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NUCLEAR REGULATORY COMMISSION

In the Matter of:

PUBLIC MEETING

BRIEFING ON DIABLO CANYON - INCORRECT

SEISMIC ANALYSIS

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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Public Meeting

BRIEFING ON DIABLO CANYON - INCORRECT SEISMIC ANALYSIS

- - -

Room 1167,
1717 H Street, Northwest,
Washington, D. C.
Wednesday, 30 September 1980.

The meeting of the Commissioners was convened,
pursuant to a vote to hold a short-notice meeting, at 11:05
a.m.

BEFORE:

- NUNZIO PALLADINO, Chairman
- PETER BRADFORD, Commissioner
- VICTOR GILINSKY, Commissioner
- JOHN AHEARNE, Commissioner
- THOMAS ROBERTS, Commissioner

ALSO PRESENT:

Messrs. Chilk, Bickwit, Jordan, Eisenhut, Cornell,
Denton, Knight, and Scroggins.

* * *

P R O C E E D I N G S

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(11:05 a.m.)

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CHAIRMAN PALLADINO: The topic of this morning's
4 meeting is a briefing on a potential problem in the analysis
5 of piping systems contained in the annulus area of the
6 containment building for Diablo Canyon Unit 1. We were
7 notified of this problem on September 28 by Pacific Gas &
8 Electric. The problem was uncovered as part of a design
9 review, and it is our understanding that fuel loading will
10 be delayed while the problem is being reviewed.

11 Before we go on with the meeting, since this is a
12 short-notice meeting, we will need the concurrence of the
13 Commission to proceed on that basis. Do we have a
14 concurrence?

15 COMMISSIONER ROBERTS: Aye.

16 COMMISSIONER BRADFORD: Aye.

17 COMMISSIONER AHEARNE: Aye.

18 COMMISSIONER GILINSKY: Aye.

19 CHAIRMAN PALLADINO: Aye.

20 I gather it is unanimous. Before I turn the
21 meeting over to the Staff for the briefing, General Counsel
22 has some comments he would like to make.

23 MR. BICKWIT: Thank you.

24 I am advised that this discussion could in some
25 way touch on contested issues before Boards and before the

1 Commission. What we have done in the past in this
2 proceeding is, where we felt that there was a rationale for
3 discussions with the Staff in any event -- and we do in this
4 case, and I will get into that later -- we have advised that
5 the other parties would have an opportunity to comment on
6 anything that was said with respect to those contested
7 issues.

8 The reason we think, in spite of touching on these
9 contested issues that there is no problem with the ex parte
10 constraints of the Commission, is that the Commission is
11 entitled to hear from the Staff on matters involving the
12 supervision of its licensees. In this case, there is a
13 license that is effective and it seems entirely appropriate
14 for the Staff to communicate with the Commission with
15 respect to its supervisory function regarding that
16 licensee.

17 In fact, it would our view that these
18 communications could take place in private. Our advise
19 would be, however, that we proceed as we have in the past on
20 this matter; and that the communications take place in
21 public as they are doing in this meeting; and that the other
22 parties be given a week to comment on any contested issues
23 that may be touched upon by the Staff's presentation.

24 CHAIRMAN PALLADINO: All right. Thank you.
25 Let's see. Who is going to give the

1 presentation?

2 MR. DENTON: Darrell Eisenhut and Ed Jordan will
3 give the briefing.

4 MR. JORDAN: Okay, Mr. Chairman, you already
5 identified a part of the presentation I have regarding
6 notification. The NRC actually became aware on Sunday,
7 September 27th, when the plant superintendent called the
8 Resident Inspector and advised him that there was a question
9 of the seismic analysis that may affect fuel loading, and
10 that they were looking into it.

11 COMMISSIONER GILINSKY: I think some people are
12 having trouble hearing you back there.

13 MR. JORDAN: The notification was made informally
14 to the Resident Inspector on Sunday, September 27th, by the
15 Plant Superintendent. The notification was that there may
16 be a problem with the seismic analysis that would affect
17 Unit 1, and so the Licensee was not going to go ahead with
18 fuel loading at that time and they would notify us further.

19 On Monday, the 28th, the Licensee reported
20 formally that incorrect values had been used for the
21 vertical component of the seismic response spectra for Unit
22 1, and that fuel loading would not be initiated until it was
23 resolved, and that the NRC concurred. There is a written
24 report to that effect.

25 The error was stated to be affecting equipment

1 that is in the annulus between the crane wall -- this is an
2 interwall, and I will show you a figure in a moment -- and
3 the outer containment wall on two elevations.

4 The error was discovered by an engineer who was
5 examining Bulletin 79-14 actions on Unit 2. We understand
6 from the utility that this was identified as a question on
7 Friday, the 25th, and identified to management. There was a
8 management engineering review that was done on Saturday, and
9 then on Sunday --

10 COMMISSIONER GILINSKY: Could you tell us what
11 79-14 covered?

12 MR. JORDAN: Certainly. The Bulletin 79-14 was a
13 bulletin to review the as-built configuration of piping in
14 the reactor facilities to compare the actual configuration
15 with the analysis that was done for the seismic. That
16 bulletin has been applied to all operating plants, and it is
17 continuing to be applied for plants that are under
18 construction.

19 COMMISSIONER BRADFORD: Did that come out of the
20 five-plant shutdown in '79? Or was that another matter?

21 MR. JORDAN: It was a part of the series of
22 seismic reviews. We also had a Bulletin on anchor bolts and
23 base plates, and this particular bulletin on as-built grew
24 directly out of the findings from the as-built-- or I'm
25 sorry, from the anchor bolt/base plate bulletin.

1 The Licensee established on Sunday that this was a
2 nonconservative error. Their Plant Review Committee was
3 reviewing the plant status for fuel load, the Unit 1 plant
4 status for fuel load, and they made the determination not to
5 proceed until it was resolved.

6 I will attempt to explain the error. The response
7 spectra are taken for segments from a diagram in a
8 consultant's report. What actually happened was that the
9 identification of the segments was inadvertently exchanged
10 for the two units.

11 Could I have the first slide, please?

12 (Slide.)

13 MR. JORDAN: The unit arrangements for the two
14 containments are essentially mirror images because of the
15 common auxiliary building between the two containment
16 buildings. So that if you simply mirror-flipped the
17 equipment in one containment, it would match very closely
18 the equipment in the other containment.

19 The vertical response spectra in a given segment
20 of this annulus is dependent upon the massive components and
21 equipment that is in that particular sector, and
22 predominantly that mass is the fan coolers which are located
23 above the elevations, at least the two elevations that were
24 affected.

25 Could I have the second slide, please?

1 (Slide.)

2 MR. JORDAN: Let me see slide three.

3 (Slide.)

4 MR. JORDAN: Okay, the fan coolers are the dark
5 objects, the five fan coolers in the annulus. This is the
6 Unit 1 view. The annulus region -- maybe it would be better
7 if I pointed to it -- this (indicating) is the annulus
8 region. The crane wall and the outer containment wall
9 (indicating), and the fan coolers are located here
10 (indicating).

11 Now could I have the slide two?

12 (Slide.)

13 MR. EISENHUT: I guess you should note also that
14 this is perfectly symmetrical. So the crane wall literally
15 goes essentially from the base slab to the higher elevations
16 in the plant; so there is actually an annulus that goes
17 completely around the containment, and what we will be
18 talking about here is the structures in that annulus and
19 their vertical height.

20 CHAIRMAN PALLADINO: Are these fan coolers located
21 in a mirror image on the other plant?

22 MR. JORDAN: That is correct; precisely true.

23 The only reason for showing this diagram is this
24 is the diagram from the Hosgri Report which shows the frame
25 numbers and the angles. This is in the upper lefthand

1 corner of the drawing and are supposed to correspond with
2 the locations of the fan coolers on Unit 1.

3 This is for Unit 1. The label is obscured at the
4 bottom, but the object is that those lines then precisely
5 correspond to the location of the fan coolers.

6 Now could I have slide --

7 MR. EISENHUT: If I could interrupt for a second?
8 You see the little diagram at the top. This is just simply
9 a mathematical model. The inside of the crane wall is
10 modeled as a point on here, and this is actually just a
11 modeling, a mathematical model of the outer annulus. It is
12 broken into five sectors, so to speak, corresponding to five
13 steel frames. These are actual structural, interior
14 structures in this area that actually support the piping.
15 So don't be misled by the little diagram at the top; it is
16 actually just a configuration. It is modeling into
17 nonsymmetrical, nonuniform sort of mass areas in the annulus,
18 and that is what the little configuration is we're talking
19 about.

20 MR. JORDAN: That is good. So the calculations
21 that are done by this modeling are then to provide for the
22 piping analyst the forcing function, the spectral components
23 at those locations; and then at each one of those frames,
24 then the highest value is what is applied to the equipment
25 within that sector.

1 Could I have the third slide with the overlay,
2 then?

3 (Slide.)

4 MR. JORDAN: This is back to Unit 1. Then this is
5 the overlay of the figure that was taken from the Hosgri
6 Report, which would be north-arrows' oriented. You will
7 note that the frame lines do not coincide with the locations
8 of the fan coolers.

9 (Slide.)

10 MR. JORDAN: If you will interchange now the
11 figure for Unit 2, now the frame lines correspond precisely
12 with the fan coolers.

13 COMMISSIONER GILINSKY: Is the problem that they
14 did not take the mirror image of the diagram?

15 MR. JORDAN: There was a mirror image
16 transformation so that both units were incorrect.

17 CHAIRMAN PALLADINO: Both units were incorrect?

18 MR. JORDAN: Both units.

19 COMMISSIONER BRADFORD: So they used Unit 1 and
20 Unit 2, as well?

21 MR. JORDAN: Yes. That is my understanding.
22 There is going to be, then, a 50.55(e) report for Unit 2, as
23 well.

24 MR. EISENHUT: It is certainly a question that is
25 still open; that certainly we know that EG&E has informed us

1 that on Unit 1 they used the breakdown and the layout for
2 Unit 2. They have yet to inform us officially whether or
3 not the Unit 2 was done right, or whether they actually had
4 reversed them and what they used on Unit 2.

5 MR. JORDAN: Right. Since Unit 2 doesn't have an
6 operating license, the reporting time interval that is
7 allowed is longer.

8 MR. DENTON: So what they take, then, is for the
9 design of the supports for the equipment sector is the
10 maximum vibration of either of the two adjacent frames. So
11 they will have to go back and recalculate then with the
12 right geometry for each one to see if the supports for the
13 equipments are properly designed, and the equipment is
14 properly designed.

15 COMMISSIONER BRADFORD: I need to have you tell me
16 in the simplest terms you can what the significance of the
17 frame line is.

18 MR. DENTON: The "frame" is sort of "structure."
19 The structure was broken up into various frames so that they
20 could model the vibration of the reactor structure itself.
21 Then they used that as input to design the supports and
22 equipment that went into those parts of the reactor
23 compartment.

24 COMMISSIONER BRADFORD: Okay. What is the
25 significance of that in relation to the fan coolers?

1 MR. JORDAN: The mass of the fan coolers is
2 predominant in those sectors, so that then becomes the
3 strongest forcing function that feeds back into the
4 structure and gives some amplification of the seismic
5 forces.

6 MR. EISENHUT: When you model it, you choose to
7 model it around the largest mass. So in this case you have
8 modeled it around it, and this is just meant to be a pretty
9 simple description. We are actually simplifying it somewhat
10 of course, but to show that in fact this is a mirror-image
11 problem and that is in fact the way it has been conveyed to
12 us from PG&E; that it has been only for -- and the only
13 evaluation, as Ed mentioned earlier, the only piece that
14 this was done on on PG&E's preliminary assessment is on the
15 vertical acceleration for the equipment located in the
16 annulus region.

17 CHAIRMAN PALLADINO: Only for that?

18 MR. EISENHUT: Only for that one calculation. And
19 they are essentially separable, looking at the horizontal
20 acceleration models and the calculations for the annulus
21 region and the rest of the plant.

22 So at this point it is their preliminary belief
23 that it only affects the one piece -- that is, the vertical
24 accelerations in the annulus region for equipment and
25 piping.

1 COMMISSIONER AHEARNE: Have they gone back and
2 checked a wider survey to see whether or not --

3 MR. EISENHUT: They obviously must have to give us
4 the preliminary assessment that the only one it affects is
5 this. It is something that --

6 COMMISSIONER AHEARNE: Well, there is a difference
7 between a "hope" and a --

8 MR. EISENHUT: Yes; that's right. You need to
9 appreciate that it is a little early in the discussion. A
10 lot of this information we got off of a phone conversation
11 yesterday afternoon.

12 MR. DENTON: We certainly intend that they go
13 back. I don't know how much we can say that they have gone
14 back today.

15 MR. EISENHUT: Today I just don't think we really
16 can.

17 CHAIRMAN PALLADINO: It seems strange that you
18 would have this kind of mixup for just one particular
19 acceleration --

20 COMMISSIONER AHEARNE: Yes, one.

21 CHAIRMAN PALLADINO: -- because you probably were
22 looking, I'm sorry, the person doing the work was probably
23 looking at the same diagram for the horizontal one.

24 MR. JORDAN: But the only affectation here is for
25 that vertical component. The horizontal component is the

1 same on that entire elevation. So that that mass doesn't
2 affect the horizontal component. The elevation within the
3 building has a greater effect on horizontal component.

4 MR. DENTON: It sounds to me as though it is
5 potentially -- and I don't want to speculate too far -- a
6 potential interface problem between the two parties that did
7 this. I think PG&E itself did some of the calculations, and
8 then John Bloom and Associates did some. And when the
9 information transferred over that interface perhaps is where
10 it got switched.

11 CHAIRMAN PALLADINO: Are we asking the Licensee to
12 go back and look at their whole --

13 MR. JORDAN: Yes, and you will see --

14 MR. DENTON: We will get to that.

15 MR. EISENHUT: Could we hold up on that for one
16 second?

17 COMMISSIONER BRADFORD: Before you go on, can you
18 make clear to me what the practical consequences of the
19 mistake -- or not in the sense -- in one sense you are only
20 going to know after more work has been done; that is,
21 whether it makes a real difference. But what kind of
22 mistaken conclusion would this sort of misalignment lead you
23 into? Would it lead you to misassess the susceptibility of
24 the reactor itself to --

25 MR. DENTON: I have urged Darrell not to

1 speculate, because I don't want to get too far out of our
2 data base, but since this goes into the design of the
3 support system for equipment, it would say that the supports
4 to hold down for example the fan coolers or to tie down the
5 fan coolers might have to be changed.

6 MR. CASE: We can tell you the equipment that is
7 in that annulus.

8 MR. EISENHUT: Right. And we will be addressing
9 which equipment we think potentially is affected by this.
10 It does not reflect back into the reactor itself.

11 MR. DENTON: It is very difficult to speculate
12 what it may do.

13 CHAIRMAN PALLADINO: What I think he is trying to
14 ask is: What kind of result might there be, either the
15 supports or some pipe hangers?

16 MR. DENTON: There might be more pipe hangers,
17 pipe hangers at different locations -

18 CHAIRMAN PALLADINO: Different locations.

19 MR. DENTON: -- stronger pipe hangers, stronger
20 bolts, or --

21 COMMISSIONER BRADFORD: The only reason I asked
22 about the reactor is that I gathered, Harold, from your
23 explanation of the frame that it somehow centered on the
24 effect on the reactor. No?

25 MR. JORDAN: No.

1 COMMISSIONER BRADFORD: Okay. Forget the reactor,
2 then.

3 MR. JORDAN: Maybe I can help by calling for a
4 backup slide, which is the elevation of the building.

5 (Slide.)

6 MR. JORDAN: This is the crane wall (indicating).
7 The crane is actually supported on two walls, which is an
8 annular wall. This (indicating) is the outer containment
9 wall. These (indicating) are the two elevations, and here
10 (indicating) are the ones that are directly affected. So it
11 is the equipment that is supported on the floor in this
12 annulus region and is subsequently tied to this (indicating)
13 column that the fan coolers are installed on.

14 So that it should not affect the pedestal, any of
15 the reactor components in this sector as a result of that
16 error. Does that help to clarify that?

17 COMMISSIONER BRADFORD: It does, within its own
18 terms.

19 (Laughter.)

20 COMMISSIONER BRADFORD: It leaves me still
21 somewhat confused about the overlay that showed the five
22 frames which seemed to flow out from the reactor.

23 MR. JORDAN: Okay. Yes, the five frames were just
24 geometric. They really should have been only segments from
25 this annular region.

1 MR. EISENHUT: Ed, it goes back to what I meant
2 before about the little diagram in the corner. The sectors
3 are really sectors in the annulus. From a modeling
4 standpoint, a mathematical modeling standpoint, you for this
5 exercise make everything inside the wall a point. But it is
6 not really a --

7 COMMISSIONER BRADFORD: So it has got nothing to
8 do with the reactor --

9 MR. EISENHUT: It really has nothing to do with
10 the fact that these things continue on in.

11 MR. DENTON: There are many important reactor
12 systems, though, that pass through this.

13 COMMISSIONER BRADFORD: Right.

14 MR. DENTON: It would have pipes and equipment in
15 there. So it deals with the supports for those pipes and
16 equipment that penetrate this area.

17 COMMISSIONER BRADFORD: Yes.

18 COMMISSIONER GILINSKY: Could I ask, did the
19 analysis in effect assume that the fan coolers were in
20 different locations than they in fact are?

21 MR. EISENHUT: That is one way of looking at it;
22 yes. That is one way of looking at it.

23 MR. JORDAN: So that in the sectors that they came
24 up with the vertical acceleration component, they would have
25 a nonconservative component applied in the design where the

1 error was prevalent.

2 Now in their other areas, they are overdesigned.
3 Where the forcing function that they picked off of the
4 diagram was incorrect and was greater than is actually
5 correct, then that sector is overdesigned. The largest
6 segment in fact that is facing the reactor building appears,
7 from our preliminary information, to be overdesigned; that
8 those two are symmetric.

9 COMMISSIONER BRADFORD: And I gather from what you
10 are saying -- I am referring to something that was not clear
11 to me from the PV -- and that is, that the error did
12 actually affect the design of the plant; that it is not just
13 something that has gone into some after-the-fact analysis?

14 MR. EISENHUT: Well, it may or may not. The thing
15 that you have to remember is a couple of things. All the
16 piping there does have a seismic design. It is supported.
17 It has an existing design that is there in place.

18 COMMISSIONER BRADFORD: Right.

19 MR. EISENHUT: They now know that there was this,
20 on this certain selected pieces of piping area, they are
21 going to have to back and recalculate. They may find that
22 some piping was over-restrained. That is, it's more than
23 enough. It is more than conservative.

24 COMMISSIONER BRADFORD: Yes.

25 MR. EISENHUT: And they find on others that they

1 have to go in and either put in more supports or beef up
2 supports. It is really going to take an analysis of going
3 through one-by-one to decide what the real net effect is
4 going to be. It may well turn out, like the other
5 evaluations in the past which turn out to be very much
6 largely a computer exercise, considerable paper,
7 considerable time, but very little change physically in the
8 plant.

9 MR. DENTON: It depends on the sensitivity of the
10 analysis to things like the weight of the fan coolers.
11 There is a lot of weight in there which was correctly
12 modeled such as floor weight, and so forth.

13 COMMISSIONER BRADFORD: Yes.

14 MR. DENTON: So you just have to rerun the code
15 and use spectrum to analyze the supports.

16 COMMISSIONER BRADFORD: Yes. I understand that.
17 My point was a little different. I appreciate that it may
18 turn out at the end of the analysis that everything is still
19 all right. What I was not clear on until just now was that
20 the error had actually taken place at a point in time when
21 it was used in the design and construction of what is
22 actually there. It is not simply something that is in an
23 after-the-fact analysis.

24 MR. FISENHUT: That is correct. It was used in
25 actually designing the supports and calculating the stresses

1 for example on piping in those regions from the best
2 information we have right now.

3 COMMISSIONER GILINSKY: Let me just pursue this
4 for a point and see if I understand what you are saying.
5 The problem, or the potential problem, comes from the fact
6 that we are not dealing with a symmetrical reactor. If there
7 were circular symmetry presumably it would not matter if you
8 had shifted the coolers around and analyzed it at some
9 different angle. But it is the lack of symmetry in the rest
10 of the problem that causes concern?

11 MR. EISENHUT: Well, that is the way it exhibits
12 itself certainly; and if it was symmetrical and you flip it
13 around an axis of symmetry, there is no problem.

14 MR. DENTON: Maybe we should ask a specialist in
15 mechanical design.

16 MR. KNIGHT: I think if I --

17 CHAIRMAN PALLADINO: For the record, would you
18 mind identifying yourself?

19 MR. KNIGHT: Yes. I am Jim Knight from the NRC
20 Staff.

21 I think it would perhaps lead us astray to get too
22 involved in worrying about the lack of symmetry as a
23 fundamental aspect of the problem. In doing such analyses,
24 after you go through your various steps you compile a
25 "catalogue," if you will, of floor response spectra at

1 different locations in the building. This is the motion
2 after it has been filtered through the building, and some
3 frequencies are damped and some are amplified.

4 I have this catalogue now, and from everything we
5 know to date the actual development of those floor response
6 spectra was done properly. It appears that when the
7 individual went to do his analyses he selected the wrong
8 response spectra from that catalogue of response spectra.

9 He was led astray because of the fact that he had
10 this difficulty with his mirror image, and that where he
11 thought frame three was in a certain location in Unit 1 it
12 in fact wasn't. He was looking at the location of frame
13 three in Unit 2.

14 So as I said, I don't see that --

15 COMMISSIONER AHEARNE: Are you saying, Jim, that
16 they actually calculated the response spectra correctly; but
17 they then used the wrong --

18 MR. KNIGHT: They used the wrong response spectra;
19 yes. Everything we know to date leads to that. It is an
20 error, if you will, that seems so far down in the chain of
21 concerns, so to speak, that it seems miniscule, but that is
22 apparently what happened.

23 MR. JORDAN: Could I have slide six, please?

24 (Slide.)

25 MR. JORDAN: We have described the region of

1 concern. I want to focus just very briefly on the
2 equipment that we understand goes through those sectors.
3 There is some large-diameter and small-diameter piping,
4 auxiliary system piping, and it is that piping that is
5 supported on those two floors that is in question at this
6 point.

7 Could I have slide seven?

8 (Slide.)

9 MR. JORDAN: This is a cursory equipment list
10 which indicates the kinds of equipment that we believe would
11 be involved within those sectors.

12 COMMISSIONER BRADFORD: You are not sure of this
13 yet, Ed? I notice you say "potentially involved."

14 MR. JORDAN: We know that the equipment goes
15 through, but we are not sure of the location of supports on
16 that floor for that equipment.

17 MR. EISENHUT: Well, we are sure of where the
18 supports are. The reason the word "potentially" is there is
19 because you have to analyze it to see whether or not it is a
20 problem. It goes back to -- that wasn't there. I added
21 that just a little while ago, because you really do not know
22 that until you do the analysis. But we do know that these
23 are the systems, the piping that goes through this area.

24 Basically it is sort of separate from the
25 reactor. It is those support systems that goes in -- things

1 like component cooling water that goes in of course that is
2 needed for the reactor coolant pumps as one example. All
3 the safety injection piping goes through this area. The
4 residual heat removal system all goes through this area.

5 The big pieces of equipment, per se, that are in
6 this area are things like the accumulators, the hydrogen
7 recombiners, and of course the fan coolers that we have been
8 talking about.

9 So it is a 16- to 18-foot area. The equipment
10 that is there is actually a limited amount of equipment, but
11 of course it is where the key piping that goes in and
12 communicates with the reactor that goes through.

13 And again, this is just a listing of systems that
14 are potentially affected that the utility is already now
15 going through the process of looking at.

16 The last slide --

17 MR. JORDAN: This leads naturally to you.

18 MR. EISENHUT: The last slide, if I can have it?

19 (Slide.)

20 MR. EISENHUT: This just summarizes where we are
21 today and where we are expecting, sort of the game plan of
22 where we are going.

23 Ed mentioned the notifications to the region, the
24 PN. We did issue a Board notification yesterday. It was
25 sent to the Commission, the Appeals Board, the Board and all

1 the parties in the proceeding, and it basically contained
2 the three documents we had with the details at the time, the
3 abbreviations that contained the PN, that contained the
4 simple letter from PG&E which was the notification per the
5 tech specs, and a PG&E press release.

6 Yesterday we had a rather detailed, at this
7 juncture, conference phone call with PG&E and a number of
8 parties on the Staff. PG&E agreed to send a follow-up
9 letter today. They are basically going to be telling us the
10 details of the information that we have presented here this
11 morning, which was largely gained through a telephone
12 discussion. They will be sending that letter in today.
13 They committed to have it here by 5:00 p.m.

14 Following that, we will be issuing another Board
15 notification to all of the parties and sending out that
16 piece of information.

17 The second piece of the discussion with PG&E
18 yesterday was: If we set up a meeting on Monday, for PG&E
19 to come in and to explain to the Staff in some detail what
20 happened, to bound the problem as they understand it, where
21 they are going.

22 They told us yesterday that as of Monday they
23 expect to actually have reanalyzed some of the piping in the
24 area to know the magnitude of the problem -- Is it a big
25 problem? Was the approach they used conservative enough

1 that it turns out that no modifications are necessary? But
2 they are really trying to bound it.

3 The last two bullets here are: We will be sending
4 an Information Notice out to the industry following that
5 meeting when we have enough definitive information. An
6 Information Notice, remember, is we just send it to the
7 entire industry that this is some information that you ought
8 to be aware of; it doesn't require any action at that
9 juncture.

10 The last bullet is the piece where IE and NRR are
11 going to continue to look at the PG&F reanalysis and where
12 they are going. It is largely broken down between the two
13 bullets. I&E is looking at the actual error at the plant
14 and has been following along on the 79-14 aspects. A
15 primary concern that NRR has been pushing is the impact on
16 the overall seismic design adequacy of this error.

17 That is, the question: Was this an isolated error
18 that occurred in one spot? Or does it have implications for
19 the overall seismic design?

20 I have specifically asked PG&E to be able to
21 address that question on Monday, and to try to give us some
22 information to bound the problem and convince us that
23 everything we have done in the past on this plant on seismic
24 design is either all right, or it is not all right "because."

25 They said they will attempt to come in and present

1 that.

2 COMMISSIONER AHEAPNE: Or, put "otherwise." "It
3 is not all right, or it is all right because."

4 MR. EISENHUT: That is correct. I said that
5 backwards. It is either all right, or not all right.

6 CHAIRMAN PALLADINO: Darrell, when you send these
7 bulletins out to the industry, do you alert those people
8 that have mirror-image plants that they may have the same
9 problem?

10 MR. EISENHUT: Well, presumably the Information
11 Notice would say just that; that we have identified the
12 problem with the mirror image in the plant, and it is
13 provided for their information at this time and does not
14 require something on their part; but we want to alert them
15 at the earliest possible time.

16 CHAIRMAN PALLADINO: But it might -- I don't know
17 whether it is proper to suggest that they look at it on
18 their own?

19 MR. EISENHUT: We have been known to suggest that
20 "here is something they ought to look at."

21 There has been an occurrence in the past some
22 months back, perhaps even last year as much as time flies,
23 at the North Anna facility where a similar problem
24 occurred. It was a symmetry problem, and in that case I
25 believe it was connecting piping again outside the reactor

1 where they had to go back and do a re-analysis.

2 COMMISSIONER GILINSKY: So what extent is the
3 79-14 review complete?

4 MR. JORDAN: For operating plants, it is --

5 COMMISSIONER GILINSKY: No. In this case.

6 MR. JORDAN: For Unit 2 it is not complete. For
7 Unit 1 it was complete. So that the individual that found
8 it, found it on their Unit 2 facility and then the concern
9 was applied back to Unit 1.

10 COMMISSIONER GILINSKY: I see. It was --

11 COMMISSIONER AHEARNE: It was not picked up in
12 doing the Unit 1 analysis?

13 MR. JORDAN: That is correct.

14 CHAIRMAN PALLADINO: That is strange.

15 COMMISSIONER AHEARNE: Would you not have expected
16 them to?

17 MR. JORDAN: Actually, the 79-14 as being an
18 as-built focuses on the hardware, a verification that the
19 piping as it is laid out in the isometrics is actually
20 installed in that fashion, and that the analysis that was
21 done is based precisely on the way it is installed.

22 So the next step back to the forcing functions
23 that were used was not a portion, a specific request for
24 that bulletin.

25 COMMISSIONER AHEARNE: You are saying that it is

1 possible that it could have been also missed in Unit 2?

2 MR. EISENHUT: Yes. By "79-14," I think --

3 MR. JORDAN: That is correct.

4 MR. EISENHUT: -- 79-14 would not have focused on
5 it. Because as Jim Knight sort of looked at it is an
6 excellent example. You have a book of floor response
7 spectra. You pick it. You go in and lay out your design on
8 a system, and you lay out where the supports have to go.

9 So you have now a detailed diagram on, let's say,
10 the RHR system. 79-14 told the utility to take that drawing
11 on the detailed layout of RHR --

12 COMMISSIONER AHEARNE: go look and see how it
13 was put together.

14 MR. EISENHUT: -- and to be sure that the supports
15 were put in exactly like the drawing was; that the drawing
16 neglects things, sometimes there are columns in the way. So
17 you have to see how close you can actually have gotten to
18 the drawing.

19 COMMISSIONER AHEARNE: They need not have gone
20 back beyond --

21 MR. EISENHUT: It did not ask them to go back.

22 COMMISSIONER GILINSKY: So it was really PG&E
23 going beyond the bulletin in Unit 2 --

24 MR. EISENHUT: Well, I think it was more PG&E
25 doing their normal verification process on Unit 2, because a

1 utility should be going through this standard Quality
2 Assurance function to ensure that his layout is in fact
3 accurate. We just have not looked into it in enough depth
4 to know exactly whether it was just his routine review.

5 COMMISSIONER BRADFORD: Let's see. If it would
6 not routinely have been picked up in Unit 1 as part of the
7 Quality Assurance function, why not?

8 MR. DENTON: I don't think we know --

9 COMMISSIONER BRADFORD: Why --

10 MR. DENTON: In other words, I do not think we
11 know yet why it was picked up; what led the engineer to find
12 it. And it is hard to --

13 COMMISSIONER BRADFORD: One of the concerns that
14 occurs to me out of this -- I guess it would come under your
15 last bullet there -- is the question of Quality Assurance
16 almost apart from seismic.

17 MR. EISENHUT: That's right.

18 MR. DENTON: Well, what we do not know is whether
19 it was an isolated translation by someone sitting at a desk
20 copying numbers, or whether it is more symptomatic of a
21 breakdown in the process, and I am not able to answer that
22 today.

23 MR. EISENHUT: But be assured it is a series of
24 things that I can commit that I&E will normally be looking
25 at in going through this progress.

1 COMMISSIONER AHEARNE: And NRR committing I&E.

2 (Laughter.)

3 MR. JORDAN: But I&E is looking into that. We are
4 holding hands on it.

5 COMMISSIONER BRADFORD: Let me ask in the same
6 vein: Why is it not something that would have turned up in
7 our review processes of Unit 1 sometime ago?

8 MR. DENTON: That is because we did not audit this
9 particular part. We only do an audit to look at
10 methodology, and criteria, and calculational tools, and we
11 audit a system or two. But this occurs at a level of detail
12 that would require thousands of man-years to possibly find
13 in an isolated example, if that is what it is.

14 COMMISSIONER BRADFORD: Now if this had been an
15 audited area, would we have gone into it in sufficient
16 detail to have found that?

17 MR. DENTON: I will have to ask Jim about that. I
18 doubt if we would have, though, from the way I understand it
19 today.

20 MR. KNIGHT: No. I would confirm that. When I
21 was speaking earlier, as I mentioned, this type of error
22 which is to me almost analogous to someone doing their
23 arithmetic wrong, all of the sophisticated analytical
24 mechanisms that we look into were all --

25 COMMISSIONER BRADFORD: I think it is more like

1 writing down the wrong assignment.

2 (Laughter.)

3 MR. KNIGHT: I'm sorry?

4 COMMISSIONER BRADFORD: It is more like writing
5 down the wrong assignment.

6 MR. KNIGHT: Perhaps. The direct answer is: We
7 did in fact do a specific and, at that time, unique audit of
8 Diablo Canyon in this area. Again, we went back and in each
9 of the steps necessary from the determination of the ground
10 motion all the way down to the development of the ground
11 response spectra, we took their commitment to us as to the
12 criteria or the methodology they were using, and went in and
13 sampled actual problems that they had done to see that they
14 had in fact applied that criteria, and that they had applied
15 it in a way that was technologically appropriate.

16 But we didn't, and we quite normally would not go
17 back and say: Now, did you pick, when you got all of this
18 done --

19 COMMISSIONER BRADFORD: Did you use the right
20 plan?

21 MR. KNIGHT: -- did you use the right one for the
22 corresponding place in the line.

23 MR. EISENHUT: That is all we were planning to
24 present.

25 CHAIRMAN PALLADINO: Darrell, I understand they

1 have delayed their fuel loading. Who will decide when they
2 can restart that? What I am getting at is: To what extent
3 must the Staff be satisfied that the corrective action is
4 appropriate?

5 MR. DENTON: I think at the moment they have
6 satisfied the Staff. Where they have to satisfy other
7 parties, we will get to that. At the moment the
8 understanding is that they will not load the fuel until the
9 Staff is satisfied.

10 COMMISSIONER GILINSKY: When you say "the Staff"
11 is that you? Or is that I&E?

12 MR. JORDAN: Both.

13 MR. DENTON: Both.

14 MR. JORDAN: The NRC Staff.

15 COMMISSIONER BRADFORD: Do you plan to confirm
16 that in any way? I take it in terms of the legal structure
17 right now, they could go ahead.

18 MR. DENTON: Well, it seems a bit early for us to
19 confirm it. I want to wait until after Monday and find out
20 more about the situation. We have inspectors on the site,
21 so I do not think there is any danger of their breaching
22 their commitment. Next week when we seem to know where it
23 is going, we will consider that issue.

24 MR. JORDAN: And the utility did make a very rapid
25 and voluntary response. That commitment was strong from

1 them.

2 COMMISSIONER GILINSKY: It sounds like it will not
3 be until Monday before you know the extent of this, or
4 whether we are talking about a long delay or a short
5 delay.

6 MR. EISENHUT: And then maybe not even Monday. I
7 had to press the utility pretty hard for them to agree to
8 come in Monday for a meeting. We felt we wanted to have
9 more detailed information as soon as possible. I had asked
10 for the meeting by Friday, and they just felt that they were
11 not in a position enough themselves to be able to assess the
12 problem and they have agreed to come in Monday.

13 CHAIRMAN PALLADINO: Do you have any preliminary
14 indication of how long the analysis is going to take?

15 MR. EISENHUT: No, but we should have a better
16 answer, they said, by Monday to that question.

17 CHAIRMAN PALLADINO: Are we talking weeks,
18 months?

19 MR. EISENHUT: We don't know.

20 COMMISSIONER AHEARNE: Well, there is another
21 thing; that since they are in a hole, there is nothing that
22 is going ahead that would sort of force you to have them
23 come in sooner, ill-prepared, is there?

24 MR. EISENHUT: No, there is not, except that this
25 is an area that has been very sensitive.

1 COMMISSIONER AHEARNE: Sure.

2 MR. EISENHUT: It is pending before a few
3 parties--

4 COMMISSIONER AHEARNE: No, I understand that.

5 MR. EISENHUT: And we felt --

6 COMMISSIONER AHEARNE: But you want to, as best
7 you can, to make sure that the analysis is thorough.

8 MR. EISENHUT: Oh, absolutely. I am not pushing
9 them for the complete analysis. The thing we were asking
10 was: If they are doing one small piece of an analysis of
11 the plant, then we may decide that we want them to extend it
12 to other pieces --

13 COMMISSIONER AHEARNE: Sure.

14 MR. EISENHUT: -- and we want to know enough to
15 make that decision as soon as possible; that we should not
16 let them go down one path perhaps mistakenly and then change
17 our minds later.

18 COMMISSIONER AHEARNE: Yes.

19 MR. EISENHUT: So however long it takes them to do
20 the reanalysis, it takes. What partially led to the coming
21 in was the letter that they sent us was in fact a
22 one-paragraph letter, as you've seen when we notified all
23 the parties, and some of that information I would not say is
24 "misleading"; it was just very preliminary at the time, and
25 new information has evolved as it went along. Hence, that i

1 why we asked for another letter today, and a more detailed
2 discussion to have a dialogue on it on Monday, recognizing
3 that we had to get their experts and our experts together.

4 MR. DENTON: I think Commissioner Ahearne's
5 comment is correct. There is no fuel in the reactor vessel,
6 so in terms of time limits it is not an operating reactor
7 problem as where we are usually dealing with valves in
8 question. We can wait as long as they need.

9 COMMISSIONER AHEARNE: That is right.

10 COMMISSIONER GILINSKY: Could you keep us informed
11 in one way or another?

12 MR. DENTON: Certainly.

13 MR. EISENHUT: Well, as I mentioned, we will be
14 sending Board notifications each step down the line, and of
15 course the Commission is a Board in this overall sense.

16 MR. DENTON: I think you ought to let us read and
17 see what we learn Monday and see if it warrants another
18 Commission meeting, whether they have made any progress.

19 COMMISSIONER BRADFORD: Let me just ask a variant
20 of the Chairman's question: Do you have a sense, if
21 everything went very well and it turned out that in their
22 view at least everything was adequate and the margins were
23 clear, what the minimum amount of time involved in doing
24 that sort of an analysis would be?

25 MR. EISENHUT: Well, they stated yesterday

1 optimistically that they could hope to define the affected
2 systems and have them reanalyzed in something in the order
3 of ten days.

4 COMMISSIONER BRADFORD: Then there would be
5 whatever time it took for you to satisfy yourselves?

6 MR. EISENHUT: And if in fact it necessitated a
7 fix in the plant, it would require whatever time it would
8 take to do that.

9 COMMISSIONER AHEARNE: There might also, though,
10 be some additional time required to get some confidence that
11 this was the only affected system.

12 COMMISSIONER BRADFORD: Right.

13 CHAIRMAN PALLADINO: And you have asked them to do
14 that, have you not? You have asked them to examine the rest
15 of the system?

16 MR. EISENHUT: Well, we have not asked them to--
17 We have asked them to provide some assurance to us so that
18 we can make an independent assessment that the problem is in
19 fact limited to this one area. They are not doing any
20 computer re-analysis, for example.

21 CHAIRMAN PALLADINO: But they are examining the
22 bases that determine that there was no other errors such as
23 this?

24 MR. EISENHUT: Yes.

25 CHAIRMAN PALLADINO: Well, I think we would all

1 like to be kept informed. And when you get to the point of
2 some resolution, we particularly would like to be informed.
3 And based upon what informal notification we get, we may
4 want to have another Commission meeting.

5 MR. DENTON: I would caution you, too, based on
6 prior experience in this area, the information seems to
7 change sometime between that received by telephone and then
8 received in meetings. So today is just the --

9 COMMISSIONER AHEARNE: Well, this has to be very
10 preliminary --

11 MR. DENTON: That is right.

12 COMMISSIONER AHEARNE: -- because it is just
13 beginning to be examined.

14 CHAIRMAN PALLADINO: Are there any other
15 questions?

16 (No response.)

17 CHAIRMAN PALLADINO: If not, we thank you and look
18 forward to hearing from you again.

19 (Whereupon, at 11:50 a.m., the meeting was
20 adjourned.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: REFILING ON DIABLO CANYON - INCORRECT SEISMIC ANALYSIS

Date of Proceeding: September 30, 1981

Docket Number: _____

Place of Proceeding: Washington, D. C.

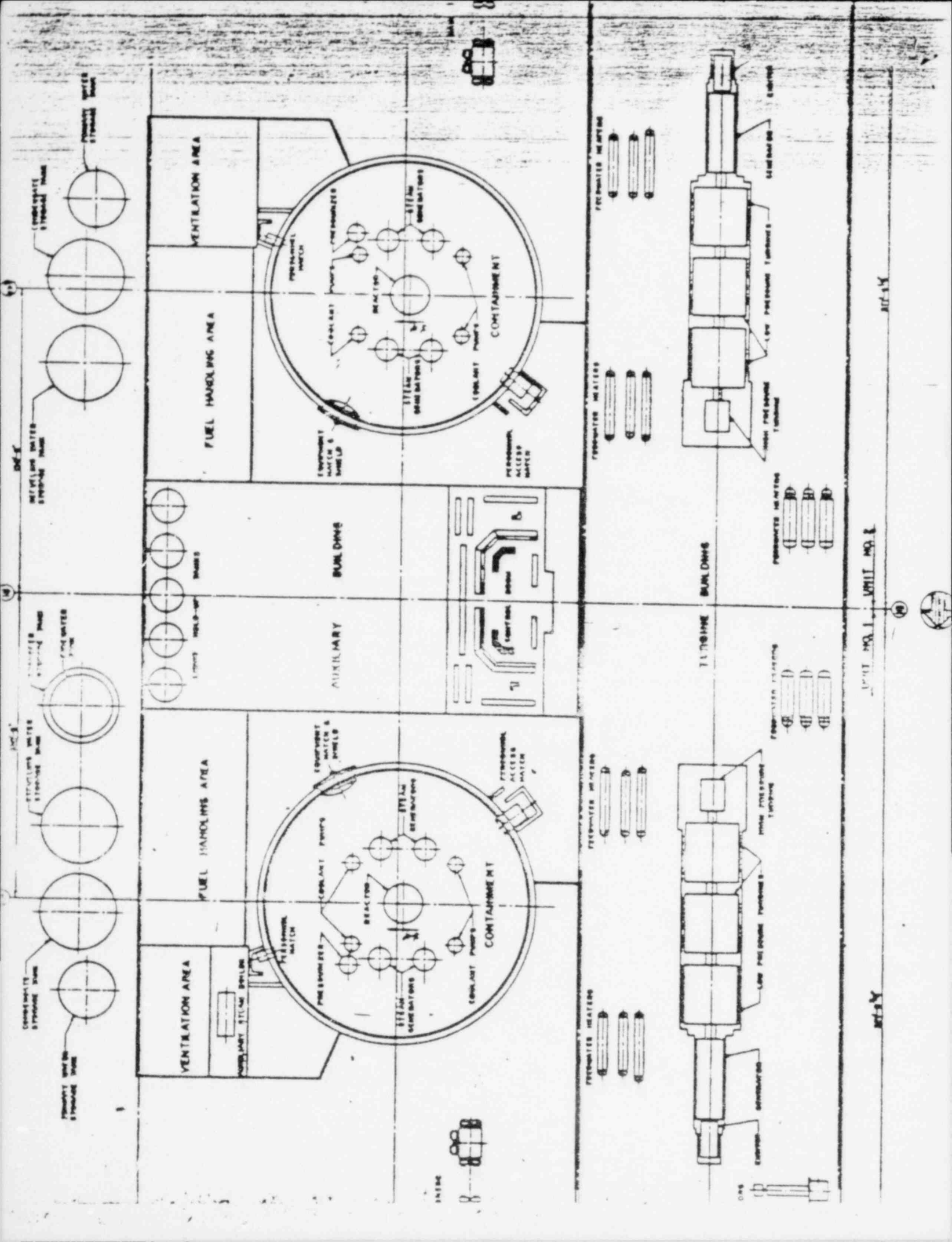
were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Jane Beach

Official Reporter (Typed)

Jane N. Beach

Official Reporter (Signature)



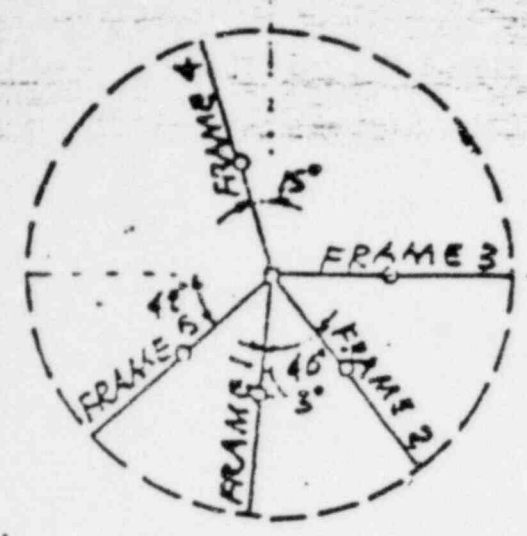
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UNIT NO. 1, UNIT NO. 2

UNIT NO. 1, UNIT NO. 2

CONTAINMENT

CONTAINMENT



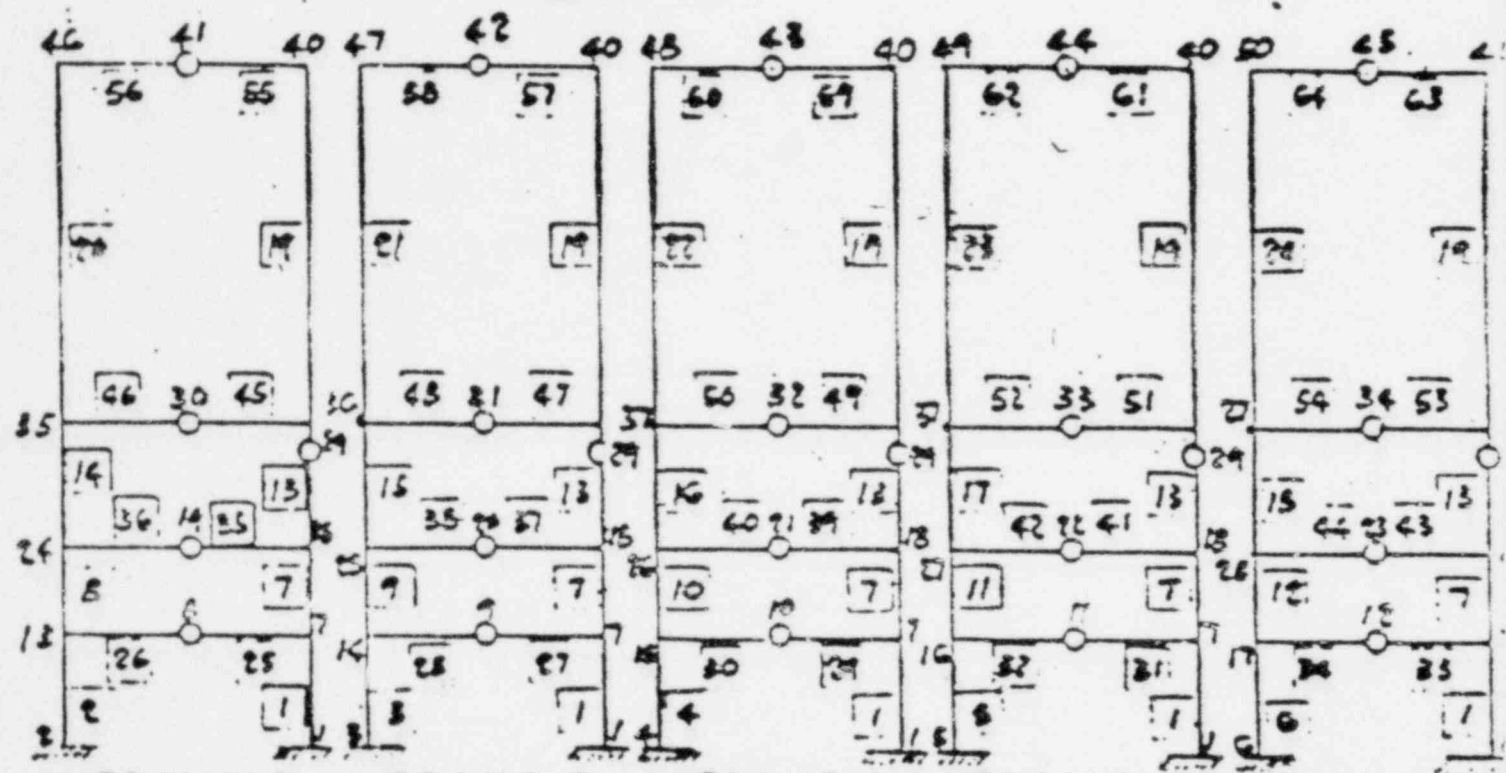
LEGEND :

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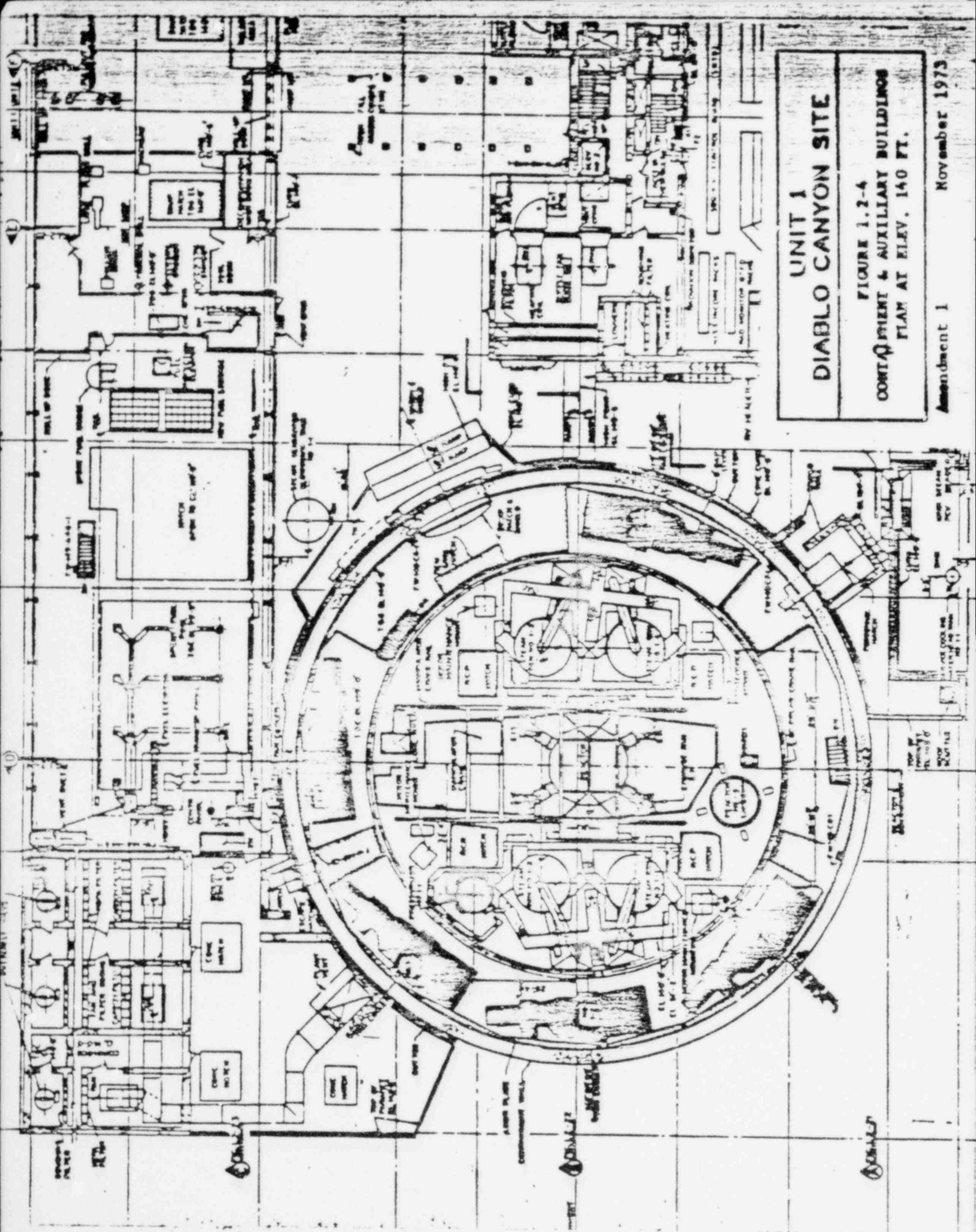
NODES 1, 7, 13, 29 AND 40 ARE ALONG E OF STRUCTURE AND ARE COMMON TO ALL FIVE FRAMES.

PLAN



FRAME 1 FRAME 2 FRAME 3 FRAME 4 FRAME 5
ELEVATIONS

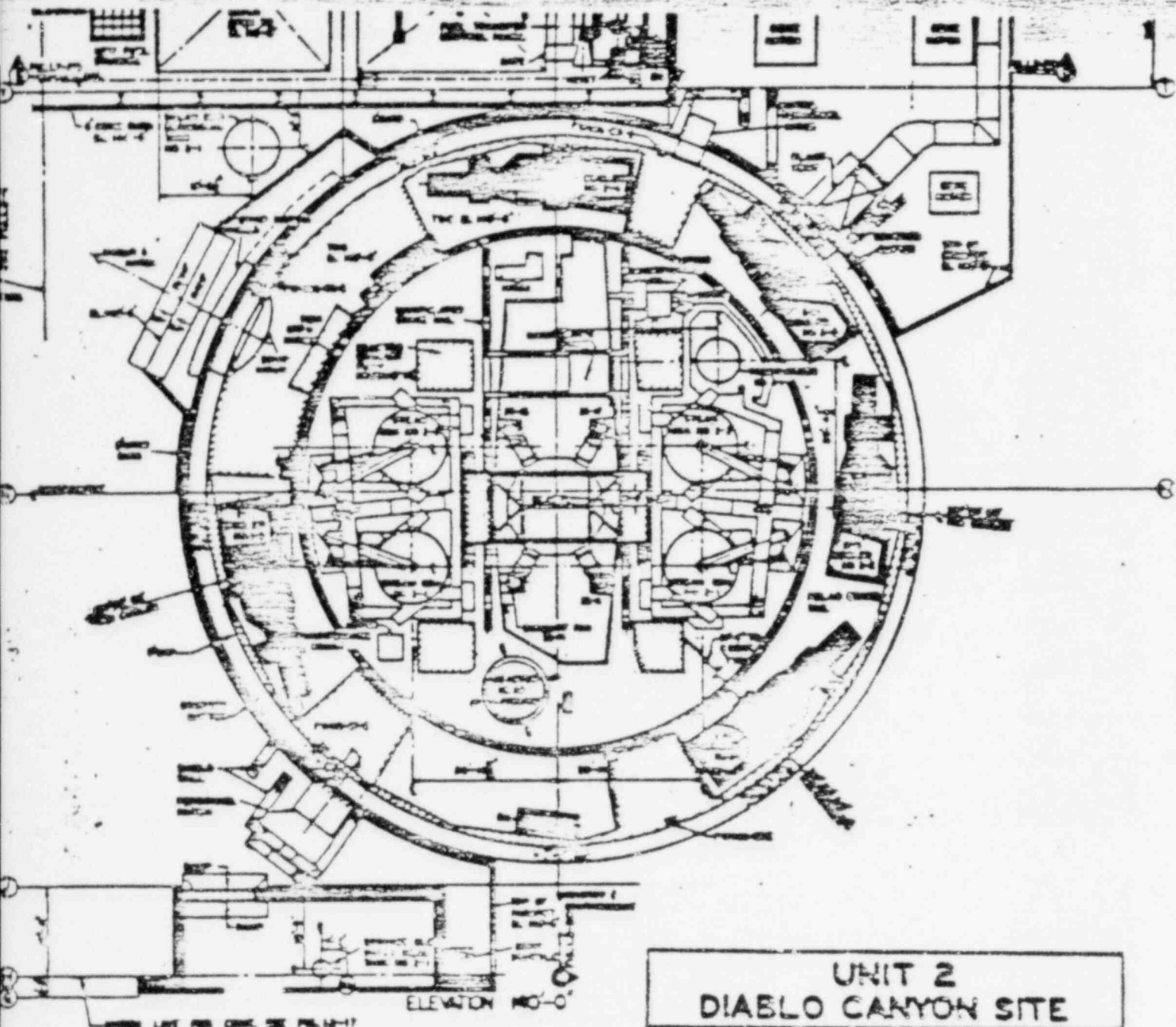
CONTAINMENT INTERIOR STRUCTURE
MATHEMATICAL MODEL FOR VERTICAL ANALYSIS



**UNIT 1
DIABLO CANYON SITE**

**FIGURE 1.2-4
CONTINGENT & AUXILIARY BUILDINGS
FLAN AT ELEV. 140 FT.**

Amendment 1 November 1973

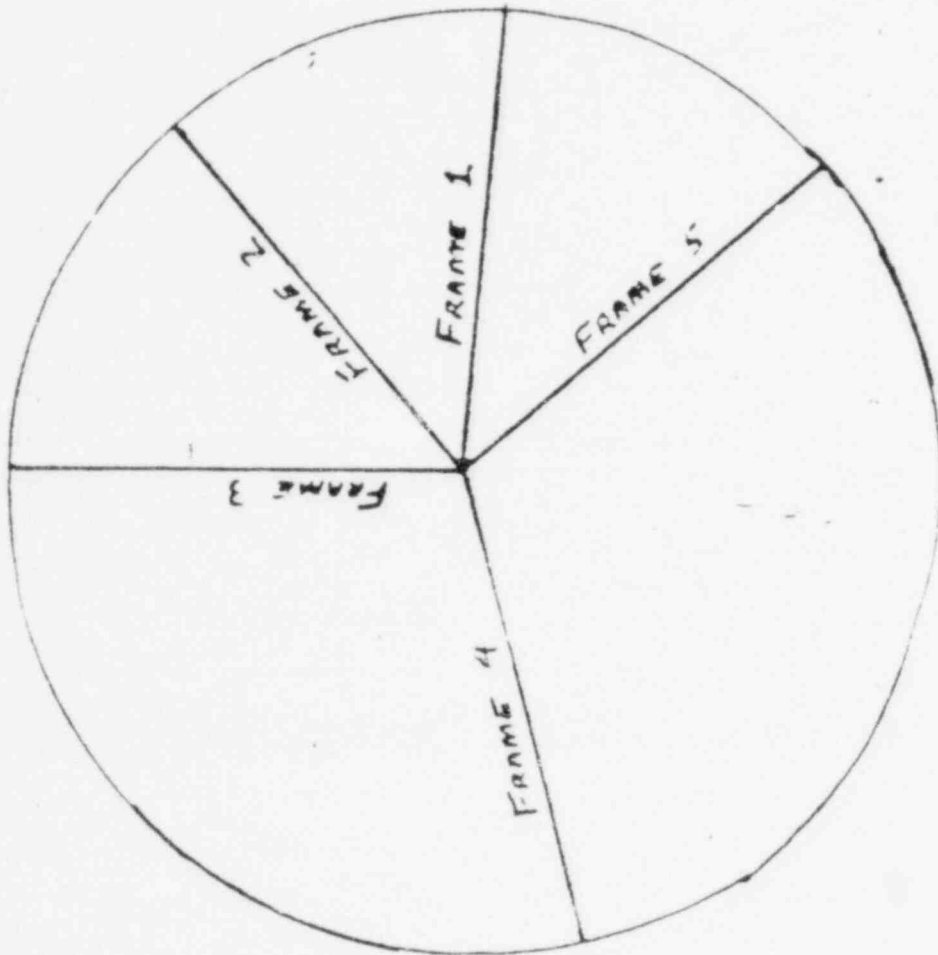


UNIT 2
DIABLO CANYON SITE

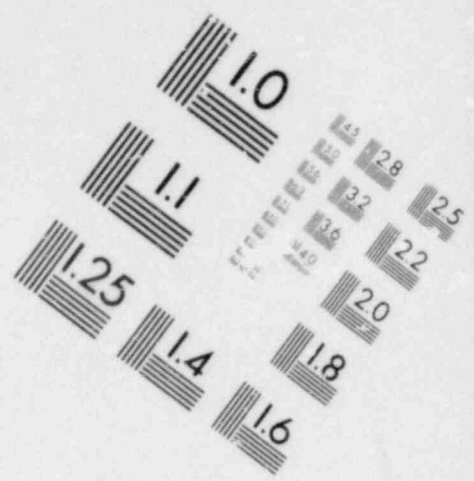
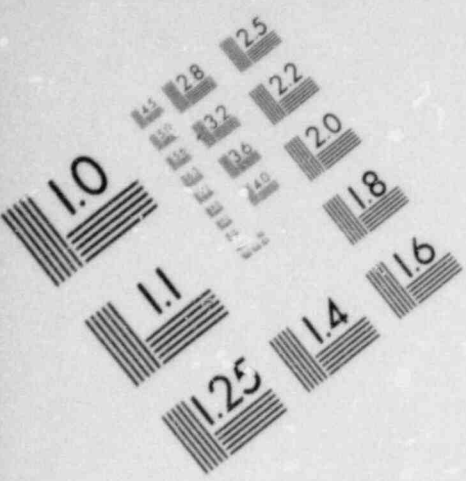
FIGURE 1.2-10
 CONTAINMENT & AUXILIARY BUILDINGS
 PLAN AT ELEV. 115 & 140 FT.

Amendment 1

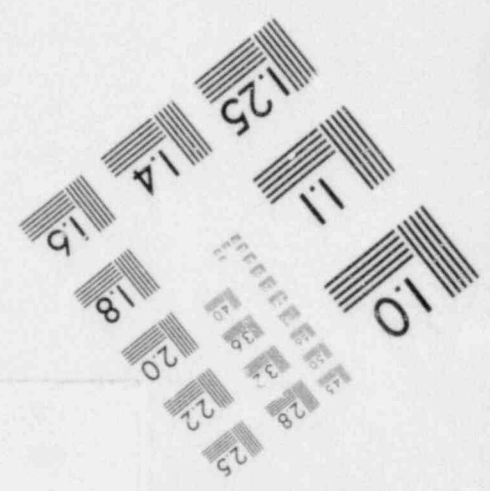
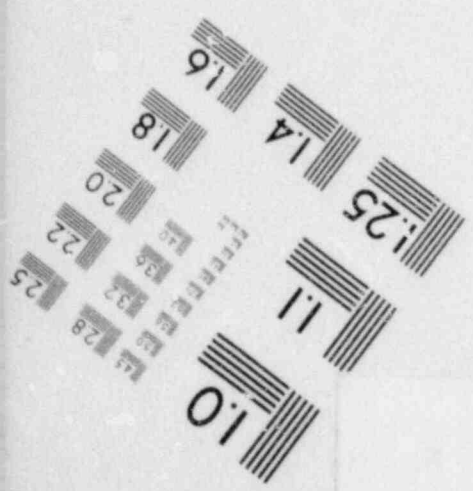
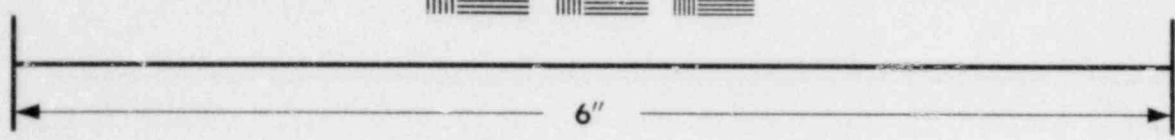
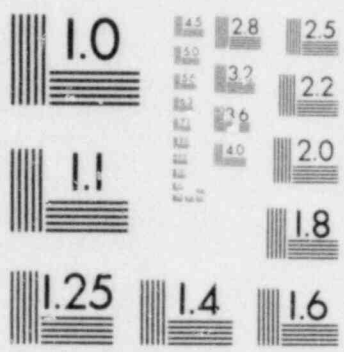
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**IMAGE EVALUATION
TEST TARGET (MT-3)**



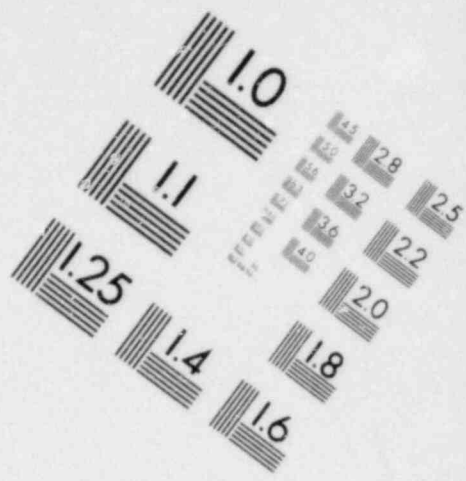
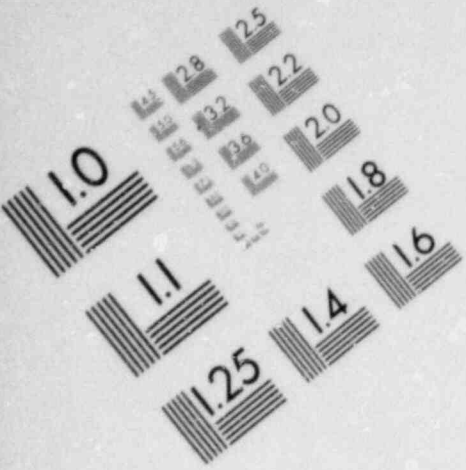
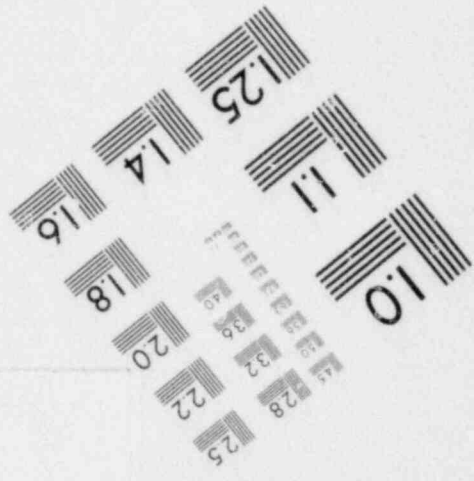
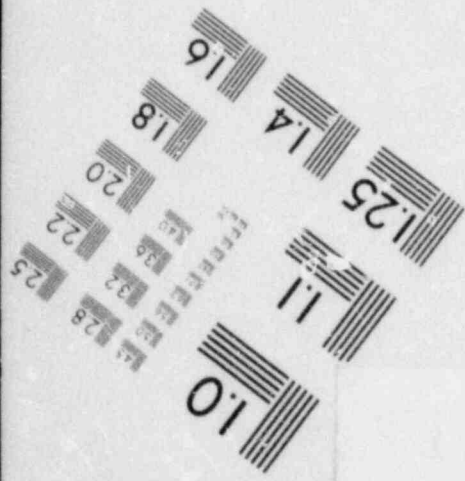
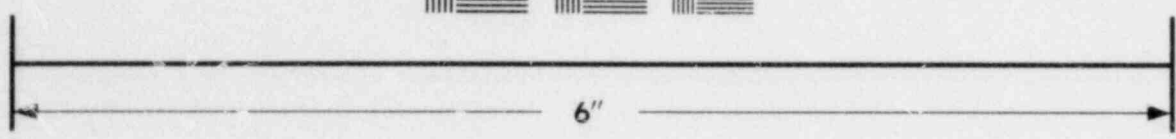
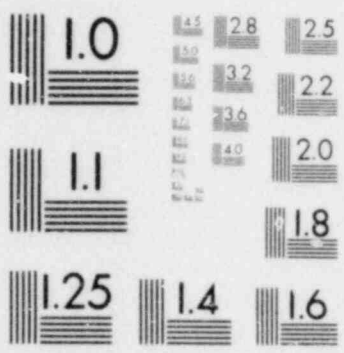


IMAGE EVALUATION
TEST TARGET (MT-3)



DIABLO CANYON UNIT 1

o REGION OF CONCERN:

- ANNULUS FORMED BETWEEN CONTAINMENT INNER WALL AND CRANE WALL (APPROX. 18' WIDE)
- LARGE DIA PIPE ANALYSES
- LARGE DIA PIPE SUPPORTS
- SMALL DIA PIPING

SYSTEMS POTENTIALLY AFFECTED

- o SAFETY INJECTION SYSTEM
 - ACCUMULATORS
 - PIPING

- o COMPONENT COOLING WATER SYSTEM
 - FAN COOLER
 - CCW FOR RC PUMPS
 - PIPING

- o STEAM GENERATOR BLOWDOWN SYSTEM
 - PIPING

- o RESIDUAL HEAT REMOVAL SYSTEM
 - PIPING

- o H₂ RECOMBINERS

ACTION PLAN

COMPLETE

- IE REGION V NOTIFIED 9/27
- IE PN V-81-50 ISSUED 9/28
- BOARD NOTIFICATION 81 - 27 ISSUED 9/29
(PN; PGE 9/28 NOTIFICATION PER TECH SPECS;
PRESS RELEASE)

EXPECTED

- PG& E FOLLOWUP LETTER DUE 9/30
- BOARD NOTIFICATION OF 9/30 LETTER
- MTG. WITH PGE - 10/5
- INFORMATION NOTICE TO INDUSTRY
- IE/NRR REVIEW OF PGE REANALYSIS
 - ACTUAL ERROR
 - IMPACT ON OVERALL SEISMIC DESIGN ADEQUACY

TRANSMITTAL TO: Document Control Desk,
016 Phillips

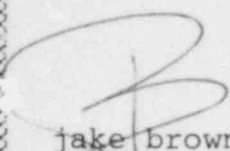
ADVANCED COPY TO: The Public Document Room

DATE: October 2, 1981



Attached are the PDR copies of a Commission meeting transcript/s/ and related meeting document/s/. They are being forwarded for entry on the Daily Accession List and placement in the Public Document Room. No other distribution is requested or required. Existing DCS identification numbers are listed on the individual documents wherever possible.

1. Transcript of: Briefing on Diablo Canyon -- Incorrect Seismic Analysis, September 30, 1981. (1 copy)
 - a. Vugraphs presented at above meeting. (1 copy)


jake brown
Office of the Secretary