in the procurement area from PG&E and potentially from Bechtel's staff. Almost all of our activity has been through PG&E. Orders are placed through PG&E's materials department. Supplier surveillance and control is provided by PG&E, as well as audits of the suppliers.

This slide shows the scope of the project QA program, how that is divided.

MS. BLACK: I would like to ask a question now. Is this just a design as it relates to the verification process

and design modifications required by this process or are you looking at the design process as it was carried out in the past?

MR. JACOBSON: This program is a current activity of the current design activities and it covers both Unit 1 and Unit 2, corrections of items that come up and also any new design that will be issued at this point.

MS. BLACK: As well as the design work that is being done, say, on the pressure temperature analysis, the computer services that were designed, would you have any role in that?

MR. JACOBSON: That is correct. The program does cover that.

MR. FRIEND: All of these contemporary activities of the project, today's activities, are covered by this program. The review of the past design activities was part of the Independent Design Verification Program and Robert F. Reedy made those reviews.

MS. BLACK: Thank you.

MR. JACOBSON: This slide shows the division of scope, if you will, the PG&E procurement functions and construction. Those operations remain under the PG&E QA program as they were prior to the formation of the project team.

There are three basic elements involved in the structure of the project QA program. First, the quality is achieved by those doing the work through the use of these

items, management, skilled personnel, planning, procedures appropriate to the work activities, supervision and technical direction.

Second, the fact that quality has been achieved is verified through surveillance, checking, testing and review of work activities and documentation. This verification function is performed by individuals who are not directly responsible for performing the work activity, but are qualified to have initiated it. In the case of calculations, we have an independent checker by another designer who would have been qualified to originate that work.

Third, we have an independent quality assurance group that is responsible for the review, surveillance and audit of quality-related activities. For the Diablo Canyon project this group is the project quality assurance group that I supervise.

Project QA reports independently off the project. I report to the quality assurance manager of projects on the Bechtel management staff and he in turn reports to the San Francisco Power Division QA manager. I also receive project guidance and management support from the quality management member of Howard Friend's management team.

Also, down here is the quality engineering group, which is a part of engineering, and assist them in meeting their quality requirements on a continuing basis.

More specific levels of reviews are implemented as a part of the program and are shown here. First, as I mentioned, checking and design output documents by engineers who do not perform the original activities. We have a formal, assigned verification of systems and structures performed by engineers, day to day surveillance by the quality engineering group, quality engineering review of selected engineering documents, such as design change notices and specifications, day to day monitoring by the project QA group and project QA also independently approves certain documents, such as the quality requirements and specifications, engineering material memos and also scope documents defining how work is to be assigned the staff group. All of those with the objective to make sure that appropriate quality requirements have been imposed.

Formal preplanned project audits by project QA are required to audit each area of activity on the project; QA management audits by Bechtel QA management staff, to provide a further independent overview of the project and finally, audits by other external organizations, R. F. Reedy, Incorporated, NRC and PG&E QA, as the licensee.

MR. CHANDLER: Let me ask you just one question. This seems to be generally quality reviews of either the paper involved or work in progress. Is there a quality review of completed work?

MR. JACOBSON: Our program is reviewing the work that has been performed since the formation of the project team, so we are not going back into the --

MR. CHANDLER: No, no, no, no. Modification to determine what is necessary, you track it through the design, procurement and from what I can see here, work as it is being done, but is there a review then of what is completed?

MR. JACOBSON: You are referring to in the field?

MR. CHANDLER: In the field.

MR. JACOBSON: Yes, there is. That is covered by the PG&E QA program and they have another set of inspectors and auditors out there to do continuing reviews of the completed product.

MR. SCHIELING: Along that line, do you have -- there is an integrated work force at the site, PG&E/Bechtel. Are there also Bechtel's QA personnel involved?

MR. FRIEND: We have a limited number of Bechtel QA personnel at the site, yes.

Any other questions?

MR. KENNEKE: Is this different than might have existed five years ago, let us say?

MR. JACOBSON: Well, I think it may be different with the standards that the design is required to meet. It is a different program than was used before. It is based on

a Bechtel topical. Before they were using PG&E QA programs. All programs evolve over time. Ours has been no exception. There have been a lot of changes made over the years.

MR. KENNEKE: But the kinds of things that are here are not different qualitatively?

MR. JACOBSON: No.

MR. EISENHUT: Al, let me follow up on that question, if I could.

This program is really a program, as I understand it, that addresses any Phase I design, modification, review work, all the way through installation and any Phase II, other follow-on activities, anything that might fall out. Now, this program is really a Bechtel QA overlay that was used. Now, if Bechtel was doing the job five years ago, then, in fact, it would have been the difference between whatever the Bechtel topical version today in existence is versus five years ago and the only difference there was any revisions to the standards, so to speak.

However, really we are comparing an apple and an orange because this program is a program and the Bechtel program for those particular modificaticns. The rest of the project, as I understand, was under the PG&E QA program, which, of course, was not covered by anything like a Bechtel topical. It was more of a plant specific QA program and that program was the subject of the Reedy evaluation generically.

So, the real comparison -- what I think you were getting at, Al, was how does this program for Phase I/Phase II evaluations modifications compare against what we have used on the rest of the plant five years ago and that is a different question, I think, than --

MR. KENNEKE: Let me follow up two things to see if I understand correctly. Is this chart labeled "Bechtel" or "Joint Project QA" and is there a different chart that would apply to the PG&E internal QA?

MR. JACOBSON: Yes. What I am addressing is the program being used by the integrated project team.

MR. KENNEKE: Does PG&E use different things than are here? My point is that these seem like general kinds of things.

MR. FRIEND: Maybe I can help. When we came together to form a joint project, it was obvious that we needed some quality assurance program. We had a choice of how we might proceed. We elected to take the Bechtel topical program and tailor it as appropriate to meet the PG&E commitment of the SAR and other licensing commitments such that we had a project quality assurance program whose father might be the Bechtel topical and mother might be PG&E's existing conditions.

We applied that to the engineering work. The work outside of engineering, the procurement and construction work, was and continues to be primarily controlled by PG&E procurement

organization and general construction department. They have a quality assurance program that has been developed and evolving over the years that covers those activities, that is procurement and construction, and I haven't studied the documents line by line, but I would believe that the contemporary today PG&E quality assurance program is quite comparable to the Bechtel program.

One of the reasons why we elected to do what we did was that we felt, and experience has shown, that the bulk of the new people that were added to the project would be Bechtel people and it would be useful for us if they were familiar with -- generally familiar with Bechtel programs and Bechtel quality assurance procedures. So, we elected to lean in that direction because we felt that that would be the most efficient way of getting new people involved in the project.

But the remainder of the project, outside of engineering, has a very viable quality assurance program also that has been recently audited by Reedy, has been reviewed and audited by the Commission and so forth. I hope that helps.

MR. NORTON: You might want to add that the IDVP all have quality assurance programs of their own also. Reedy has a QA program. Cloud has a QA program. Teledyne has a QA program and those programs are being audited by PG&E QA people. You have a tremendous interface, if you will, of

QA programs because everybody has got one.

MR. COOPER: Let me say something in clarification of this slide. That last item on there identifies external organizations and I think we had better define exactly what that is because just having it appear there might give us a broader sense than it really has.

As part of our verification of the Diablo Canyon project corrective action program as defined in our ITRA, Reedy's organization on behalf of the IDVP is auditing the implementation of this NRC-approved program, so that the Reedy audit is somewhat more limited in scope than might appear from what is right there. But on the other hand, they are quite broad in looking at what they are looking at.

The other thing I should mention along those lines is, of course, Reedy's organization is the same one that did do the QA reviews and audits of the previous program, so they are very familiar with the differences. The Reedy work on the present effort has been essentially completed for those activities which the project is conducting completely within house because the project is indicated as having some work done by organizations other than the Diablo Canyon project.

Reedy is continuing to look at those let's call them service organizations to the Diablo Canyon project, but he has essentially completed his audit of his in-house activities. There was a standard report kind of meeting last

week, January 5th, I believe, which again was a properly noted type of meeting and at that time, Reedy reviewed the status. He reported that he had no findings and he had 20 some observations -- somebody remind me of what the right number is. It is either 20 or 26 or something. Twenty was the number. Okay. And something like 20 observations, QA observations. No QA findings in his work to date.

MR. SCHIERLING: Let me add something to that. The project QA program that we are talking about here was submitted by PG&E, not by Bechtel. It is a program, a true Diablo Canyon project program. It is not a Bechtel program. It is a PG&E program and I think you, George, are in charge of that program. They report directly to you on the findings of that program.

MR. MANEATIS: Yes. And I might add in answer to those questions that the PG&E quality assurance program also audits this project QA. So, that subject is audited just like every other entity, including the IDVP. So, we have quite a high idea of QA purview overall as a function, but you are correct, the program is the PG&E/Bechtel program, but it is really the PG&E because the project -- we are the licensee. The project reports to us.

MR. KENNEKE: Let me pursue it a little bit further, please. If I delete the specifics, the conceptual element of the program seems to me universal.

MR. MANEATIS: Yes.

MR. KENNEKE: In what sense are the seven or eight elements new today -- you mentioned earlier you go by today's standards -- in comparison to say five or six years ago? In what way have the concepts of QA evolved to the point of specifying additional checks and balances on the system that didn't exist then?

MR. DICK: Let me try to answer that one.

There is something here which is not shown and the thing which is not shown here are several tiers of implementing documents, procedural documents. We could have diagramed it, but it is a rather complex thing. Suffice it for present to note that each of the principal departments within the project has a set of implementing procedures. Those are the things which the individual engineers and other people doing quality-related work use as guides in their day to day activities

Now, you are quite correct when you say conceptually what you see before you is similar to what you might have seen five years ago, but the implementing procedures are quite different and those things have evolved over the last not only five years, but the last ten or twelve years since we have had quality assurance programs formally applied to the nuclear industry.

I think those would be the main differences that you would see, sir.

MR. KENNEKE: Could you give an example of a

significant change in those procedures? What kind of things?

MR. DICK: Well, at the risk of possibly overlooking something more significant, I would say that which is most relevant to what we are considering here is, in fact, design verification activities, how we would go about that. That is somewhat more detailed now than it was in the past. Perhaps, another good example is the control of interfaces between organizations doing design work. Does that help you?

MR. KENNEKE: Additional checks on the --

MR. DICK: Yes. The interfaces, for example, would be much more formally controlled than, perhaps, they might have been five or ten years ago. And that, I might add, is more or less common practice in the industry.

MR. SCHIERLING: Just for clarification, someone mentioned earlier that the NRC approved -- this is an NRC-approved QA program.

MR. FRIEND: I didn't say that. I wish I could say it.

MR. SCHIERLING: Yesterday I had a few more stipulations on it and it is in the process of being approved. It is getting extremely close.

MR. DICK: May I add one more thing? The basic approval of this program is by PG&E. We seek the Commission's concurrence as we might with respect to the SAR.

MR. JACOBSON: My last slide. I previously mentioned

management commitment as an important part of the program. This final slide provides some examples of how management is involved in this project program. These are some of the things that have been mentioned before. Both PG&E and Bechtel have approved project QA program in QAM. Both perform independent audits of the projects. Both are recipients of status reports that address the status and adequacy of the program and both perform periodic reviews of that and attend audit exit interviews.

MR. CHANDLER: Is that independently or through the project?

MR. JACOBSON: These are all overview roles; PG&E management and PG&E QA department and some of the managers over there and Bechtel management, so they are all independent activities.

MR. CHANDLER: Thank you.

MR. FRIEND: Thank you very much. Any other questions? Are there any other areas that anyone would like to question or address? Yes, sir.

MR. MAESCH: I have one question about the initial schedule that was handed out this morning. You show three NR decision blocks, each about a month long. Is that the time required for the NRC staff to do the safety evaluation or is there also built into this a time for the Commissioners themselves to review NRC staff evaluations?

MR. FRIEND: That is our best guess at the time it would take for the Commission staff to complete their safety evaluation report and to obtain Commission concurrence.

MR. MAESCH: So, both Commission concurrence and Commission review of the staff's safety evaluation and the staff's preparation of the safety evaluation is to be completed in each of these three segments within an approximate 30 day period?

MR. FRIEND: The final steps of those processes, yes. By the way, at the Commission meeting where we talked about the process, it is not clear to me that the Commission has decided that they need to take action on each of these steps. I think that was a matter that was discussed at that time and I came away with the impression that there might be a possibility that they might not wish to take an action on each of these steps.

MR. WHITE: Don't you want to point out that the 30 day block, a lot of work can be done prior to the beginning of that 30 day block.

MR. FRIEND: That is what I tried to infer when I said the final step of the project.

MR. KENNEKE: Could you identify the source of your impression?

MR. MANEATIS: The source of the impression was really the record, I think. There was a lot of discussion

at that meeting. I got the impression that it wasn't totally resolved.

MR. FRIEND: I believe it was something that Commissioner Hearn said in passing and I think --

MR. MANEATIS: We were all sitting there. We ought to be able to remember.

MR. FRIEND: We can look at the transcript, though, and I believe you will find that there is some discussion in there about whether or not it is necessary for the Commission to act on each step of the process and I believe there are some other remarks by the staff about their position in that regard.

MR. EISENHUT: Late in the day as tired as I am, I hate to venture into this, but I will. I have to comment on some of these comments.

First, the 30 day block was a yardstick the staff, just as a rough estimate figured that after the internal program efforts were complete, after the IDVP efforts were complete and the last document was laying on our table, we figured 30 days for us to do an approval and the good general counsel probably recognizes it was not fine tuned as well as what fine steps were in that. This process being on for some year and a half now, 30 days is probably close enough, so we didn't try to fine tune what it was.

The comment referred to by Mr. Friend and Mr. Maneatis

was that this Commission discussion in early December that culminated in the vote to go and approve the step 1, 2, 3 approach, there were at least two Commissioners who stated that they felt there was no need for the staff to seek Commission approval for Step 1 or Step 2. That is reinstatement of the low power license. The record certainly speaks for itself, but my recollection, I was asked whether I felt there was a need to go back to the Commission and my view was not in my opinion. However, it was we have once giveth the license and the Commission has taketh away. So, the Commission now has the license. So, I will defer to the general counsel on his interpretation of what is required.

MR. MALSCH: Let me ask you, Daryl, now for your understanding of the NRC decision in each of the three steps. That is the issuance of your safety evaluation report.

MR. EISENHUT: It would be -- and it is not clear. We certainly didn't fine tune it as that would be the date of the safety evaluation report. We would try to have it there as much as possible before that to facilitate -- we are shooting for a decision on those dates. However, it is clearly recognized that a process that once it gets to the Commission, the Commission may well decide for their own reasons, that process could take varying amounts of time. So, we did not try to factor that explicitly in. We are trying to get our evaluation completed as soon as possible after

getting the last document in.

The program, I believe, on Step 1, reinstatement of the general power fuel power license, I believe most of the documents start coming in the door on the schedule about February 15th. The last document comes in the door about March the 1st. So, we are certainly going to do everything we can to stay in phase and on top of the reports. That is why we have expressed some concern today -- in fact, we are quite concerned -- that we are really afraid that the process is moving along and at the eleventh hour we are going to find out that, as an example, the modifications in the fuel handling building are complete and we are over here saying but we have questions about the soil and the foundation leading to what the spectra ought to look like.

It gives me a good opportunity, I guess, to strongly encourage the continued interaction -- I believe it is the IDVP has been setting up. Bob Cloud had a meeting set up, I believe, at one point or tentatively set up with internal program. We would certainly encourage that those technical meetings get started so that we would very much like be a participant in those because a basic premise is that we take some of our comfort and some of our confidence in our evaluation by witnessing the process. That is, we are there witnessing the discussions between the ITP and the IDVP and that we hope will short circuit our review time to facilitate

maybe staying on those schedules. I mean, that is a basic premise that went into the 30 days.

MR. MALSCH: Let me ask a question. If we, for purposes of argument, added, let's say, a two or three week period on top of the bars here for Commission decision-making processes themselves, would that simply shift the whole schedule on the top line two or three weeks to the right?

MR. FRIEND: No. What we would prefer to do would be to hold the date and state our review process with the staff and others earlier so that we could still achieve the dates that we are looking at and allow the longer period of time.

MR. MALSCH: Let me suggest that you ought to talk with Daryl about this because I think as things stand now there would need to be a Commission decision to delegate reinstating the license maybe to the staff in order for the Commission not to become involved in this process as things stand now. I don't know whether there has been any discussions about this. I think you ought to think about building into the schedule --

MR. FRIEND: We will certainly do that, but is there any way that we could start the deliberation process to see whether or not the Commissioners would delegate to the staff any one of these steps?

MR. MALSCH: I am sure there is a way you could do

that. You would just have to raise that with the Commission on paper recommending that the staff be delegated authority to reinstate the fuel loading license, for example, with the Commission reserving its authority to pass on low power. That can be done. I just think the people need to be thinking about this.

MR. FRIEND: Thank you. We will consider that and consider it appropriately and take some steps.

MR. MALSCH: Particularly if you want to move some documents back, I mean, stick with your dates, you will need to be thinking about that very soon.

MR. FRIEND: Yes. Certainly.

MR. MANEATIS: Are there any other questions? Do you want to say anything further, Mr. Friend?

MR. FRIEND: No. I just want to say I just looked at my watch and I am surprised it is 6 o'clock and I just remembered the old adage that time really flies when you are having fun. I would like to adjourn this meeting if it is agreeable to everybody.

MR. EISENHUT: I think it is and I think we will be following up with you as we said on the -- the next iteration, I think, will be in terms of the discussion of the allegations, which is a serious matter.

MR. FRIEND: Thank you all for your patience and attention today.

(Whereupon, at 6:00 p.m., the meeting adjourned.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

---

in the matter of: Pacific Gas & Electric Company, Design Verification Program for Diablo Canyon/OPE/OGC Meeting

Date of Proceeding: January 13, 1983/3-6 P.M.

Docket Number: _____

Place of Proceeding: San Francisco, California

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

Deborah Easley

Official Reporter (Typed)

Deborah Easley /erm

Official Reporter (Signature)

DEVELOPMENT OF PROJECT QA PROGRAM

- INITIAL BECHTEL INVOLVEMENT—APRIL, 1982

  DEVELOP AND APPROVE PROJECT QA PROGRAM DESCRIPTION

  DEVELOP AND APPROVE PROJECT NUCLEAR QUALITY ASSURANCE MANUAL

  MODIFY AND APPROVE IMPLEMENTING PROCEDURE

  STAFF AND TRAIN PERSONNEL

- PG&E QA PROGRAM REMAINS IN AFFECT DURING TRANSITION

DCP QA PROGRAM

- BASED ON BECHTEL TOPICAL REPORT BQ-TOP-1 REV. 3A WHICH IS NRC APPROVED
- EXISTING PG&E PROCEDURES WERE MODIFIED OR SUPPLEMENTED WHERE NECESSARY
- COMPLIES WITH REGULATORY GUIDES AND ANSI STANDARDS ON QUALITY ASSURANCE AS DESCRIBED IN BQ-TOP-1.

REGULATORY GUIDES

1.28 QUALITY ASSURANCE PROGRAM REQUIREMENTS

1.38 QUALITY ASSURANCE REQUIREMENTS FOR PACKAGING, SHIPPING, RECEIVING, STORAGE AND HANDLING OF ITEMS

1.64 QUALITY ASSURANCE REQUIREMENTS FOR THE DESIGN OF NUCLEAR POWER PLANTS

1.74 QUALITY ASSURANCE TERMS AND DEFINITIONS

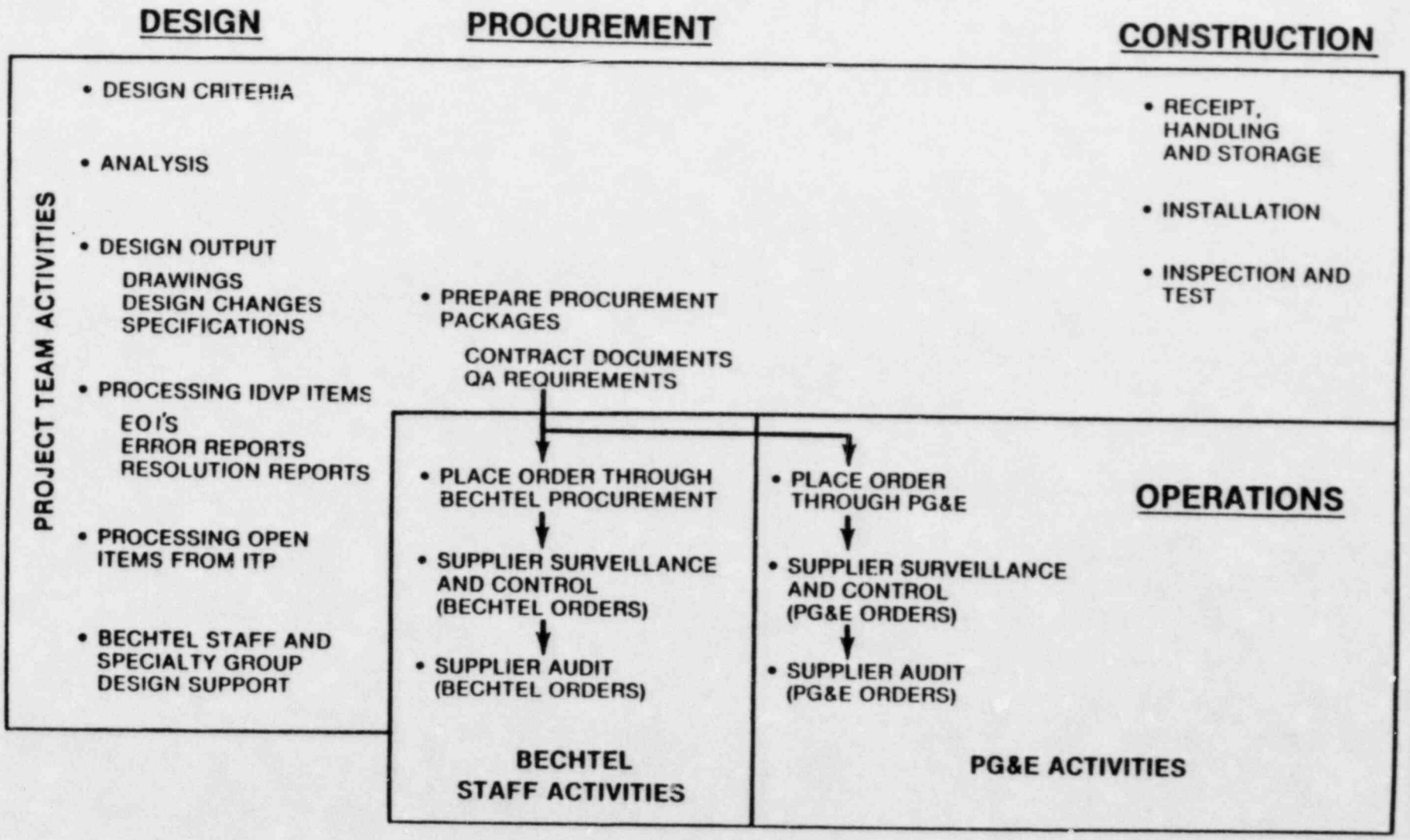
1.88 COLLECTION, STORAGE, AND MAINTENANCE OF QUALITY ASSURANCE RECORDS

1.123 QUALITY ASSURANCE REQUIREMENTS FOR CONTROL OF PROCUREMENT OF ITEMS AND SERVICES

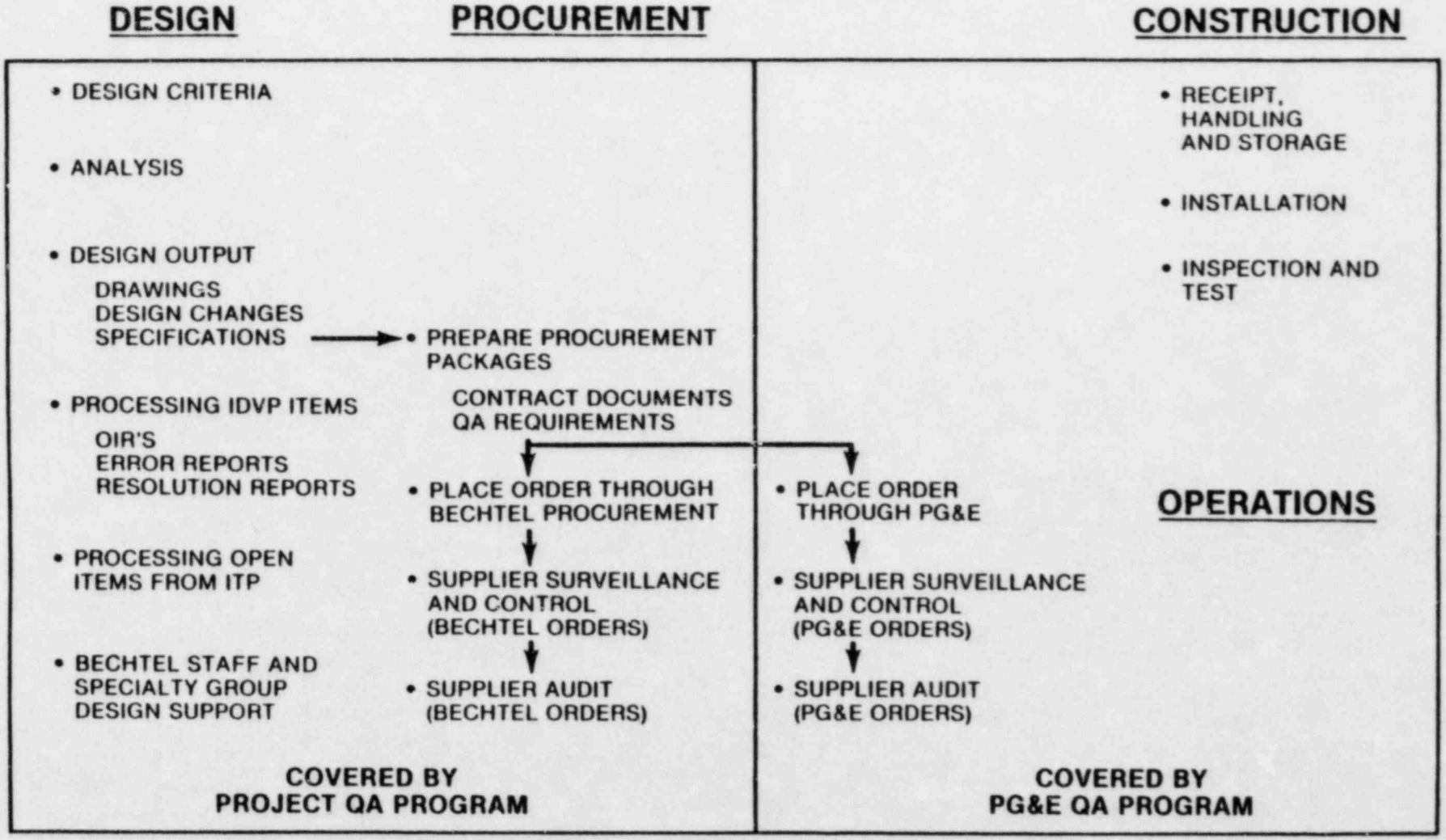
1.144 AUDITING OF QUALITY ASSURANCE PROGRAMS

1.146 QUALIFICATION OF QUALITY ASSURANCE PROGRAM AUDIT PERSONNEL

ACTIVITIES INVOLVED IN VERIFICATION PROCESS



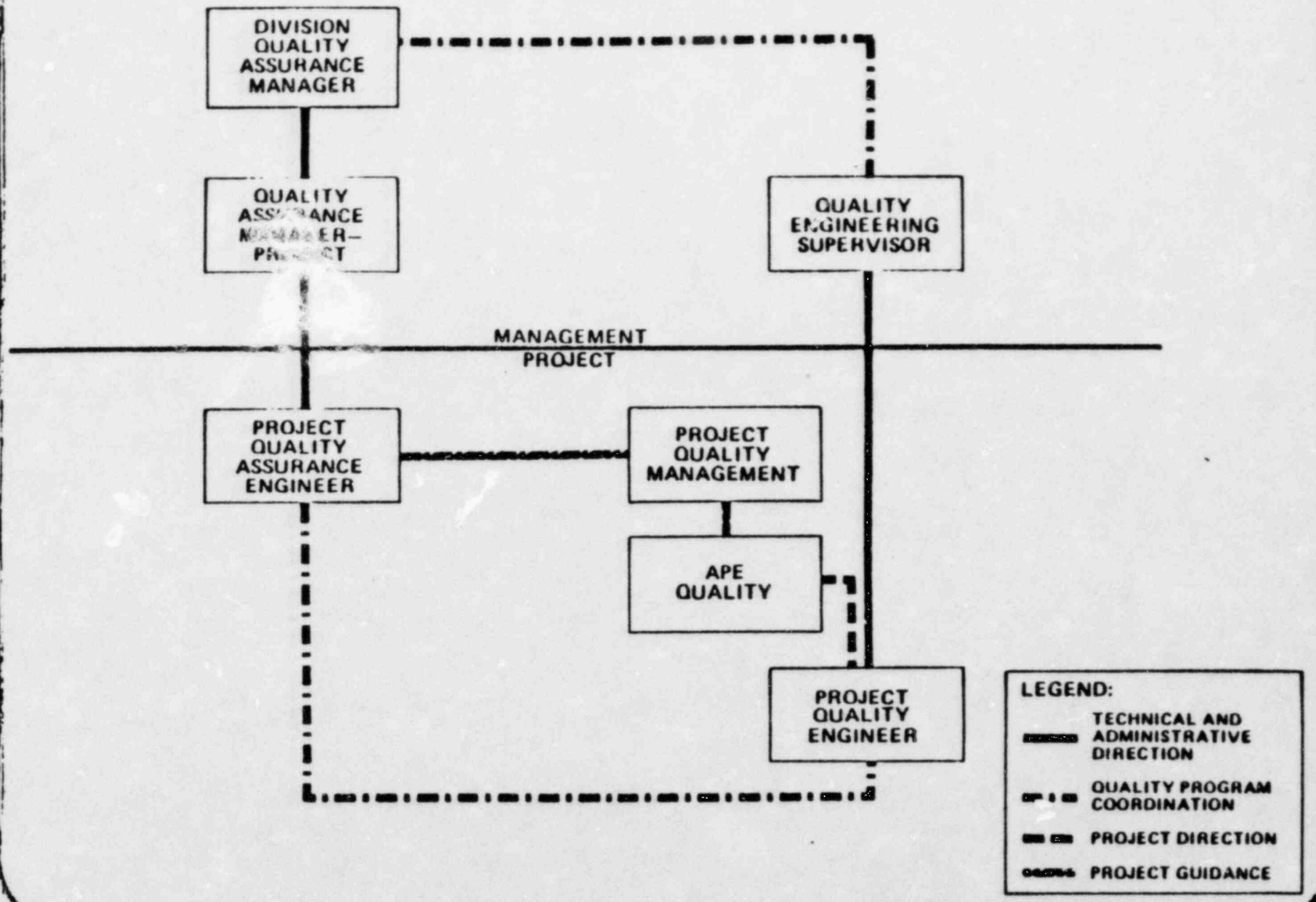
ACTIVITIES INVOLVED IN VERIFICATION PROCESS



QA PROGRAM ELEMENTS

- QUALITY IS ACHIEVED THROUGH THE USE OF:
  - MANAGEMENT COMMITMENT
  - SKILLED PERSONNEL
  - PLANNING
  - PROCEDURES
  - SUPERVISION AND TECHNICAL DIRECTION
- QUALITY IS VERIFIED THROUGH:
  - SURVEILLANCE
  - CHECKING
  - TESTING
  - REVIEW OF WORK ACTIVITIES AND DOCUMENTATION
- QUALITY CONTROL AND QUALITY VERIFICATION ARE PERFORMED BY INDIVIDUALS WHO ARE NOT DIRECTLY RESPONSIBLE FOR PERFORMING THE WORK ACTIVITY
- AN INDEPENDENT QUALITY ASSURANCE GROUP IS RESPONSIBLE FOR THE REVIEW, SURVEILLANCE AND AUDIT OF QUALITY RELATED ACTIVITIES

QUALITY ASSURANCE FUNCTIONAL RELATIONSHIP



LEVELS OF QUALITY REVIEWS

1. CHECKING OF DESIGN OUTPUT DOCUMENTS
   - CALCULATIONS
   - DRAWINGS
   - DESIGN CHANGE NOTICES
   - SPECIFICATIONS
   - ENGINEERING MATERIALS MEMOS

2. DESIGN VERIFICATION OF SYSTEMS AND STRUCTURES

3. DAY-TO-DAY SURVEILLANCE BY QUALITY ENGINEERING

4. QUALITY ENGINEERING REVIEW OF SELECTED ENGINEERING DOCUMENTS

5. DAY-TO-DAY MONITORING BY PROJECT QA

6. PROJECT AUDITS BY PROJECT QA

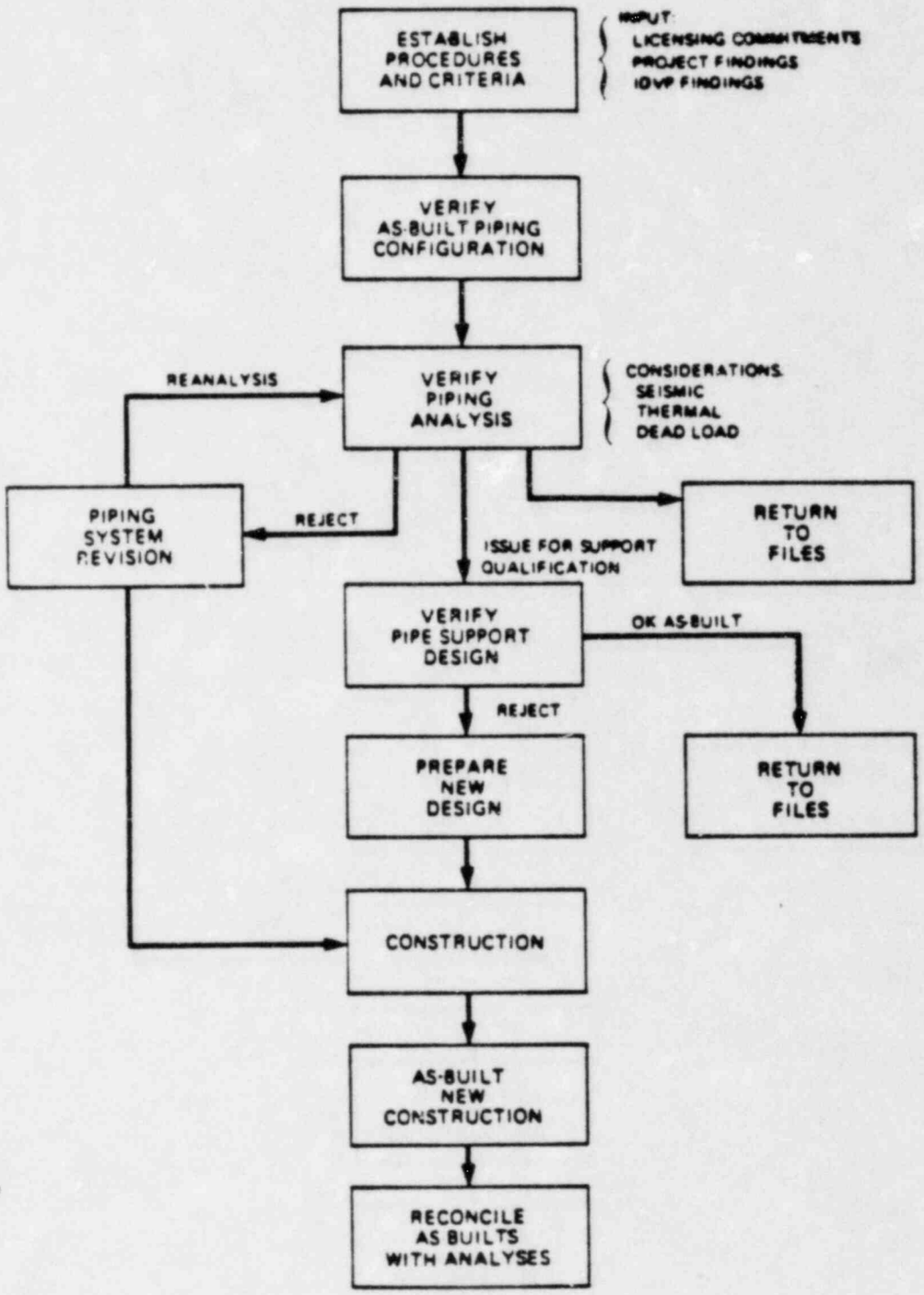
7. QA MANAGEMENT AUDITS BY BECHTEL QA MANAGEMENT STAFF

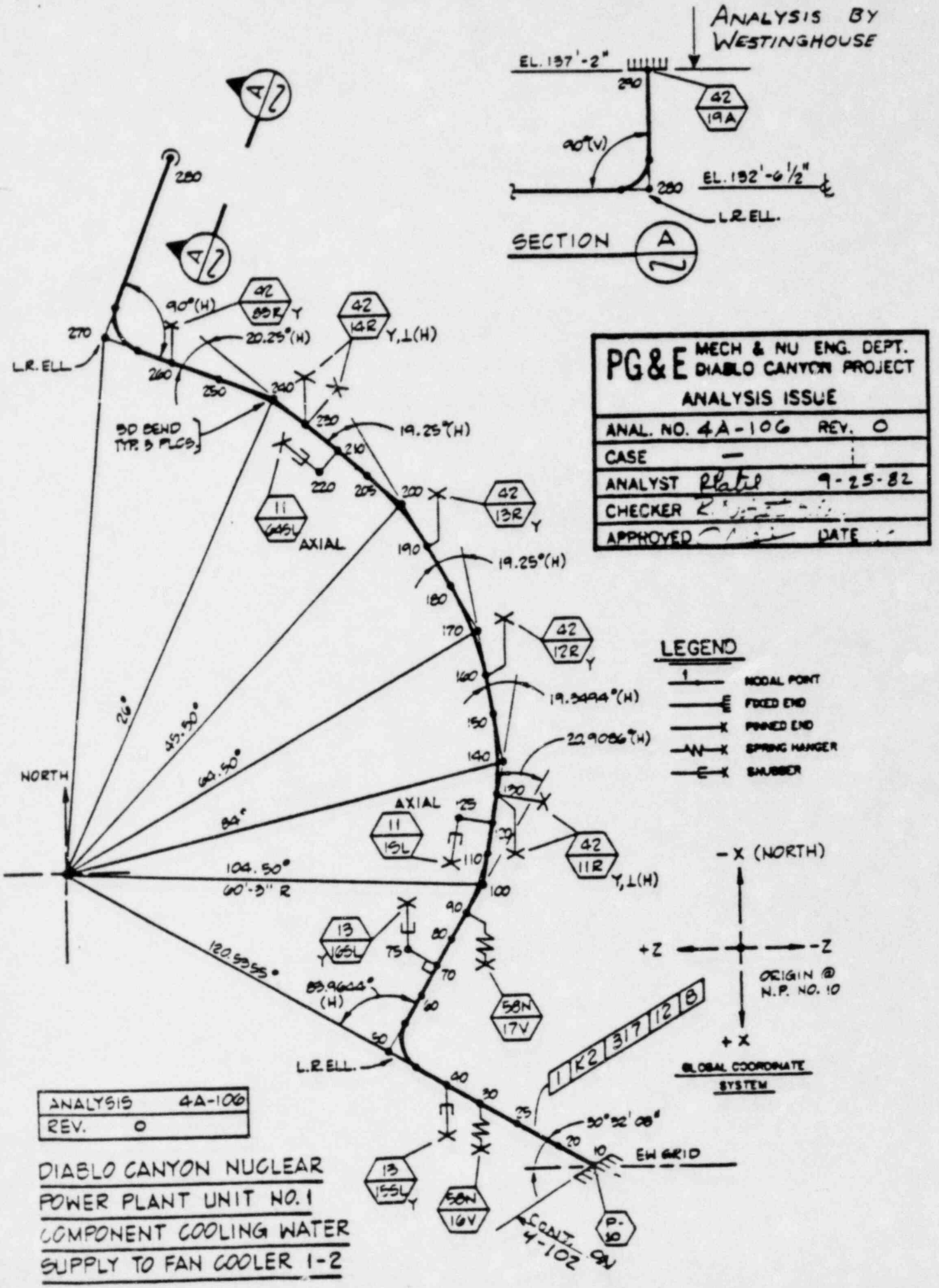
8. AUDITS BY OTHER EXTERNAL ORGANIZATIONS
   - R. F. REEDY, INC.
   - NRC
   - PG&E QA

MANAGEMENT OVERVIEW OF QUALITY PROGRAM

	PG&E Management	Bechtel Management
1. Approve Project QA Program	X	X
2. Approve NOA's	X	X
3. Perform Audits	X	X
4. Review Status Reports		
Weekly Progress Report	X	X
Monthly Progress Report	X	X
QA Activity Report	X	X
5. Periodic Reviews of Program Status and Adequacy	X	X
6. Attend Audit Exit Interviews	X	X

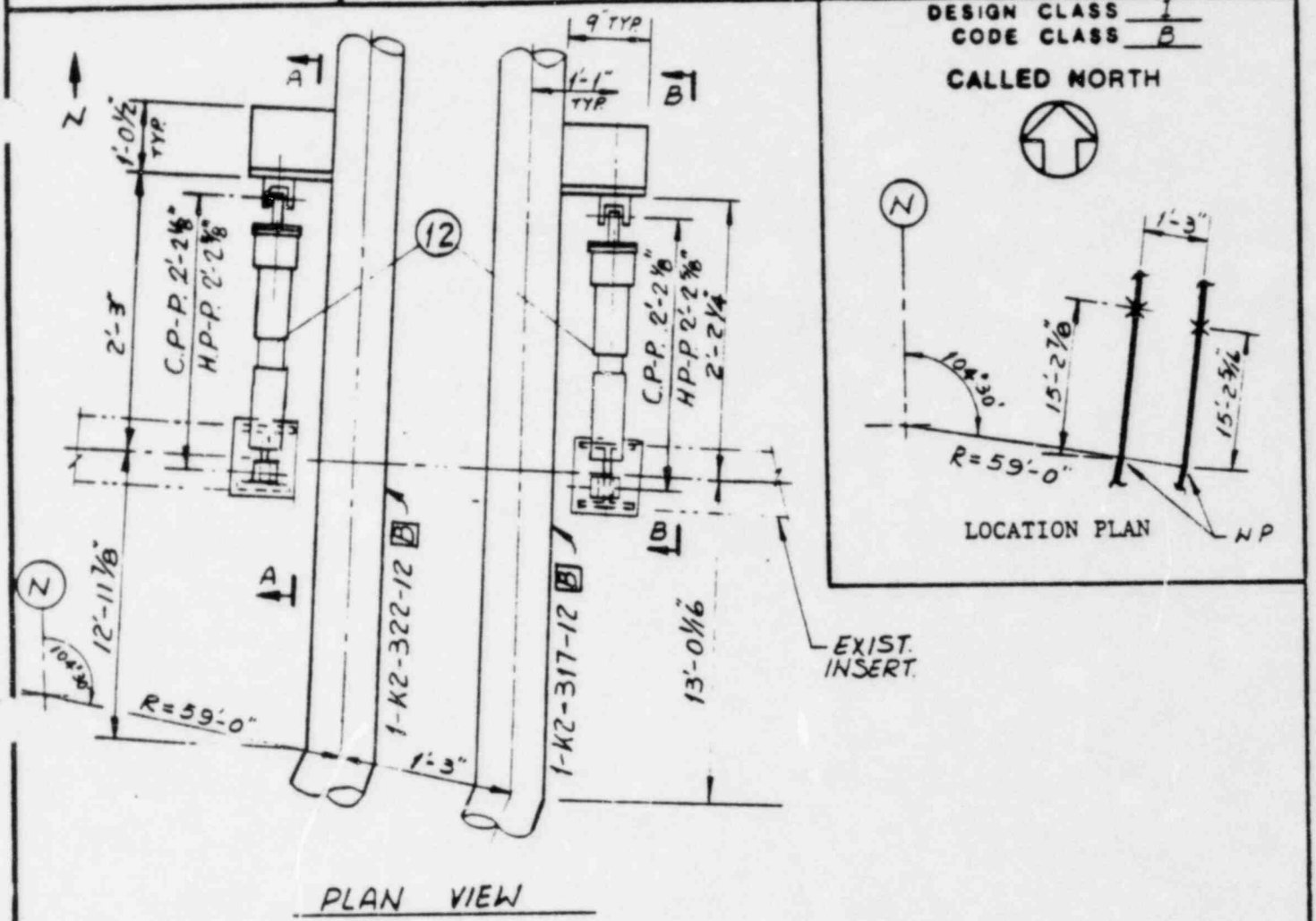
PIPING AND PIPE SUPPORT REVIEW AND DESIGN PROCESS




ANALYSIS BY WESTINGHOUSE
EL. 197'-2"
280
42 19A
90°(V)
EL. 192'-6 1/2"
L.R. ELL.
SECTION A 2
A/2
280
270
L.R. ELL
260
250
240
90°(H)
42 8SR Y
20.25°(H)
42 14R Y,⊥(H)
30 BEND TYP. 3 PLCS.
230
19.25°(H)
220
210
205
200
11 6SL AXIAL
42 13R Y
190
19.25°(H)
180
170
42 12R Y
160
19.3494°(H)
150
22.9086°(H)
140
130
AXIAL
11 15L
125
110
42 11R Y,⊥(H)
NORTH
26°
45.50°
64.50°
84°
104.50°
60'-3" R
100
90
80
13 16SL
75
70
120.9995°
89.9644° (H)
58N 17V
60
50
L.R. ELL.
40
30
25
30°32'08"
20
10
EW GRID
13 15SL Y
58N 16V
CONT. 4-102 GN
P-10
LEGEND
1 NODAL POINT
FIXED END
PINNED END
SPRING HANGER
SNUBBER
-X (NORTH)
+Z
-Z
ORIGIN @ N.P. NO. 10
+X
1 K2 3 17 12 B
GLOBAL COORDINATE SYSTEM
PG&E MECH & NU ENG. DEPT.
DIABLO CANYON PROJECT
ANALYSIS ISSUE
ANAL. NO. 4A-106 REV. 0
CASE —
ANALYST Patel 9-25-82
CHECKER
APPROVED DATE
ANALYSIS 4A-106
REV. 0
DIABLO CANYON NUCLEAR POWER PLANT UNIT NO.1
COMPONENT COOLING WATER SUPPLY TO FAN COOLER 1-2

AREA 1F	LINE 1-K2-317-12 B 1-K2-322-12 B	HANGER SYMBOL 11/1SL
EL 117'-0"		LOC ON DWG 500042

DESIGN CLASS 1
CODE CLASS B

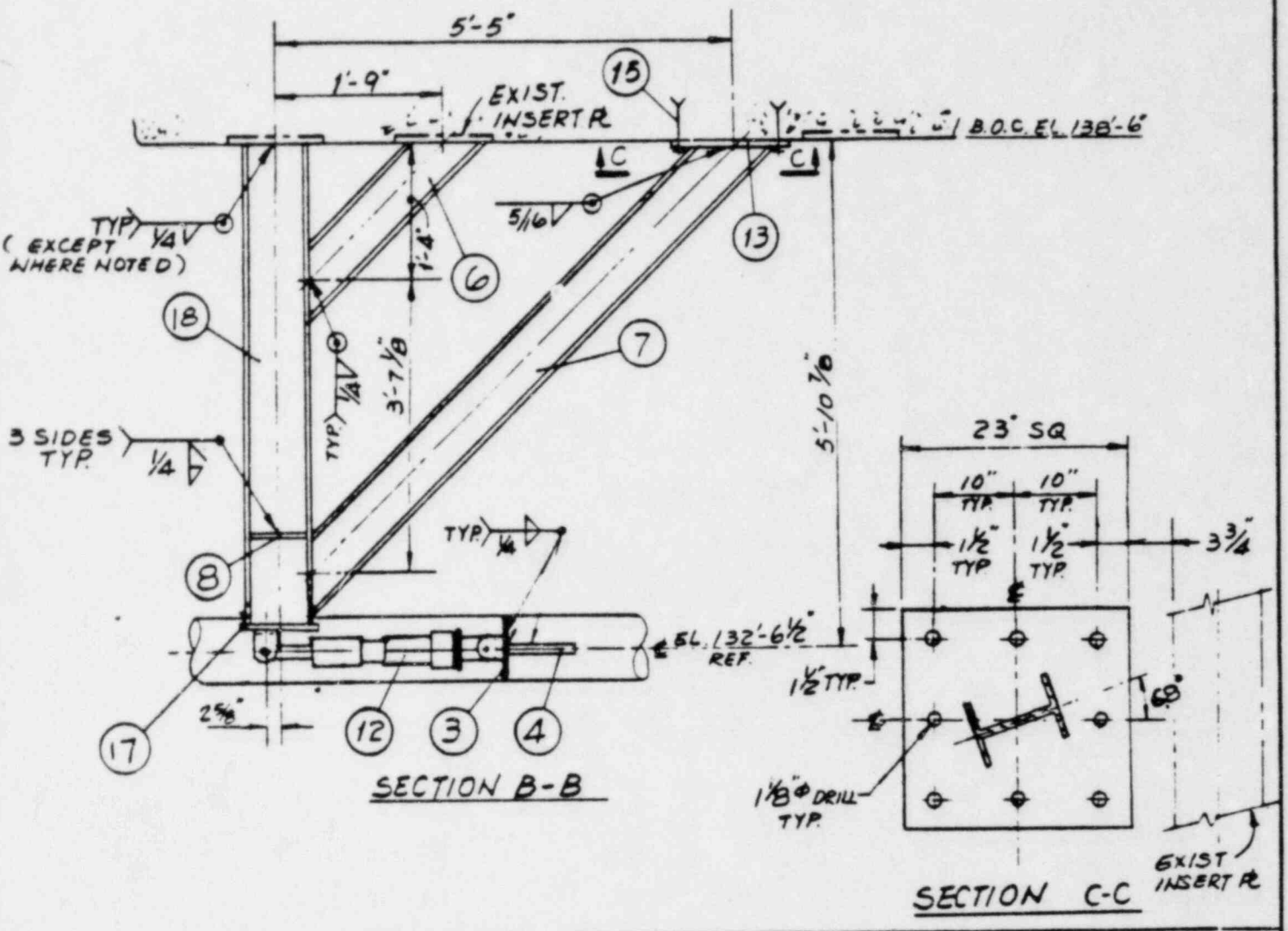


NO OF ASSEMBLIES REQUIRED 2

NO	REQD	MATERIALS PER ASSEMBLY
1	-	DELETED
2	-	DELETED
3	2	BAR 6 x ½ x 0'-10" LG (COPE TO FIT)
4	2	R ½" x 9" x 1'-0" LG
6	1	W8 x 28 x 2'-7½" LG (CUT TO FIT)
6A	1	W8 x 28 x 2'-6" LG (CUT TO FIT)
7	1	8WF28 x 7'-6" LG
7A	1	W8 x 28 x 8'-4½" (CUT TO FIT)
8	4	R ½" x 3⅜" x 0'-8⅜"

	DSGN William Yu DWN FYC CHKD EO	DRAWING NO SK-11-1SL		
PROJECT: DIABLO CANYON	UNIT: ONE	SHT 5 OF SHTS	P G & E CO	ISSUE 0 REV

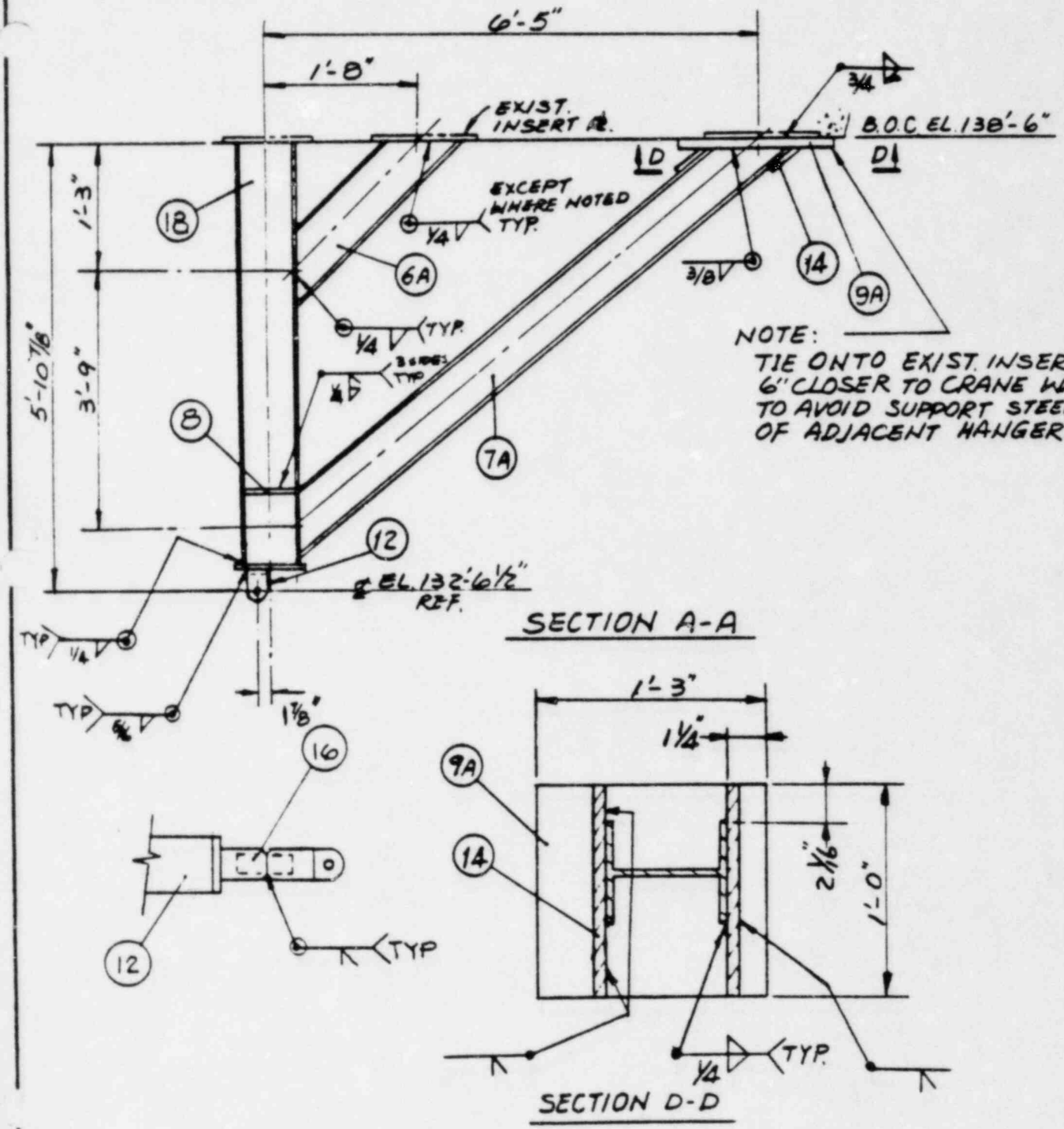
AREA 1F	LINE 1-K2-317-12 B 1-K2-322-12 B	HANGER SYMBOL 11 / 1SL
EL 117'-0"		LOC ON DWG 500042



9	-	DELETED
9A	1	R 3/4" x 1'-0" x 1'-3" LG C.S
10	-	DELETED
11	-	DELETED
12	2	PSA-10 SNUBBER ASSEMBLY WITH ONE ADDITION
		REAR BRACKET. COLD SET = 1".
13	1	R 1" x 1'-11" x 1'-11" LG C.S.
14	2	BAR 1/2" x 3" x 1'-0" LG
15	8	1" ϕ CONC. FASTENER W/BOLT (SHELL TYPE)
16	2	2" ϕ SCH. 80 EXTENSION PIPE 0'-3" LG
17	2	C.S PL 3/4" x 12" x 12" LG
18	2	W 10 x 39 x 5'-7 3/8" LG

	DSGN WILLIAMS YU	DRAWING NO SK-11-1SL		
	DWN FYC			
	CHKD ED			
PROJECT: DIABLO CANYON	UNIT: 1	SHT 6 OF SHTS	P G & E CO	ISSUE 0 REV

AREA 1F	LINE 1-K2-317-12 [A] 1-K2-322-12 [B]	HANGER SYMBOL 11 / 1SL
EL 117'-0"		LOC ON DWG 500042



	DSGN William Yu	DRAWING NO		
	DWN EYC	SK-11-1SL		
	CHKD EO			
PROJECT: DIABLO CANYON	UNIT: 1	SHT 6A OF SHTS	P G & E CO	ISSUE 0 / REV

AREA 1F	LINE 1-K2-317-12 [B] 1-K2-322-12 [B]	HANGER SYMBOL 11 / 1SL
EL 117'-0"		LOC ON DWG 500042

REV	ISSUE DATE	DESCRIPTION OF CHANGES	PREPARATION			APPROVAL		
			DSGN	DWN	CHKD	DUS	ENGR	SUPV ENGR
0		DELETE ITEMS 1, 2, 9, 10, 11 & ADD ITEMS 12, 13, 14, 15, 16, 17, 18 ITEM 8 'QTY' CHANGED TO '4'.	W.Yu	FYC	ED	[illegible]		

NOTES:

1-K2-317-12 [B]
SYS 14 CCWS CON. FAN CLR 2 CCW SUPPLY

1-K2-322-12 [B]
SYS 14 CCWS CON. FAN CLR 2 CCW RETURN

SHEETS ASSIGNED TO THIS HANGER SYMBOL (TOTAL 4 SHEETS)

5	6	6A	6X																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

	DSGN William Yu DWN FYC CHKD ED	DRAWING NO SK-11-1SL	ISSUE 0 / REV
PROJECT: DIABLO CANYON	UNIT: 1	6X OF SHTS	P G & E CO

OVERVIEW

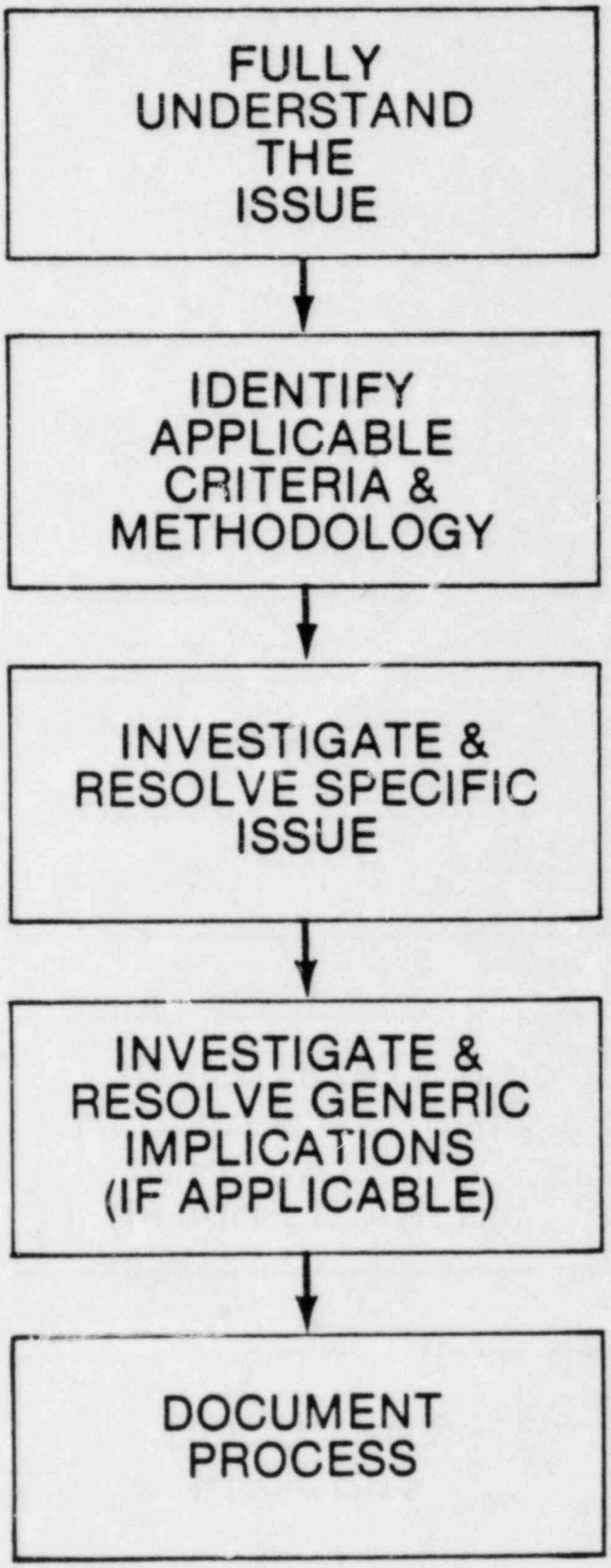
I. DESCRIBE REVIEW PROCESS
   - — DCP
   - — IDVP

II. DESCRIBE TRACKING, REPORTING & DOCUMENTING PROCESS

III. DESCRIBE ENGINEERING RESOLUTION PROCESS — GENERAL

IV. DESCRIBE FOUR SPECIFIC EXAMPLES OF THE ENGINEERING RESOLUTION PROCESS
   - PHASE I — FUEL HANDLING BUILDING REVIEW
   - — PIPING & PIPE SUPPORT REVIEW
   - PHASE II — PRESSURE/TEMPERATURE ANALYSIS REVIEW
   - — FIRE DAMPER REVIEW

ENGINEERING RESOLUTION PROCESS



FIRE DAMPER

- BACKGROUND
  - — SWEC EOI
    - FIRE BARRIER RATING
    - GAPS
- RESOLUTION PROCESS
  - — IDENTIFIED DAMPER RATING ON DAMPER
  - — GAPS FOR THERMAL EXPANSION
  - — MEASURED GAPS ARE WITHIN UL CRITERIA
- CLOSED EOI

PRESSURE/TEMPERATURE ANALYSIS

- BACKGROUND
  - — P/T ENVIRONMENT FROM POSTULATED LINE BREAKS
  - — NATURE OF CONCERN — ORIGINAL ANALYSIS GAVE NONCONSERVATIVE RESULTS

PRESSURE/TEMPERATURE ANALYSIS (Cont'd)

- RESOLUTION PROCESS
  - — ESTABLISH CRITERIA & METHODOLOGY
  - — ESTABLISH SCOPE OF REANALYSIS
  - — CONFIRM AS BUILT AREAS, VOLUMES & SURFACE AREAS
  - — CONFIRM OTHER INPUT DATA (AMBIENT TEMPERATURE, BLOW DOWN DATA, ETC.)
  - — CONSTRUCT MODELS
  - — PERFORM COMPUTER ANALYSIS
  - — REVIEW & DOCUMENT RESULTS
  - — FACTOR RESULTS INTO PLANT DESIGN (ENVIRONMENTAL QUALIFICATION, ETC.)

IDVP REVIEW

- BACKGROUND
- ORGANIZATION
- OBJECTIVES
- METHODOLOGY
- TRACKING AND REPORTING

BACKGROUND

- NOVEMBER 19, 1981 ORDER SUSPENDING LICENSE DEFINED ACTIONS THAT CONSTITUTE PHASE I OF THE INDEPENDENT DESIGN VERIFICATION PROGRAM (IDVP)

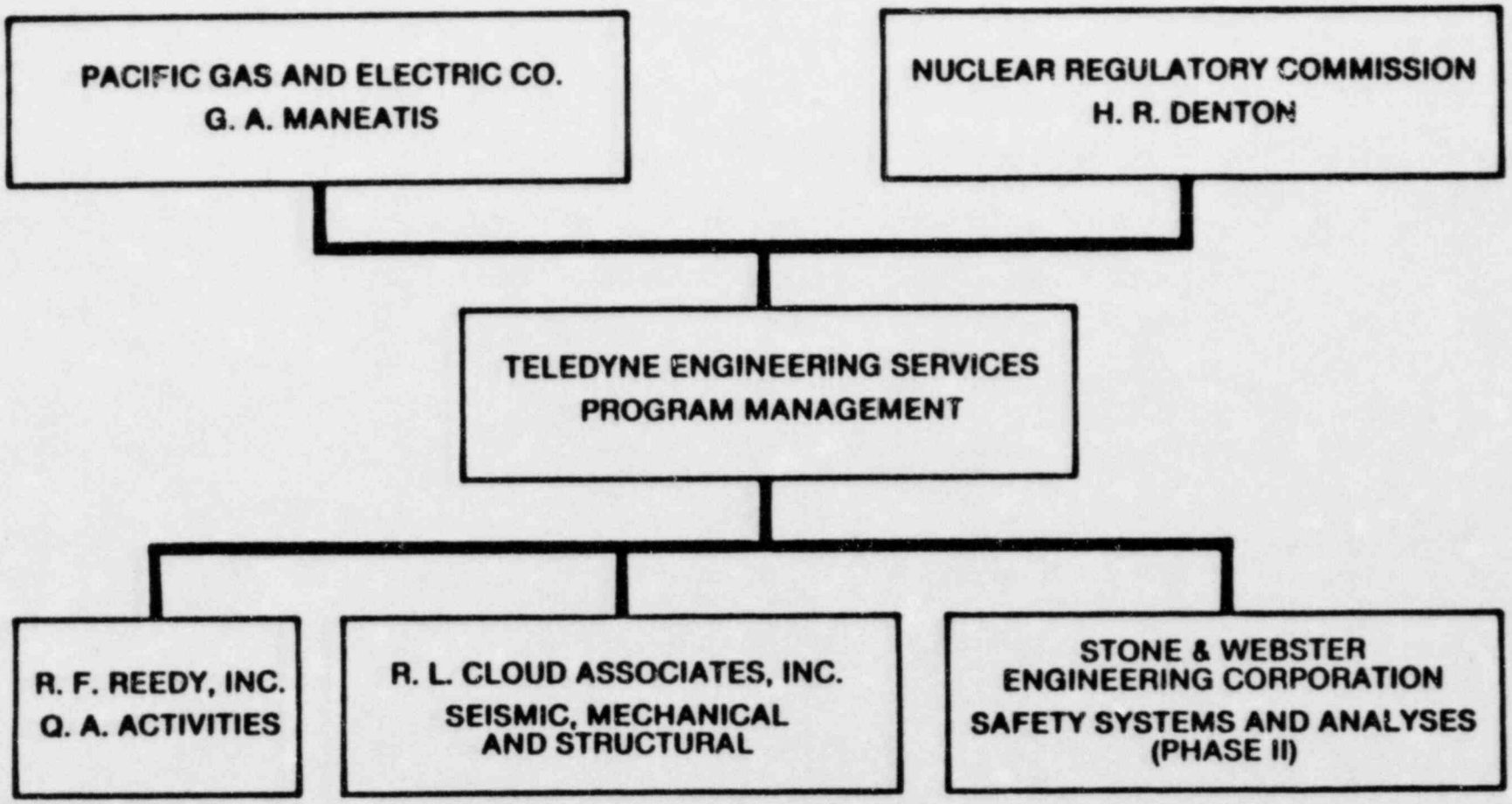
- NOVEMBER 19, 1981 DENTON LETTER DEFINED ACTIONS THAT CONSTITUTE PHASE II OF THE IDVP

- OCTOBER 1981 TO FEBRUARY 1982 ROBERT L. CLOUD ASSOCIATES, INC. BEGINS PHASE I (SEISMIC) EFFORTS

BACKGROUND (Cont'd)

- FERRUARY 1982 TES AGREES TO MANAGE THE IDVP
- APRIL 27, 1982 NRC APPROVES IDVP PHASE I PROGRAM MANAGEMENT PLAN
- JULY 1982 STONE & WEBSTER ENGINEERING CORPORATION BEGINS PHASE II (SYSTEMS) EFFORTS
- DECEMBER 8, 1982 NRC APPROVES IDVP PHASE II PROGRAM MANAGEMENT PLAN

ORGANIZATION



OBJECTIVES

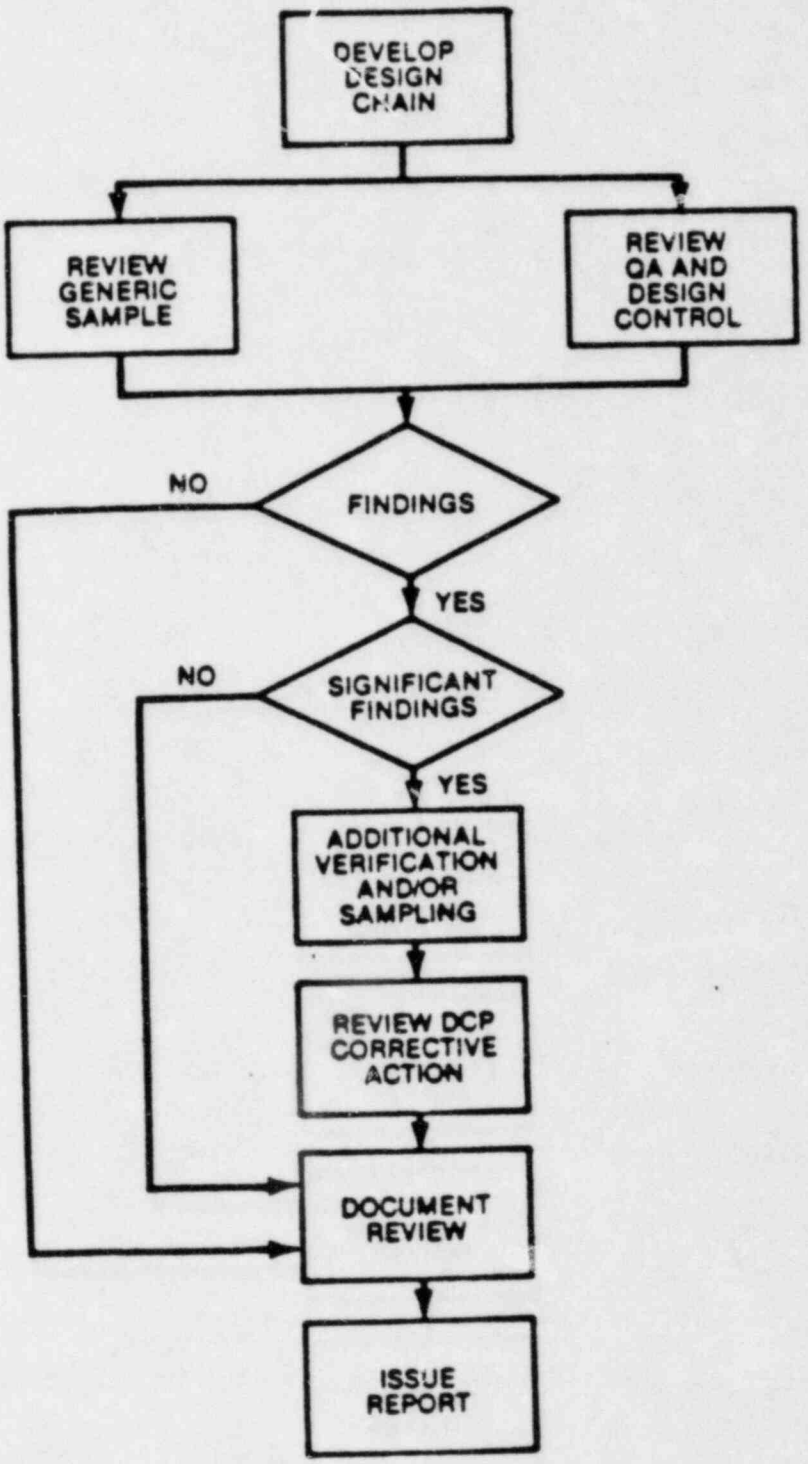
- THE INDEPENDENT DESIGN VERIFICATION PROGRAM (IDVP) AS DEFINED IN THE IDVP PHASE I AND II PROGRAM MANAGEMENT PLANS IS DESIGNED TO BE RESPONSIVE TO THE NOVEMBER 19, 1981 "ORDER" AND "LETTER"

- THE IDVP IS DESIGNED TO ELIMINATE UNCERTAINTIES IN THE CORRECTNESS OF THE SAFETY-RELATED SEISMIC AND SYSTEMS DESIGN

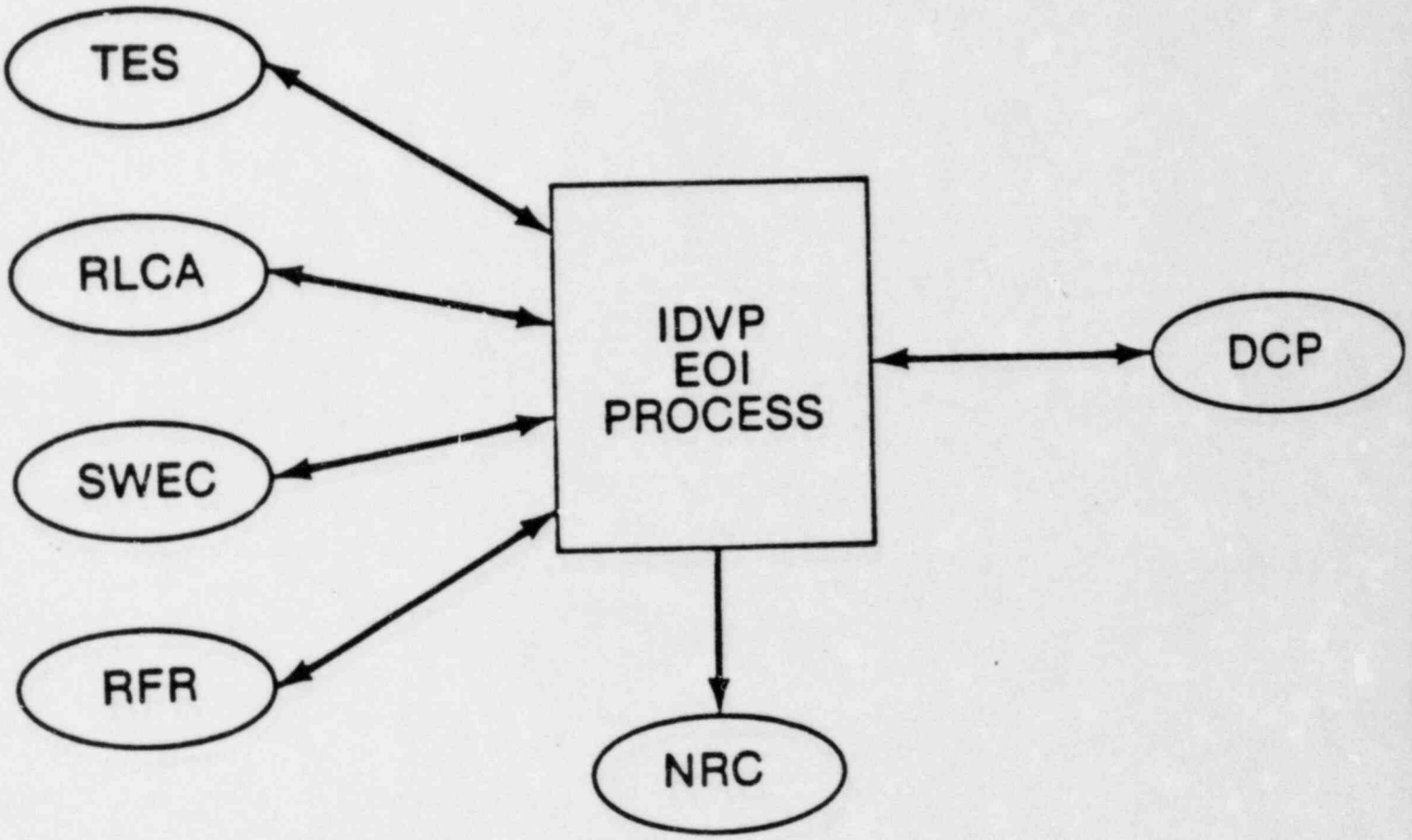
- THE IDVP WILL EVALUATE SIGNIFICANCE OF ANY ERRORS THAT ARE FOUND

- THE IDVP WILL DETERMINE WHETHER OR NOT THE DESIGN IS IN COMPLIANCE WITH THE PG&E LICENSE APPLICATION

METHODOLOGY



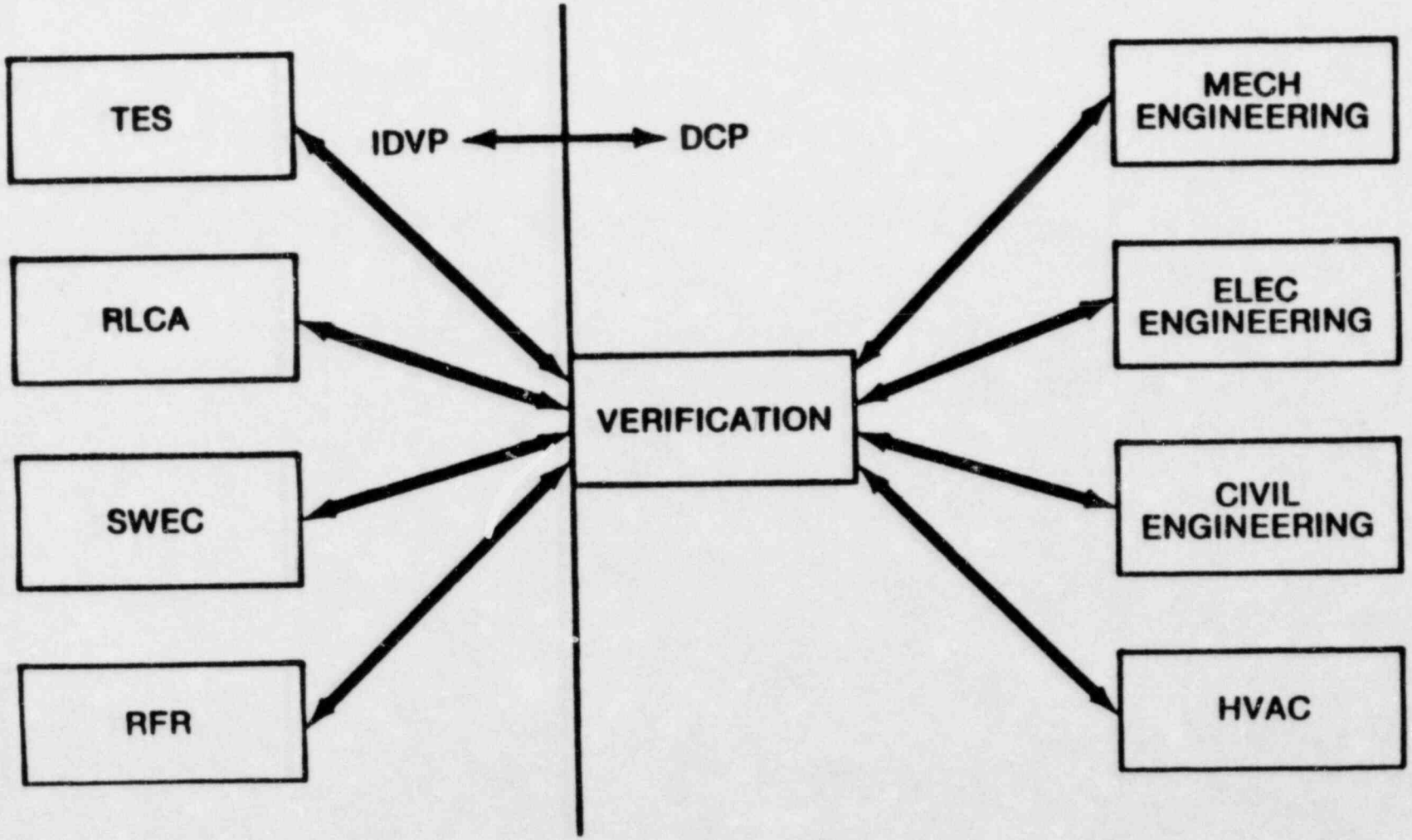
IDVP TRACKING AND REPORTING



DCP TRACKING, REPORTING AND DOCUMENTING OF CONCERNS, OPEN ITEMS AND ERRORS

- IDVP-DCP TECHNICAL INTERFACE
- DCP PROCEDURES
- DCP TRACKING AND REPORTING
- DCP DOCUMENTATION

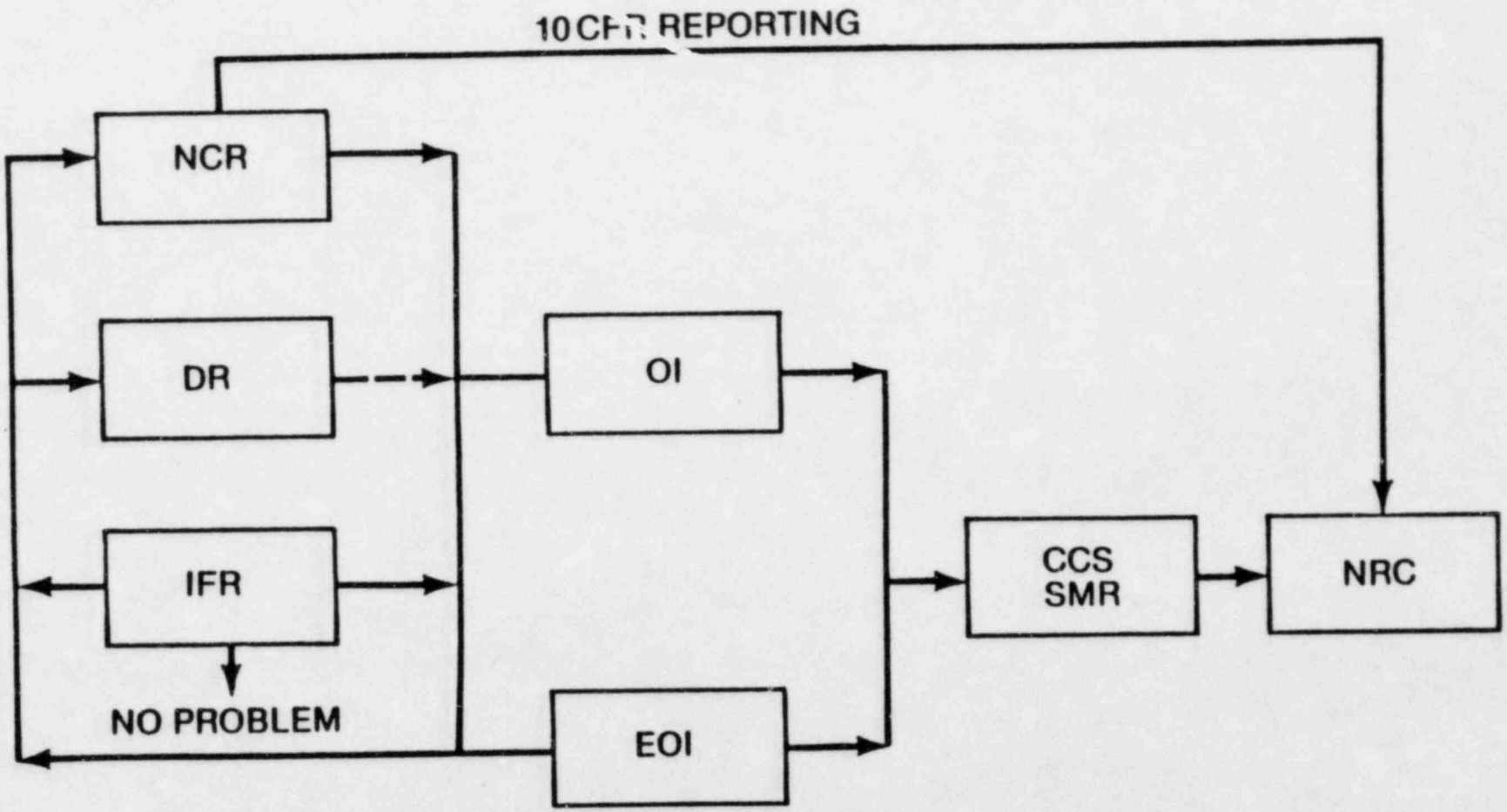
IDVP-DCP TECHNICAL INTERFACE



DCP PROCEDURES

- ENGINEERING MANUAL PROCEDURES
  - 9.1 — NONCONFORMANCES
  - 10.1 — DISCREPANCIES
- DIABLO CANYON VERIFICATION PROGRAM PROCEDURES
  - NO. 1 — INTERFACE WITH CONSULTANTS
  - NO. 2 — ADDRESSING OF IDVP OPEN ITEM, ERROR AND PROGRAM RESOLUTION REPORTS
  - NO. 3 — ITEM FOR REVIEW
  - NO. 4 — DCP OPEN ITEMS
  - NO. 5 — DIABLO CANYON SITE VISITS BY IDVP CONSULTANTS

DCP TRACKING AND REPORTING



CCS — COMMITMENT CONTROL SYSTEM, A TRACKING SYSTEM
DR — DISCREPANCY REPORT, ENGR MANUAL PROC 10.1
EOI — IDVP ERROR & OPEN ITEM, DCVP PROC NO. 2
IFR — ITEM FOR REVIEW, DCVP PROC NO. 3
OI — DCP OPEN ITEM, DCVP PROC NO. 4
NCR — NONCONFORMANCE REPORT, ENGR MANUAL PROC 9.1
NRC — NUCLEAR REGULATORY COMMISSION
SMR — DCP SEMIMONTHLY REPORT

DCP DOCUMENTATION/COMPLETION

3.4 DCP COMPLETION OF AN IDVP CONCERN INCLUDES THE FOLLOWING:

3.4.1 COMPLETION OF TASKS THAT WERE SPECIFIED AS PART OF THE DCP RESOLUTION

3.4.2 COMPLETION OF ANY PHYSICAL MODIFICATIONS THAT ARE REQUIRED

3.4.3 A COMPLETION PACKAGE WHICH CLEARLY DOCUMENTS THE ABOVE ITEMS

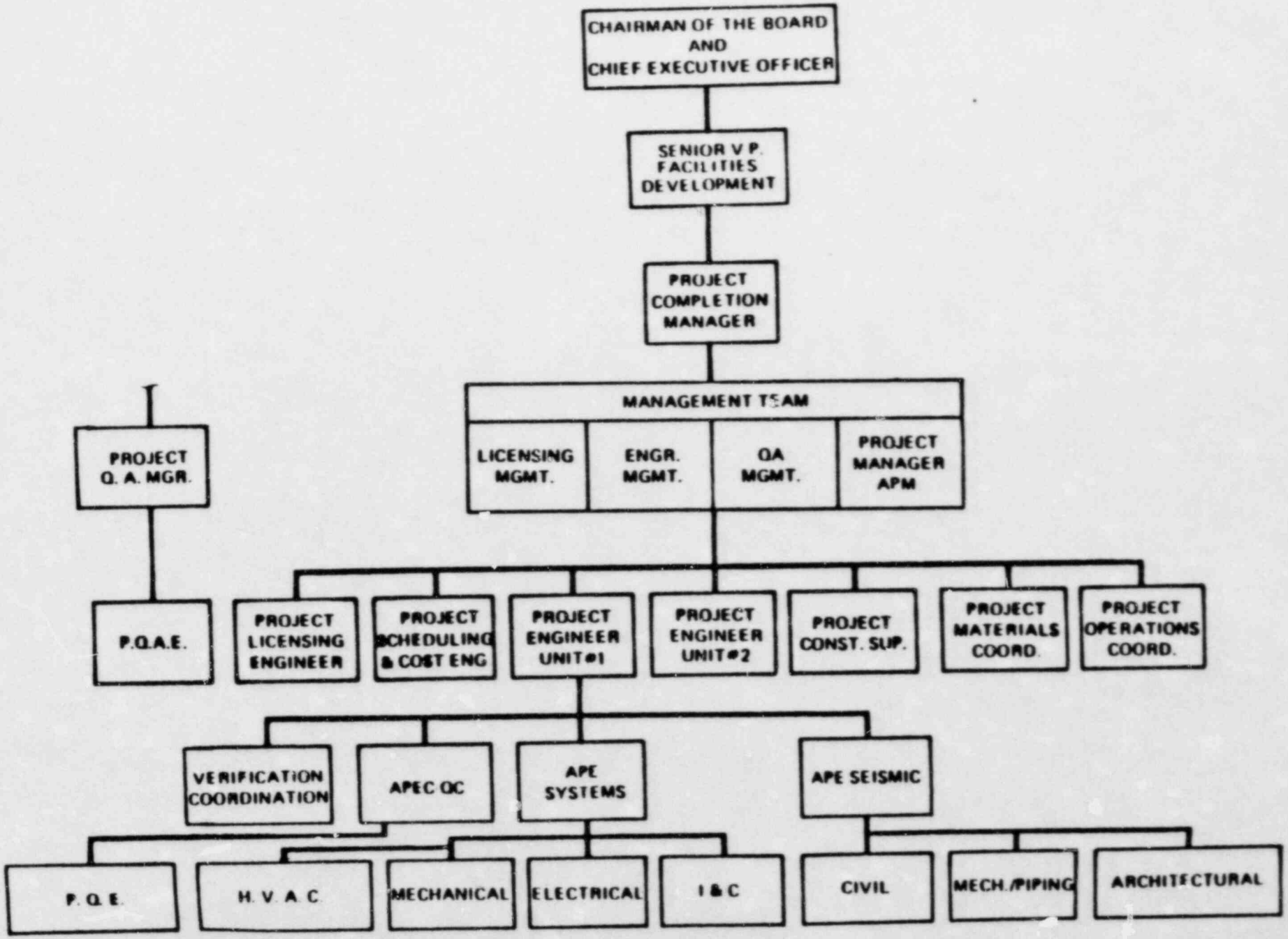
DCP REVIEW

- BACKGROUND
- ORGANIZATION
- OBJECTIVES
- METHODOLOGY
- TRACKING AND REPORTING

BACKGROUND

- SEPTEMBER 28, 1981 DIAGRAM ERROR
- OCTOBER AND NOVEMBER 1981 PG&E VERIFICATION
- NOVEMBER 19, 1981 ORDER SUSPENDING LICENSE WITH ATTACHMENT 1 WHICH DEFINED ACTIONS THAT CONSTITUTE PHASE I OF THE IDVP
- NOVEMBER 19, 1981 DENTON LETTER ACCOMPANYING ORDER WHICH DEFINED ACTIONS THAT CONSTITUTE PHASE II OF THE IDVP
- FEBRUARY 26, 1982 PG&E 8th SEMI-MONTHLY REPORT IDENTIFIES PG&E TECHNICAL PROGRAM

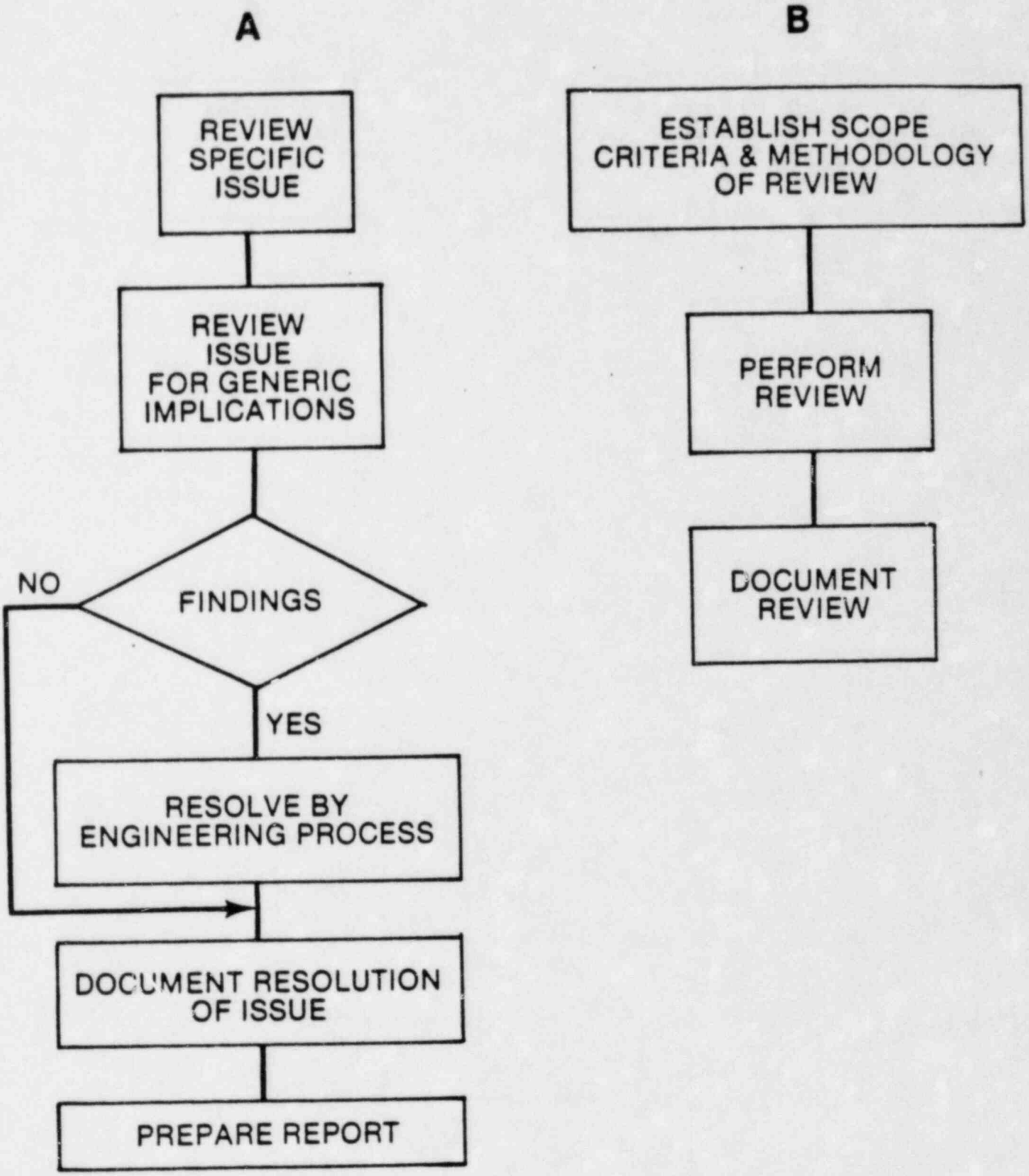
DIABLO CANYON PROJECT ORGANIZATION



OBJECTIVES

- ADDRESS TECHNICAL ISSUES IDENTIFIED AS A RESULT OF THE ORIGINAL ANNULUS PROBLEM
- ADDRESS ISSUES IDENTIFIED BY THE INDEPENDENT PROGRAM
- ADDRESS ANY OTHER TECHNICAL CONCERNS IDENTIFIED DURING THE EVALUATION OF ANY TECHNICAL ISSUE
- REVIEW PG&E DESIGNED SAFETY-RELATED SYSTEMS IN PREPARATION FOR THEIR EVALUATION IN THAT PORTION OF THE PHASE II PROGRAM DEALING WITH THE INTERNAL PG&E DESIGN PROCESS

METHODOLOGY



TRACKING & REPORTING

- DESCRIBED BY R. R. FRAY AS PART OF THE IDVP PRESENTATION

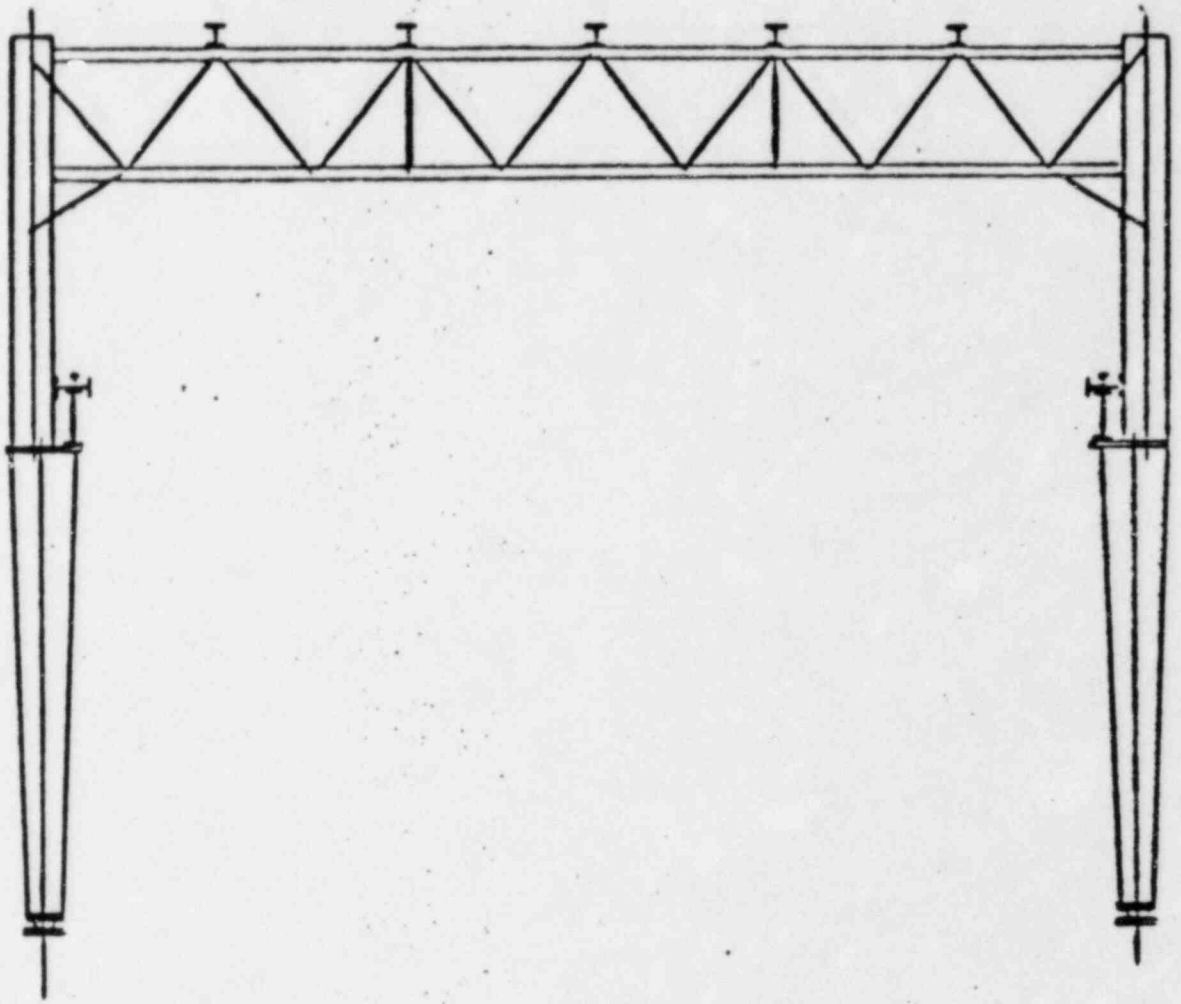


FIGURE 2.1.3-9

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
DESIGN REVIEW FINDING
FOR A TYPICAL INTERIOR FRAME
BASED ON SIMPLIFIED ANALYSIS

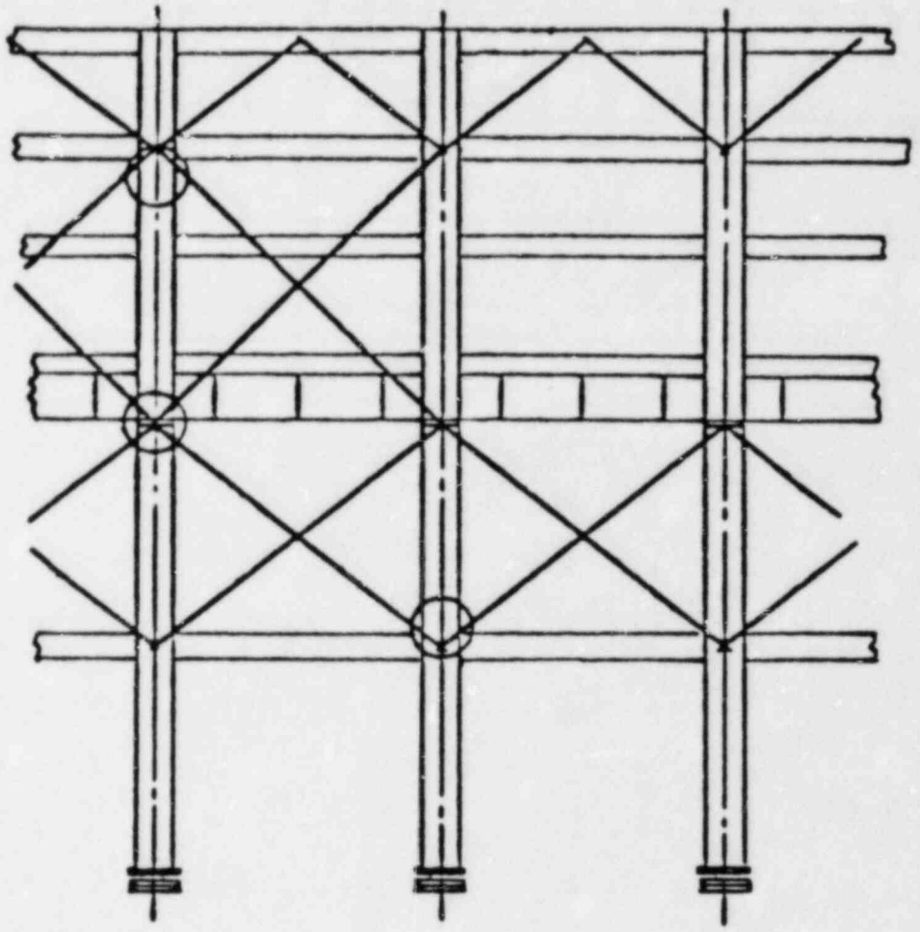


FIGURE 2.1.3-10

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
DESIGN REVIEW FINDING FOR
EAST AND WEST WALL
ELEVATION BASED ON

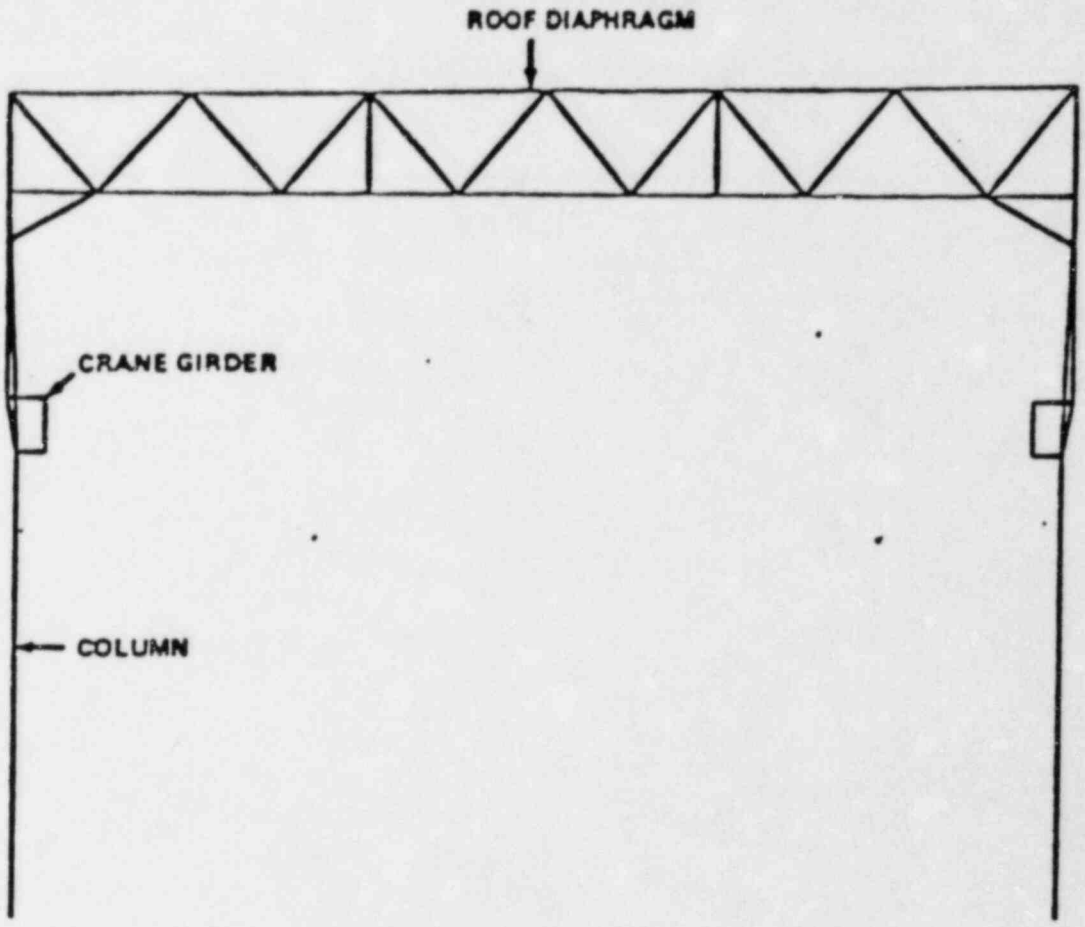


FIGURE 2.1.3-4

DIABLO CANYON POWER PLANT
UNITS 1 & 2

FUEL HANDLING BUILDING MODEL
TYPICAL CROSS-SECTION

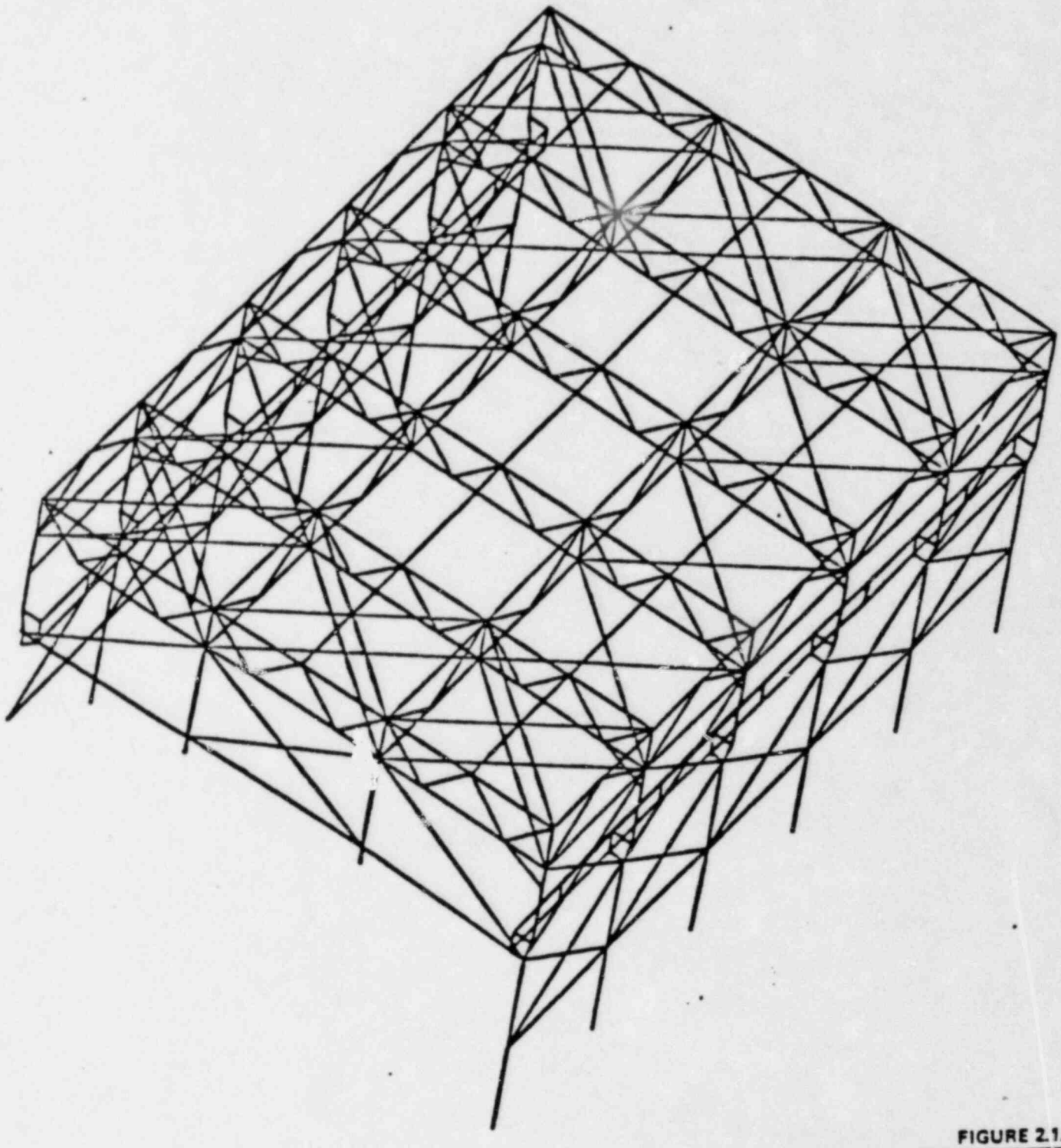


FIGURE 2.1.3-2

DIABLO CANYON POWER PLANT
UNIT 1

FUEL HANDLING BUILDING
PARTIAL BUILDING MODEL 2.1
(Six end bay frames with approx.
290 nodes and 600 members)

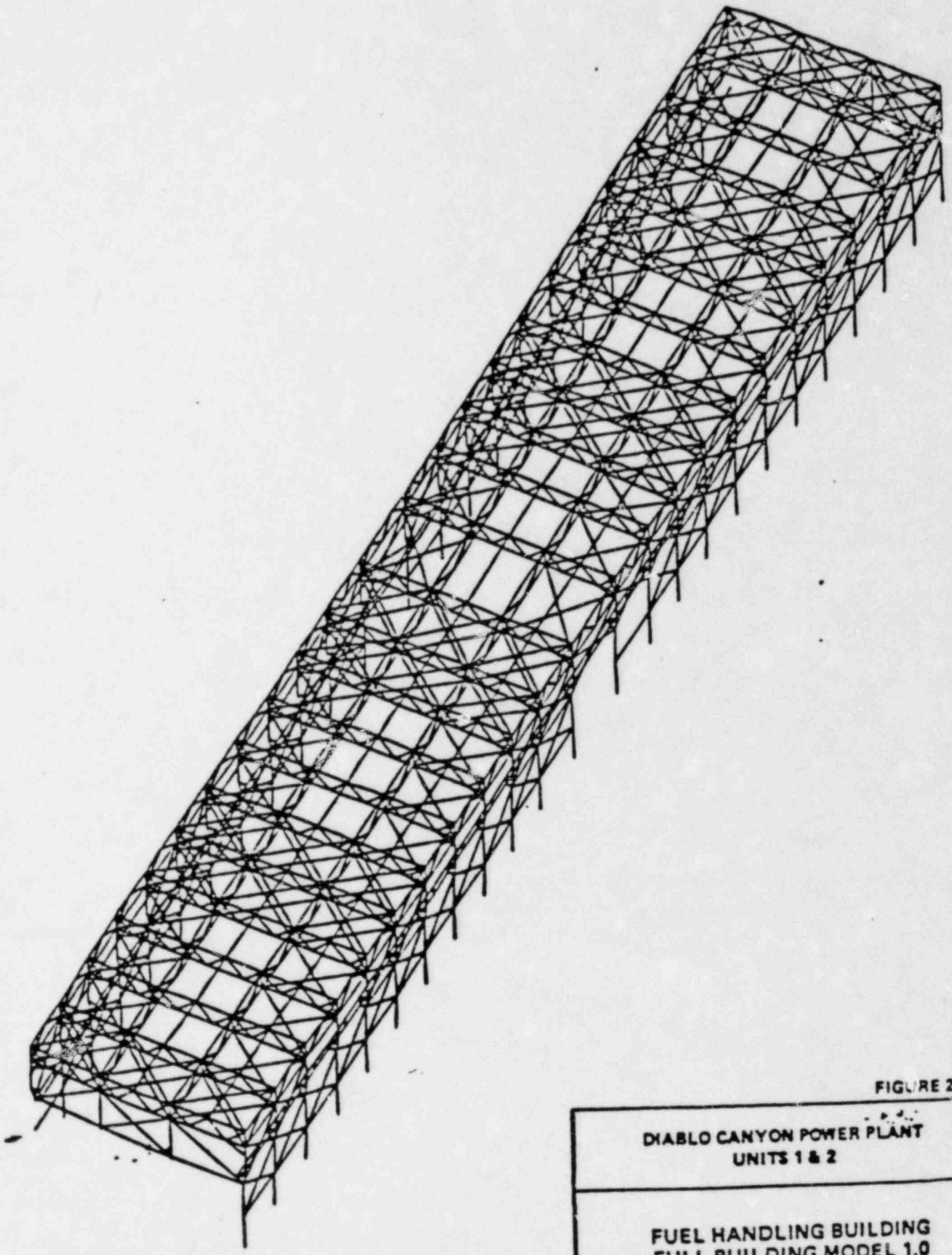
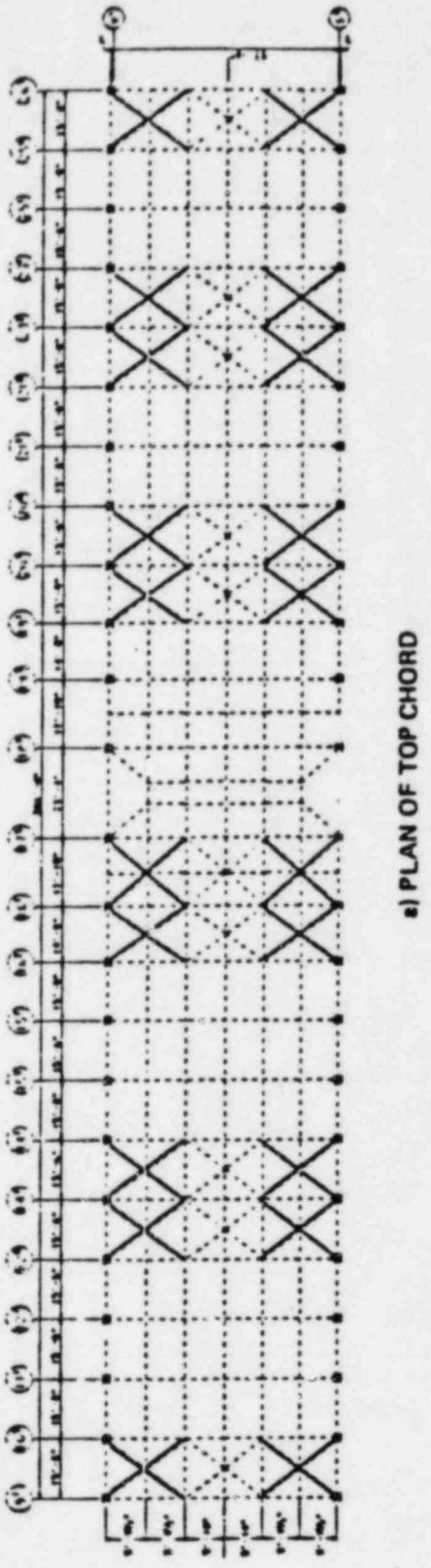


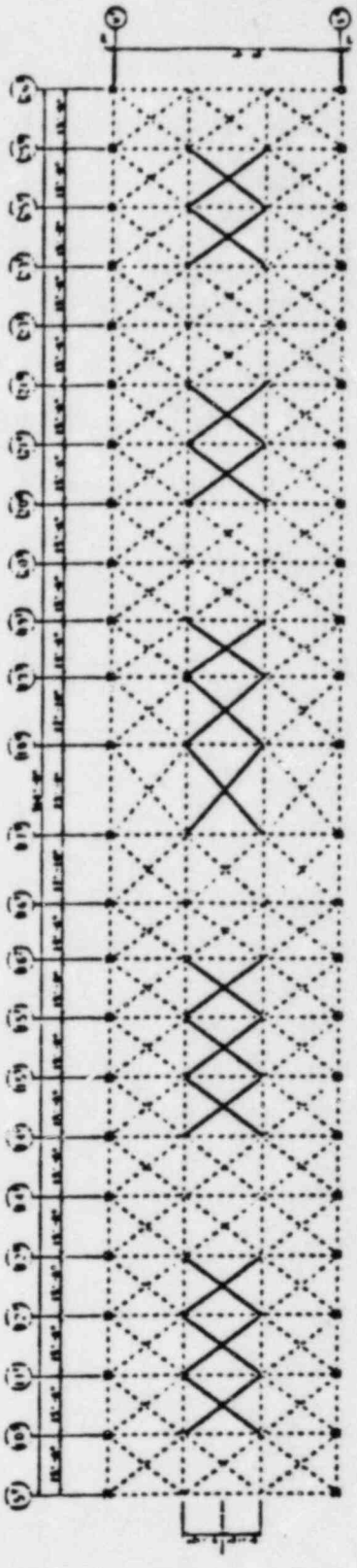
FIGURE 2.1.3-1

DIABLO CANYON POWER PLANT
UNITS 1 & 2

FUEL HANDLING BUILDING
FULL BUILDING MODEL 1.0
(Approx. 1160 nodes and 2300 members)



a) PLAN OF TOP CHORD



b) PLAN OF BOTTOM CHORD

LEGEND:

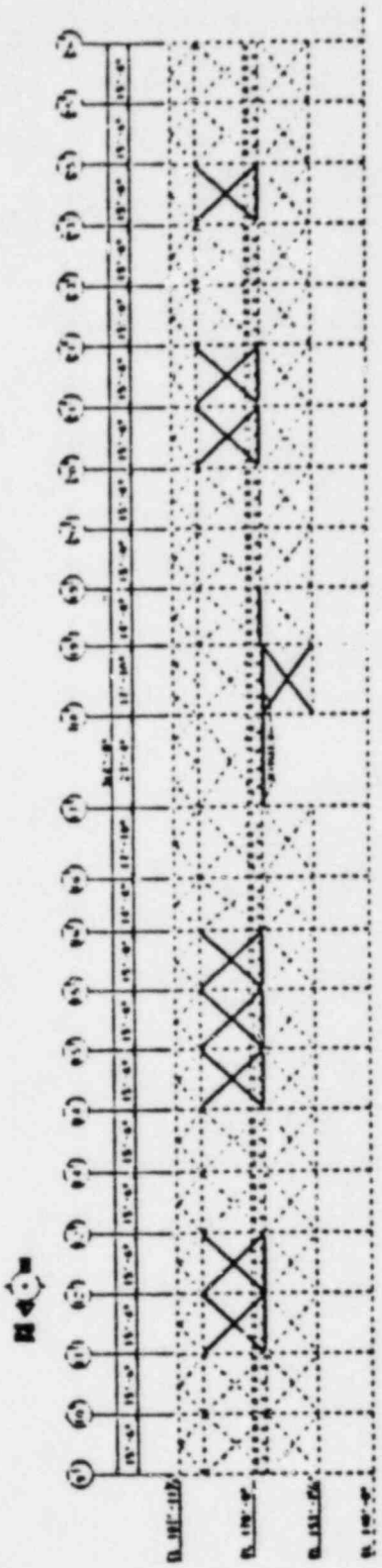
- - - - EXISTING MEMBERS

——— ADDITION OF MEMBERS

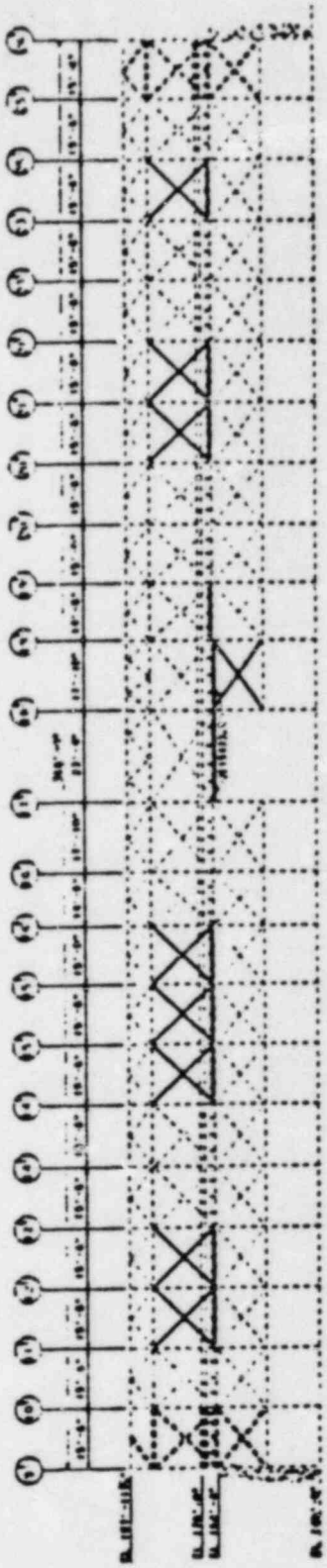
FIGURE 2.1.3-16

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
PROPOSED MODIFICATION OF
TOP AND BOTTOM DIAGONALS



a) WEST WALL ELEVATION



b) EAST WALL ELEVATION

FIGURE 2.1.3-17

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

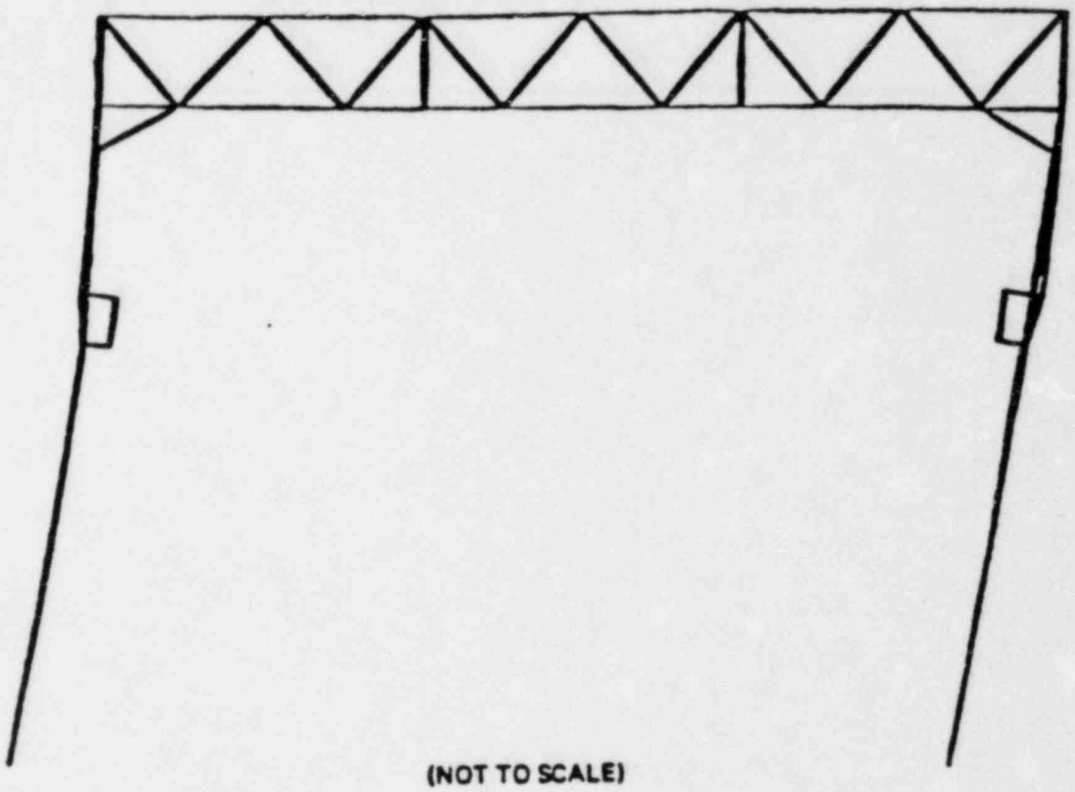
FUEL HANDLING BUILDING
PROPOSED MODIFICATION OF
EAST AND WEST WALL ELEVATIONS

LEGEND:

---------- EXISITING MEMBERS

.... MEMBERS TO BE REMOVED

———— ADDITION OF MEMBERS

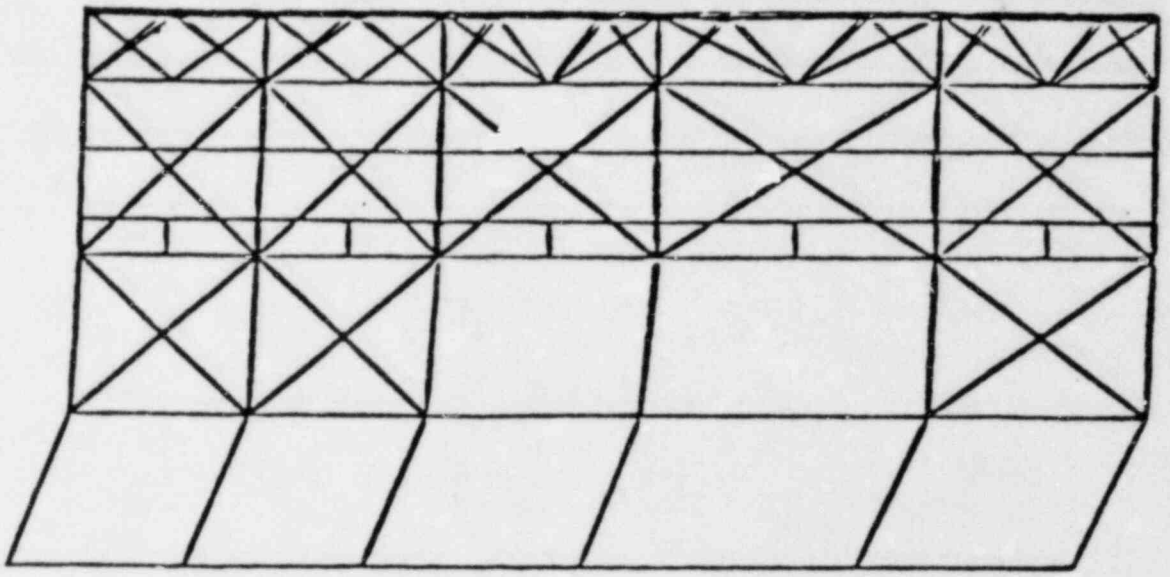


(NOT TO SCALE)

FIGURE 2.1.3-11

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
PARTIAL BUILDING MODES 2.2
MODE SHAPE NO. 1, FREQ. = 1.6 Hz
EAST–WEST DIRECTION
EFFECTIVE MODAL WEIGHT = 85%

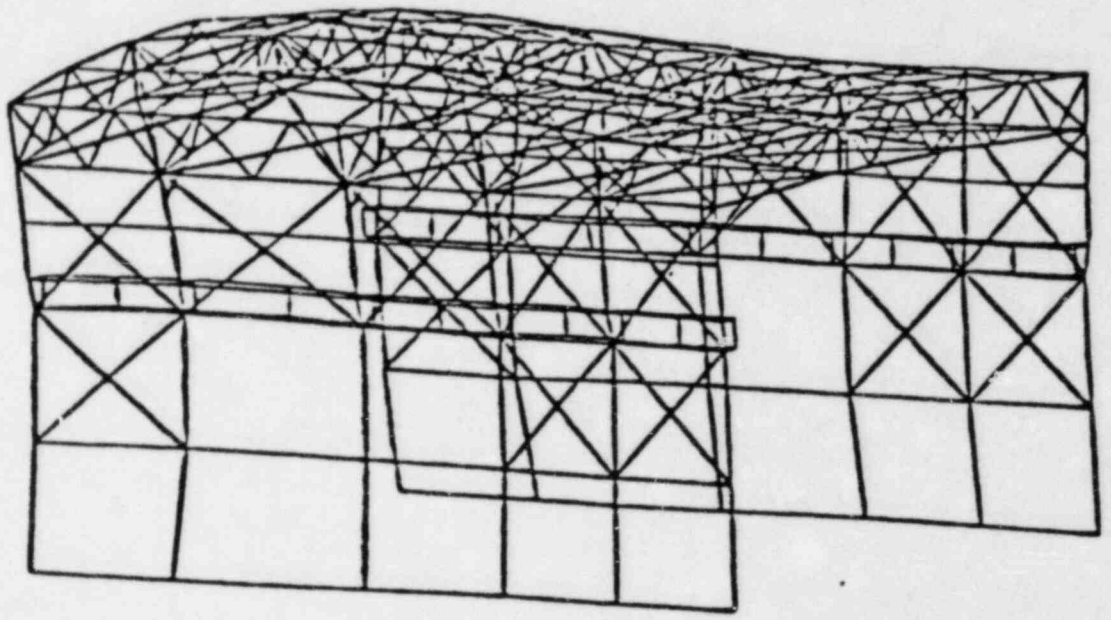


(NOT TO SCALE)

FIGURE 2.1.3-12

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
PARTIAL BUILDING MODEL 2.2
MODE SHAPE NO. 3, FREQ. = 2.7 Hz
NORTH–SOUTH DIRECTION



(NOT TO SCALE)

FIGURE 2.1.3-14

DIABLO CANYON POWER PLANT
UNITS 1 AND 2

FUEL HANDLING BUILDING
PARTIAL BUILDING MODEL 2.2
MODE SHAPE NO. 5, FREQ. = 10.8 Hz
VERTICAL DIRECTION