

NUCLEAR REGULATORY COMMISSION

ORIGINAL

In the Matter of:

PACIFIC GAS AND ELECTRIC COMPANY) DOCKET NO. 50-275/323
)
(Diablo Canyon Nuclear Plant 1 and 2) LOW POWER TEST PROCEEDING

DATE: May 19, 1981 PAGES: 10,556-10,714

AT: San Luis Obispo, California

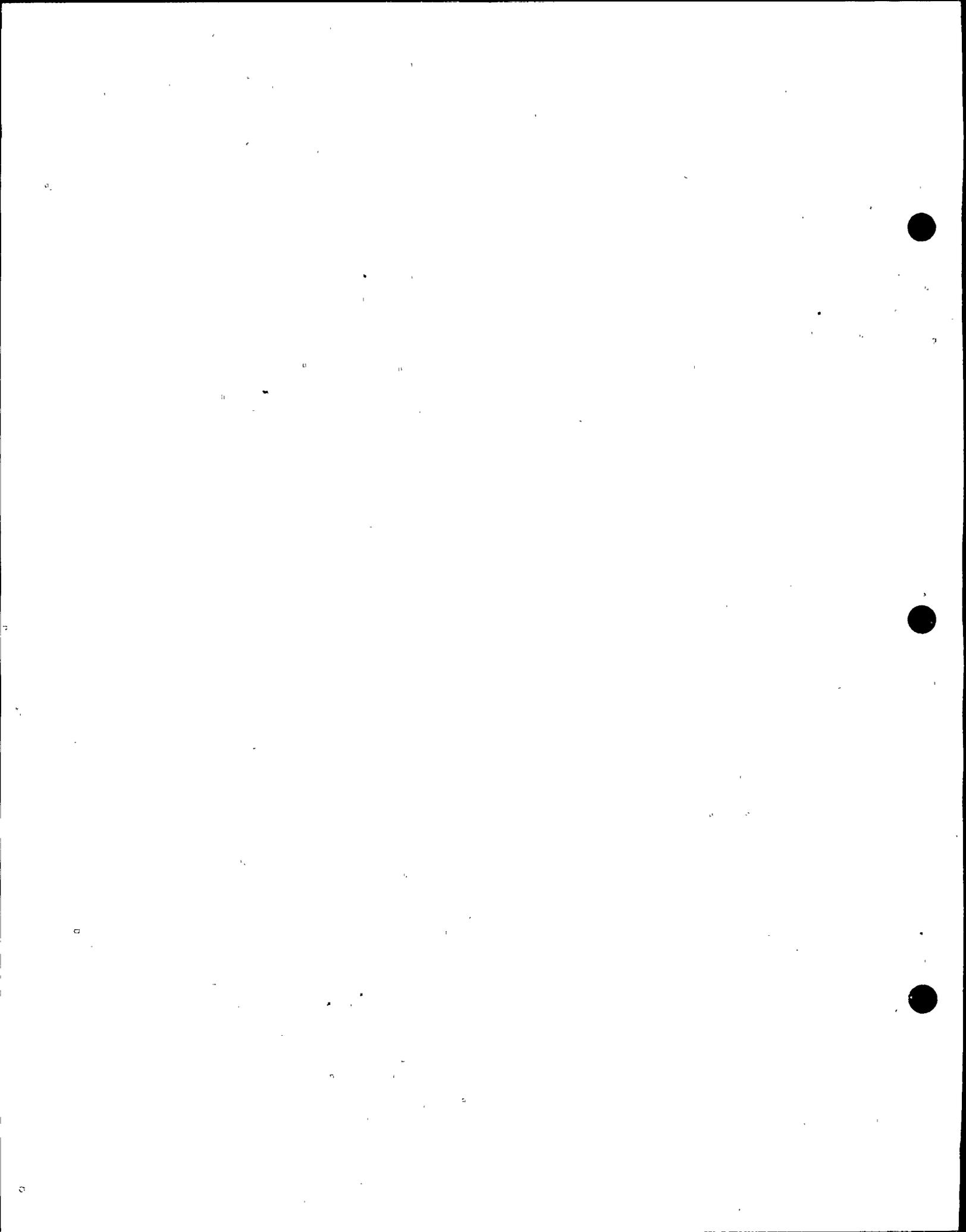


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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3
 4 In the Matter of:)
)
 5 PACIFIC GAS AND ELECTRIC COMPANY) Docket No. 50-275
) Docket No. 50-323
 6 Diablo Canyon Nuclear Power)
) (Low Power Test
 7 Plant Units No. 1 and 2) Proceeding)
)

8 Discovery Motor Inn, and
 9 Veterans Memorial Building
 Monterey Street
 San Luis Obispo, California

10 Tuesday, May 19, 1981

11 The Atomic Safety and Licensing Board met, pursuant
 12 to notice, at 8:00 a.m.

13 BOARD MEMBERS PRESENT:

14 JOHN F. WOLF, ESQ., Chairman
 15 Administrative Judge
 Atomic Safety and Licensing Board
 U.S. Nuclear Regulatory Commission
 16 Washington, D.C. 20555

17 GLENN O. BRIGHT
 18 Atomic Safety and Licensing Board
 U.S. Nuclear Regulatory Commission
 19 Washington, D.C. 20555

20 DR. JERRY R. KLINE
 Atomic Safety and Licensing Board
 U.S. Nuclear Regulatory Commission
 21 Washington, D.C. 20555

22 For the NRC Staff:

23 WILLIAM J. OLMSTEAD, ESQ.
 24 Office of Executive Legal Director
 BETH 042
 U.S. Nuclear Regulatory Commission
 25 Washington, D.C. 20555



1 APPEARANCES:

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20 Sacramento, California 95184

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I N D E X

1			
2	<u>WITNESSES:</u>	<u>DIRECT</u>	<u>CROSS</u>
3	William Brunot	10588	
4	By Mr. Reynolds		10619
5	By Mr. Lanpher		10705
6	J. D. Shiffer	10596	
7	By Mr. Reynolds		10614
8	S. M. Skidmore		
9	W. B. Kaefer		
10	R. Patterson		
11	<u>EXHIBITS:</u>	<u>FOR IDENTIFICATION</u>	<u>IN EVIDENCE</u>
12	<u>NRC Staff:</u>		
13	18 thru 25	10609	
14	<u>Joint Intervenor:</u>		
15	111	10618	10619
16	112	10634	
17	113	10639	
18	114 (a)	10639	
19	114 (b)	10639	
20	115	10646	
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P R O C E E D I N G S

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2 JUDGE WOLF: Please come to order. Good morning,
3 ladies and gentlemen. We are here today to receive relevant
4 evidence related to low power test proceedings in the Matter
5 of the Pacific Gas and Electric Company Diablo Canyon Nuclear
6 Power Plant.

7 This case bears docket number 50-275-OL, and
8 50-323-OL. The Board consists of three Administrative
9 Judges today. On my right is Mr. Glenn Bright, a nuclear
10 engineer, and on my left is Dr. Jerry Kline. I am John Wolf,
11 a lawyer. Dr. Kline is an environmentalist.

12 This proceeding that we are holding in this matter
13 is an adversary proceeding. It is not a legislative
14 proceeding.

15 We members of the Board regret the crowded
16 condition here this morning, and we would advise you that
17 tomorrow we have a larger place across the street.

18 At this time, I would ask that Counsel for the
19 parties identify themselves for the record, beginning with the
20 Applicant.

21 MR. NORTON: Thank you, Your Honor. My name is
22 Bruce Norton, appearing for Applicant, Pacific Gas and
23 Electric. With me at Counsel table, to my far right, Mr.
24 Phil Crane, who is the Assistant General Counsel; to my
25 immediate right Mr. Malcolm Furbush, Senior Vice-President of



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1 PG & E, to my immediate left Richard Locke, Senior Counsel
2 for PG & E, and Mr. Arthur Gehr, an attorney, a compatriot
3 of mine from Phoenix.

4 JUDGE WOLF: The Nuclear Regulatory staff?

5 MR. OLMSTEAD: Yes, Mr. Chairman. My name is
6 William Olmstead. I am an Assistant Chief Hearing Counsel
7 with the NRC staff. To my immediate right is Mr. Bradley
8 Jones, Counsel for the NRC staff. To my left is Mr.
9 Bartley Buckley, Project Manager for the Diablo Canyon
10 application.

11 Also at the Counsel table with me on my right is
12 Mr. Roger Mattson. Across the table from him is Mr. Frank
13 Chierney. Next to him, Mr. Norm Laubum, and on my far
14 right, Mr. John Sears, and immediately across from me is
15 Ms. Mary Sweeney, who is a paralegal in our office.

16 JUDGE WOLF: The Joint Intervenors?

17 MR. FLEISCHAKER: Thank you, Mr. Chairman. My
18 name is David Fleischaker. On my immediate left is Mr. Joel
19 Reynolds, who is -- will be trying the case for me. He is
20 from the Center for Law in the Public Interest, out of Los
21 Angeles, California.

22 JUDGE WOLF: The State of California as an
23 interested state, through Governor Brown?

24 MR. BROWN: Judge Wolf, my name is Herbert Brown.
25 I am accompanied by Byron S. Georgiou on my right, Mr.



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1 Georgiou is the Legal Affairs Secretary to Governor Brown.
2 On my left, co-Counsel is Larry Lanpher, a partner of mine
3 in our law firm in Washington, D.C.

4 JUDGE WOLF: Thank you. Are there any preliminary
5 matters?

6 MR. BROWN: Also, pardon me.

7 JUDGE WOLF: Pardon me.

8 MR. BROWN: Judge, we have Richard Hubbard. Richard
9 Hubbard is also at the table with us. He is a technical
10 consultant to the Governor in this matter.

11 JUDGE WOLF: Thank you. Are there any preliminary
12 matters?

13 MR. FLEISCHAKER: Yes, sir, Mr. Chairman. David
14 Fleischaker from the Joint Intervenors. I have a preliminary
15 matter. As the Chair is well aware, the Atomic Energy Act
16 requires that hearings on license applications be public
17 meetings.

18 I am concerned that the hearings today are in fact
19 public meetings -- a public meeting open to the public in
20 theory only, because in fact most of the public is locked
21 outside.

22 Just across the street, there is a hall that is
23 available for these proceedings. We have held hearings at
24 that hall in October, will be planning to move to the hall
25 tomorrow. I see that there is no good reason why we shouldn't



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1 move these proceedings to that hall, as opposed this place,
2 where we can accomodate 70, 80, 90 people, the hall across
3 the street will hold maybe two, three, four hundred people.

4 So I am going to make a motion that we adjourn
5 this proceeding to allow time for the proceedings to be
6 relocated across the street, so that we can permit the
7 public at least to attend and to view the proceeding.

8 (Applause.)

9 JUDGE WOLF: As I stated earlier, this is an
10 adversary proceeding, and we will not permit applause. If
11 there is more applause, the hall will be cleared.

12 Anyone else wish to comment on the motion made by
13 Joint Intervenor's Counsel? Mr. Brown?

14 MR. BROWN: Thank you, Judge Wolf. I am going to
15 support, on behalf of Governor Brown, the motion, and I would
16 like to make a statement for the record, because I think this
17 is a situation where everyone is well-intentioned, and we are
18 confronted here with a predicament which could result in a
19 problem that none of us really needs, and that problem would
20 be to discredit the character and the integrity of this
21 proceeding.

22 I presume -- and I am certain from having a chance
23 to chat with the Board briefly this morning, that no one
24 intended that we have a proceeding in a room where the public
25 was kept out, but now that we are all confronted with the



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1 facts very dramatically --

2 JUDGE WOLF: Well, we might say limited. They are
3 not kept out, Mr. Brown.

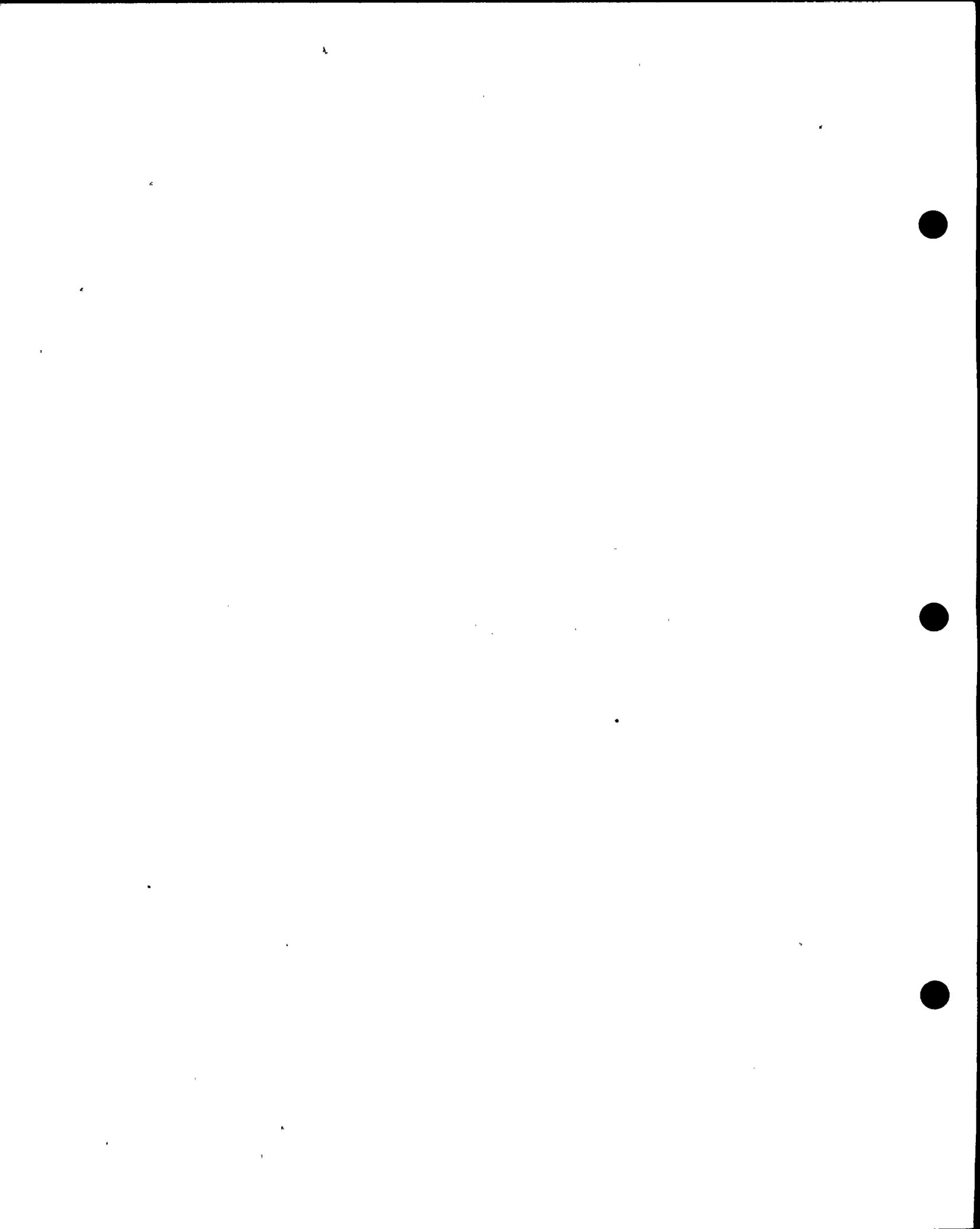
4 MR. BROWN: I stand corrected. At this point, I
5 think that no one else could come in, because of the large
6 numbers standing in the way, but in any event, there are many
7 many other people outside, but I do stand corrected, thank
8 you.

9 The fact is, however, Judge Wolf and members of the
10 Board, from this moment forward, we are not the victim of
11 circumstance, but the situation is the product of our own
12 will, and if a decision is made by the Board for us to
13 continue at this point, I think we will create a situation
14 where we have eliminated de facto a public hearing.

15 This is a particularly disturbing point for the
16 Governor, and the reason is that earlier in this proceeding,
17 we had another case, a security proceeding, which was held
18 actually secretly in PG & E's building. We moved not to have
19 the regulated company have its own hearing for its own license
20 in the office of the regulating agency.

21 JUDGE WOLF: We understand that, and we agree with
22 that.

23 MR. BROWN: This compounds that problem. It
24 presents to the public the impression that the NRC truly
25 does not believe in public hearings. I know that is not the



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1 case, but what will the public think? What will the Congress
2 think? What will the Commissioners think? What will the
3 Courts think?

4 I propose a very simple solution. I ask that
5 since tomorrow we already have the Veterans Memorial
6 Auditorium available, and we stipulate that to be perfectly
7 satisfactory for this, and I suspect other parties will too,
8 since we have held other hearings in this proceeding there,
9 I join in Mr. Fleischaker's motion, and I move that we recess
10 until tomorrow.

11 Counsel, accordingly, can spend this morning very
12 usefully in doing the preliminary matters that must be done
13 in any event, and we will eliminate the situation where I
14 think we cast a cloud over the NRC in this proceeding.

15 I want to finish with a simple point on behalf of
16 the Governor. The tradition of California jurisprudence and
17 American jurisprudence is that proceedings be open widely,
18 that we not engage in forensic discourse and create the
19 pretext or the belief that we have a public hearing under
20 these conditions where we in fact don't, and I would ask that
21 we address that reality, and that we as gentlemen use our own
22 will to put this proceeding off until tomorrow morning, that
23 in the interim we do the preliminary matters that sorely
24 need resolution.

25 JUDGE WOLF: Thank you, Mr. Brown. Anyone else have



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1 any comment?

2 MR. NORTON: Yes. As the Board knows, none of the
3 parties had anything to do with scheduling the facilities.
4 The Board scheduled here, which was known, because the
5 Veterans hall was not available today, we presume. I think
6 we are scheduled for a restaurant on Saturday, and we presume
7 that you did not do that by choice because you are hungry,
8 but because other facilities weren't available.

9 The hearing is scheduled today. All the parties
10 and witnesses who have travelled from all over the country
11 to be here to testify are here. We want to finish this
12 proceeding as rapidly as possible, as does the Counsel for
13 the Intervenor and the Governor's Counsel.

14 I find as I sit here with cameras literally three
15 feet from my face, with lights in my eyes, that when
16 Governor Brown's Counsel says this is not a public hearing,
17 I find that rather incredible. There has got to be 20 or 30
18 cameras here. There are people here. It is clearly a
19 public hearing. If we had 20,000 people, one could make the
20 same argument about a football stadium, I suppose.

21 The facilities are fine for this hearing, and we
22 suggest we proceed.

23 JUDGE WOLF: Mr. Jones?

24 MR. OLMSTEAD: Mr. Olmstead speaking.

25 JUDGE WOLF: Mr. Olmstead, I am sorry.



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1 MR. OLMSTEAD: I think that it is clear from the
2 Commission's Rules and practice that we do hold public
3 hearings. The definition of a public hearing means one where
4 the record is publicly available, and parties are free to
5 participate in the hearing.

6 These hearings have been going on for some four
7 years, off and on here in San Luis Obispo. We have used a
8 number of facilities, including this one, including the
9 Veterans hall across the street.

10 I would just point out to the Board that although
11 the first day is usually heavily attended, subsequent days
12 frequently are not.

13 The second thing I would point out is the United
14 States Courts frequently do not have room for people within
15 the hearing room in an adjudicatory hearing. That does not
16 mean it is not a public hearing. It means that the seating
17 may be limited, but the participants, namely the Governor
18 and the Joint Intervenors and their Counsel are here, and
19 the witnesses are here, and the people who are able to speak
20 to the Board will be speaking here, so I don't think it is
21 fair to characterize this as not a public hearing.

22 The second thing I would point out is that you do
23 have --

24 JUDGE WOLF: Pardon me, Mr. Olmstead. Please move
25 away so that I can see the speaker.



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MR. OLMSTEAD: The second thing that I would point out to you is that there is another device available to the Board, and that is the device that is used in the Federal District Courts, and that is to limit the amount of time that people can sit and observe and move them in and out, so that everybody gets an opportunity to come into the hearing room, and with those comments, I have no further comments to make.

JUDGE WOLF: Thank you

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1 JUDGE WOLF: Thank you.

2 The motion of Mr. Fleischaker to adjourn the meeting
3 at this time, or at least after the preliminary matters are
4 taken care of, will be overruled. We will meet tomorrow in
5 the Veterans Building, and we understand, from what has been
6 said, that it is of a larger size and will accommodate more
7 people.

8 MRS. SILVER: Mr. Wolf, excuse me, I am Sandra Silver.

9 JUDGE WOLF: Pardon me --

10 MRS. SILVER: I have been an Intervenor for eight
11 years, not four years.

12 JUDGE WOLF: Pardon me.

13 VOICES: Let her speak.

14 MRS. SILVER: I am an Intervenor here, Mr. Wolf.
15 Mr. Bright knows me well. We have been together for eight years.
16 He knows the Mothers for Peace very well. We have been here
17 for eight years.

18 I am here on behalf of the thousands of people in
19 this community who want to speak. We have been outraged at this
20 idea of a public meeting. Sir, there are hundreds of people
21 outside, they can't get in. You have even gagged us. You
22 have not allowed us to speak at this hearing.

23 We have, for eight years, come here. We have, for
24 eight years, been frustrated. We have been coming here, as
25 Mr. Bright knows. We have been patient, we have been orderly,



2
1 we have been following the rules, we have been showing the
2 utmost patience. Frankly, sir, we have had it.

3 (Applause.)

4 For eight years, whenever we have won legal skirmishes
5 here, the NRC's response has been to bend the laws, has been
6 to reinterpret the laws, and even as we speak here today, in
7 Washington the NRC is planning to change the laws. Sir, for
8 eight years we have been appearing here. We have had -- eight
9 years ago, we asked you to halt the construction of this plant,
10 because the public found out that it was built just three miles
11 away from an active earthquake fault. We asked you to stop
12 construction of the plant, and you didn't listen to us. You
13 didn't listen even to your own two consultants of the Advisory
14 Committee on the reactor safeguards when they said that this
15 plant is dangerous.

16 MR. NORTON: Excuse me.

17 MRS. SILVER: Bruce, you don't have to talk. You
18 are from Phoenix, Arizona. You don't even live here. You have
19 no stake in this plant.

20 (Applause.)

21 MR. NORTON: Your Honor --

22 MRS. SILVER: I am sorry, Bruce, but you are going
23 to be going back to Phoenix, and all you get is a nice, big,
24 fat paycheck.

25 MR. NORTON: Your Honor --



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1 MRS. SILVER: We are at risk at this community, and
2 the community wants to speak.

3 MR. NORTON: Your Honor --

4 MRS. SILVER: The NRC said eight years ago money
5 would never be a factor in licensing this plant. Yet, today,
6 self-righteously, you make claims that we have got to get this
7 plant licensed because any delay costs the plant millions of
8 dollars.

9 Sirs, may I remind you that, as taxpayers, we in
10 this community pay your salaries. As taxpayers, we pay the NRC's
11 salaries. As rate payers, we pay PG & E's salaries. And
12 because we don't feel protected, we have to hire our own
13 attorneys, at very limited wages, to protect us. We, sir, are
14 paying for this Goddam proceeding, and you won't even let us
15 talk.

16 (Applause.)

17 MRS. SILVER: Eight years ago, eight years ago, you
18 told us that a Class 9 accident was incredible. Our fellow
19 citizens in Harrisburg have learned too painfully that you
20 were wrong, again.

21 Here we are, two years after Three-Mile Island, and
22 you are going back to business as usual. It is worse. You
23 are saying, "Get them on line and have the hearings after we
24 license them." We won't have that.

25 (Applause.)



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1 MR. NORTON: Your Honor --

2 MRS. SILVER: Today, you are here to talk about
3 evacuation plans. What evacuation plans? This County doesn't
4 have evacuation plans. We have thousands of testimonies here
5 from people who don't know the evacuation routes, who don't
6 know what to do in the event of an accident, and who don't
7 know what medical facilities, if there are any medical facilities,
8 to go to if there is an accident.

9 But irregardless of whether we have an evacuation
10 plan or not, that is not the point. This plant sits three
11 miles away from an active earthquake fault.

12 Sirs, if you can license this plant, then you will
13 send a signal throughout the world, that the American Nuclear
14 Regulatory Commission can license anything, including a
15 reactor sitting on top of a sink hole.

16 If you can license Diablo, then you will show the
17 American people that corporate greed is more important than
18 the will of the people. If you do license Diablo, we shall
19 weep for the moral corruption of this regulatory body.

20 Sirs, we want you to deny Diablo a license. Please
21 spare our children. Don't issue a license.

22 (Applause.)

23 JUDGE WOLF: The Fire Chief has an announcement
24 to make.

25 FIRE CHIEF OF THE CITY OF SAN LUIS OBISPO: I hate



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1 to take this distasteful task under hand right now, but as
2 Fire Chief of the City of San Luis Obispo, we have got an
3 overcrowding problem, and I would like to ask your cooperation
4 in working with us.

5 What I would like to do -- and this is for your
6 safety, and I can respect and appreciate your needs to communi-
7 cate and hear what is going on.

8 What I would like to do is ask that before we can
9 continue the meeting, we have got to have a free access all
10 the way out to the outside at this point here. Maybe we
11 can work a system between you and the people that are running
12 the meeting, where people can come and go and allow partial
13 hearing to occur.

14 I am not sure what the larger arrangements here at
15 the Center are, but we are going to have to have free access
16 to and from the room.

17 PARTICIPANT: Excuse me, but does PG & E also revolve,
18 or is it just the Intervenors that have to revolve?

19 FIRE CHIEF: That is not up to me.

20 PARTICIPANT: Well, I think it should be up to some-
21 body.

22 FIRE CHIEF: All I am trying to do, ma'am, is maintain
23 the State Law for your safety, for your safety.

24 I think that would be good. That way, everybody
25 can hear the proceedings.



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1 JUDGE WOLF: We could set up a rotating system that
2 is often used in courts, and at the end of, say, 20 minutes,
3 one section could be evacuated, and a new group come in, if
4 you wish to do that.

5 FIRE CHIEF: I would like to reemphasize, the meeting
6 cannot continue until we abate the problem of access to and
7 from the room, and I would like to ask your cooperation.

8 PARTICIPANT: As a suggestion, it might be possible
9 that if that is true, what needs to happen is, those essential
10 people, and you know who you are and possibly need to stay, the
11 rest of them need to be cleared, and equal numbers of each
12 party needs to be let back into this room. Otherwise, Your
13 Honor, in all honesty, it would be a zoo, and this proceeding
14 obviously does not need that.

15 So I am saying, Fire Chief, if, in fact, that is the
16 case, then we need to evacuate this entire room, with the
17 exception of essential people, and then have somebody at the
18 door who knows how many people can sit in this room, and that
19 equal numbers of each party enter this room.

20 JUDGE WOLF: I don't understand what you mean, "each
21 party."

22 PARTICIPANT: I am saying, people that are represent-
23 ing let's say PG & E or a pro-nuclear status, and I am saying
24 people that are representing the anti-nuclear position. That
25 is what I am saying. And I am talking about an equal number



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1 of bodies from each of those. I am just saying, that is a
2 possibility.

3 JUDGE WOLF: If it is workable, it is agreeable with
4 me.

5 FIRE CHIEF: The Fire Department will post a man
6 at the entrance in the rear of the room, but it is not going
7 to be his responsibility to determine who is going to come in
8 and out, whether he is one side or the other. The only thing
9 he is going to be concerned about is, if one person leaves,
10 another one can come in. If you would like to set up a
11 monitoring system as to who that person is that comes in, that
12 is fine. We will work with you in any way we can.

13 PARTICIPANT: Would the Fire Chief suggest that we
14 move the hearing?

15 FIRE CHIEF: That is not up to me to determine. The
16 only thing I am saying is, the room is overcrowded.

17 PARTICIPANT: The Vets Building is open today, isn't
18 it?

19 PARTICIPANT: It is open.

20 MR. REYNOLDS: Judge Wolf, I am also informed that
21 the Veterans Building across the street is open. Now, it
22 appears that there may be quite a bit of procedural difficulty
23 in working out how this rotation system is going to work.

24 I might suggest, through a renewal of the motion
25 perhaps, that we might save time; certainly, it doesn't seem



8 1 to take more time to simply perhaps recess for an hour and-a-
2 half and move the hearing across to the Veterans Building.
3 We can accommodate everybody over there, and we can avoid any
4 problems, any claims of unfairness as to ratios of people
5 actually admitted to the hearing.

6 And with that, I would renew the motion, just as
7 a matter of convenience for all concerned.

8 JUDGE WOLF: Well, off the record, we don't have a
9 contract to go over there. We just can't go over and take over
10 a hall.

11 MR. FLEISCHAKER: Yesterday, when I called the Hall
12 and spoke to a woman named Donna in General Services Administra-
13 tion, she informed me that the Hall would be available today,
14 and it would cost \$80, and that the only problem was giving
15 the janitorial staff adequate time to set up the chairs.

16 So I think that they are probably amenable and
17 flexible enough to be able to accommodate a move relatively
18 rapidly. It is already almost 10:00 o'clock. We probably
19 could get this thing done, adjourned, and meet again at
20 1:00 o'clock in the afternoon. That is a mere three hours'
21 loss of time in the hearing -- two hours, actually, because
22 we will need an hour for lunch.

23 (Laughter.)

24 Also, Mr. Chairman, if it will do any good, I will
25 represent on behalf of my clients that we will make every



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1 effort to conduct ourselves in an appropriate manner to permit
2 the proceeding to continue appropriately, and we will not be
3 involved in disturbances. We will make every effort to try
4 to conduct ourselves appropriately.

5 MR. NORTON: Your Honor, we would like to proceed
6 with the hearing. We have now been here an hour and we have
7 not accomplished anything yet.

8 Mr. Fleischaker seems to be obeying the rules is to
9 turn over his microphone to whoever wants to speak. That is
10 not the way these proceedings are noticed and supposed to
11 proceed. We respectfully request that we proceed now, according
12 to the rules.

13 MR. BROWN: Judge Wolf, this is an opportunity, I
14 think, sir, for all of us to do something that we will all be
15 very happy about. We will eliminate this confrontation and
16 some pretty rough moments we have had. I think we all could
17 smile and we could use this little break as a moment of maybe
18 relief from the hot air here, and I suspect that things will
19 be working out much more expeditiously across the street this
20 afternoon.

21 PARTICIPANT: Excuse me. What happens if the Veterans
22 Hall still isn't big enough to hold everybody? Where do they
23 go then?

24 MR. NORTON: Your Honor, I would like to point out
25 that the meeting has been noticed for this place. You must



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1 carry it on at this place. That is the law.

2 MR. BROWN: No, that isn't the law.

3 (Applause.)

4 (There was an off-the-record discussion, at which
5 time, the hearing was recessed and was scheduled to resume at
6 1:00 p.m. in the Veterans Building.)

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A F T E R N O O N S E S S I O N

1:00 p.m.

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3 JUDGE WOLF: Ladies and gentlemen, please come
4 to order.

5 At this time, I'm asking the technical members of
6 the Board to comment on the criteria used in judging emergency
7 planning. First, I'll ask Mr. Bright to make some comments.

8 JUDGE BRIGHT: Well, of course, we're guided by
9 the regulation Part 50-57.

10 VOICES FROM THE AUDIENCE: We can't hear you.
11 Louder.

12 JUDGE BRIGHT: I'll try harder.

13 We're guided by the Regulations, as you gentlemen
14 know: Part 50-57, Appendix E to Part 50 and the implementing
15 document, NUREG-0654. Now, what we want you to do, all of
16 you who are putting on direct cases. If you would be so kind
17 as to indicate on this sixteen point layout that we're all
18 working, what your testimony applies to in those sixteen
19 points. Because that's the way we are going to be looking
20 at the results of the Hearing.

21 JUDGE WOLF: Do you have something, Dr. Kline?

22 JUDGE KLINE: Yes, just to add to that.

23 If there are any of the sixteen points listed in
24 NUREG-0654 for which an exemption is sought under 50-57C,
25 we would like to know the reasons you have for believing that



1 one or another of those points do not apply for low power
2 testings.

3 I'm sorry. That is 50-47C.

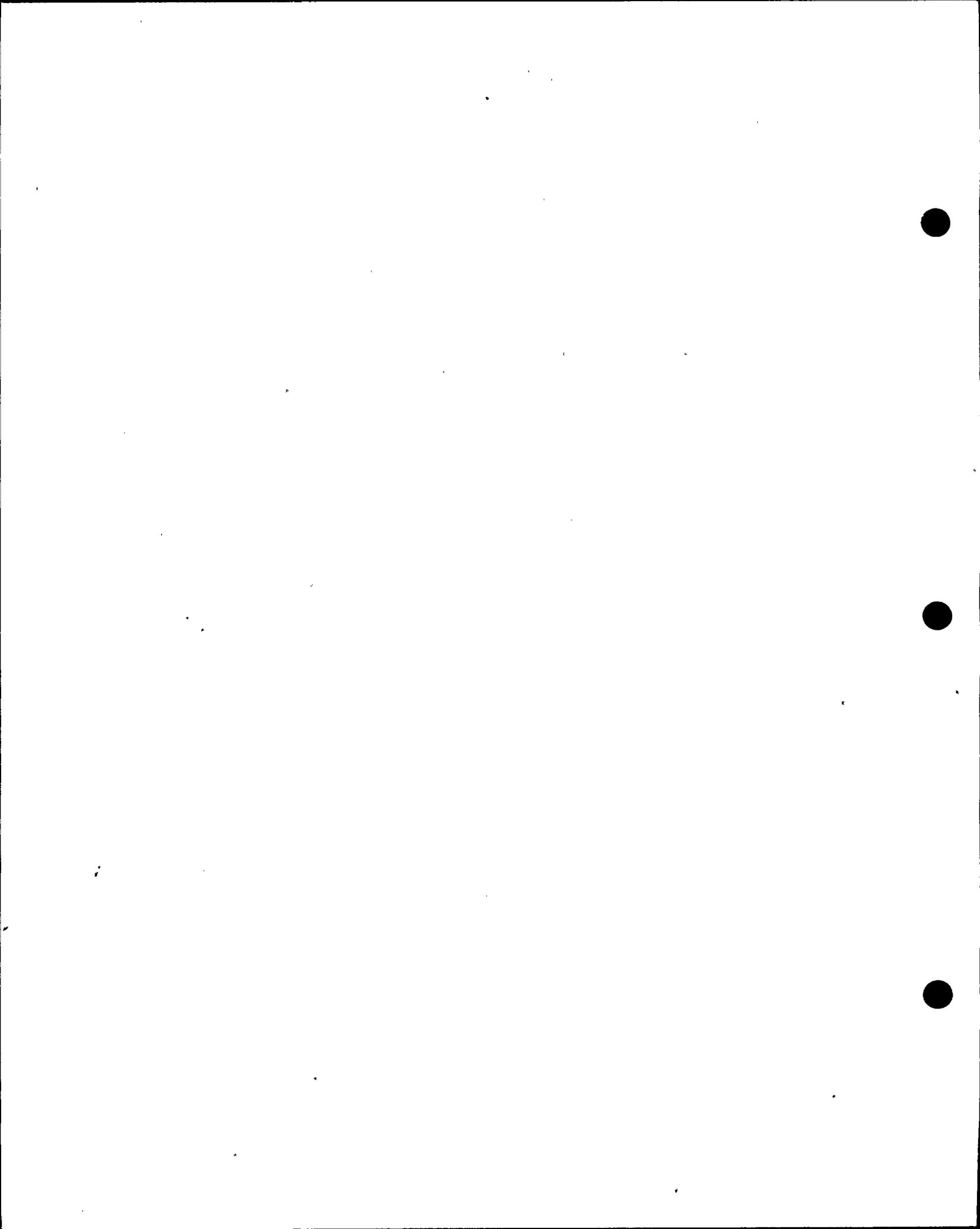
4 JUDGE WOLF: The first contention that we are going
5 to take up reads as follows:

6 "Numerous studies arising out of the accident at
7 TMI Nuclear Power Plant have shown the need for upgrading
8 emergency response planning. Based upon these studies, the
9 Commission promulgated revised emergency planning regulations
10 effective November 3, 1980. The Applicant has failed to
11 demonstrate that the combined Applicant, state and local
12 emergency response plans for Diablo Canyon comply with those
13 revised regulations, paren, quote, final regulations on
14 emergency planning, close quote, Forty-Five Federal Register
15 55402, August 19, 1980."

16 At this time, I would like to ask the Applicant
17 to proceed to put on its direct testimony in regard to that
18 contention.

19 MR. GEORGIU: Mr. Chairman, I request an oppor-
20 tunity to be heard at this point.

21 My name is Byron Georgiou, counsel for Governor
22 Brown. I'd like to make an opening statement with the
23 permission of the Board and I'd like to request permission to
24 do so at this time. The reason I ask that request is that
25 it's the beginning of the Hearing. I will only be able to



1 attend today. Our co-counsel will continue and I'd like to
2 present a statement on behalf of the Governor.

3 It's consistent, I think, Your Honor, with past
4 practice at this Hearing and at the Seismic Hearing in
5 October and I would request permission to spend about five
6 minutes of the Board's time to make a statement.

7 JUDGE WOLF: Counsel, you came up to the bench
8 and asked permission. I explained to you that this was not
9 the time for opening statements. It is still not the time.
10 If you have a statement to make, you can make it in your
11 brief when you file your brief and we'll have no further
12 requests regarding opening statements.

13 MR. GEORGIU: With the permission of the Board,
14 then, I would like to submit the statement in written form --

15 JUDGE WOLF: You may do that.

16 MR. GEORGIU: -- to Your Honors at this time,
17 if I could.

18 JUDGE WOLF: You may proceed, now, counsel for the
19 Applicant.

20 MR. BROWN: Judge Wolf, pardon me. This is Herbert
21 Brown. There are a couple of preliminary matters as to the
22 Hearing, I wonder if I might raise, for just a moment?

23 JUDGE WOLF: You may ask a question about them.

24 MR. BROWN: Thank you.

25 The first is the order in which the witnesses will



1 be presented. I am taking the liberty of assuming that they
2 will be PG & E, then the staff and then the Governor's wit-
3 nesses. Am I correct in my assumption?

4 JUDGE WOLF: No. The order will be the Applicant,
5 the Joint Intervenors, the State of California as represented
6 by Governor Brown and the NRC staff.

7 The NRC staff, according to the regulations, comes
8 last in the proceeding.

9 MR. BROWN: Well, I wonder, if given the fact, in
10 this particular proceeding -- I'm not sure that the Regula-
11 tions compel that the staff goes last, but in any event, I
12 would like to raise the fact question because in the other
13 two hearings that we've had, in each instance, the staff
14 followed the Applicant and given the fact that the positions
15 are so intimately tied together, the integration of the
16 record, I think, and then cross examination that would follow
17 might well be more forthcoming and comprehensive and intelli-
18 gible, frankly, if we were to consider that.

19 I principally raise it because it works well in
20 the other two instances.

21 JUDGE WOLF: It's a matter of procedure and I
22 have adopted the procedure that I've stated, Mr. Brown.

23 MR. BROWN: As to the -- I take it that given the
24 thought that we will be presenting our direct testimony after
25 PG & E, we will be permitted to have several additional



1 direct questions in the form of rebuttal to cover matters
2 that have been raised by PG & E.

3 JUDGE WOLF: The procedure will be that everyone
4 will have the right to cross examine and the right to rebut
5 after that. We will have a series of rounds on that, so you
6 will have plenty of opportunity to ask your questions.

7 MR. BROWN: Thank you and I just have two other
8 quick questions.

9 One would be the order of cross examination of the
10 parties. The order in which counsel for each party will
11 proceed to cross examination.

12 JUDGE WOLF: The same order we stated as far as
13 presenting the direct or written testimony.

14 MR. BROWN: So the Joint Intervenors would proceed
15 and then the Governor and the staff would be last. Otherwise,
16 the Applicant would be first, the Joint Intervenors, the
17 Governor and then finally the staff.

18 JUDGE WOLF: At this juncture, of course, the
19 Applicant won't cross examine.

20 MR. BROWN: Right.

21 JUDGE WOLF: He's putting on direct testimony.

22 MR. BROWN: And finally, I wonder if I might raise
23 a question about the daily hearing schedule, simply because
24 we do have witnesses coming and going and I believe other
25 parties are in the same situation. Can the Board provide



1 counsel with any guidance with respect to the schedule of
2 the hearings? Times of commencement, for example, a likely
3 schedule for break and termination at the close of the day.

4 JUDGE WOLF: Well, I'm not sure that I understand
5 your question.

6 MR. BROWN: I guess in simple language, I'm saying
7 is it a nine to five hearing with an hour at twelve-fifteen
8 or forty-five minutes or is it eight-thirty to five-thirty
9 and so on?

10 JUDGE WOLF: Tomorrow, I hope to call the Hearing
11 at nine o'clock and we'll run to twelve and recess for lunch
12 and come back at one and continue to five.

13 MR. BROWN: Thank you very much.

14 JUDGE WOLF: In the morning, we'll have one break
15 as close to ten-thirty as convenient for everyone and another
16 in the afternoon at two-thirty or a quarter to three.

17 MR. BROWN: Fine. Now, I would just like to
18 raise one final question and I will not proceed with any
19 preliminary matters. But in light of what Judge Bright
20 stated, I, myself, would like to raise a question to the
21 Board. Judge Bright stated that -- It should be stated
22 precisely by witnesses which of the sixteen points in 50-47
23 were being addressed and I take it then an expression, also
24 he asked, to be explicit with respect to any exemptions from
25 those Regulations and I assume that he's referring there to



1 Subsection C. I would like the Board to consider a prelimin-
2 ary ruling or to take under advisement this matter, because
3 it's going to come up as a more serious matter as we move
4 ahead in the proceeding whether, in fact, an exemption
5 legitimately comes within the meaning of C1 or an exemption.
6 from the Regulations, since this is the contested Hearing
7 in which the delegated authority of the Commission is vested
8 in this Board and not in the staff.

9 It actually must be pursued under Section 2.758,
10 because in substance and I would propose, in law, the
11 Applicant would be asking for a waiver of the application of
12 the rule. The procedure, therefore, would be somewhat
13 different in that the Applicant would demonstrate -- take a
14 somewhat different angle in the demonstration of legitimacy
15 for his exemption. It alters, somewhat, the standard of
16 proof and the way in which the parties are going to approach
17 that question.

18 JUDGE WOLF: That's a matter that we have to
19 decide is a question of law when we come to write our
20 decision. You can brief it in anyway you want and you can
21 file your brief as can the other counsel. I don't see any
22 reason for a ruling at this time.

23 MR. NORTON: Your Honor, before calling the
24 witnesses, we have a minor problem in light of Dr. Bright's
25 request in that we do not have sufficient copies of 50-47,



1 the sixteen points to give the witnesses at the witness table
 2 to be allowed to say, well, now, where in your testimony is
 3 number one, etcetera. We had planned on doing that as a
 4 matter of legal argument. Their testimony would go in
 5 evidence and then in the findings of fact, we would do
 6 exactly what Dr. Bright requested, but we had not planned
 7 for the witnesses to make that legal argument, which in a
 8 sense, is what you're asking.

9 JUDGE WOLF: No, we are not asking the witnesses
 10 to make a legal argument. We're asking counsel before he --
 11 when he puts on his direct testimony. To point that out for
 12 the record.

13 MR. NORTON: That's going to take a little bit of
 14 time to go through the testimony and to -- you know, because
 15 we did not know that that's what you wanted until you, of
 16 course, said that ten minutes ago.

17 JUDGE WOLF: We realize that. This is something
 18 that came up after you had submitted your direct testimony.

19 (Pause)

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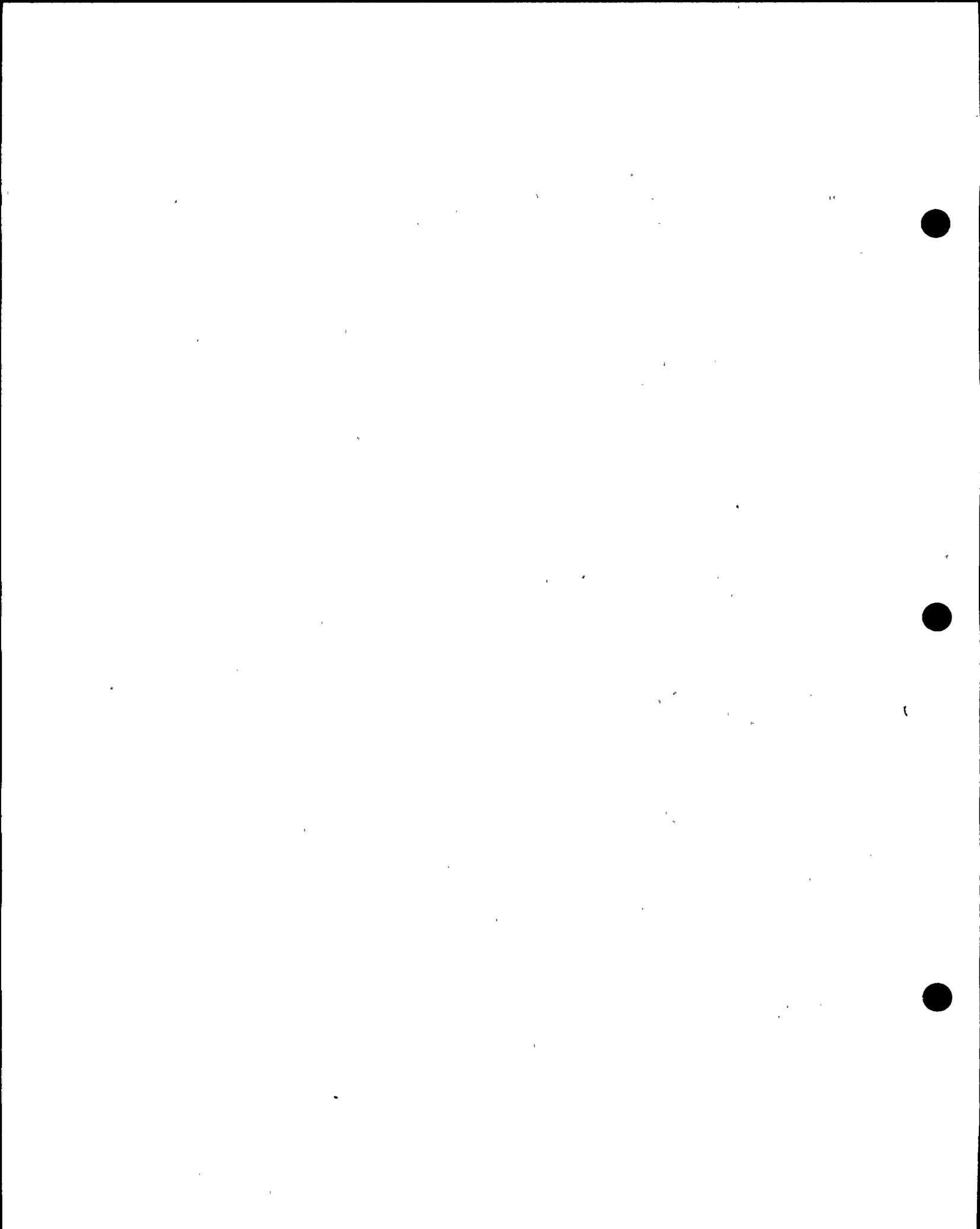
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25 Continued on the next numbered page.



1 MR. BRIGHT: Mr. Norton, this, as far as the Board
2 is concerned, is an easy way, it is the most direct way, for
3 us to determine whether you have complied with '0654, or do you
4 want us to make that judgment? We might not make it the way
5 you would want it made.

6 MR. NORTON: I understand that, Dr. Bright. The
7 problem is that we are not prepared at this exact moment to
8 take 75-100 pages of testimony and tell you which paragraphs
9 apply to Number 1 and which paragraphs apply to Number 12,
10 et cetera. It takes a little bit of time, of course, to do that.
11 And until you just said that, we had no idea you wanted us to
12 do that. We were going to do that, of course, in our Proposed
13 Findings. I am just not sure that it would do it justice to
14 do it off the cuff, so to speak, with as many pages of testimony
15 as we have.

16 JUDGE WOLF: If you find it too difficult at this time,
17 you may do it through your brief, if you wish.

18 MR. NORTON: All right. We, at this time, would
19 like to put the testimony on, and perhaps at the end of this --
20 when I say "this," our case and the cross-examination of our
21 case, then we could point that out specifically. We would
22 certainly have an evening to sit down and go through the
23 testimony and match up the numbers, so to speak, and we would
24 be happy to do that.

25 I really feel we might miss something if we did it



1 right now, without that kind of thought.

2 JUDGE WOLF: Well, you can ask for a conference
3 tomorrow morning.

4 MR. NORTON: Certainly. Thank you.

5 At this time, we would like to call Dr. Brunot,
6 Mr. Shiffer, Mr. Skidmore, Mr. Kaefer and Mr. Patterson.

7 Gentlemen, I believe you are going to have to be
8 sworn in, so if you will remain standing by your chairs.

9 JUDGE WOLF: Raise your right hands, please.

10 Whereupon,

11 WILLIAM K. BRUNOT

12 J. D. SHIFFER

13 S. M. SKIDMORE

14 W. B. KAEFER

15 R. PATTERSON

16 were called as witnesses, and having been duly sworn, were
17 examined and testified as follows:

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19 / / / /

20 (Continued on the next numbered page.)

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3
1 MR. NORTON: I would like to proceed, Your Honor, by
2 first asking the witnesses if they have any corrections to
3 their testimony. As the first piece of Emergency Response
4 Testimony is by Dr. Brunot, I will start with Dr. Brunot.

5 DIRECT EXAMINATION

6 BY MR. NORTON:

7 Q Dr. Brunot, do you have in front of you a copy of
8 the written submitted testimony that you have prepared?

9 A (Witness Brunot) Yes, I do.

10 Q All right. Could you please indicate them at this
11 time?

12 A Starting on Page 1, Line 20, there is a parenthesis
13 in there which has the words "contained in." That should be
14 deleted.

15 Q All right.

16 A On Page 2, Line 24, in between the words "with"
17 and "contention," there should be the word "this."

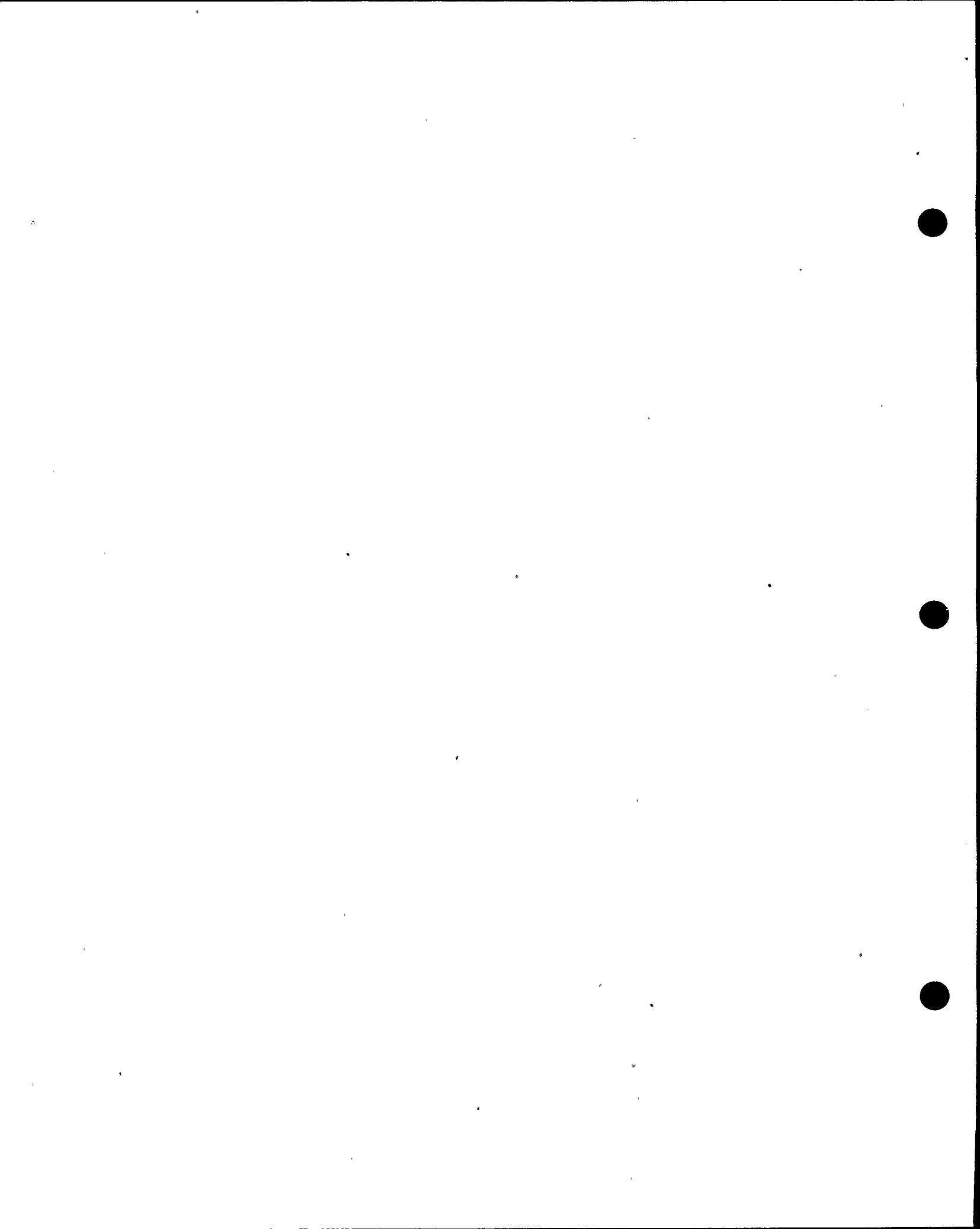
18 Q Yes.

19 A On Page 4, Line 16, there is a word "project"
20 which should be the word "product."

21 Page 16, Line 18, about the middle, between the words
22 "what" and the word "is" there should be a "this."

23 Page 17, Line 15, the first number --

24 Q Excuse me, Dr. Brunot, but going back to Page 16,
25 Line 18, when you insert the word "this" between "what" and



4
1 "is," do you not also delete the word "is?"

2 A I am sorry, you are right. Right, delete the word
3 "is."

4 (Applause.)

5 JUDGE WOLF: Did you mean to say "means" in that line?

6 ". . . what is really means . . ."

7 MR. NORTON: ". . . what this really means. . ."

8 JUDGE WOLF: ". . . what this really means. . ."

9 WITNESS BRUNOT: Page 17, Line 15, the number which
10 is 0.016 should be 0.16.

11 And at the end of the testimony, in Table III, which
12 is not a numbered page, Line 16, the number 0.016, should be
13 0.16.

14 Those are all the corrections I have.

15 MR. NORTON: Your Honor, we have already submitted
16 the required number of copies of the testimony to the court
17 reporter, so we will not do that at this time; that was done
18 ahead of time.

19 JUDGE WOLF: Just a moment. In order to have it
20 bound in the record, you have to make the offer.

21 MR. NORTON: Yes, Your Honor.

22 JUDGE WOLF: Are you going to make it separately
23 for each one of these witnesses, or are you going to attempt
24 to do it all at once?

25 MR. NORTON: I will do it with Dr. Brunot as soon



5
1 as I ask him a couple of more questions, and then move on
2 to the other four and do it with them, also. But I did want
3 you to know that we had physically already given the required
4 copies.

5 BY MR. NORTON:

6 Q Dr. Brunot, the resumé that follows your testimony
7 is, indeed, a true resumé of yours, is it not?

8 A That is correct.

9 Q Is the written testimony that you have submitted
10 true and correct, to the best of your knowledge?

11 A Yes. It is.

12 MR. NORTON: At this time, we would like to have
13 the written testimony of Dr. Brunot that has been pre-filed,
14 along with Dr. Brunot's testimony, inserted in the record as
15 though read.

16 JUDGE WOLF: Are there any objections?

17 MR. REYNOLDS: I have a procedural question.

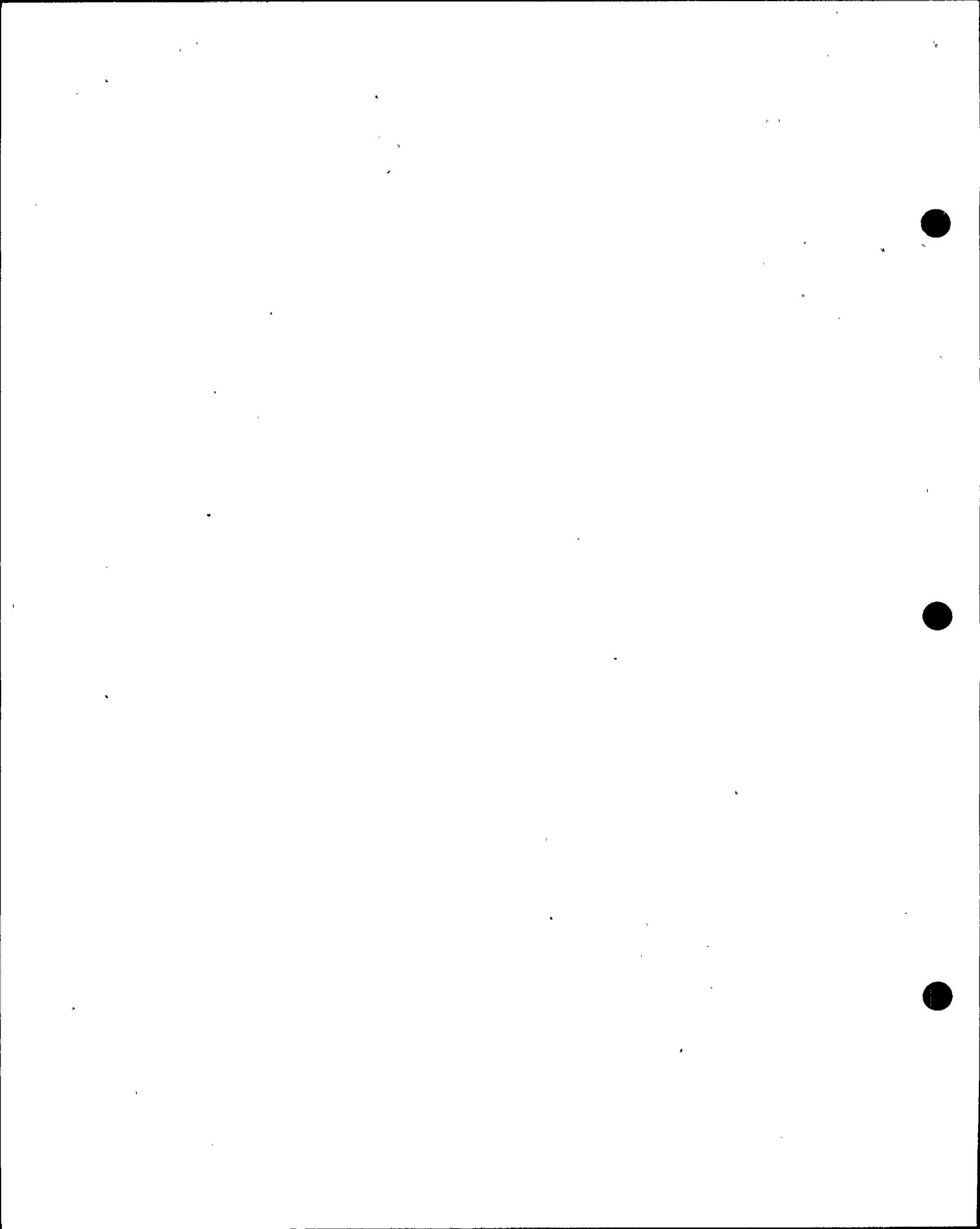
18 Would you like motions to strike at this time, or
19 would you like them at the time of cross-examination?

20 JUDGE WOLF: At either time, I would think.

21 MR. NORTON: Excuse me, Your Honor. I don't think
22 you can make a motion to strike unless it is in the record.

23 JUDGE WOLF: That is right.

24 MR. REYNOLDS: All right. I have no objection to
25 the testimony, with the exception of Part 3, and I will



6 1 reserve the motion to strike until the time of cross-examination.

2 MR. LANPHER: Governor Brown does have an objection
3 to Part 3 of the testimony, specifically Pages 14 through 18,
4 as well as Tables II and III, which are at the end of the
5 testimony.

6 We object to the admission into evidence of this
7 portion of the testimony on the following grounds:

8 The first basis is that we believe that the references
9 to, and the comparisons with the Kemeny Report, which are set
10 forth in this portion of Dr. Brunot's testimony, are not
11 relevant to this proceeding, and they are hearsay. We do not
12 have an opportunity to cross-examine the authors of the Kemeny
13 Report.

14 Second, we are not litigating a TMI-equivalent
15 accident at Diablo Canyon. For instance, this statement at
16 Page 15, Line 10, Dr. Brunot talks about the equivalent accident,
17 a TMI-equivalent accident at Diablo Canyon.

18 The question before this Board and that we are
19 litigating on this contention is whether the Emergency Response
20 Plans for Diablo Canyon comply with the Regulatory requirements.
21 And, accordingly, I don't think this discussion of an equivalent
22 TMI accident is relevant at all.

23 Further, at Page 17 of Dr. Brunot's testimony, I
24 that it is clear speculation. The question is: "What would
25 the Kemeny Commission have concluded had they been considering



7
1 Diablo Canyon?" Well, that is clearly not relevant to this
2 proceeding, again for the reasons outlined. The question is
3 whether the Diablo Canyon emergency response plans are adequate
4 and comply with the regulatory requirements. Accordingly,
5 Governor Brown objects to Part 3 of Dr. Brunot's testimony
6 and Tables II and III.

7 JUDGE WOLF: Very well.

8 Staff, do you have any comment?

9 MR. OLMSTEAD: Well, I think that the first thing
10 that I would comment on is that at this time in the examina-
11 tion of witnesses, the relevant inquiry is, do the qualifica-
12 tions of the witness to render the testimony in the nature of
13 voir dire. I didn't understand that particular objection to go
14 to the voir dire questions.

15 The other grounds would be relevancy and materiality,
16 and I am not sure I really understood that. One issue was
17 that there was a false reliance on the Kemeny Commission Report,
18 and I think the Staff would believe that the Board could take
19 official notice of the Kemeny Commission Report, so I don't
20 think that that, alone, is objectionable.

21 The other objection I just am not quite certain I
22 understand, so I won't comment on it.

23 JUDGE WOLF: Do you have anything further you want
24 to say?

25 MR. LANPHER: I thought I had made myself clear,



8
1 Judge Wolf. I believe that this testimony is not relevant.
2 We have a proper objection on the basis of relevance at this
3 time. We are not litigating a TMI-equivalent accident here,
4 and the speculation as to what the Kemeny Commission might have
5 concluded at Diablo Canyon simply is not within the scope of
6 this proceeding.

7 MR. OLMSTEAD: I would like to comment on that.

8 What I don't understand about the Governor is, if he
9 is saying we are not litigating accidents in this proceeding,
10 then I would hold him to that objection as we move into other
11 testimony.

12 Secondly, I think PG & E ought to respond, since it
13 is an objection to their testimony

14 JUDGE WOLF: If you wish to, you may.

15 MR. NORTON: Your Honor, I think the testimony is
16 clearly relevant. It is because of TMI and 0737 that we are
17 here, and to say that TMI is not relevant to this proceeding
18 escapes me. It is clearly relevant. That is why we are here.

19 MR. LANPHER: Judge Wolf, could I be heard briefly?

20 We, of course, are not saying that TMI is not
21 relevant. If they have specific analyses relating to Diablo
22 Canyon and risk factors and accidents which might occur at
23 Diablo Canyon, a demonstration of probabilistic risk analyses,
24 we would have to concede that that is relevant. This portion
25 of Dr. Brunot's testimony does not address that, in my opinion.



9
1 MR. NORTON: Well, Your Honor, in very brief reply
2 to that, it clearly does. It doesn't do much good to talk
3 about numbers in the abstract. It does help the Board and
4 the readers of the testimony to indeed make comparisons of
5 the numbers for Diablo Canyon with the numbers from something
6 that is known, like TMI.

7 The very point of the testimony is that it is a much,
8 much, much less significant factor at Diablo Canyon than it
9 was at TMI, and that is the whole purpose of that testimony.

10 For them to argue that it is not relevant misses
11 the point. It is clearly relevant. They just don't like the
12 comparison.

13 MR. REYNOLDS: Judge Wolf, as long as we are talking
14 about relevance, I think it is probably better just to put
15 our position on the record here, as well, instead of preserving
16 it until later.

17 We object to the testimony on the grounds of relevance.
18 We feel that the specific data which is discussed in Part 3
19 of the testimony is not connected to Diablo Canyon and really
20 is irrelevant to the question of emergency planning here.

21 I do not, however, object in principle to the use
22 of the Kemeny Commission Report, because I agree with
23 Mr. Olmstead, that it is a document of sufficient importance,
24 and that the Board can take notice, so long as those sections
25 of the report which are noticed are relevant to the issues here,



10
1 and that is really the problem that I have with Mr. Brunot's
2 testimony in Part 3.

3 JUDGE WOLF: The written testimony of Dr. William K.
4 Brunot will be received and bound in the record as if read.

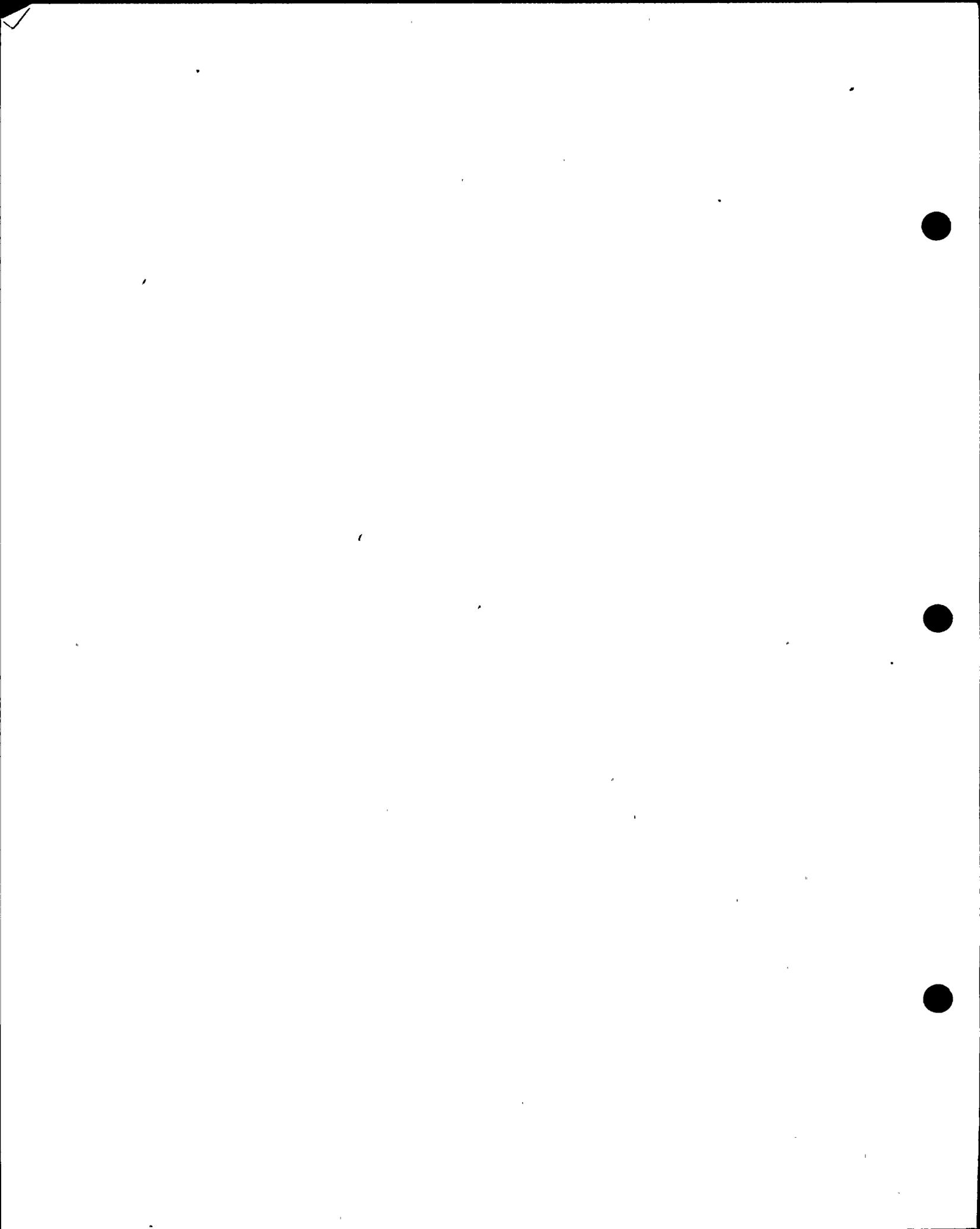
5 The Board will not consider any testimony contained
6 in this written testimony which is not relevant to the issues
7 here in this case.

8 MR. NORTON: Thank you, Your Honor.

9 (Whereupon, the prepared statement of William K.
10 Brunot was inserted into the record.)

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13 (Continued on the next numbered page.)
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1 TESTIMONY OF
2 DR. WILLIAM K. BRUNOT

3 ON BEHALF OF
4 PACIFIC GAS AND ELECTRIC COMPANY

5 MAY 19, 1981

6 CONTENTION 4
7
8

9 My name is William K. Brunot, and I am a Consulting Engineer licensed
10 to practice Nuclear Engineering in the State of California. My certificate
11 number is NU-985. I have attached to this testimony a resume of my general
12 background and qualifications (Attachment 1).

13 With regard to issues related to emergency planning, I have the
14 following specific qualifications:

- 15 a. I was the Senior and Supervising Engineer in the Mechanical and Nuclear
16 Engineering Department at the Pacific Gas and Electric Company,
17 responsible for the radiation analysis required for Diablo Canyon
18 licensing.
- 19 b. I directed the accident analyses which were performed for Supplement
20 Number 1 of Diablo Canyon Environmental Report (contained in) and carried
21 out much of the analysis and writing myself.
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- 1 c. I wrote some of the computer programs required to perform these analyses
2 and other radiation work on the Diablo Canyon project, and directed other
3 engineers in the performance of work of this kind. These computer
4 programs have been requested and used by a number of other utilities and
5 universities in this country and abroad.
- 6 d. I was the principal PGandE expert witness in the ASLB environmental
7 hearings on the subject of the radioactivity analysis required for
8 licensing.
- 9 e. I directed and wrote much of the Diablo Canyon Seismic Risk Analysis
10 (Amendment 52 of the Final Safety Analysis Report), which contained a
11 large amount of probabilistic analysis, as well as radiation consequences
12 analysis. This work required the direct efforts of 10 to 15 engineers and
13 scientists and supporting information from many others.
- 14 f. I have testified as an expert witness in the area of safety and risk
15 analysis in several Atomic Safety and Licensing Board hearings at Diablo
16 Canyon, in the Federal Rulemaking Hearing on Criteria for Emergency Core
17 Cooling Systems, and in several State of California hearings.
- 18 g. I have written and published a number of papers on methods of calculating
19 radiation exposures and in the area of probabilistic analysis.
- 20 h. I am currently participating in an Industrial Standards Committee which
21 has as its objective the development of probabilistic risk criteria for
22 nuclear power plants.

23 The purpose of my testimony is to provide a discussion of a number of
24 technical factors connected with contention. My testimony is divided into the
25 following sections:
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1. Fission Product Inventories
2. Risk Analysis of Diablo Canyon
3. Comparisons to the TMI Accident
4. Emergency Planning Zones
5. General Conclusion.



1 1.0 Fission Product Inventories

2 At various times the Joint Intervenors and Governor Brown have
3 asserted that the "small" fission product inventories so often discussed have
4 not been quantified. In fact, an adequate estimate can easily be obtained by
5 assuming that such inventories are simply the full power values multiplied by
6 the percentage of full power level being considered as "low power." The full
7 power inventories are given in Chapter 11 in the Diablo Canyon FSAR.

8 A more detailed calculation indicates that for many of the long-lived
9 isotopes, the inventories following a low power test run will be much less than
10 the values obtained by the simple procedure above, because the long-lived
11 isotopes are proportional to the total energy generated, rather than to the
12 power level. A complete set of values is provided in Table I. The low power
13 values were generated simply by exercising the EMERALD computer program, which
14 was used to generate the inventories given in Chapter 11 of the FSAR, at a
15 power level of 5% for one month.

16 With regard to the fission product inventories following a low power
17 test program limited to 5% of full power for less than a month, it can be
18 concluded that:

- 19 1. The amounts of the fission products produced in the core are directly
20 proportional to the amount of fuel burned, as in any other chemical or
21 physical reaction.
- 22 2. For some isotopes, because they decay naturally or are consumed by the
23 core reactions, the amounts available for release from the core at any
24 time are significantly less than the amounts produced.

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3. The methods for calculation of these inventories for any reactor operating condition are well known and well verified by experimental data, and that the inventories for full power operation at Diablo Canyon are fully reported in the Diablo Canyon FSAR (Chapter 11, Table 11.1-4).
4. The operation of Diablo Canyon at power levels less than 5% of full power for one month will result in core inventories of 5% of those associated with full power for some of the isotopes, and much lower percentages for others, particularly those with long half-lives. This proportionality is a well established basic principle of nuclear physics.
5. The fission product inventories have been adequately quantified in the record of this proceeding, since an adequate simple relationship exists between the full power values and those at any other power less than full power.



1 2.0 Risk Analysis of Diablo Canyon

2 There are a number of factors associated with operation during the
3 initial low power testing period which reduce significantly the risk of
4 operation, when compared to a similar period of operation at full power. A
5 brief discussion of these factors is presented below:

6 1. Reduced Fission Product Inventories:

7 Because fission product inventories are reduced, as discussed in
8 detail in Section 1, there is a risk reduction factor 20 to 40, applied to all
9 accidents involving a core release.

10 2. Reduced Decay Heat After Shutdown:

11 This factor has the broad effect of reducing all heat loads on
12 reactor cooldown equipment. Risk reduction factor approximately 1 to 5.

13 3. Time Available for Emergency Actions:

14 Because the dissipation of heat and transport of radioactive
15 materials throughout the plant occurs at a much lower rate, much longer times
16 are available to conduct emergency operations, from the manipulation of
17 controls to the implementation of off-site activities. Risk reduction factor 5
18 to 10.

19 4. Reduced hydrogen production rate:

20 Because the production of hydrogen, both from the potential metal to
21 water reaction and from longer term radiolytic decomposition, depends directly
22 on core inventories and heat generation, the risk of hydrogen ignition, both
23 short and long term is greatly reduced. Risk reduction factor 2 to 20.



1 5. Spent fuel pool accidents:

2 Since there is no spent fuel in the facility, no such accidents
3 involving long half-life isotopes can occur. Risk reduction factor about 100
4 (applied only to spent fuel accidents).

5 6. Lack of Activated Corrosion Products:

6 Since the plant is substantially clean, all systems are completely
7 free of activated corrosion products, which in a plant operating for some time
8 can be a contributor to risk of exposure. Risk reduction factor 1 to 2.

9 7. Lack of Radioactive Inventory in Waste Systems:

10 Since the plant waste systems are entirely clean, or are operating
11 with minimal inventories, all accidents involving leaks or ruptures of waste
12 systems, whether active or passive, will result in minimal consequences. Risk
13 reduction factor 20 to 500, applied to those accidents.

14 8. Lack of Radioactive Inventory in Steam Generators and Secondary Systems:

15 Since the principal exposures from steam line breaks, feedwater
16 system breaks, steam tube ruptures and all other secondary system accidents
17 depend upon the activity resident in the primary and secondary water, all these
18 consequences will be greatly reduced. Risk reduction factor 20 to 40.

19 9. Few "Wear-Out" Failures:

20 Since the pumps, valves, seals and all other active components are in
21 the early stages of their useful lifetime, few, if any, "wear out" failures
22 will occur. Risk reduction factor 1 to 2.

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1 There are also some circumstances which tend to increase the risk of
2 an accident during the initial testing period. These are discussed briefly
3 below:

4 1. Break-in Failures:

5 Because the low power test program presents the first "challenge" at
6 operating conditions for some components and systems, greater than average
7 "failure rates" or "outage rates" can be anticipated. In fact, the low power
8 test program is designed in part to identify and correct the effects of such
9 "break-in" outages. General risk increase factor 2 to 5.

10 2. Plant Modifications:

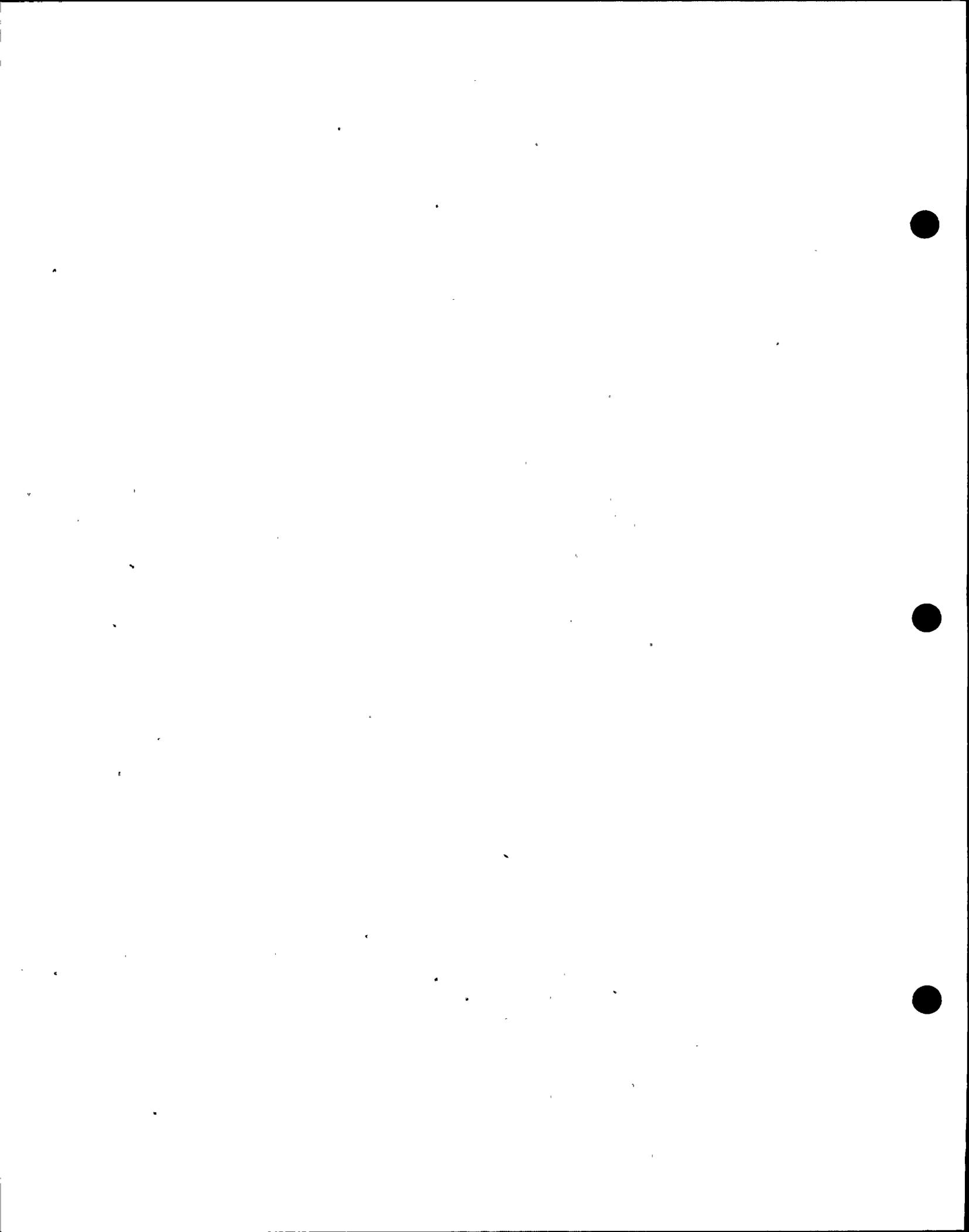
11 Because some components and systems, required only for full power
12 operation, may not be completely on line by the time of low power testing,
13 their contribution to risk reduction is not available during low power testing.
14 Risk increase, if any, 1 to 2.

15 3. Emergency Plan Arrangements:

16 Some features of the emergency plans for full power operation are not
17 complete. Risk increase, if any, 1 to 2.

18 4. Uncertainties in Performance Parameters for Components and Systems:

19 Because final testing is still being done during the low power
20 period, there is somewhat more uncertainty in the performance parameters for
21 all systems. This factor is substantially compensated for by the strict
22 procedural control and the augmented staff available during testing. Risk
23 increase factor 1 to 2.



1 The factors which operate to decrease and increase the risk which
2 were described above are neither additive nor multiplicative, since they apply
3 to different segments in an over-all risk analysis. Appropriate application of
4 these factors leads to the following conclusions:

- 5 1. Factors which decrease overall risk are much greater than those which may
6 tend to increase risk during low power testing of Diablo Canyon.
- 7 2. The over-all risk of events leading to accidental releases, as well as the
8 quantity of radioactive materials involved in such releases, is greatly
9 reduced.

10 In some of the responses of the Joint Intervenors and of Governor
11 Brown to interrogatories, several assertions were made concerning Diablo Canyon
12 plant-specific risk analysis. These assertions result from a misinterpretation
13 of the requirements for such risk analyses, and of the terminology of risk and
14 safety analysis. The objectives of "risk" analysis and "safety" analysis are
15 the same. Until the past few years, estimates of frequencies of accidents,
16 whether quantitative or qualitative, were considered part of the safety
17 analyses for plants, and no separate analysis was made and termed a "risk"
18 analysis.

19 In recent years the term "probabilistic risk analysis" has come to be
20 applied to an analysis in which the probabilities or frequencies of chains of
21 events are given explicit numerical values. Such techniques for risk analysis
22 are well developed for certain kinds of events and systems, but are not
23 sufficiently developed for broad use in licensing. The ACRS has recommended
24 that they be given consideration by the Nuclear Regulatory Commission for
25 possible future incorporation in generic or specific licensing decisions.
26



1 The Joint Intervenors have asserted that (a) such analyses are required for
2 Diablo Canyon; and that (b) no such analyses have been made. In fact, the
3 opposite of both assertions is the case.

4 First, no plant-specific probabilistic risk analysis has been
5 recommended or required by the ACRS or by the regulations or guides, or by NRC
6 policy, for Diablo Canyon for full power or low power operation, nor is such a
7 requirement part of the NUREG-0737 requirements for low power operation.

8 Second, plant-specific safety analyses have been done for Diablo
9 Canyon on numerous occasions. Specifically, accident analyses were done for
10 full power operation in:

- 11 1. The Preliminary Safety Analysis Report (PGandE)
- 12 2. The Final Safety Analysis Report (PGandE)
- 13 3. The Environmental Report (PGandE)
- 14 4. The Final Environmental Statement (NRC)
- 15 5. The Safety Evaluation Report (NRC)

16 All these analyses, including their amendments, were plant-specific.
17 All of these classified accidents in terms of their probabilities, and two of
18 them gave specific frequency values, namely:

- 19 1. The Accident evaluation in the Environmental Report, Supplement 1
20 (PGandE).
- 21 2. The Analysis of Risk to the Public (seismic), Amendment 52, to the Final
22 Safety Analysis Report (PGandE).

23 The Joint Intervenors have failed to recognize that these safety
24 analyses do constitute safety (or risk) analyses for Low Power Operation, since
25 they cover operation up to full power.
26



1 With regard to the risk to the public associated with low power
2 testing of the Diablo Canyon Nuclear Power Plant, Units 1 and 2, I conclude
3 that:

- 4 1. Any estimate of risk of exposure to any member of the public, or group,
5 whether characterized by an estimated exposure or by a probability or
6 frequency of receiving the exposure, at any distance away from the
7 reactor, is directly proportional to the core inventory of the isotope or
8 isotopes which could contribute to that exposure.
- 9 2. Since the establishment of emergency planning zones, evacuation and
10 sheltering distances, etc. are based upon the selection of dose criteria
11 and estimation of distances at which such doses occur, the distances of
12 concern are greatly reduced if the isotopic inventories in the core are
13 greatly reduced, regardless of whether other factors may also contribute
14 to reduction of risk.
- 15 3. Because the core inventories of significant isotopes are from a factor of
16 20 to 400 less for operation during the low power tests, the distances at
17 which any given exposure could occur are correspondingly lower.

18 As mentioned above, accident evaluations were made for a range of circumstances
19 by PGandE and the NRC staff during the process of licensing. As a requirement
20 of the regulations, 10CFR100, 10CFR50, and 10CFR20, all such accident
21 evaluations were required to be conducted in prescribed ways, and the resulting
22 consequence predictions were required to fall under prescribed exposure limits.
23 Because all of these evaluations have been completed, it has been established
24 that for full power inventories, the consequences of all such accidents have
25 fallen under the following levels:
26



<u>Location</u>	<u>Period</u>	<u>Exposure Limit</u>
Site Boundary	2 hours	25 Rem, Whole Body
Site Boundary	2 hours	300 Rem, Thyroid
LPZ	30 days	25 Rem, Whole Body
LPZ	30 days	300 Rem, Thyroid

Using only the minimum reduction in fission product inventories associated with low power inventories, I conclude that all such accidents, if they occurred at low power, would result in exposures less than:

<u>Location</u>	<u>Period</u>	<u>Exposure</u>
Site Boundary	2 hours	1.25 Rem, Whole Body
Site Boundary	2 hours	15 Rem, Thyroid
LPZ	30 days	1.25 Rem, Whole Body
LPZ	30 days	15 Rem, Thyroid

For Diablo Canyon, all such accident doses (for full power) fall well below the limits, and many other risk reduction factors (at low power) reduce the risk of exposure further than the factor of 20 used in the above table. Further, the actual power profile planned for the low power test series results in significantly lower actual fission product generation than the profile used for the inventories in Table I.

From the table above, and recalling that the EPA protective action guides for the general population are 1 to 5 Rem for a gamma dose to the Whole Body, and 5 to 25 Rem to the Thyroid, I conclude that:



1 1. No accidents of the severity considered in the FSAR, SER, Environmental
2 Report, or Final Environmental Statements, if they occurred at low power,
3 would be expected to require any protective actions to be taken outside
4 the LPZ, on the basis of exposure predictions.

5 2. Any such accidents for which protective action might be considered
6 appropriate on the basis of other criteria would involve sufficient time
7 for full implementation of the actions required.

8 In several responses, the Intervenors have asserted that the
9 potential exposures via the liquid pathways have not been evaluated. The
10 liquid pathways were part of the evaluations associated with normal operation
11 and have been considered in the accident evaluations made by PGandE. Because
12 of the characteristics of the site, and the remote location, the dilution
13 factors which apply to such pathways when taken in combination are enormous.

14 On the basis of the analysis contained in the Chapters 11 and 15 of
15 the Final Safety Analysis Report, and upon knowledge of the characteristics of
16 the site, I conclude that no exposure via liquid pathways will be significant
17 compared to the plume exposure pathways accompanying any accident at Diablo
18 Canyon.

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1 3.0 Comparisons to the TMI Accident

2 The Three Mile Island accident provided valuable information and
3 experimental data which could not have been obtained in any other way. Several
4 of the conclusions that have been drawn which are relevant to the matters being
5 considered in this hearing are as follows:

- 6 1. In spite of major core damage, the releases of radioactive materials to
7 the environment were far lower than the conservative licensing
8 calculations used for licensing would have predicted. (Kemeny Report,
9 page 31)
- 10 2. In spite of serious loss of cooling for an extended period of time, the
11 core did not undergo massive melting. (Kemeny Report, page 31)
- 12 3. The measured concentrations of radioisotopes outside the containment were
13 consistent with the models and assumptions currently used for atmospheric
14 diffusion calculations.

15 Because Diablo Canyon has one of the most remote sites in the world,
16 population exposure following any event at Diablo Canyon will be much lower
17 than that at a densely populated site. The following table compares the
18 cumulative population for the TMI and Diablo Canyon sites:

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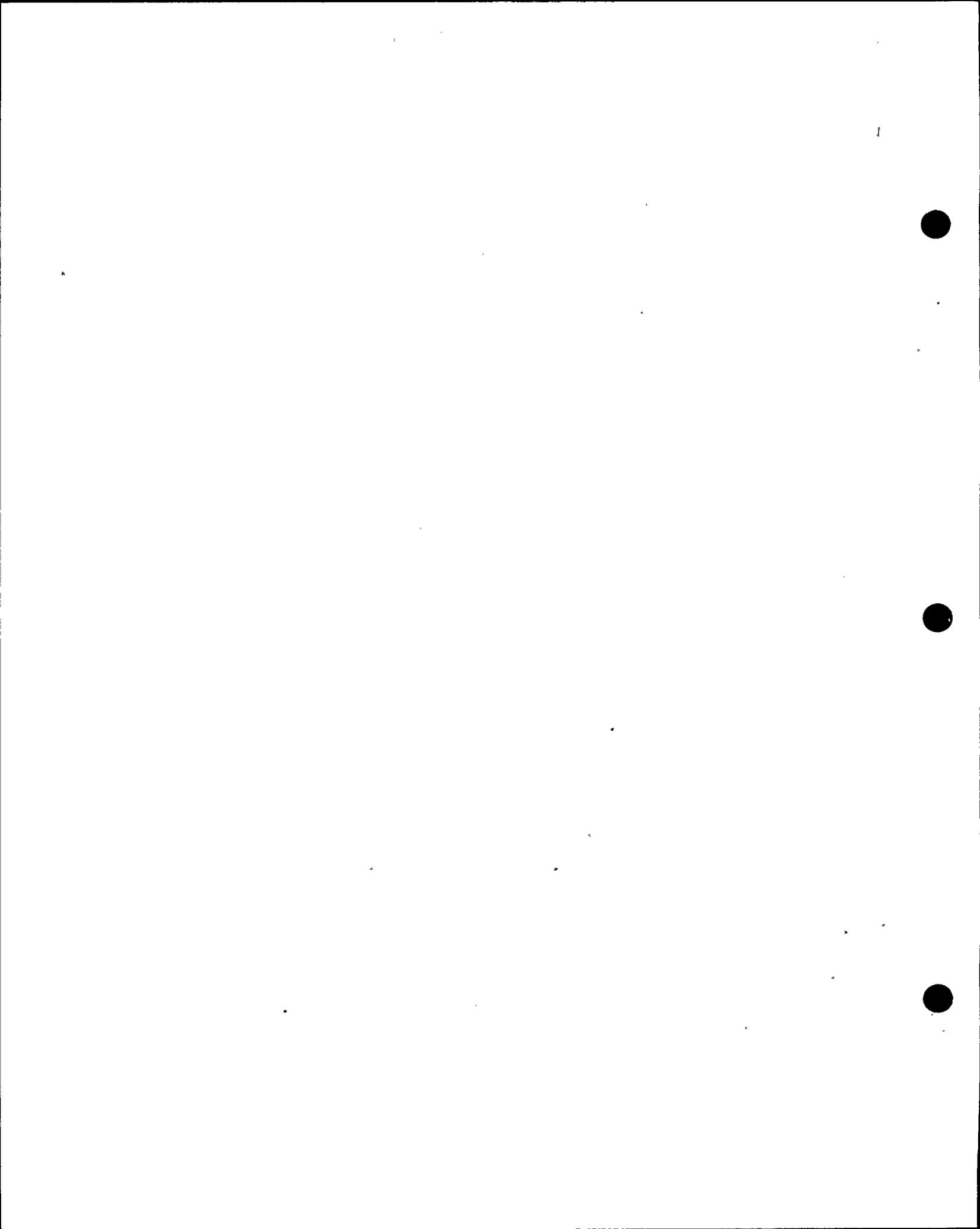




1 The Kemeny Commission Report* provided an adequate summary of
2 radiation exposure information to form the basis of a comparison with potential
3 Diablo Canyon exposures from similar situations. The resulting estimates of
4 exposure from the accident were given as follows, from page 34:

- 5 a. It is estimated that between March 28 and April 15, the collective
6 dose resulting from the radioactivity released to the population
7 living within a 50-mile radius of the plant was approximately 2,000
8 person-rems. The estimated annual collective dose to this population
9 from natural background radiation is about 240,000 person-rems. Thus
10 the increment of radiation dose to persons living within a 50-mile
11 radius due to the accident was somewhat less than one percent of the
12 annual background level. The average dose to a person living within
13 5 miles of the nuclear plant was calculated to be about 10 percent of
14 annual background radiation and probably was less.
- 15 b. The maximum estimated radiation dose received by any one individual
16 in the off-site general population (excluding the plant workers)
17 during the accident was 70 millirems. On the basis of present
18 scientific knowledge, the radiation doses received by the general
19 population as a result of exposure to the radioactivity released
20 during the accident were so small that there will be no detectable
21 additional cases of cancer, developmental abnormalities, or genetic
22 ill-health as a consequence of the accident at TMI.
- 23 c. During the period from March 28 to June 30, three TMI workers
24 received radiation doses of about 3 to 4 rems; these levels exceeded
25 the NRC maximum permissible quarterly dose of 3 rems.
26 An example of a projection derived for the total number of
radiation-induced cancers among the population affected by the
accident at TMI was 0.7. This number is an estimate of an average,
such as the one that appears in the statement: "The average American
family has 2.3 children."
In the case of TMI, what is really means is that each of some 2
million individuals living within 50 miles has a miniscule additional
chance of dying of cancer, and when all of these minute probabilities
are added up, they total 0.7. In such a situation, a mathematical
law known as Poisson distribution (named after a famous French
mathematician) applies. If the estimated average is 0.7, then the
actual probabilities for cancer deaths due to the accident work out
as follows: There is roughly a 50 percent chance that there will be
no additional cancer deaths, a 35 percent chance that one individual
will die of cancer, a 12 percent chance that two people will die of
cancer, and it is practically certain that there will not be as many
as five cancer deaths.

25 *Report of the President's Commission on the Accident at Three Mile
26 Island, October, 1979.



1 Similar probabilities can be calculated for our various estimates.
2 All of them have in common the following: It is entirely possible
3 that not a single extra cancer death will result. And for all our
4 estimates, it is practically certain that the additional number of
5 cancer deaths will be less than 10.
6 Since a cancer caused by nuclear radiation is no different from any
7 other cancer, additional cancers can only be determined
8 statistically. We know from statistics on cancer deaths that among
9 the more than 2 million people living within 50 miles of TMI,
10 eventually some 325,000 people will die of cancer, for reasons having
11 nothing to do with the nuclear power plant. Again, this number is
12 only an estimate, and the actual figure could be as much as 1,000
13 higher or 1,000 lower. Therefore, there is no conceivable
14 statistical method by which fewer than 10 additional deaths would
15 ever be detected. Therefore, the accident may result in no
16 additional cancer deaths or, if there were any, they would be so few
17 that they could not be detected.

18 The appropriate comparative numbers for a TMI "equivalent" accident
19 at Diablo Canyon are presented in Tables II and III. Examination of the tables
20 leads to several extraordinary conclusions.

21 What would the Kemeny Commission have concluded had they been working
22 with a projected number of cancer deaths of 0.008 (Diablo site, low power) or
23 0.016 (Diablo site, full power), instead of 0.7? It is hard enough to compare
24 0.7 to a background of 325,000 "natural" cancers. There are times when words
25 cannot convey the concept. This is one of those times. It is not enough to
26 say that the health effects from a "TMI equivalent" accident at Diablo Canyon
would cause a "negligible number of health effects" or that evacuation would be
unnecessary on the basis of predicted exposure. Such conclusions are
colorless, and do not express the great distance between the estimated effects
and significant levels.

For this reason the significance of the results in Tables II and III
are best expressed in the following ways:



- 1 1. An accident during low power operation at Diablo Canyon would have to be
2 at least 100 times more severe than the TMI accident, to cause a single
3 potential cancer among the surrounding population.
- 4 2. An accident during full power operation at Diablo Canyon would have to be
5 at least 5 times more severe than the TMI accident, to cause a single
6 potential cancer among the surrounding population.
- 7 3. An accident during low power operation at Diablo Canyon would have to be
8 at least 250 times more severe than the TMI accident to cause an
9 individual exposure exceeding the EPA protective action guideline levels,
10 at the site boundary, and at least 10,000 times as severe as the TMI
11 accident to cause an individual exposure exceeding the EPA protective
12 action guidelines at the LPZ.
- 13 4. An accident during low power operation at Diablo Canyon would have to be
14 at least 6,000 times more severe than the TMI accident to cause an
15 individual exposure large enough to show any detectable clinical effects
16 on an individual at the site boundary.
- 17 5. An accident during low power operation at Diablo Canyon would have to be
18 at least 1,000 times as severe as the TMI accident, to cause a
19 statistically detectable increase in the number of cancer deaths occurring
20 in the population surrounding the plant.
- 21 6. For accidents well beyond the severity of the TMI accident, all proposed
22 protective action exposure guides will be easily met at the Diablo Canyon
23 site for low power operation without any protective actions outside the
24 LPZ distance.



1 4.0 Emergency Planning Zones

2 In order to estimate the reduction in calculated exposures for an
3 accident at low power from those associated with full power operation, it is
4 necessary only to use the ratio of fission product inventories.

5 Using the simple reduction of a factor of 20 (for 5% power) across
6 the board (for all isotopes) along with an appropriate plot or table of dose
7 versus distance, or air concentration versus distance, leads directly to
8 several conclusions concerning emergency planning zones.

- 9 1. That any emergency planning dose criteria which can be met at distances of
10 10 to 30 miles (a distance which encompasses the plume exposure emergency
11 planning zones proposed by the federal government and the State of
12 California Office of Emergency Services), for any accidents during full
13 power operation, will be met at distances less than six miles (the LPZ
14 distance) for the same accidents during operation at power levels less
15 than 5%.
- 16 2. For planning purposes related to ingestion pathways, any emergency
17 planning dose criteria which can be met at the 50-mile distance
18 recommended in NUREG-0654 for full power operation, will be met at
19 distances less than 10 miles for operation at less than 5% of full power.
- 20 3. That operation at power levels less than 5% would assure that for any
21 accident, exposures within the LPZ would not exceed any dose criteria for
22 emergency planning which had been established for full power operation for
23 distances out to 30 miles.
- 24 4. That these conclusions (1, 2, and 3, above) can be drawn by inspection of
25 the Table I-2, page I-17, of NUREG-0396 (EPA 520/1/-78-16). Further, that
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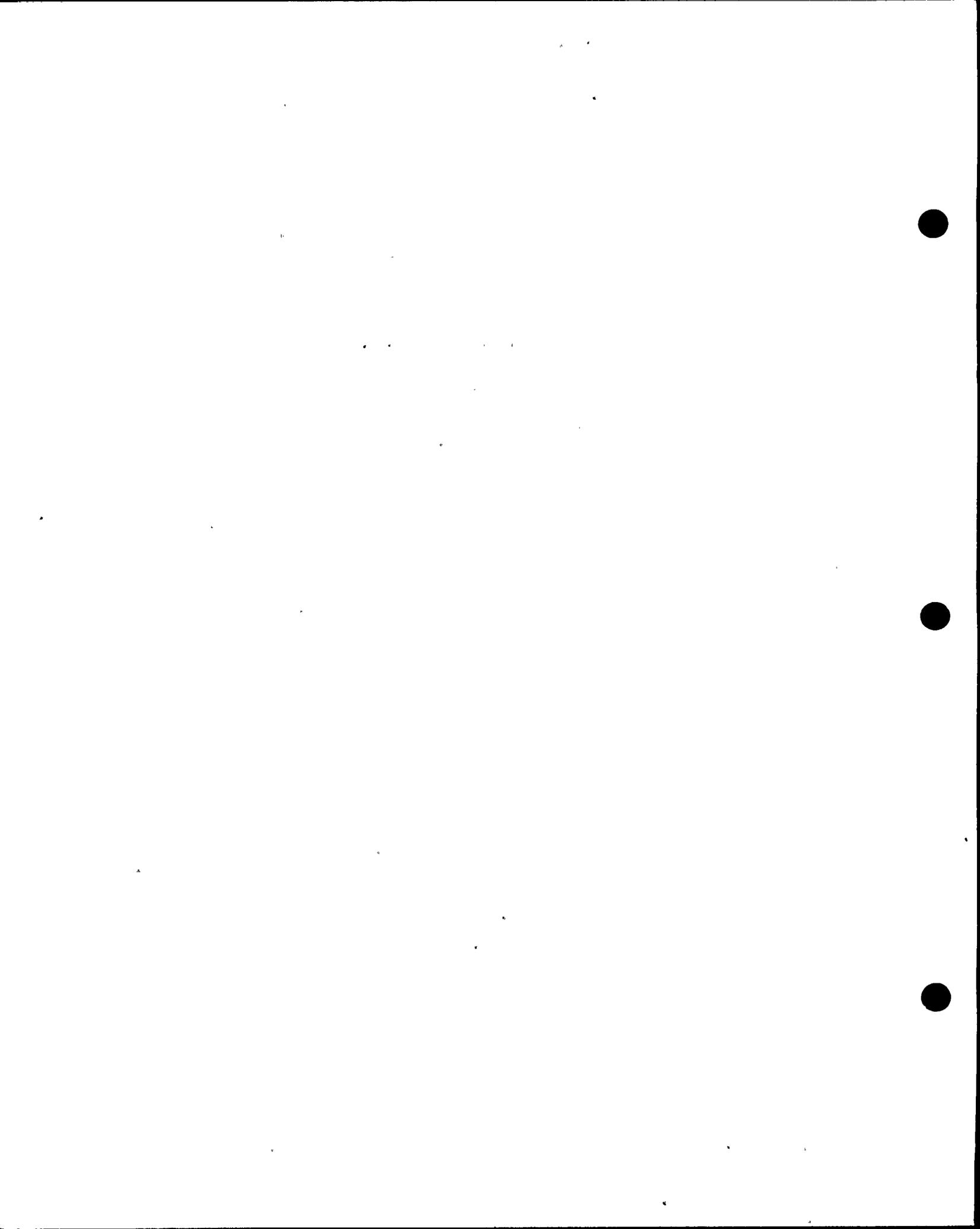
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they can be drawn for specific Diablo Canyon site meteorological conditions, by simple inspection of Table 5.26, page 5-59 of the Final Environmental Statement for Diablo Canyon Units 1 and 2, or from the Diablo Canyon Environmental Report, Supplement No. 1.

- 5. That the same conclusions can be inferred in a general way from the probability and dose curves presented in the OES (SAI) report, but that the procedure is more tedious and indirect. (State of California Office of Emergency Services, Report on Emergency Planning Zones, November 1980).

With regard to the Emergency planning zones required for the ingestion pathways:

- 1. The inventories of the long-lived isotopes (see Table I) are so small after operation at five percent power for one month, and even smaller for the actual planned test profiles, that planning for ingestion pathways beyond the low population zone is entirely unnecessary.
- 2. Because no dairies exist within the low population zone, no planning is necessary to avoid iodine exposure by way of the milk pathway.



1 5.0 General Conclusion

2 In the preceding sections, the risk associated with low power
3 operation has been discussed with reference to a wide range of accidents which
4 are considered possible at full power operation, and in comparison to the
5 recent TMI accident. In view of the large reductions in both probability and
6 consequences of such accidents which could occur during low power operation, it
7 is my conclusion that on the basis of all such predictions of potential
8 exposures that emergency planning need not be carried out for distances much
9 beyond the site boundary, and certainly not beyond the low population zone, for
10 plume exposure or ingestion pathway exposure.

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TABLES



TABLE I

FISSION PRODUCT INVENTORIES

(Curies times 10^{-6})

	<u>Nuclide</u>	<u>Full Power Equil. Cycle</u>	<u>5% Power One Month</u>	<u>Ratio FP/5%</u>
6	Kr-83m	14.3	0.71	20
	Kr-85m	31.3	1.56	20
7	Kr-85	0.82	0.0019	430
	Kr-87	58.9	2.9	20
8	Kr-88	85.7	4.2	21
	Sr-89	111.6	1.89	60
9	Sr-90	6.4	0.014	460
	Y-90	6.3	0.012	520
10	Sr-91	140.0	7.0	20
	Y-91	142.0	2.06	71
11	Sr-92	137.0	6.9	20
	Y-92	149.0	7.5	20
12	Zr-95	176.0	2.5	70
	Nb-95	178.0	0.73	240
13	Mo-99	184.0	9.2	20
	I-131	97.0	4.5	21
14	Te-132	141.0	7.0	20
	I-132	142.0	7.1	20
15	I-133	188.0	9.4	20
	Xe-133m	4.5	0.23	20
16	Xe-133	188.0	9.2	20
	Cs-134	3.1	0.0097	320
17	I-134	232.0	11.6	20
	I-135	182.0	9.1	20
18	Xe-135m	49.0	2.5	20
	Xe-135	28.0	7.4	20*
19	Cs-136	1.1	0.046	24
	Cs-137	9.2	0.021	440
20	Xe-138	169.0	8.5	20
	Ba-140	181.0	7.3	25
21	La-140	184.0	7.2	26
	Ce-144	112.0	0.52	215
22	Pr-144	112.0	0.52	215

*This isotope has a temporary low ratio after shutdown because the low neutron flux at 5% does not consume as many atoms as at full power. Shortly after shutdown it decays.



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TABLE II
INDIVIDUAL EXPOSURES

	Actual	Estimated Diablo Canyon (Full Power)	Estimated Diablo Canyon (Low Power)
Maximum Individual Exposure from Accident (millirem)	70	90	4
Average Individual Exposure (0-5 miles) (millirem)	10	13	0.6
Annual Natural Background (millirem)	150	150	150

GUIDES FOR COMPARISON

Protective Action Guide (EPA) (millirem)	1000-5000
Lowest Exposure Causing Clinical Effects (millirem)	25000



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TABLE III
POPULATION EXPOSURES AND HEALTH EFFECTS

	<u>Actual TMI</u>	<u>Estimated Diablo Canyon (Full Power)</u>	<u>Estimated Diablo Canyon (Low Power)</u>
Population Exposure (50 miles from accident) (person-rem)	2,000	320	16
Annual Natural Background (50 miles) (person-rem)	240,000	39,000	39,000
Incremental Population Exposure from Accident (%)	1	1	0.05
Total Radiation-Induced Cancer Deaths	0.7	0.016	0.008
Natural Cancer Deaths in Population (0-50 miles)	325,000	42,000	42,000



ATTACHMENT 1

PROFESSIONAL QUALIFICATIONS OF

DR. WILLIAM K. BRUNOT

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5
6 My name is William Kennedy Brunot. I am a Consulting Engineer
7 licensed to practice Nuclear Engineering in the State of California. My
8 certificate number is NU-985. My business address is 595 John Muir Drive #508,
9 San Francisco, California, 94132.

10 My educational background is as follows:

11 University of Notre Dame - B.S. in Mechanical Engineering, 1957

12 University of Virginia - M.N.E. in Nuclear Engineering, 1962

13 University of Maryland - Ph.D. in Nuclear Engineering, 1969

14 From 1957 to 1959, I worked in the Technical Evaluation Section of
15 the Army Reactors Branch, Atomic Energy Commission, at Germantown, Maryland.
16 This work consisted of evaluating and checking contractors' design reports,
17 conducting technical feasibility studies, and providing technical consultation.
18 The subjects of the work were heat transfer, fluid flow, mechanical design,
19 stress analysis and shielding.

20 From July of 1962 until late 1963, I was employed as a Test Engineer
21 at the Westinghouse Astronuclear Laboratory in Pittsburgh, Pennsylvania. My
22 work there included mechanical design, heat transfer, thermodynamics, and
23 activation analysis.



1 From October 1963 until January 1965, I was employed by the General
2 Atomic Division of the General Dynamics Corporation at San Diego, in the
3 Nuclear Analysis and Reactor Physics group. My work there was in reactor core
4 design in the fast gas cooled reactor and tungsten nuclear_rocket_projects.
5 The work consisted of calculating core nuclear parameters, with the aid of the
6 General Atomic family of codes for reactor analysis.

7 From September 1968 until May 1970 I was employed by Westinghouse
8 Nuclear Energy Systems, in the Licensing and Reliability Department. As lead
9 engineer of the Radiation Effects and Release Models group, my work included
10 planning, directing, and carrying out off-site dose calculations and activity
11 transport calculations. I defined and developed a group of computer codes for
12 the calculation of the doses resulting from various accidents. Later work
13 concentrated on applying probability and reliability methods to reactor safety
14 assessments.

15 From May 1970 until July 1979, I was employed as a Senior and
16 Supervising Engineer by the Pacific Gas and Electric Company. This work was
17 principally in the areas of reactor safety and environmental effects. I
18 developed the EMERALD computer program, which is used for evaluation of
19 potential radiation exposures from accidents, and in conjunction with a member
20 of my group, the EMERALD-NORMAL program, which is used for calculating
21 radiation exposures from normal reactor operations. These programs were used
22 to carry out the majority of this type of work for the Diablo Canyon project.
23 I supervised a group of four to five nuclear engineers and physicists in this
24 and other reactor safety work for nine years. I have served on the Nuclear
25 Safety and Analysis Task Force at the Electric Power Research Institute, the
26 Edison Electric Institute Task Force to review the Rasmussen Report, as a



1 technical advisor and expert witness for the Utilities in the ECCS Federal
2 Rule-Making hearing, as a witness at the 1972 State of California hearings of
3 the Assembly Land Use Subcommittee, as a witness at several Diablo Canyon
4 hearings, as a member of several PGandE Committees, and on several industry
5 Committees. During 1978, I directed a group of engineers and consultants in
6 performing a detailed probabilistic seismic risk analysis for the Diablo Canyon
7 Nuclear Power Plant. This analysis involved preparation of seismic failure
8 data, system fault trees and a probabilistic radiation hazards analysis for a
9 specific site. In 1979, I participated in the PGandE activities required in
10 response to the Three Mile Island accident.

11 Since June 1979, I have worked as an independent Consulting Engineer,
12 principally assisting the Pacific Gas and Electric Company in its Safety
13 Analysis work on the Diablo Canyon project.

14 I am a member of the American Nuclear Society and have served on a
15 number of industry advisory committees related to reactor safety, and I have
16 published a number of technical papers in the area of safety analysis. A
17 partial list of these publications is attached to this summary.

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ATTACHMENT 2

PARTIAL LIST OF PUBLICATIONS

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4
5 Fuel Element Surface Temperature in the University of Virginia Reactor --

6 Journal of the Virginia Academy of Sciences - Spring 1961.

7
8 Analysis of Fuel Element Surface Temperature and Coolant Flow Rate in the

9 University of Virginia Reactor -- Transactions of the American Nuclear

10 Society - June 1962.

11
12 The Development and Application of a Monte Carlo Method for Reactor Safety and

13 Reliability Analysis -- University of Maryland Dissertation (Dissertation

14 Abstracts, Order No. 69-16, 605) January 1969.

15
16 Control of the Hydrogen Concentration Following a Loss-of-Coolant Accident by

17 Containment Venting for the H. B. Robinson Plant -- W. K. Brunot, et al.,

18 WCAP-7372, November 1969.

19
20 WEDOSE - A Program for the Calculation of Potential Off-Site Doses From a

21 Reactor System -- W. K. Brunot, et al., WCAP-7460, February 1970.

22
23 PREL - A Program for the Calculation of Activity Release From a Reactor System

24 -- W. K. Brunot, et al., WCAP-7461, February 1970.



- 1 Reliability of a Complex Safety Injection System for Digital Simulation --
2 Transactions of the American Nuclear Society, December 1968. . . .
3
- 4 The Probability Distribution of Inhalation Dose Following a Loss-of-Coolant
5 Accident -- Transactions of the American Nuclear Society, June 1969.
6
- 7 EMERALD - A Program for Calculating Radiation Doses from a Pressurized Water
8 Plant -- Transactions of the American Nuclear Society, June, 1972.
9
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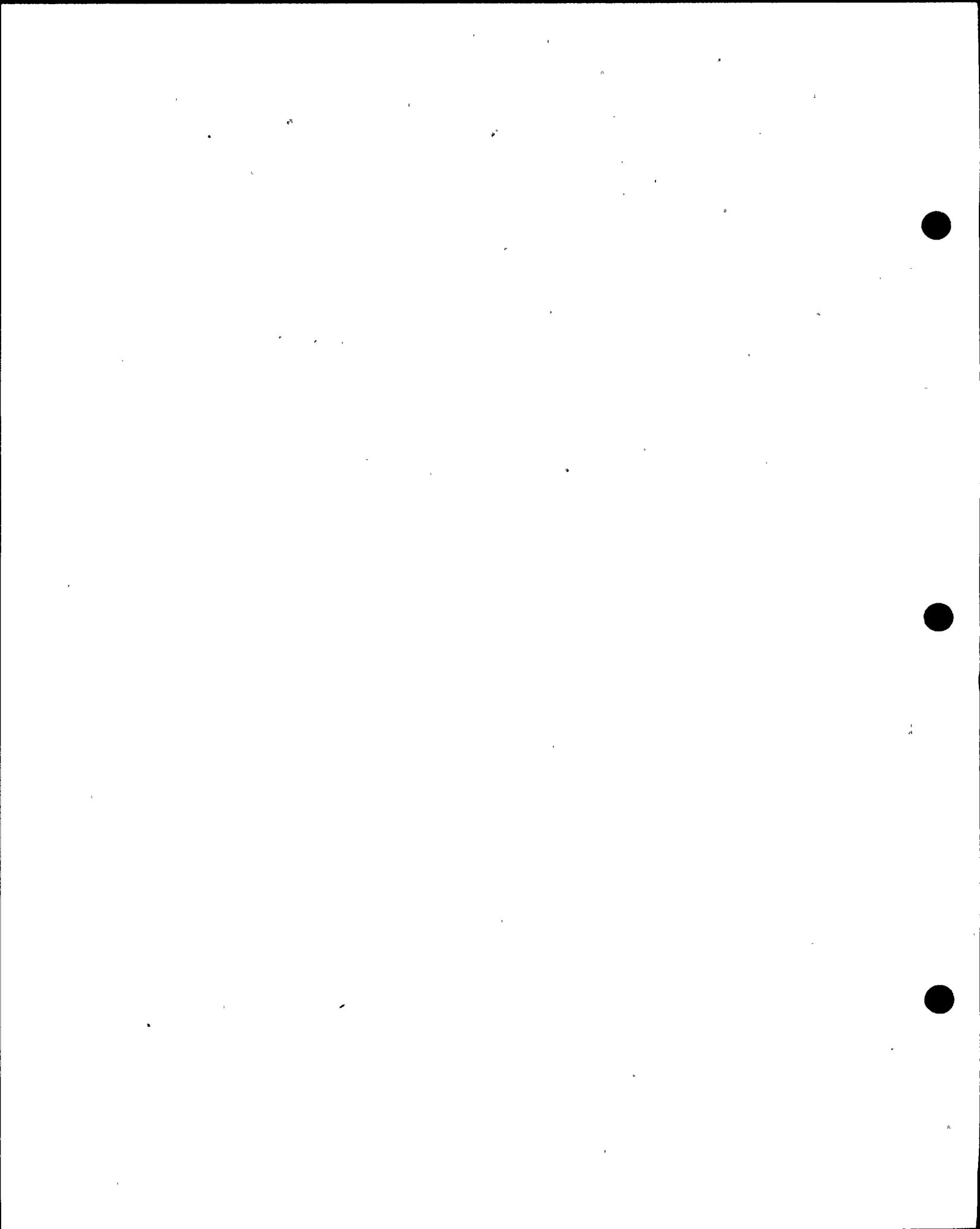


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DIRECT EXAMINATION

BY MR. NORTON:

Q At this time, I am going to turn to the testimony of Messrs. Shiffer, Skidmore, Kaefer and Patterson. There are some changes to that testimony, some corrections, I know, and I will start first with the changes to the testimony by asking Mr. Shiffer to please give the Board those changes.

///Continued on the next numbered page///



tape 5 1g

1 A (Witness Shiffer) The first change occurs on page
2 eight, on line three, towards the end of the line, it says
3 General Design Criteria 819, the number eight should be
4 eliminated. The correct number is 19.

5 In the following paragraph, I would like to do a
6 little rewording. The second sentence, the sentence that
7 starts "Intake air is conditioned"?

8 BY MR. NORTON:

9 Q Could you give the line number? I think it is
10 much easier.

11 A (Witness Shiffer) Yeah, I am sorry. It starts on
12 line five.

13 Q All right.

14 A That entire sentence, that runs from the words
15 "Intake air is conditioned" down to "and charcoal filters,"
16 I would like to move that line, or move that sentence to the
17 end of the sentence on line 10, that ends with "water gage."
18 Follow that? And take that sentence that says "Intake air"
19 and you move it down to line 10, insert it after the word
20 "water gage," after the words "water gage."

21 Okay, and then on line nine, at the end of the line,
22 where it says "approximately one-quarter inch," strike the
23 words "approximately one-quarter inch" out, and just simply
24 substitute "one-eighth inch."

25 And then in line 11, in the sentence which starts



t5 2g
1 "The duct work," et cetera, after the word "the," after the
2 first word, I would like to insert the following:

3 "The pressurization portion of the ventilation
4 system, including the -- "

5 Q You better slow down.

6 A Yeah, I will repeat that.

7 "The pressurization portion of the ventilation
8 system, including the -- " okay?

9 Q All right, next change?

10 JUDGE KLINE: Before we do anything, on that
11 particular spot, in line 9 --

12 THE WITNESS: Yes?

13 JUDGE KLINE: It says, "maintains the TSC and at
14 a minimum." Is that "and" intentionally in there?

15 THE WITNESS: No, I am sorry. That is right. That
16 is one I missed. The word "and" should be stricken.

17 Okay, now on the next page, page nine, I guess, on
18 line 14, where it starts, the paragraph "The laboratory is
19 provided"? Okay, prior to the start of that sentence, I
20 would like to add the words "Under accidents conditions,"
21 and then the sentence continues on, "the laboratory is
22 provided," so it would say -- it would start out saying,
23 "Under accident conditions, the laboratory is provided with,"
24 and I would like to, after the word "with," I would like to
25 insert "pressurization air," and strike the word



1 "ventilation."

2 And at the end of that sentence, adding onto the
3 end of that sentence on line 15, after the word "system,"
4 "and is maintained at a minimum positive pressure of one-
5 eighth inch water gauge."

6 Would it help if I read that whole sentence as
7 modified now?

8 MR. NORTON: If the Board -- does the Board have it?

9 JUDGE WOLF: Yes. Would you do that, please?

10 THE WITNESS: So the whole sentence starting on
11 line 14 says, "Under accident conditions, the laboratory is
12 provided with pressurization air from the TSC ventilation
13 system, and is maintained at a minimum positive pressure of
14 one-eighth inch water gauge."

15 Now, then on line 15, at the end of the line, the
16 word "under," okay, starting at the word "under," from there
17 to the end of that paragraph, I would like to cross the whole
18 thing out. Starting "Under accident conditions," et cetera,
19 et cetera, down to the end of that section, eliminate that
20 whole thing.

21 BY MR. FLEISCHAKER:

22 Q Excuse me, is that through the end of line 21?

23 A (Witness Shiffer) End of line 21.

24 Q Thank you.

25 A Okay? Okay, the rest of them are simple after that.



t5 : 4g
1 I am sorry.

2 On the following page, page ten, on line 9, on line
3 9 at the beginning, it says "10' by 55' trailer." That
4 should actually be "twelve by fifty-one."

5 On line eleven, at the end of the line, it says
6 4,000. That should be about 3,900 -- that should be 3,900.

7 On page 15, on line 10, in the middle of the line,
8 it says "short-range," the word "short" should be changed to
9 "long." It should be "long-range."

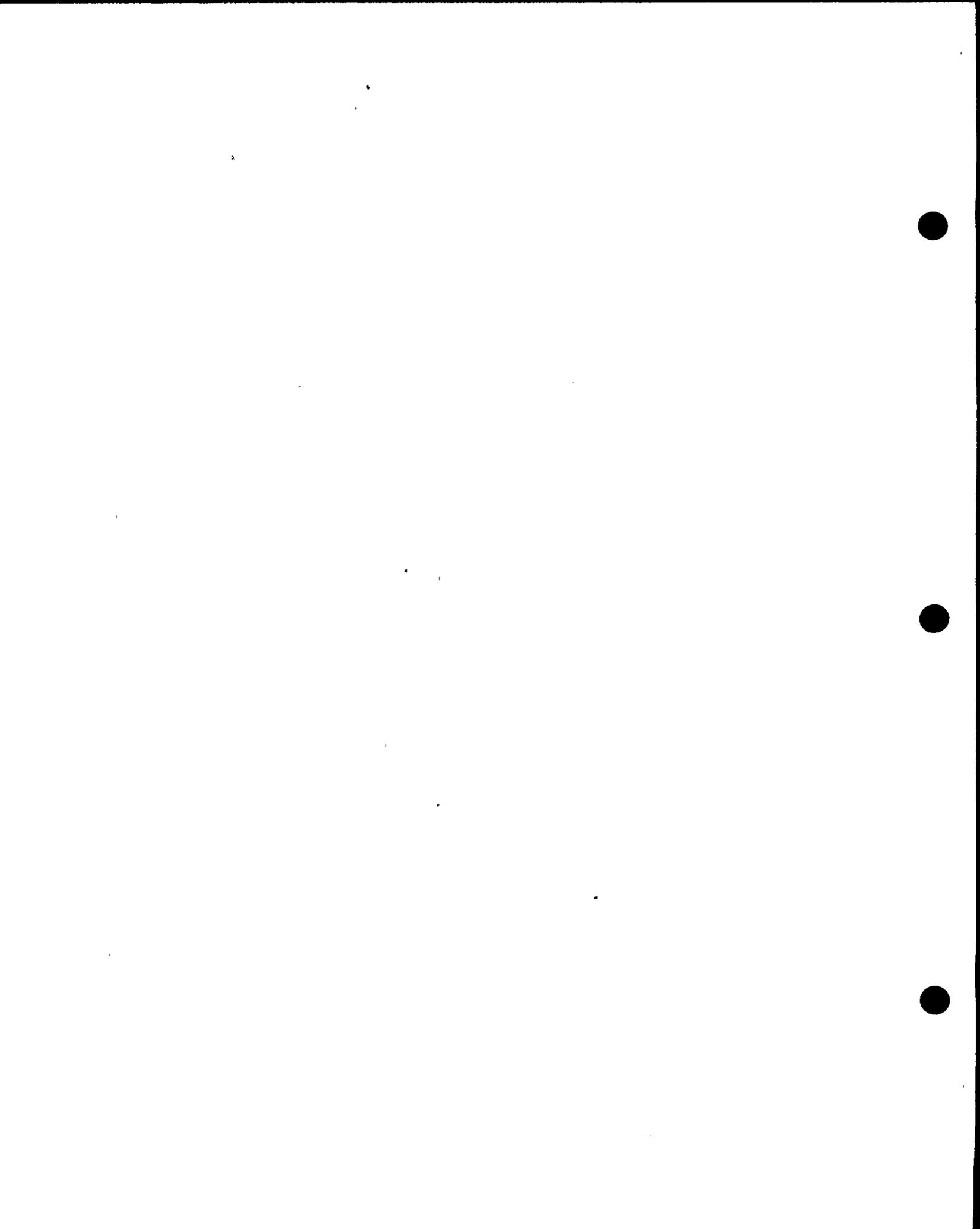
10 On page 18, line 8, at the end of the line, it says,
11 the last four words say "such a sample in." Replace "such a"
12 with the word "the," and after the word "sample," insert the
13 word "data," so that last thing says "analyze the sample data
14 in."

15 On page 25, line 22, in the last third of the --
16 the sentence that starts there "seven members," the word
17 "seven" should be "Nine."

18 On page 33, on line 13, starting on the second word
19 of that line, it says "indicate that sufficient time," those
20 four words should be eliminated, and they should be replaced
21 with "demonstrate that more than three hours."

22 BY MR. NORTON:

23 Q You would have to change the word because of that
24 verb that follows in the sentence, "is" would have to be
25 changed to "are," I believe.



t5 5g 1 A (Witness Shiffer) Oh, yes. I am sorry, yes, and
2 that -- okay. The word "is" would change to "are," correct.

3 And then on page 35, on-line 10, the second word.
4 in that thing is "chi over Q(x), bracket," after the right-
5 hand bracket, there should be a parentheses, so right before
6 the word "shrinks," there should be a parentheses, a right
7 parentheses, a right-hand parentheses, and then finally on
8 page three of my biography, or whatever, qualifications, in
9 the first line, it says "as a Power Plant Engineer," the word
10 "a" should be removed, just simply "as Power Plant Engineer."

11 Q Is that all you have, Mr. Shiffer?

12 A That is all I have now.

13 Q Mr. Patterson, do you have any changes to the
14 testimony or your qualifications?

15 A (Witness Patterson) No, I do not.

16 Q Mr. Skidmore?

17 (Applause)

18 BY MR. NORTON:

19 Q Mr. Skidmore, I believe you told me you had a
20 change in the qualifications, a typographical?

21 A (Witness Skidmore) Yes, I do. On the first page of
22 my qualifications, line 13?

23 Q Yes.

24 A At the end of that line, where it says "and from
25 March to," after the word "March," put in "1965:"



t5 6g
1 Q All right.

2 A On the same page, on line 21, at the end of the
3 line, strike "in the PGandE."

4 Again on the same page, on line 23, at the beginning
5 of that paragraph, where it says "From June, -1972," change
6 that to read "From January, 1972."

7 On the second page of my qualifications, on line 7,
8 starting a little past the middle of that line, where it says
9 "acting as PGandE," strike the rest of that, strike line 8,
10 strike line 9.

11 Q So it would be a period after "Corporate Emergency
12 Response Plan?"

13 A No, I am going to insert another phrase.

14 Q Okay.

15 A So line 7 now would read, "Corporate Emergency
16 Response Plan," and I want to insert the following phrase:
17 "and coordinating Diablo Canyon licensing activities in
18 response to post-TMI requirements," period. Did I go too
19 fast?

20 Q You might repeat it.

21 A Okay, so after "Corporate Emergency Response Plan,
22 comma," I am inserting "and coordinating Diablo Canyon
23 licensing activities in response to post-TMI requirements,"
24 period.

25 On the same page, on line 12, which in the center it



t5 7g
1 says, "from May, 1980 to May, 1981," where it says "May, '81,"
2 change the May to "March, '81."

3 On line 23, where the paragraph begins with "In May
4 of 1981," change the "May" to "April of '81."

5 That is all the changes I have.

6 Q And Mr. Kaefer, do you have any changes?

7 A (Witness Kaefer) No, I do not.

8 Q All right. Gentlemen, I would like to ask you as
9 a -- I guess we better do this individually. Is this
10 testimony true and correct to the best of your knowledge, both
11 the testimony and qualifications that are attached? We can
12 just go around and start with Mr. Skidmore, if you would.

13 A (Witness Skidmore) Yes, to the best of my knowledge
14 it is.

15 Q All right, Mr. Shiffer?

16 A (Witness Shiffer) Yes.

17 Q Mr. Patterson?

18 A (Witness Patterson) Yes.

19 Q And Mr. Kaefer?

20 A (Witness Kaefer) Yes.

21 MR. NORTON: All right. At this time, Your Honor,
22 we would move that the testimony, combined testimony of these
23 gentlemen, and their qualifications as inserted at the end of
24 the testimony, be inserted in the record as though read.

25 MR. REYNOLDS: No objection.



1 MR. LANPHER: No objection.

2 MR. OLMSTEAD: No objection.

3 JUDGE WOLF: Without objection, the written
4 testimony of Mr. Skidmore, Brunot, Shiffer, Kaefer, and
5 Patterson will be received and bound in the record as if
6 read.

7 (Whereupon, the prepared statement of the above
8 persons was inserted into the record.)

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10 /// PLEASE CONTINUE READING NEXT NUMBERED PAGE ///

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TESTIMONY OF

J. D. SHIFFER

S. M. SKIDMORE

W. B. KAEFER

R. PATTERSON

ON BEHALF OF

PACIFIC GAS AND ELECTRIC COMPANY

MAY 19, 1981

CONTENTION 4

INTRODUCTION

The Diablo Canyon Emergency Plan was first prepared in 1974. Attached to this Plan was an "Interim Evacuation Plan" prepared by the San Luis Obispo County Sheriff, which dealt with the evacuation of the "low population zone" which surrounds Diablo Canyon. This package was submitted to the NRC, who reviewed it and concluded in a staff report dated October 16, 1974, that "... the program conforms with Appendix E of 10CFR50, and is acceptable."

Revision 1 to the Plan was submitted to the NRC in October, 1977. This revision was made to reflect certain changes in agreements with interfacing agencies. In particular, French Hospital in San Luis Obispo became the Company's local radiological medical emergency facility, and the Sheriff's "Interim Evacuation Plan" was replaced by San Luis Obispo County's "Nuclear Power Plant Emergency Response Plan" and their plan for "Nuclear Power Plant



1 Emergency Evacuation." The County plans were adopted by the County Board of
2 Supervisors in December, 1976, and remain in effect to this date. This version
3 of the emergency plan was also approved by the NRC, and was the subject of
4 public hearings in October, 1977.

5 Revision 2 to the Plan was submitted to the NRC in February, 1980.
6 This revision grew out of a post-TMI review by the NRC of all existing site
7 emergency plans and, in the case of Diablo Canyon, included a site visit and a
8 public meeting during the week of November 27, 1979. The outgrowth of this
9 process was a directive by the NRC for PGandE to submit a revised plan in the
10 format of and addressing the requirements of Regulatory Guide 1.101. In
11 addition, the Plan was also to address PGandE's proposed means for compliance
12 with new emergency planning requirements which had been identified at that
13 time--such as the development of an Early Warning System, and the establishment
14 of an onsite Technical Support Center. Another required change was the
15 adoption of the emergency classification system described in NUREG-0610.

16 Subsequent to the submission of Revision 2 to the Plan, the site
17 implementing procedures were revised. The major purposes of this revision were
18 to incorporate the new emergency classification system and to reflect changes
19 in both the plant and corporate organizations which had taken place since 1977.
20 In addition, several new procedures were prepared which discussed initial
21 activation and staffing of the interim onsite Technical Support Center and
22 offsite Emergency Operations Facility, and the onsite Operations Support
23 Center.



1 Another development in the evolution of PGandE's internal emergency
2 planning which occurred in the latter part of 1980 was the preparation of a
3 formal "Corporate Emergency Response Plan." The Company has numerous
4 resources, in the form of both personnel and equipment, which can be brought
5 into play to assist in the event of an emergency at Diablo Canyon. Although
6 these capabilities were discussed in general terms in early versions of the
7 site plan, the Corporate Plan provides a formal emergency plan and implementing
8 procedures for each involved corporate department. In addition to the plans
9 and procedures, a Corporate Incident Response Center has been established at
10 the corporate headquarters in San Francisco.

11 Finally, PGandE is currently in the process of preparing Revision 3
12 to the site Emergency Plan. The purpose of this revision is to address all
13 remaining criteria of NUREG-0654 as they relate to full power operation.
14 Similarly, both the State of California and San Luis Obispo County are in the
15 process of revising their nuclear emergency plans to meet NUREG-0654.

16 In the section which follows, certain of the more important emergency
17 planning provisions are discussed, including, as appropriate, the present
18 status; identification of significant changes which have occurred since the
19 previous public hearings in 1977; and identification of further changes which
20 will be in place prior to fuel loading.

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1 STATUS OF MAJOR EMERGENCY PLANNING PROVISIONS

2
3 1. Organization

4 In the event of an emergency, the normal operating crew is
5 responsible for, and qualified to make an initial evaluation of the incident,
6 perform any immediate operations which are necessary, and place appropriate
7 portions of the Emergency Plan into effect. This would involve notification of
8 offsite agencies and personnel and deployment of the operating crew into an
9 interim Onsite Emergency Organization, followed by the augmentation of this
10 organization with other members of the plant staff as they become available.

11 The Onsite Emergency Organization is headed by the Site Emergency
12 Coordinator, who has overall responsibility for all assessment, corrective and
13 protective actions taken by Company personnel at or near the plant site prior
14 to the time that the Corporate Emergency Response Plan is activated. Following
15 the latter, the Site Emergency Coordinator's responsibilities are twofold:

- 16 a. To work with the local Corporate Recovery Manager to develop an
17 overall Company emergency response program, and
18 b. To manage all onsite activities.

19 Initially, the position of Site Emergency Coordinator is assumed by
20 the on-duty Shift Foreman. Administrative procedures emphasize the Shift
21 Foreman's responsibility for command and control of control room activities in
22 an emergency to assure that effective leadership is provided in its early
23 stages. The position of Site Emergency Coordinator is subsequently assumed by
24 a senior member of the plant staff, such as the Plant Manager. However,
25 command and control of control room activities is retained by an NRC-licensed
26 Senior Operator such as the Shift Foreman.



1 There have been several significant changes made in the plant staff in the
2 past year which enable it to better respond to emergency situations. First,
3 the previous on-shift crew of a Shift Foreman and seven additional operators
4 (for operation of one unit) has been increased by the addition of a shift
5 technical advisor (required to be a graduate engineer), two instrument and
6 controls technicians, one chemistry and radiation protection technician, and a
7 shift clerk. Further, the total plant complement has grown with the addition
8 of approximately 80 personnel, many of whom are graduate engineers in various
9 disciplines. This provides a greater reservoir of personnel from which to draw
10 to handle any emergency situation.

11 During fuel loading and low-power testing, the shift crew will be
12 supplemented by engineers from the plant staff, the Company's General
13 Construction department, and Westinghouse. At a minimum, during periods of
14 fuel loading and low power testing there will be three PGandE engineers and two
15 Westinghouse engineers on each shift. Numerous other engineers and technical
16 specialists are also normally present during periods of testing.

17 The Corporate Emergency Response Plan, developed within the past
18 year, provides for deployment of key corporate officials to the San Luis Obispo
19 area in the event of a significant emergency. These personnel would staff the
20 offsite Emergency Operations Facility and provide interface between the Company
21 and local officials, and would coordinate and direct the overall Company
22 response to the emergency. Other corporate officials are similarly deployed in
23 the Corporate Incident Response Center in the San Francisco corporate office to
24 provide assistance as required. In addition, Westinghouse has agreed to
25 provide technical support as needed in the event of an emergency.
26



1 From an organizational standpoint, the Company's current emergency
2 plans not only meet the requirements of Regulatory Guide 1.101, but also are
3 substantially in accord with the requirements of NUREG-0654, as discussed by
4 the NRC in Supplement 14 to the Safety Evaluation Report (NUREG-0675).
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1 2. Facilities

2 The Company has established the following emergency response support
3 facilities:

- 4 a. An onsite Technical Support Center (TSC) to provide plant management
5 and technical support to plant operations personnel during emergency
6 conditions.
- 7 b. An onsite Operational Support Center (OSC) to provide an assembly
8 area for operations support personnel and logistical support
9 coordination.
- 10 c. An offsite Emergency Operations Facility (EOF) to provide for
11 management of the Company's overall emergency response, coordination
12 of radiological and environmental assessment, and coordination of
13 emergency response activities with federal, state, and local
14 agencies.
- 15 d. A Corporate Incident Response Center (CIRC) in San Francisco to
16 provide for additional technical, logistical, and liaison support.

17 Technical Support Center

18 The permanent TSC structure has been completed and will be
19 operational at the time of fuel loading. This structure is located on the
20 upper level of the Unit 2 end of the buttresses on the west side of the turbine
21 building. Following activation of the TSC in an emergency, the overall onsite
22 assessment and recovery programs will be directed from this location. In
23 addition, communication with offsite locations will be handled through the TSC.

24 The TSC is a seismic Class I structure sized to accommodate a minimum
25 of 20 Company personnel and five NRC personnel in a space in excess of 3400
26 ft², excluding space for ventilation equipment. The TSC is designed to be



1 habitable throughout the course of a degraded-core accident. The TSC shielding
2 and ventilation were designed to assure that personnel inside the TSC will not
3 receive doses in excess of those specified in General Design Criteria 819 and
4 Standard Review Plan 6.4.

5 The TSC is provided with its own ventilation system. Intake air is
6 conditioned and internally recirculated through high efficiency particulate air
7 (HEPA) and charcoal filters. Under accident conditions the supply to the TSC
8 is automatically transferred to the control room pressurization system which
9 maintains the TSC and at a minimum positive pressure of approximately 1/4"
10 water gage. The pressurization air exfiltrates from the TSC to the outside
11 atmosphere. The duct work, ventilation fans and filter units for the TSC are
12 designed to Seismic Class I criteria. Normal lighting for the TSC is provided
13 from either of two AC sources through a manual transfer switch. Backup DC
14 lights are also provided. In addition, a permanent radiation monitoring system
15 is installed in the TSC. The TSC is provided with an extensive communications
16 system as discussed in Section 3.

17 Special equipment provisions are included to permit persons in the
18 TSC to monitor important plant parameters. One piece of equipment for this
19 task is a Harris 1600 computer, which has the capability to read data from the
20 plant process computer, store it on disc, and transmit it offsite to the
21 Emergency Operations Facility and the Corporate Incident Response Center. This
22 equipment will serve the basic functional requirements of the data acquisition
23 system in NUREG-0696.

24 In addition to the Harris system, closed circuit TV cameras are
25 located in the control room in a such a manner that the console, main vertical
26 boards, and the post-accident monitoring panel can be scanned from the TSC.



1 The resolution of these cameras is such that the indicators and recorders on
2 these boards and panels are easily read in the TSC.

3 One section of the TSC serves as a radiological counting laboratory.
4 This facility is intended to be a backup location for this type of work in the
5 event that the normal counting laboratory is unuseable due to high background
6 radiation levels. It will be equipped with a multichannel gamma ray
7 spectroscopy system using a high resolution intrinsic germanium detector, a low
8 background alpha/beta detector, a Thermoluminescent Dosimeter (TLD) reader
9 which can be used for either personnel or environmental dosimeters, and other
10 miscellaneous radiation protection equipment. Although not specifically
11 required, this instrumentation was installed in response to the problem which
12 occurred at TMI, wherein high radiation background in certain areas of the
13 plant made some of the normal analytical instruments unusable.

14 The laboratory is provided with ventilation from the TSC ventilation
15 system. This laboratory also contains its own air-conditioning unit. Under
16 accident conditions, TSC air is exhausted to the laboratory, which is at a
17 pressure (1/8" water gauge) slightly less than the other portions of the TSC.
18 The pressurization air exfiltrates from the laboratory to the outside
19 atmosphere. The exhaust air from the hood passes through HEPA and charcoal
20 filters before being discharged to the atmosphere. The duct work, ventilation
21 fans and filter units are designed to Seismic Class I criteria.

22 Operational Support Center (OSC)

23 The existing plant security building, located on the southern
24 perimeter of the protected area, is used as the onsite Operational Support
25 Center. The OSC is approximately 1,600 square feet in area, and contains
26



1 kitchen and lavatory facilities. The OSC is provided with Company and PT&T
2 telephone facilities and radio communications as discussed in Section 3.

3 The OSC serves as a staging area for support personnel who are called
4 into the site to provide support activities. Use of the OSC eliminates
5 unnecessary congestion in the control room and TSC, and enhances the
6 implementation of personnel accountability measures.

7 Offsite Emergency Operations Facility (EOF)

8 The interim PGandE offsite Emergency Operations Facility consists of
9 a 10' x 55' trailer which is located adjacent to the San Luis Obispo County
10 Sheriff's Operations Center, approximately 11 miles northeast of the site. The
11 County Emergency Operations Center (EOC) occupies approximately 4000 ft² of the
12 Sheriff's facility.

13 The EOF is provided with extensive telephone and radio communications
14 capability as part of the Company phone-system, and is also tied into the
15 Harris Computer System. In addition, the adjacent Sheriff's Operations Center
16 has emergency radio communications with the plant. The interim EOF has been
17 approved by the NRC staff for fuel loading and low power testing.

18 Corporate Incident Response Center

19 The Corporate Incident Response Center is located in the corporate
20 headquarters in San Francisco. It consists of one entire secured floor of the
21 general office building. It is provided with communications from the Company
22 telephone system (see Section 3 below), and data links to the Harris computer
23 system. In addition, further technical support is provided by the Nuclear
24 Plant Operations Computer System located on this floor. This computer system
25 uses diverse computer equipment outside PGandE to provide extensive thermal-
26 hydraulic, core physics, and other analytical capability.



1 In our opinion, these emergency response facilities are more than
2 adequate for the handling of any reasonably conceivable emergency which could
3 result from fuel loading and low power testing.

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1 3. Communications

2 In the original Emergency Plan, the plant relied upon the Pacific
3 Telephone and Telegraph phone system and a UHF radio system to reach
4 non-Company offsite locations, such as the Sheriff's office.

5 The original PT&T provisions included three normal-use business lines
6 plus four totally unlisted (not even on the dial) lines which were intended to
7 provide a backup means for calling out if the normal lines were busy. All
8 lines were served from the Avila Beach exchange.

9 The original radio system was intended to supplement the normal
10 in-plant communications systems (Company phone and intercom) and to serve as a
11 backup means (to the PT&T telephones) for offsite communications in an
12 emergency. This system utilizes two frequencies; one short-range, used for
13 local onsite communication, while the other provides long-range coverage. The
14 short-range channel provides direct radio-to-radio coverage in the immediate
15 vicinity of the Diablo Canyon site, including the control room, Technical
16 Support Center, switchyards, intake structure, and open yard areas. When
17 long-range coverage is required, all radio transmissions are rebroadcast by a
18 mountain-top repeater using the second channel. Long-range coverage extends
19 north to Cambria, south to Santa Maria, and east to San Luis Obispo. Base
20 station radios are located in the control room, the Morro Bay Switching Center
21 (about 12 miles north of the plant), the PGandE Information Center (about 9
22 miles east of the plant), the Avila Beach guard station, and the Sheriff's
23 Operations Center. More recently, control consoles for the plant radio have
24 been added in the onsite TSC and OSC, and the offsite EOF. In addition, there
25 are mobile units in several of the plant vehicles and numerous hand-held
26 walkie-talkie units.



1 The Company has long employed a direct-dial telephone system which
2 enables any Company telephone to reach any other Company telephone. This
3 system is the principal means used by plant personnel to communicate with other
4 inplant locations and with offsite Company facilities, such as the corporate
5 office. Several hundred phones are located throughout the plant. The system
6 employs a Private Automatic Branch Exchange (PABX) at the plant, and has
7 various inplant code-calling and conference features. There is no direct
8 access to the PT&T system from phones off of this exchange.

9 All of the systems mentioned above still exist and are functional.
10 However, significant improvements have been made in the last year in the
11 plant's communications capabilities. The first is an upgrade of the Company
12 direct-dial system involving the installation of a Computerized Branch Exchange
13 (CBX) at the plant. The CBX is a computer-based, software-controlled telephone
14 exchange which interconnects with the power plant PABX via 10 tie trunks.
15 There are approximately 160 CBX telephones; 16 are Off-Premise Local Extensions
16 (OPL) located at key General Office locations, 7 are OPL's in the EOF, and the
17 remainder are phones located at the plant in key emergency areas (control room,
18 TSC, OSC) or in the offices of key individuals.

19 Since the CBX is interconnected with the PABX, any Company phone can
20 reach a CBX phone. However, the CBX phones have several special capabilities
21 not available on a normal Company phone. For example, there are 20 new
22 incoming and 20 new outgoing trunks which tie directly from the CBX to the PT&T
23 system. Ten of each go south to Avila Beach and the other half will go north
24
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26



1 to Baywood Park¹ in order to provide an independent path. In addition, there
2 are 12 one-way (outgoing) trunks which go from the plant CBX via microwave to
3 the San Francisco General Office PBX, through which the PT&T system can be
4 reached by direct dialing. These 12 special trunks can be accessed only by a
5 limited number of high-priority CBX phones at the plant, to ensure their
6 availability. Thus, the new system substantially increases the ability of the
7 plant to communicate via the PT&T system. Other standard CBX telephone
8 features include call-transfer, call-waiting, conferencing, call-forwarding,
9 and toll restriction in various degrees. Finally, certain high-priority CBX
10 phones have an executive override feature which allows the calling party to
11 place a call to any other CBX telephone, even if the called station is in use.

12 Several dedicated phone lines have been installed which link the
13 plant control room to key offsite locations, including the NRC (the "red" and
14 "blue" emergency phones), the State Office of Emergency Services, and the
15 County Emergency Operations Center at the Sheriff's Office. The latter has a
16 transfer switch to transfer it from the control room to the TSC after the
17 latter is activated. A dedicated line also links the control room and TSC.

18 A second radio system has been installed for health physics use,
19 i.e., communications with field-monitoring teams so that plant operations and
20 health physics personnel can simultaneously utilize radio communications to
21 perform their duties without interfering with each other. This is also a
22 2-frequency radio system. Three mountain-top radio sites are utilized to
23 provide extended radio coverage both to the north, including Paso Robles and

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25
26 ¹ These latter trunks will not be installed until approximately June 1.



1 San Luis Obispo, and to the south, including the Santa Maria area.- Short-range
2 radio communications coverage is provided around the Diablo Canyon site:

3 Control consoles for this system are located in the control room,
4 Technical Support Center, and Emergency Operations Facility. Mobile radio
5 sets will be provided to key vehicles and portable radio sets will be
6 available to health physics monitoring teams on this system. The portable
7 and mobile sets are expected to be available by the end of June.

8 A third 2-frequency radio system has been provided for plant
9 security. This system has essentially the same coverage capabilities as the
10 original operations radio system; i.e., short range coverage north to Cambria,
11 east to San Luis Obispo, and south to Santa Maria. This system was provided to
12 allow security forces to utilize radio communications in the performance of
13 their duties without interfering with or being interfered with by either the
14 operators or health physics personnel.

15 All communications systems are powered by reliable AC power sources
16 with battery backup.

17 This expanded communications system provides secure, redundant and
18 diverse communications to all essential onsite and offsite locations during
19 normal and accident conditions.

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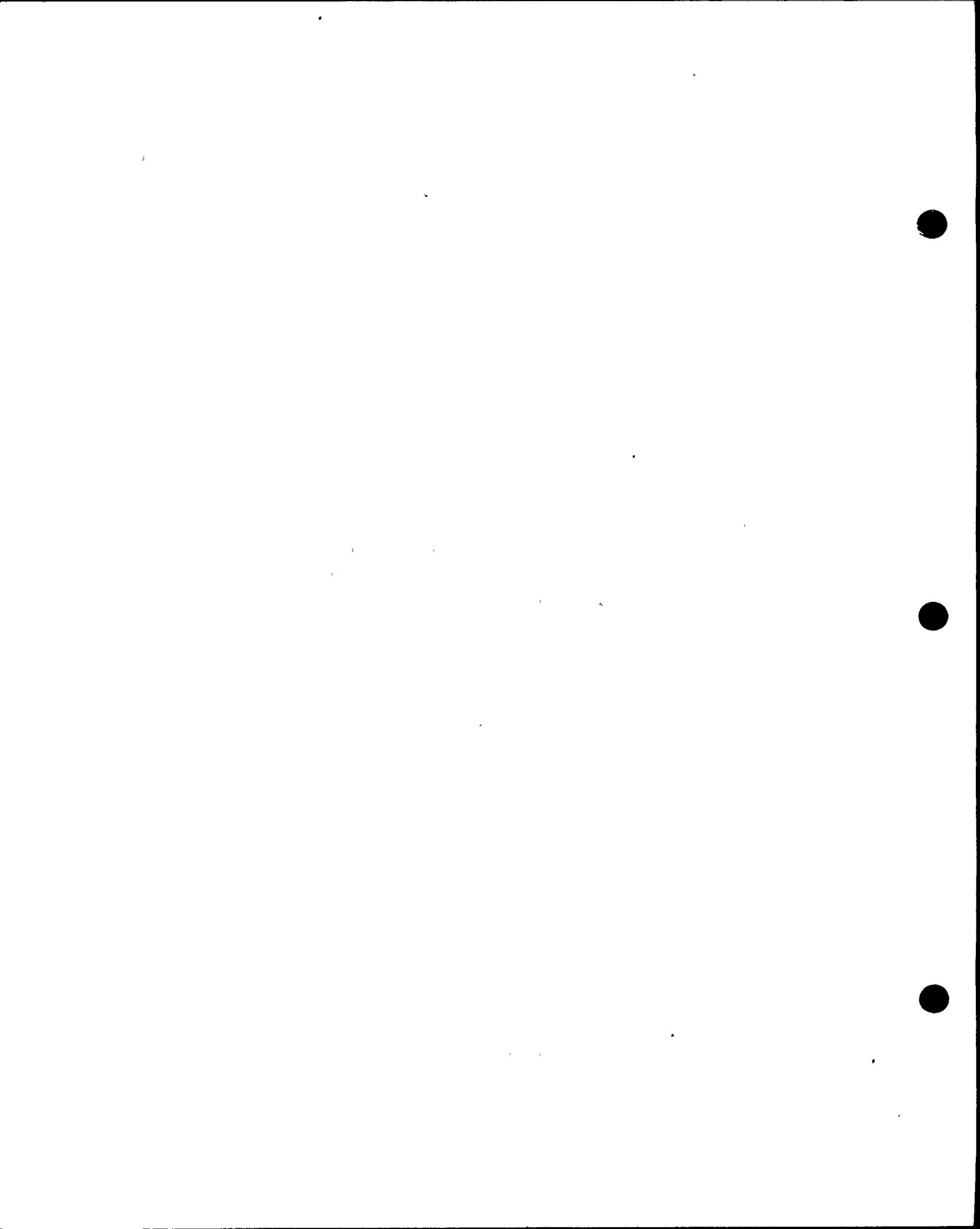
1 4. Radiological Monitoring

2 Previously, the Company had provided for post-accident environmental
3 radiological monitoring using three basic mechanisms:

- 4 a. Two man monitoring teams equipped with portable radiation survey
5 instruments and air sampling equipment which will be dispatched
6 onsite and offsite to predesignated monitoring locations.
- 7 b. A network of 21 environmental radiation monitoring stations
8 maintained by the Company's Department of Engineering Research, 12 of
9 which are located offsite. Each station is equipped with a
10 thermoluminescent dosimeter (TLD) and 4 have air samplers (one
11 onsite, 3 offsite.)
- 12 c. Two "real-time"¹ instruments (TASC-4's) employing NaI scintillation
13 detectors. These instruments are located in Baywood Park, about 8
14 miles north of the plant and at the Avila Beach gate, about 6 miles
15 South-Southeast of the plant.

16 All of the above methods still exist. However, the number of
17 environmental sampling stations has been increased to 32 (15 onsite and 17
18 offsite) of which 6 now include air sampling equipment (3 onsite, 3 offsite).
19 In addition; three environmental sampling stations have been provided to
20 officials of Santa Barbara County. These all include TLDs and air samplers and
21 are located in Santa Maria, Lompoc, and Solvang.

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24 ¹By "real-time" is meant an instrument which enables an observer to
25 immediately determine the existing dose rate at a given location.
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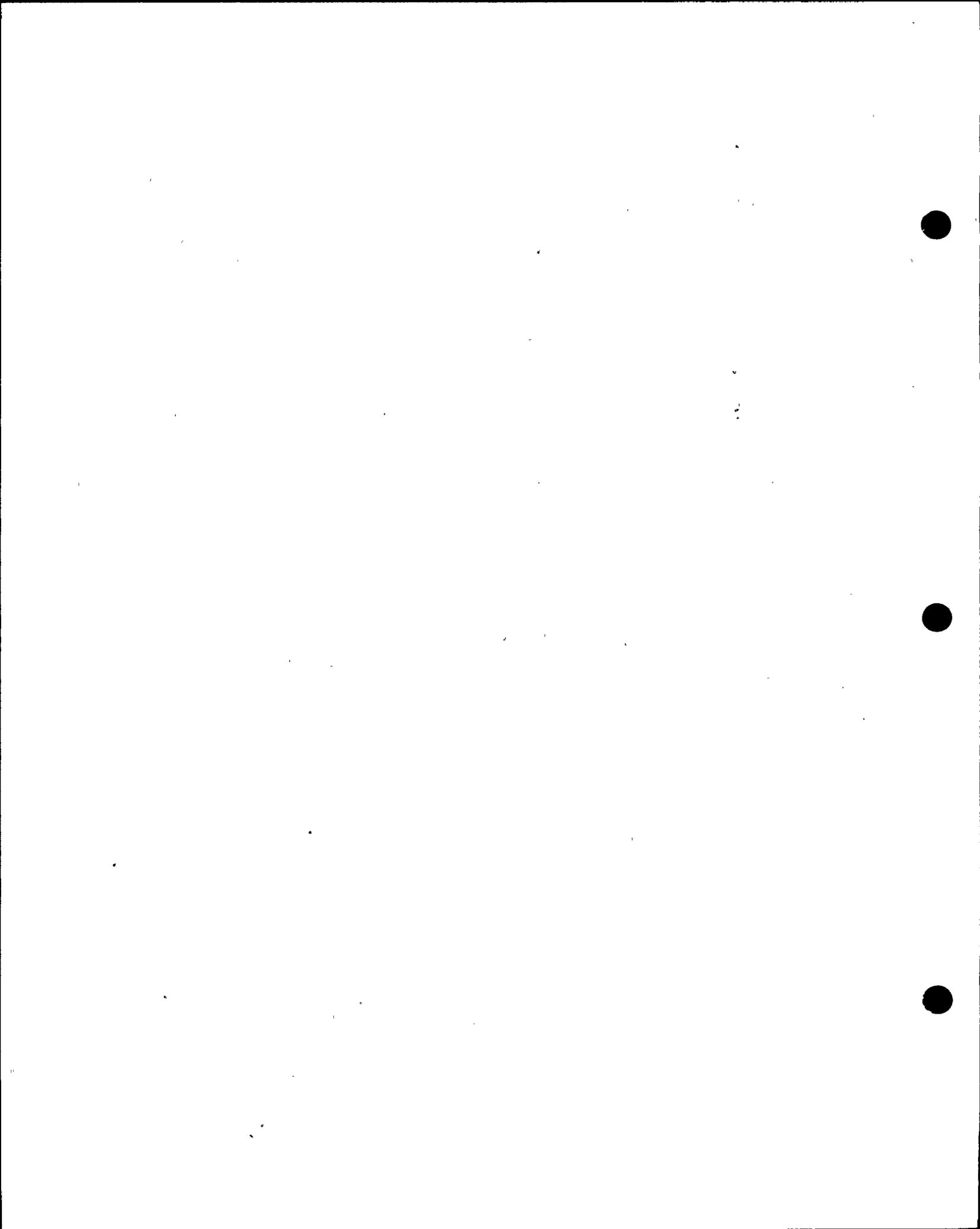


1 In Revision 2 of the Plan, the conceptual design was provided for a
2 substantially increased environmental monitoring and offsite dose assessment
3 system employing a mobile environmental radiological monitoring laboratory, the
4 establishment of a radiological analysis laboratory at Cal Poly University in
5 San Luis Obispo, and the installation of several new real time radiation
6 monitors. This equipment will ultimately tie together in a master computer
7 system (the Emergency Assessment and Response System, or EARS) which can be
8 used for transmission of radiological information (real time data, dose
9 projections) to decision-making locations such as the control room, TSC, EOF,
10 and the California Office of Emergency Services in Sacramento. This system is
11 scheduled to be fully operational in August, 1981. However, certain features
12 will be operational prior to fuel loading. In particular:

13 a. A computer-based multichannel analyzer, equipped with a high resolution
14 intrinsic germanium detector has been installed at Cal Poly.
15 This system could be used by either Company, County, State or University
16 personnel for making radiological analysis of environmental samples should
17 an emergency occur during low-power testing.

18 b. The mobile environmental monitoring van has been delivered and has
19 undergone the bulk of its preoperational testing. A training program in
20 its use is underway, and is expected to be completed in May, 1981.

21 Although this Mobile Lab is a Company facility, 10 members of the County
22 Health Department are scheduled to participate in this training, and we
23 have invited their representative to accompany our personnel in their
24 vehicles in an emergency.



1 The Mobile Lab is an integral part of the emergency response
2 system for Diablo Canyon and is an extremely powerful environmental
3 radiation monitoring tool. It is equipped with a variety of special
4 sampling and nuclear measurement systems which allow technicians to
5 collect samples of air, water, milk, foodstuffs, or other media. These
6 samples will then be analyzed on a computerized multichannel analyzer
7 equipped with either an intrinsic germanium detector or a NaI
8 scintillation detector. The onboard computer can analyze such a sample in
9 less than two minutes. The intrinsic germanium gamma spectrometer can
10 also be used outside the van for in-situ soil measurements, thus greatly
11 reducing analysis time. The Mobile Lab is equipped with a TLD reader to
12 obtain integrated radiation readings from environmental TLD stations. It
13 also carries three pressurized ionization chamber instruments (similar to
14 those discussed below) which may be set up and left in the field to
15 measure gamma dose rate; 50 TLDs which can be left in the environment; and
16 a variety of portable radiation monitoring equipment.

17 The Mobile Lab has a compressor sampling system which allows for
18 rapid, high sensitivity analysis of radioactive xenon and krypton. Should
19 the Mobile Lab encounter an area of high airborne radioactivity,
20 background, two specially designed 2,000 pound lead shields can be purged
21 with bottled nitrogen and the analysis of samples can continue.

- 22 c. Nine additional real time environmental radiation monitors are being
23 provided to supplement the two TASC-4's which have already been installed.
24 These instruments employ pressurized ion chamber (PIC) detectors and will
25 read the dose rate from background up to 10 rem/hour. Two of these
26 instruments will be located onsite near the site boundary (one near the



1 northern boundary and one near the southeastern boundary)... One is
2 installed and operational, and the other will be installed by the end of
3 May. The other seven are delivered and awaiting installation at various
4 offsite locations surrounding the plant. The Company is currently
5 obtaining the appropriate permits, and installation is expected to be
6 complete in June. When first installed, it will be necessary for an
7 observer to travel to the instrument to obtain a reading. Ultimately,
8 these new instruments will transmit to the central EARS computer so that
9 they can be remotely interrogated. This feature is expected to be
10 functional in July.

11 It should be emphasized that county, as well as Company
12 personnel will have access to these instruments. County officials also
13 have access to the two TASC-4 instruments which were installed several
14 years ago.

15 In a related area, the plant has long been provided with an onsite
16 meteorological tower and computer which determines the real time atmospheric
17 dilution factors to a downwind distance of 50 km. This information, when
18 coupled with release data or environmental measurements, can be used to predict
19 downwind dose rates or to extrapolate environmental measurements from one
20 location to another. In addition, the Company is in the process of installing
21 an interim high-range plant vent monitor to supplement existing environmental
22 release point monitoring equipment. This instrument will be in service prior
23 to fuel loading.

24 To summarize, considerable equipment exists for assessing the
25 environmental impact of a radioactive release which might occur during
26 low-power testing. This includes predictive capability using plant effluent



1 monitors and meteorological data, field monitoring teams using hand-held
2 equipment, up to seven real time environmental radiation monitoring devices
3 (the two original units, the two new onsite units, and the three units in the
4 van), numerous environmental TLDs and air samplers, and both on- and offsite
5 laboratory facilities. In addition, depending upon the precise fuel loading
6 date, seven additional real time instruments may be available.

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1 5. Post-Accident Sampling Capability

2 One of the difficulties encountered at TMI was obtaining and
3 analyzing post-accident samples from process streams, such as the reactor
4 coolant system, which contained high levels of radioactivity. To avoid this
5 problem at Diablo Canyon, the Company is currently completing the installation
6 of an Interim Post-LOCA Sampling System which will enable high activity reactor
7 coolant and containment atmosphere samples to be collected and diluted for
8 laboratory analysis. This system will be operational prior to fuel loading.

9 The sample line for the Interim Post-LOCA Sampling System reactor
10 coolant sample connects to the existing reactor coolant sampling system
11 downstream from the sample heat exchanger. A sample can be drawn from the hot
12 leg of coolant loops 1 or 4. For boron or dissolved radionuclide analysis, a
13 small sample is collected in a sample chamber and diluted with demineralized
14 water. This operation can be performed remotely by an operator stationed
15 outside of a shield wall. Small aliquots of the diluted sample can then be
16 drawn into a shielded sample vessel equipped with quick disconnect couplings.
17 This vessel is transported to the laboratory for analysis. Boron analysis will
18 be performed using colorimetric techniques. Radionuclide analysis will be
19 performed using a multichannel analyzer. These analyses can be performed
20 within the 3 hour criteria contained in Section II.B.3 of NUREG-0737.

21 For chloride analysis, a liquid sample will be drawn from the reactor
22 coolant system in the same general manner. The chloride analysis involves a
23 potentiometric determination using a halogen-specific electrode on a pH meter.
24 This analysis can be performed within the 24 hour time period required by
25 NUREG-0737.

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1 The system also provides the capability to remotely obtain and degas
2 (remove dissolved gases from) a reactor coolant sample. The dissolved gases
3 are diluted with argon and can be sent to either a gas chromatograph (which is
4 an integral part of the sample system) for hydrogen analysis (and oxygen and
5 nitrogen if they are present), or to a sample vessel equipped with a septum.
6 An aliquot of the gas from the sample vessel can be withdrawn using a syringe
7 and transferred to a standard counting vial for analysis on a multichannel
8 analyzer. Thus the system provides for the analysis of dissolved gases as
9 required by NUREG-0737.

10 Finally, a sample line from the containment atmosphere is provided to
11 the Interim Post-LOCA Sampling System. It ties into the same equipment
12 described previously for analysis of dissolved gases in the reactor coolant.
13 Thus the capability exists to collect a containment air grab sample for
14 laboratory analysis of radionuclides, or to affect a chromatographic analysis
15 for hydrogen, oxygen and nitrogen, as required by NUREG-0737.

16 The Interim Post-LOCA Sampling System was designed to permit a
17 reactor coolant or containment atmosphere sample to be obtained within 1 hour
18 without exceeding the dose criteria contained in NUREG-0737 (3 rem to whole
19 body, 18.75 rem to the extremities), assuming a Regulatory Guide 1.4 source
20 term. Since source term criteria in the latter are related to full power
21 fission product inventories, the system design criteria are very conservative
22 for low power testing.

23 Although the Interim Post-LOCA Sample System is intended to meet all
24 requirements of NUREG-0737, it should be noted that the Company is in the
25 process of installing a permanent system. The permanent system has several
26 advantages over the interim system, including additional shielding and the



1 the capability to do several chemical analyses (pH, chloride) "on-line." This
2 new system is expected to be available in July.

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1 6. Medical Provisions

2 Diablo Canyon is equipped with first aid and decontamination areas
3 for handling cases where traumatic injury is minor. In addition, the Company
4 has several local physicians and medical facilities on its panel for treatment
5 of industrial injuries.

6 For more serious occurrences involving radiation or radioactive
7 contamination, the Company has made arrangements with San Luis Ambulance
8 Service to transport injured personnel who may be contaminated, and with French
9 Hospital for treatment of such persons. The Company assisted the hospital in
10 modifying the morgue for use as a radiological emergency room, including the
11 provision of additional electrical outlets for emergency power and a portable
12 X-ray machine, purchase of a portable light source for minor surgery,
13 alteration of morgue table drains to divert contaminated water from the sewer
14 system, and installation of a filtered air exhaust system. In addition, the
15 hospital was provided with a NuCon contaminated personnel carrier, plus
16 miscellaneous other monitoring equipment, radiation signs and barriers, and
17 anti-contamination floor coverings. Hospital procedures call for admitting a
18 patient into an isolated hallway for immediate observation and assessment. The
19 patient is then moved to the morgue for early medical attention and
20 decontamination as necessary. The patient can then be moved to other portions
21 of the hospital for more extensive care, if required.

22 The Company has provided extensive training and consultation to
23 members of the French Hospital staff. For example, 10 members of the staff
24 have attended the course "Handling of Radiation Accidents by Emergency
25 Personnel" given by the staff of Radiation Emergency Assistance Center/Training
26 Site (REAC/TS) in Oak Ridge, Tennessee. Two others are scheduled to attend



1 this year. Two members of the staff attended the 1980 meeting of the American
2 College of Nuclear Medicine entitled "Radiation in Public Health" held in
3 Montreal, Canada. In addition, the Company's radiological medical consultant,
4 Dr. Fred Mettler, conducted training sessions at French Hospital in August,
5 1980 in emergency room procedures and biological effects of ionizing radiation.
6 (Dr. Mettler also conducted a similar session for San Luis Ambulance personnel
7 in August, 1980). Finally, the plant's radiation protection personnel have
8 conducted training sessions at the hospital, and have had hospital personnel
9 tour the plant for familiarization.

10 There have been three drills, conducted in 1977, 1979, and August,
11 1980, involving the transport and treatment of a simulated contaminated
12 accident victim at French Hospital. The last drill was administered with the
13 assistance of Dr. Mettler, and was videotaped to permit an interactive
14 critique. A copy of this tape was presented to French Hospital after the
15 drill. A fourth drill is scheduled for June 9, 1981.

16 A second agreement exists with St. Francis Memorial Hospital of San
17 Francisco to provide backup medical support for possibly contaminated Company
18 employees. St. Francis also has a well-recognized burn unit which can perform
19 long-term treatment of burn injuries. This agreement has been in effect since
20 1979. Four members of the staff of St. Francis have attended the REAC/TS
21 course entitled "Medical Planning and Care in Radiation Accidents". Six others
22 are scheduled for REAC/TS courses this year. Seven members are scheduled to
23 tour the French Hospital facilities on May 20 and tour Diablo Canyon on May 21.
24 A drill involving St. Francis is scheduled for this fall.



1 7. Public Warning Systems

2 Presently, public warning in the event of an emergency will be
3 carried out by local agencies using the traditional house-to-house contacts and
4 loudspeaker-equipped vehicles. Emergency public instructions will also be
5 broadcast via the Emergency Broadcast System (KVEC radio in San Luis Obispo).

6 The Company is also providing an early warning system consisting of
7 approximately 85 radio-controlled sirens located throughout the State of
8 California Basic Emergency Planning Zone. The conceptual design of this system
9 was included in Revision 2 to the Plan. The system will be owned by the
10 Company and maintained at Company expense, but will be under the operational
11 control of the Sheriff's Department. At present, the sirens have been
12 delivered to the site and are available for installation. The Company is
13 currently engaged in obtaining the necessary permits through the County and
14 California Coastal Commission, which is the limiting factor in installing the
15 system. If the Company is able to obtain the necessary permits in the near
16 future, it is possible that this system will be functional by August, 1981.



1 8. Fire Protection

2 As with all Company power plants, Diablo Canyon was designed with
3 extensive onsite fire protection systems and equipment. These include fixed
4 automatic sprinkler and deluge systems, hose reel stations, fixed automatic CO₂
5 flooding systems, CO₂ hose reel stations, automatic halon systems and portable
6 fire extinguishers.

7 Selected plant personnel are organized into fire brigades to provide
8 for self-sufficiency in the ability to perform fire fighting activities.
9 Members of the shift crew form one brigade, and there are two other brigades
10 made up primarily of maintenance personnel. The plant fire brigades are
11 capable of fighting postulated fires within any of the plant structures.

12 Procedures for testing and maintaining fire protection, emergency
13 lighting, and communications systems are in effect. Fire brigade members are
14 trained in the use, testing, and maintenance of fire protection equipment.

15 Formal training sessions for fire brigade members are held monthly.
16 In at least one training session each year, a representative from the
17 California Department of Forestry is invited to attend and discuss the
18 techniques of fighting brush and grass fires. Training sessions are
19 supplemented by preplanned fire drills conducted on a quarterly basis. Most
20 recently (January, 1981) 60 Diablo Canyon fire brigade members attended a
21 hands-on fire suppression training program conducted by FM Chemical Company at
22 the Frank Uhler/Kern County fire training facility. Personnel were given
23 actual experience in fighting oil, gasoline, and simulated electrical fires in
24 this program.

25 The California Department of Forestry (CDF) is the official fire
26 fighting agency in the Diablo Canyon area. It is anticipated that their



1 assistance would only be required in the event of a large brush fire onsite and
 2 they are not relied upon as the primary fire fighting capability for fires
 3 within plant structures. However, existing plant procedures direct the Site
 4 Emergency Coordinator to request their assistance in the event of a fire which
 5 cannot be controlled within 10 minutes by the plant fire brigades. If any
 6 Department of Forestry personnel are called upon to assist in fighting a fire
 7 where the potential exists for radiation exposure and/or contamination, the
 8 Company will provide trained monitoring personnel to assure that Forestry
 9 personnel are not unnecessarily exposed. Under the terms of a letter of
 10 understanding dated February 13, 1979, CDF personnel have participated in
 11 several familiarization tours of the plant and its fire protection equipment
 12 and in several fire drills as summarized below.

13	<u>DATE</u>	<u>NUMBER OF CDF PERSONS</u>	<u>EVENT</u>
14	3/13/79	10	Plant familiarization
15	3/29/79	7	Fire drill
16	10/30/79	5	Fire fighting training with
17			CDF as instructors
18	10/30/79	5	Plant familiarization
19	2/09/80	2 CDF	Plant familiarization
20		10 Avila Valley Volunteers	
21	2/14/80	7	Fire drill
22	10/14/80	10	Fire drill
23	11/26/80	20	Plant familiarization

24 In addition, Company personnel are conducting a radiation protection
 25 training program for approximately 60 CDF personnel during the month of May,
 26 1981.



1 In a letter dated April 20, 1981 from the CDF to the Diablo Canyon
2 Plant Manager, the Company was informed that CDF was rescinding the February
3 13, 1979 letter of understanding wherein CDF had agreed to provide backup fire
4 suppression support for the plant. The principal concerns expressed involved
5 completion of radiation protection training for CDF personnel and development
6 of an internal CDF response plan. The Company responded in a letter dated
7 April 29, 1981 that with the completion of the aforementioned radiation
8 protection training, all provisions of the February 13, 1979 letter of
9 understanding will have been satisfied. Further, it is the Company's position
10 that CDF is still required by law to provide necessary and adequate fire
11 support for Diablo Canyon.

12 In summary, we believe that the Diablo Canyon Fire Brigades provide
13 adequate primary fire suppression capability, and that CDF is responsible for
14 providing backup support.

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1 9. Training and Drills

2 Over the years, numerous training sessions and drills have been
3 conducted on various aspects of the emergency plans. A partial listing
4 includes:

5 a. Three drills have been performed involving handling of radiation
6 accident victims at French Hospital, and considerable training has
7 been provided for the hospital staff as discussed previously in
8 section 6.

9 b. Two general site drills were conducted in 1977 and 1979. These
10 drills involved a mobilization of all on-site personnel, and
11 notification of offsite agencies using the radio system. In both
12 drills, a contaminated patient was transported to French Hospital
13 (these were two of the three drills mentioned in a. above), and
14 selected site personnel were evacuated from the site to the PGandE
15 Information Center. In the 1977 drill, two PGandE environmental
16 monitoring teams were dispatched into the field to practice field
17 monitoring techniques, and to relay simulated data back to the
18 control room.

19 In both drills the County Emergency Organization was convened at the
20 Board of Supervisor's Chambers in San Luis Obispo. A member of the
21 plant staff (Mr. Shiffer) was present to act in the capacity of
22 Advisor to the County Emergency Organization (this is a designated
23 position in the Company's emergency organization). Radio
24 transmissions between the plant and the Sheriff's office were
25 monitored and a general discussion ensued as to their significance
26 and appropriate courses of action. In both drills, the county



1 dispatched field monitoring teams to practice this aspect of their
2 plans and check their communications.

3 The Company is aware that the protracted licensing process has
4 resulted in numerous changes in personnel, as well as changes in equipment and
5 procedures. As a result, and in anticipation of receiving a low-power testing
6 license, the Company is actively engaged at the present time in extensive
7 training and retraining of its own personnel, both at the site and at the
8 corporate offices. For example, a series of training classes, walkthroughs and
9 simulations of various aspects of the Corporate Emergency Response Plan have
10 been occurring since February, 1981. An in-house simulation with all involved
11 corporate organizations participating is scheduled for June, 1981. In
12 addition, prior to fuel loading the site emergency signal will be sounded
13 during normal working hours to again test the mobilization of all onsite
14 personnel.

15 We believe that the training and drills which will be complete by
16 fuel loading will assure that Company personnel can respond to any emergency
17 situation during fuel loading and low power testing.

18 The Company encourages local officials to participate in Company
19 conducted or Company sponsored training in areas related to emergency planning.
20 In addition to the training already provided and/or being provided for medical
21 and Department of Forestry personnel (see sections 6 and 8 above), some recent
22 interagency efforts include:

- 23 a. The current county Emergency Services Coordinator participated in a
24 course in basic radiation protection taught by Mr. Shiffer at the
25 site in October, 1979.

26



- 1 b. In July, 1980, the director of the physics laboratory at Cal Poly
2 attended a one week course in the operation of the new multichannel
3 analyzer which was installed at the university.
- 4 c. In March, 1981, the County Health Officer attended the REAC/TS course
5 on "Medical Planning and Care in Radiation Accidents."
- 6 d. The County Administrative Officer, County Emergency Services
7 Coordinator, and three members of the board of supervisors went to
8 the Trojan plant in Oregon on April 9-10, 1981 to discuss emergency
9 planning provisions with officials in that area.
- 10 e. Ten personnel from the County Health Department are scheduled to
11 attend a basic radiation protection class taught by plant personnel
12 at the site on May 7. Then during the period from May 12-18 they are
13 scheduled to receive training on emergency environmental field
14 monitoring techniques. Finally, on May 19-20 they are scheduled to
15 receive instruction in use of the Mobile Lab.

16 The Company is in contact with FEMA, state and local officials and
17 will keep them informed of upcoming programs which will be beneficial to local
18 non-Company officials as well as Company personnel. Upon request, the Company
19 is also willing to conduct or arrange for special classes as might be
20 desirable.

21 A series of interagency exercises are being planned to start in June,
22 working toward a full scale exercise of the revised Company, state and local
23 plans in August, 1981.

24 To repeat, we have always urged local officials to use the Company as
25 a resource in helping to fulfill their training requirements, and continue to
26 do so.



10. Implications of Low Power Operation on Emergency Planning

It is an undisputed fact that testing at power levels at or below 5% of rated power results in the production of a core fission product inventory at least a factor of 20 below that which would exist at equilibrium full power. This fact has several implications which are relevant to emergency planning.

1. The lower fission product inventory, and correspondingly lower fission product decay heat, provides additional time for the operators to take corrective action to prevent gross core damage for those limiting accidents involving loss of core cooling. Similarly, additional time is available to alert offsite agencies and initiate offsite protective measures such as evacuation.

For loss of coolant accidents, regardless of break size, Westinghouse analyses indicate that sufficient time is available for operators to take action prior to the loss of adequate core cooling, even if it is assumed that automatic initiation of emergency core cooling is inoperable and no operator action is taken to initiate it. We believe that it is unrealistic to assume that such operator action is not taken in this time frame.

It should also be emphasized that existing emergency procedures require that site personnel immediately notify the Sheriff and recommend evacuation of the LPZ in a LOCA situation where proper functioning of the emergency core cooling systems is in doubt. Thus, if such an accident were to occur during low power testing, it is likely that such action in the LPZ would be well underway, and possibly complete, prior to the onset of inadequate core cooling.



1 2. The lower fission product inventory reduces the offsite radiological
2 consequences for an accident at low power, in comparison to a similar
3 accident at full power. This reduces the size of the offsite area in
4 which protective actions may be necessary and provides more time (due to
5 the lower dose rates) to complete these actions.

6 a. A relatively simple calculation using the atmospheric diffusion model
7 can be made to illustrate the effect of the reduced fission product
8 inventory on the size of the area which might be affected in the
9 event of a release of radioactive materials. The offsite dose at a
10 particular downwind location which results from a release of
11 radioactive materials is approximated in this model from the
12 equation:

$$13 \quad D(x) = KQ[X/Q(x)]$$

14 where: $D(x)$ = offsite dose at downwind distance x

15 K = proportionality constant

16 Q = total curies of activity released

17 $[X/Q(x)]$ = atmospheric dispersion factor at downwind distance x .

18 Numerically this factor gets smaller as you move away
19 from the point of release. What this means is that as
20 you move away from the site the dose is reduced because
21 the plume is more dispersed.

22 As can be seen, the dose is proportional to the product of Q and
23 $[X/Q(x)]$.

24 The fission product inventory during low power testing is at least a
25 factor of 20 lower than that existing at equilibrium full power
26 operation. It follows, therefore, that an accident resulting in



1 major core damage at low power has a release potential which does not
2 exceed 1/20 of the release potential for the same accident at full
3 power. If Q in the previous equation is reduced by 20:1, it follows
4 that $[X/Q(x)]$ can be increased by 20:1 without changing the offsite
5 dose at a given location.

6 A larger value of $[X/Q(x)]$ implies a location closer in to the plant.
7 That is, if we release less radioactivity, a given dose will occur
8 closer in to the plant, other things being equal. To get a feel for
9 how much a 20:1 reduction in release (or conversely a 20:1 increase
10 in $[X/Q(x)]$ shrinks the affected area, consider Table 15.5-3 of the
11 FSAR, which gives the "design basis" values for $[X/Q(x)]$ for
12 distances ranging from 800 m to 20,000 m. For convenience, these
13 values are tabulated in Attachment 1 to this testimony. For
14 illustration, multiply the 20 km (12.4 miles) X/Q of 0.00000885 by 20
15 to yield 0.000177. By visual inspection of the table, it can be seen
16 that a X/Q of 0.000177 corresponds to a distance slightly greater
17 than 2000 m (actually 2150 m or 1.3 miles).

18 In short, if the activity release is cut 20:1, the downwind distance
19 at which a given dose would occur is reduced nearly 10:1. Thus, a 10
20 mile effect at full power is closer to a 1 mile effect at low power.

- 21 b. For currently analyzed accidents other than a pipe break loss of
22 coolant accident, Westinghouse performed, as part of the safety
23 analysis report for low power testing, a bounding analysis to
24 determine the site boundary dose during the first two hours after
25 initiation of release (assuming continuous occupancy). The results
26 were based upon a generic value of the atmospheric dispersion factor,



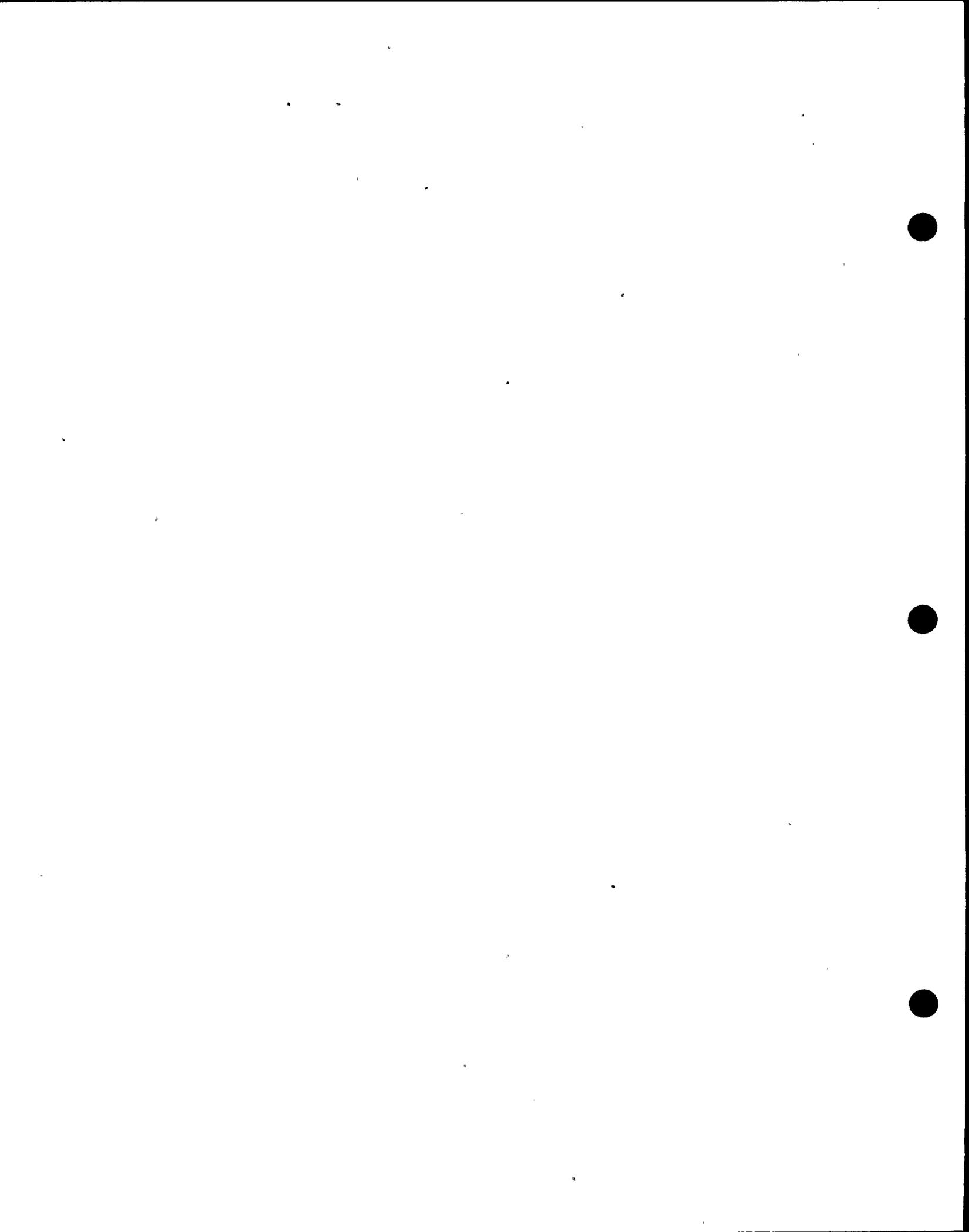
X/Q. Application of the Diablo Canyon "design basis" values for X/Q contained in Table 15.5-3 of the FSAR to the dose values contained in the safety evaluation report yields the following results:

<u>Location</u>	<u>X/Q (sec/m³)</u>	<u>2-Hour Continuous Occupancy Doses</u>	
		<u>Thyroid (rem)</u>	<u>Total Body (rem)</u>
Site boundary (800m)	5.3x10 ⁻⁴	1.6	0.3
Outer boundary of low- population zone (6 miles or 10000 m)	2.2x10 ⁻⁵	0.07	0.01

c. Reducing the analyzed off-site dose results contained in Tables 15.5-53 and 15.5-54 of the FSAR for a design basis loss of coolant accident (full power) by a factor of 20 to conservatively reflect the lower fission product inventory in existence during low-power testing results in the following doses:

<u>Location and Duration</u>	<u>Dose (rem)</u>	
	<u>Thyroid</u>	<u>Total Body</u>
Site boundary (800m), two-hour continuous occupancy	4.8	0.3
Outer boundary of low population zone (6 miles or 10000 m), 30-day continuous occupancy	0.9	0.03

d. The sample calculation in 2.a above illustrates that a 20:1 reduction in release makes a marked difference in the size of the area which is likely to be affected by the release. The results presented in 2.b and 2.c above show that at the site boundary (800m), the doses for all analyzed accidents are less than the exposure criteria for members of the public contained in the August, 1978 State of California Emergency Response Plan (which specifies 0.5 rem total



1 body), or in the January 1981 proposed revision to this plan (which
2 specifies 0.5 to 5 rem total body or 5 to 25 rem thyroid, with the
3 lower values preferred). Movement from the site boundary to the edge
4 of the LPZ results in the doses being substantially below the
5 exposure criteria. Thus it is extremely unlikely that offsite
6 protective action would ever be required beyond the boundary of the
7 LPZ due to an accident at low power.

8 It is important to note that we are speaking of protective action
9 required by current emergency planning criteria. These criteria are
10 themselves very conservative in comparison to the siting criteria of
11 10CFR100 (25 rem total body, 300 rem thyroid).

12 In short, a 6 mile plume exposure emergency planning zone for Diablo
13 Canyon is more than adequate for low power testing.
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1 11. Evacuation

2 The San Luis Obispo County Emergency Plans prepared in 1976 discuss
3 the subject of evacuation of the Low Population Zone (LPZ) surrounding the
4 site, as well as neighboring unincorporated areas outside the LPZ, including
5 Los Osos, Avila Beach and Edna Valley. For Diablo Canyon, the LPZ has a 6 mile
6 radius and contains approximately 65 permanent residents. Montana de Oro State
7 Park is located in the northern portion of the LPZ. The park may have as many
8 as 1500 visitors on a summer weekend, with an average summer weekend population
9 of approximately 400.

10 Under the terms of the county plans, the San Luis Obispo County
11 Sheriff has the lead role in coordinating and conducting an evacuation of the
12 LPZ. In conjunction with state park personnel they will conduct an evacuation
13 of Montana de Oro State Park, and can also obtain assistance from other law
14 enforcement personnel as required under existing mutual aid agreements.

15 We talk to members of the Sheriff's office routinely, and they
16 confirm what we intuitively believe - that handling an evacuation of the LPZ
17 would be a relatively simple task in comparison to others which they often face
18 in the course of their law enforcement duties. As mentioned above, Diablo
19 Canyon is surrounded by a 6 mile LPZ containing some 65 residents. Most of
20 these are clustered near the edge of the LPZ in the See Canyon area east of the
21 site. The only potentially large group of people in the LPZ is found in
22 Montana de Oro State Park. But even here, there are factors which reduce the
23 magnitude of the emergency planning problem. First, during nice weather when
24 the park population might be high, the wind invariably blows away from the
25 park. Winds toward the park are more associated with impending storms, and
26 park population during such times is likely to be low. Second, since park



1 visitors are transients, evacuees from the park would generally be able to
2 provide their own transportation and shelter, thereby lessening the burden on
3 the county officials.

4 An important feature of the existing county plan is that the sheriff
5 has been given the authority to order an evacuation of the LPZ based upon a
6 recommendation of the Plant Emergency Coordinator, and prior to the time that
7 the County Emergency Organization is convened. Further, existing plant
8 procedures require that such a recommendation be made to the sheriff by
9 appropriate Diablo Canyon personnel in any LOCA situation where the proper
10 functioning of the emergency core cooling systems at the plant is in doubt, or
11 there is evidence of inadequate core cooling. This anticipatory feature in the
12 plans provides a high degree of assurance that an evacuation of the LPZ will
13 either be complete or well underway prior to the time that such an accident
14 would proceed to the point of a major environmental release.

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1 CONCLUSIONS

2 In the preceding sections we have discussed numerous features of the
3 emergency plans which will be in effect at the time of fuel loading and low
4 power testing. The major conclusions reached are summarized below.

- 5 1. Provisions have been made to organize onsite and offsite Company personnel
6 into an effective emergency organization.
- 7 2. Onsite and offsite emergency facilities have been provided and equipped to
8 allow effective transfer of information to enhance emergency management
9 and decision making.
- 10 3. A comprehensive emergency communications system, using redundant radio and
11 telephone equipment, has been provided to assure that adequate
12 communications will exist throughout any emergency.
- 13 4. Significant radiological monitoring capability exists, including
14 monitoring teams, real time environmental instruments, environmental TLDs
15 and air samplers, a Mobile Lab, and onsite and offsite analytical
16 laboratories. In addition, the plant is equipped with effluent monitors
17 and meteorological equipment to provide predictive dose assessment
18 capability.
- 19 5. The ability exists to obtain and analyze high activity samples from the
20 containment and reactor coolant system to assist the emergency assessment
21 process.
- 22 6. Provisions have been established for the transport and treatment of
23 contaminated personnel who require medical treatment.
- 24 7. The plant is provided with extensive fire suppression equipment and
25 trained Fire Brigade personnel.
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1 In addition, we have shown that in low power testing, even the most
2 severe postulated accidents should not require that protective actions be taken
3 beyond the LPZ. The low population density and the time available provide
4 reasonable assurance that effective action can be taken in this area.

5 In summary, extensive emergency plans and provisions have been
6 provided for Diablo Canyon. In our opinion, these plans and provisions meet
7 applicable NRC requirements for fuel loading and low power testing, and provide
8 reasonable assurance that public health and safety will be protected from any
9 emergency which could occur during this program.

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ATTACHMENT 1

Design Basis Values (FSAR Table 15.5-3)

<u>Distance (m)</u>	<u>X/Q (sec/m²) (0-8 hr. period)</u>	<u>Design Basis X/Q Multiplied by 20</u>	<u>Equivalent Design Basis Distance (m)*</u>
800	0.000529	0.0105	<800m
1200	0.00034	0.0068	<800m
2000	0.000187	0.00374	<800m
4000	0.0000778	0.00156	<800m
7000	0.0000359	0.000718	<800m
10000	0.000022	0.00044	960m
20000	0.00000885	0.000177	2150m

*This is the new, closer in, distance which corresponds to the 20 times larger value of X/Q.





1 and testing programs as shift nuclear engineer, directed the
2 preparation of all reactor refueling procedures subsequent
3 to initial fueling and directed the performance of this work
4 on shift. My responsibilities included the theoretical
5 analyses of reactor core nuclear and thermal-hydraulic
6 performance, plus evaluation of the performance of plant
7 safeguard and other auxiliary equipment. I provided
8 technical advice and guidance for the chemical and radiation
9 protection engineers and participated in the establishment
10 and implementation of the chemical, radiochemical, and
11 radiation protection programs at the plant.

12 From July, 1969 to July, 1970, I was engaged at
13 Humboldt Bay and at the Company's General Office in Diablo
14 Canyon startup preparation. This included a seven-month
15 assignment in Rochester, New York, during startup and
16 initial testing of the R. E. Ginna PWR Plant. The
17 assignment to Ginna was for a period of seven months from
18 July, 1969, to February, 1970. While there, I participated
19 in the preparation and review of procedures and programs for
20 initial loading, low-level physics testing, power operation
21 testing, and radiochemical control, and participated in
22 initial loading, low-level physics testing, and power
23 operation testing programs.

24 From July, 1970 to August, 1971, I was engaged in
25 Diablo Canyon startup preparation on the Diablo Canyon Task
26 Force. From August, 1971 to October, 1978, I was assigned



1 to Diablo Canyon as a Power Plant Engineer, and from
2 November, 1978 to February, 1980, I was assigned to Diablo
3 Canyon as Technical Assistant to the Plant Superintendent.

4 At Diablo Canyon, I participated in the
5 preparation and review of licensing material for Units 1 and
6 2 including the PSAR, FSAR and Technical Specifications. I
7 supervised a staff of engineers (including persons
8 experienced in nuclear engineering, instrumentation,
9 radiation protection, and chemical engineering) engaged in
10 the preparation of equipment operating and testing
11 procedures, emergency plans, administrative procedures, and
12 equipment specifications and related materials required
13 prior to the startup of the plant.

14 In February, 1980, I was appointed Manager of
15 Nuclear Plant Operations reporting to the Vice President,
16 Nuclear Power Generation, and I am responsible for
17 supervision of all operationally related activities.

18 I have completed the following formal training
19 courses:

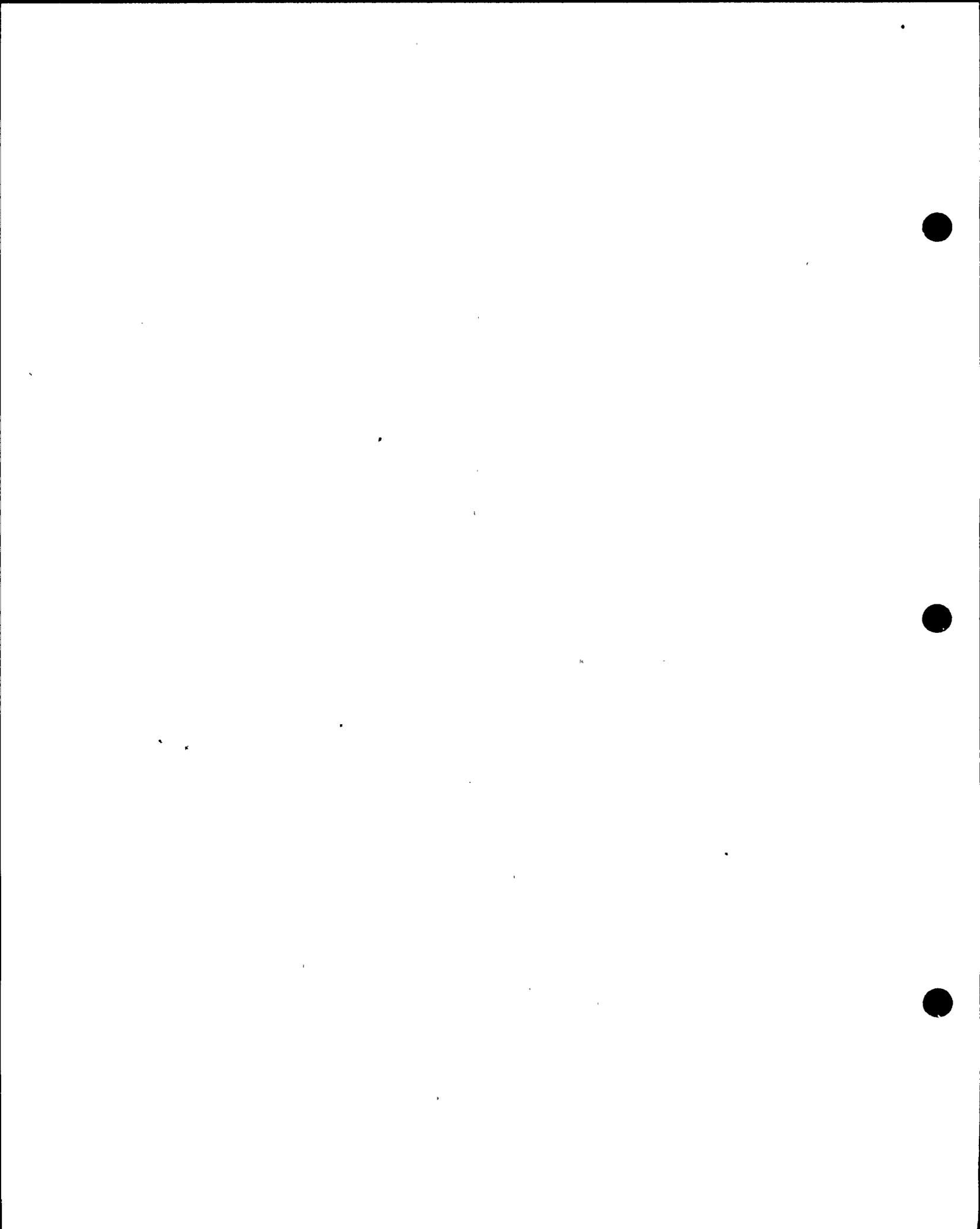
20 Stanford University Nuclear Engineering Curriculum as
21 required by AEC Scholarship Program.

22 Digital Computer Applications for Nuclear Reactor
23 Calculations, UCLA Extension.

24 Diablo Canyon Design Lecture Series - Series of lectures
25 given by designers of Diablo Canyon systems and equipment,
26 Westinghouse APD.

27 In-Place Filter Testing Workshop, Harvard School of Public
28 Health.

29 ///



- 1 Refresher Training in Radiological Engineering, General
- 2 Electric Vallecitos Nuclear Center.
- 3 Short Course in Reactor Noise Analysis, University of
- 4 Tennessee.
- 5 Simulator Training - Westinghouse Nuclear Training Center,
- 6 Zion, Illinois. Option III (three-week course) and Option
- 7 II (one-week course).
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- 10 Metallurgy for Non-Metallurgists, one week course given by
- 11 Center for Professional Advancement.
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1 programs for Diablo Canyon fuel cycle calculations and fuel
2 cost estimates for Diablo Canyon.

3 From June, 1978 to March, 1980, I served as an
4 engineer in the Safety and Licensing Analyses group of the
5 Mechanical and Nuclear Engineering Department. My
6 activities involved coordinating development of PGandE's
7 Corporate Emergency Response Plan, acting as PGandE's
8 representative to the Westinghouse Owners Group, and a
9 continuation of duties above.

10 From March to May, 1980, I was the assistant to
11 the Nuclear Projects Engineer in the Nuclear Projects
12 Department and from May, 1980 to May, 1981, I held the
13 position of Technical Assistant to the Vice President,
14 Nuclear Power Generation. In this position, my activities
15 involved responsibility for development of the Corporate
16 Emergency Response Plan, responsibility for development of
17 the Nuclear Power Generation Department manual, Corporate
18 Nuclear Power Training and Professional Development, Public
19 Relations Technical Support, Management Audit Action Plan
20 (Nuclear), Corporate Strategic Planning (Nuclear), Shielding
21 Analysis, Nuclear Power Generation Budget Development, and I
22 was a representative to the Westinghouse Owners Group.

23 In May of 1981, I was appointed Supervising
24 Personnel and Environmental Safety Engineer.

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I. have completed the following formal training courses:
Westinghouse PWR Information Course.
Exxon Nuclear Fuel Management Training Course.



1 PROFESSIONAL QUALIFICATIONS OF

2 WILLIAM B. KAEFER

3
4
5 My name is William B. Kaefer. I am a Registered
6 Professional Engineer in Mechanical Engineering in the State
7 of California.

8 My educational background is as follows:

9 Purdue University - BS in Mechanical Engineering, 1966

10 From July, 1966 to December, 1970, I was on active
11 duty in the U.S. Navy. I was commissioned from Officer
12 Candidate School as line officer and served in various
13 shipboard assignments in submarine service. During this
14 time, I received operator training on the Navy S5G prototype
15 reactor (GE-PWR) at the Naval Reactor Facility, Idaho
16 Falls, Idaho and qualified as Engineering Watch Officer.
17 Also, I was assigned to the engineering department of New
18 Nuclear Submarine Construction (W-PWR) at the Mare Island
19 Naval Shipyard. I gained experienced in primary and
20 secondary systems construction, testing, and initial core
21 loading.

22 From January to August, 1971, I was employed by
23 PGandE with various training assignments at the Humboldt Bay
24 Power Plant. I participated in the 1971 refueling outage as
25 a shift nuclear engineer. I also participated in the
26 startup preparations for Diablo Canyon as a member of the



1 Diablo Canyon Task Force. In August, 1971, I was assigned
2 to Diablo Canyon as a Power Production Engineer. This
3 included an assignment to the Point Beach Power Plant for
4 one month during October, 1971 to observe power operation of
5 Unit 1, review physics testing procedures, and assist in
6 startup preparations for Unit 2.

7 In March, 1979, I was appointed Senior Power
8 Production Engineer, and in April, 1980, I was appointed
9 Technical Assistant to the Plant Manager. At the Diablo
10 Canyon Power Plant, I participated in the preparation and
11 review of licensing material for Units 1 and 2 including the
12 FSAR, the equipment description and operating manual, test
13 procedures, and the administrative procedures and
14 operational quality assurance manual. I participated in the
15 preparation of PGandE's Apprentice Control Technician
16 training program and in the startup test program. I was
17 responsible for SNM accountability as special Nuclear
18 Material Custodian and for supervising nuclear engineers,
19 routine plant scheduling, and the surveillance test program.

20 I have completed the following formal training
21 courses:

22 Six-months officer course of Navy Nuclear Power School, Mare
23 Island Naval Shipyard, Vallejo, California.

24 Six-months operational reactor training at NRF, Idaho Falls,
Idaho.

25 Simulator Training at the Westinghouse Nuclear Training
26 Center, Zion, Illinois, Option III (three-week course) and
Option II (one-week course).



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PROFESSIONAL QUALIFICATIONS OF
ROBERT PATTERSON

My name is Robert Patterson.

My educational background is as follows:

Cooper Union School of Engineering - BME in Mechanical
Engineering, 1953

From June to September, 1953, I worked at PGandE,
being given general indoctrination and training in power
plant engineering.

From September, 1953 to September, 1955, I served
in the U.S. Army, assigned to the Ballistic Research
Laboratory at the Aberdeen Proving Ground.

From October, 1955 to July, 1959, I had various
assignments at PGandE involving power plant engineering and
technical operations. I was involved in one conventional
power plant startup.

From July, 1959 to May, 1961, I was a staff
engineer with assignments in the nuclear power field at
Vallecitos and Dresden. At Vallecitos, I observed various
phases of plant operation including the initial startup of
the AVBWR. My Dresden experience included the initial
loading and low-level testing and the half-power to
full-power testing.

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1 From May, 1961 to April, 1962, I was engaged in
2 Humboldt Bay Unit 3 startup preparation and from April, 1962
3 to November, 1964, I had various assignments in power plant
4 nuclear engineering and other technical operations at
5 Humboldt Bay.

6 At Humboldt Bay, I participated in prestartup
7 activities including preparation of training material,
8 initial loading and low-level testing procedures. I
9 conducted training of operating personnel for the AEC
10 license exam and received an AEC Senior Operator's License.
11 I participated in preoperational testing of equipment and
12 systems, directed initial loading and testing programs as a
13 shift nuclear engineer, directed the preparation of reactor
14 refueling procedures subsequent to initial fueling, and
15 directed the performance of this work on shift. I was
16 responsible for the theoretical analyses of reactor core
17 nuclear and thermal-hydraulic performance, plus evaluation
18 of the performance of plant safeguard and other auxiliary
19 equipment.

20 From November, 1964 to January, 1968, I was
21 assigned to the Potrero Power Plant for the startup of a
22 220 MWe conventional unit. I also had various assignments
23 in power plant engineering and other technical operations at
24 Potrero, and was reassigned to Humboldt Bay during refueling
25 outages to participate as shift nuclear engineer.

26 ///



1 From January, 1968 to January, 1969, I was given a
2 special assignment involving preparation of the Company
3 power plant operators training program and the related
4 manual. From January, 1969 to July, 1970, I was assigned to
5 the Company's General Office engaged in Diablo Canyon,
6 license preparation. This included a six-month assignment
7 to the R. E. Ginna PWR Plant, where I conducted a training
8 program for operators taking the AEC operator license
9 examination. I participated in the preoperational testing
10 program and review of test results for acceptance of
11 systems. I also participated in initial loading, low-level
12 physics and power operation testing programs.

13 From July, 1970 to August, 1971, I was engaged at
14 Humboldt Bay, in Diablo Canyon startup preparation, and on
15 the Diablo Canyon Task Force, and in August, 1971, I was
16 assigned to Diablo Canyon as Supervisor of Operations. In
17 April, 1980, I was appointed Plant Superintendent. At
18 Diablo Canyon, I have participated in the preparation and
19 review of licensing material for Units 1 and 2 including the
20 PSAR, FSAR, and Technical Specifications. I also supervised
21 the operating staff in the preparation of equipment
22 operating procedures and related material prior to the
23 startup of the plant.

24 I have completed the following formal training
25 courses:

26 ///



- 1 Introduction to Nuclear Physics - University of California Extension
- 2
- 3 Nuclear Reactor Engineering - University of California Extension
- 4 Radiological Health - USPHS and California Health Department
- 5 Neutron Physics - University of California Extension
- 6 Nuclear Radiation Detection - University of California Extension
- 7
- 8 Radiation Biology - University of California Extension
- 9 Reactor Survey Course - General Electric APED (sections on instrumentation, core design, and operation).
- 10 Diablo Canyon Design Lecture Series - Series of lectures given by designers of Diablo Canyon systems and equipment, Westinghouse.
- 11
- 12 Simulator Training - Westinghouse Nuclear Training Center, Zion, Illinois. Option III (three week course) and Option II (one week course).
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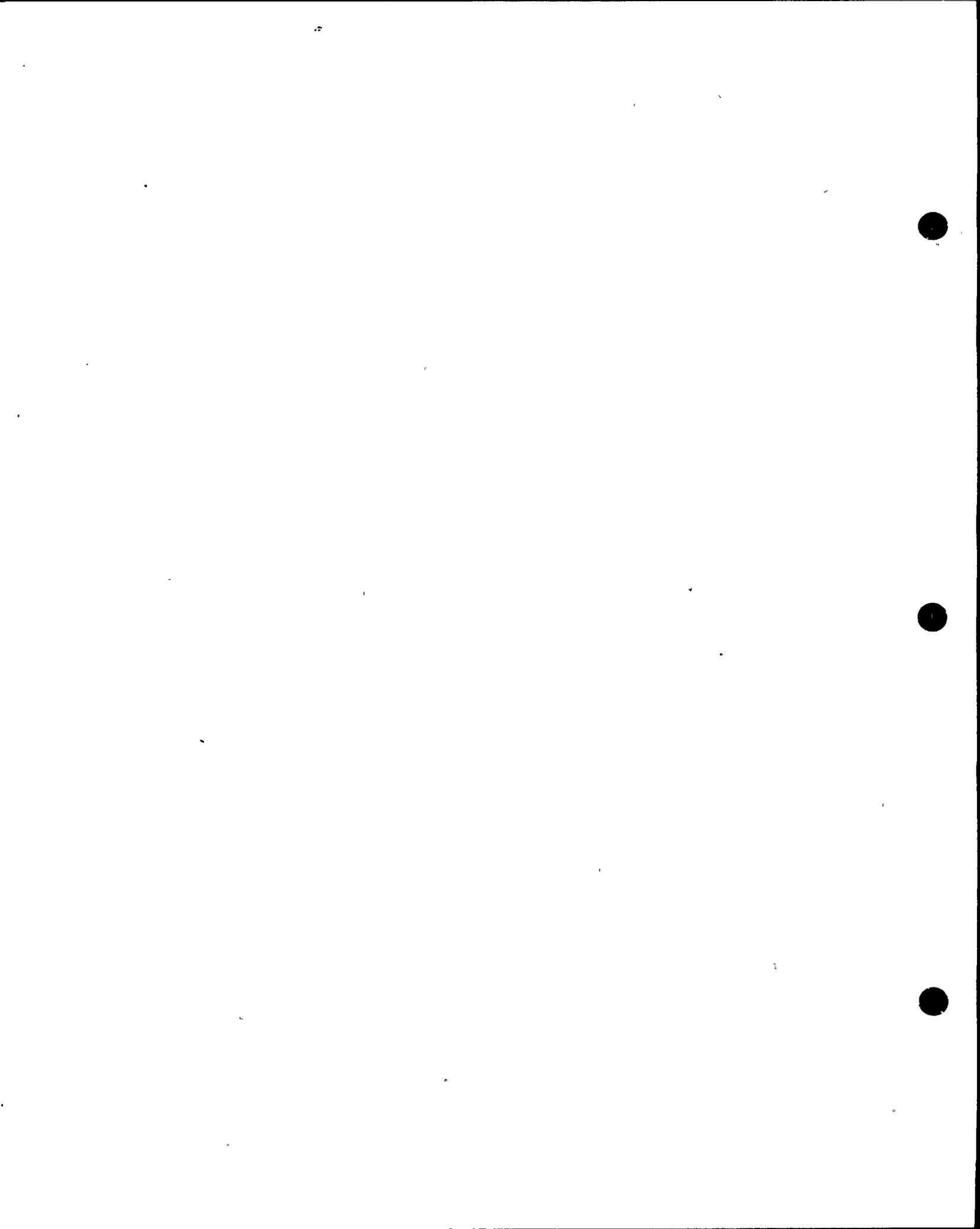
MR. NORTON: Your Honor, before we move on, in the proceedings. Since, I believe, the last one -- the first one where that started was 1974. Mr. Fleischaker's predecessor was involved then, but in subsequent proceedings also, the FSAR amendments, which have been filed and the SER supplements, which have been filed, subsequent to the last proceeding, have been moved into evidence at the beginning of the proceeding. We probably should have done that. I should have brought that up before we started out case, but before I forget it, I would like to, at this time, move that the FSAR amendments that have been filed and the SER sups which have come out since our last proceeding be officially received in evidence at this time. Because the testimony does, of course, refer to those documents and those documents should also be in evidence.

JUDGE WOLF: Can I have the numbers of those amendments.

MR. NORTON: There are numerous FSAR amendments that have all been filed and of course all the parties received copies each time one is filed. The SER sups, I forget, the last one that went into evidence, but we are now up to SER sup 14. I believe the last one into evidence was SER sup 10. Is that correct, David?

MR. OLMSTEAD: Can I speak to that, Mr. Chairman?

MR. FLEISCHAKER: Yes, I was going to suggest that



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since the SER is a staff document, that the staff probably ought to move it.

MR. OLMSTEAD: I have already provided to the Court Reporter copies of the SER supplements and asked him to be prepared to mark them as an exhibit as soon as the Board indicates what numbering system it wanted to use. The staff exhibit in the last hearings before the Atomic Safety and Licensing Board -- the last staff exhibit was Staff Exhibit No. 17. So, we're prepared to start the numbering with Staff Exhibits No. 18 through 25 for SER supplement seven through 14.

JUDGE WOLF: Any objection to that offer?

MR. FLEISCHAKER: Can I just make one comment on the numbering system, Mr. Chairman?

Excuse me, Bill. Do you have the numbers for the Joint Intervenors and for the Applicant --

MR. OLMSTEAD: Yes.

MR. FLEISCHAKER: -- because, if not, it might be better to start over. If you do have those numbers, we have absolutely no objection to --

MR. OLMSTEAD: I do have those numbers. I provided them for the Court Reporter and the sheet of paper they're written on is missing from the table right now. We have them here.

MR. FLEISCHAKER: We have no objection with con-



1 tinuing to number them, and we have no objection to the intro-
2 duction.

3 MR. OLMSTEAD: Yes, I have them if you would like
4 them.

5 MR. FLEISCHAKER: Can we just have those?

6 MR. OLMSTEAD: The last Applicant Exhibit was 65.
7 The last Joint Intervenor's Exhibit was 110. The last Board
8 Exhibit was 4 and, of course, Governor Brown was not a
9 participant at that time, so he has no exhibits.

10 While we're at this point, Mr. Chairman, I'd like
11 to also point out that the pre-hearing conference we held on
12 January 28 and 29, numbered the transcript from pages 207 to
13 373. Although, the last Licensing Board hearing transcript
14 page number was 10,182. So, I think we need to decide if
15 we're going to pick up from the pre-hearing conference or
16 from the last hearing.

17 JUDGE WOLF: Judge Bright was going to take that
18 up.

19 JUDGE BRIGHT: Before we do that, let's clear up
20 the SER.

21 JUDGE WOLF: Mr. Olmstead?

22 MR. OLMSTEAD: Yes.

23 JUDGE WOLF: Have you had all of the SER amendments
24 that you are offering marked by the Reporter?

25 MR. OLMSTEAD: We did not mark them with a number.



1 I have provided them all to the Reporter and then you -- I
2 thought that we needed a ruling from you as to what the
3 numbering system you wanted to use. If you want to continue
4 on, he's prepared to mark them starting with Staff Exhibit
5 No. 8.

6 JUDGE WOLF: I know of no reason for not continuing
7 it.

8 MR. OLMSTEAD: Well, we have a number of different
9 exhibits floating around depending on where you are in this
10 proceeding and I think that would make the most sense. So,
11 I'm prepared to go ahead with those numbers.

12 JUDGE WOLF: Will you arrange, then, with the
13 Reporter to see that they're marked correctly?

14 MR. OLMSTEAD: Yes.

15 JUDGE WOLF: And on that bases, then, we will
16 accept the offer of those exhibits yet to be numbered in
17 the record. They begin with what number now?

18 MR. OLMSTEAD: They begin with Staff Exhibit No. 8.

19 JUDGE WOLF: Staff Exhibit No. 8?

20 MR. OLMSTEAD: I'm sorry. Staff Exhibit No. 18 is
21 SER supplement No. 7 dated 1978.

22 JUDGE WOLF: Beginning with Staff Exhibit No. 18
23 through what?

24 MR. OLMSTEAD: Through Staff Exhibit No. 25.

25 JUDGE WOLF: Through Staff Exhibit No. 25.



1 MR. OLMSTEAD: Which will be SER supplement No. 14,
2 which was the last one we --

3 JUDGE WOLF: Now, what about the SAR? --

4 MR. OLMSTEAD: That would be the Applicant's Exhi-
5 bit, and his last Exhibit number was 65, but-I would have to
6 have him go with the number of supplements he wants to identify.

7 JUDGE WOLF: Yes.

8 MR. OLMSTEAD: I beg your pardon for getting into
9 that, but since he was referring to the staff document ---

10 JUDGE WOLF: I am glad you did. Can we straighten-
11 out the Exhibits, then from your viewpoint? The numbers?

12 MR. NORTON: The FSAR has never received an exhibit-
13 number, per se. It has been simply stipulated into evidence
14 as the FSAR and amendments thereto, throughout these
15 proceedings for the past decade.

16 JUDGE WOLF: Let us mark the ones that you want in-
17 cluded now. Will you arrange that with the reporter sometime;
18 the ones that you are asking us to receive at this time?

19 (Whereupon, NRC Exhibits Nos.
20 18 through 25 were marked for
21 identification.)

22 MR. NORTON: The FSAR amendment, as you know, if
23 there are pages that change throughout the entire FSAR over
24 the -- it never stops. It has been going on for the last 15
25 years and never will stop. What we have done before in these



1 proceedings, is to say that those amendments as to this point
2 in time are in evidence, but, you know, page 6,438 may be
3 changed tomorrow because of a requirement by the staff or
4 whatever and those changes are made. So, it would be physi-
5 cally impossible to go through and mark each page that has
6 been changed over the last several years. And of course, all
7 of the parties receive all such changes and supposedly keep
8 their FSARs up to date.

9 I don't think you can physically mark them. I
10 don't see how that can be done. It's just the FSAR as of this
11 date and time is in evidence and everyone's should be exactly
12 the same if they keep up with their filing as the amendments
13 come in.

14 JUDGE WOLF: Any objection to the suggestion made
15 by the counsel for --

16 MR. REYNOLDS: No objection.

17 JUDGE WOLF: If there are no objections -- Do you
18 have --

19 MR. LANPHER: We have no objections with respect
20 to the Safety Analysis Report with -- My understanding with
21 respect to the staff exhibits, at this time, they be marked
22 for identification and when the staff panel comes on, I
23 presume Mr. Olmstead will have them identified. He has Mr.
24 Buckley here to testify and then we'll see about moving them
25 into evidence.



1 MR. NORTON: Yes, I will correct what I said before.
2 We would like the FSAR admitted into evidence and the SER
3 sups simply marked for identification, because I'm sure
4 they'll be referred to in cross examination, etcetera.

5 JUDGE WOLF: All right. Will you straighten it
6 out with the Reporter, then, to see that he has some kind of
7 a listing of what you're offering at this time?

8 MR. NORTON: Certainly.

9 JUDGE WOLF: Are we straight with you, then, Mr.
10 Olmstead?

11 MR. OLMSTEAD: I believe so.

12 JUDGE WOLF: Very well.

13 MR. REYNOLDS: Judge Wolf?

14 JUDGE WOLF: Yes.

15 MR. REYNOLDS: I have one question with respect
16 to NUREG-0654. The Board's already recognized the importance
17 of that document in this proceeding and I would just like to
18 know whether or not the Board intends to take notice of that
19 document or whether you would prefer us to -- We're prepared
20 to move it into evidence as an exhibit.

21 JUDGE WOLF: It's your document. What -- We
22 surely are going to take notice of that document, because of
23 the part it plays in all of the regulations. For identifica-
24 tion, it would be -- I don't see why it would be easier than
25 just to refer to the NUREG number.



1 MR. REYNOLDS: We can refer to it as O654. That's
2 perfectly all right.

3 MR. OLMSTEAD: We did provide Joint Intervenors
4 with three copies to mark if they wish to, although we felt
5 that the Regulations referring specifically to the document
6 were sufficiently clear for the purposes of that document.

7 JUDGE WOLF: I think that's sufficient.

8 MR. REYNOLDS: That's sufficient.

9 MR. NORTON: Your Honor, I don't believe that you
10 asked the Joint Intervenors and Governor Brown if they had
11 any objections to the FSAR being admitted into evidence. I
12 don't believe you asked the staff or did you rule. We got
13 sidetracked.

14 JUDGE WOLF: I thought we had, but if we haven't,
15 we'll ask you again.

16 MR. REYNOLDS: Is that marked for purposes of
17 identification only or is it generally admitted into the
18 record as an exhibit? Is it sworn testimony or are we just
19 identifying it as a document?

20 MR. NORTON: I don't know whether he's talking
21 about the FSAR or what. He had no objection a minute ago.

22 MR. REYNOLDS: Yes, teh FSAR.

23 MR. NORTON: The FSAR is received into evidence
24 and subject to cross examination. That's the way it's been:
25 for the last ten years.



1 MR. REYNOLDS: We have no objections.

2 JUDGE WOLF: Very well.

3 MR. LANPHER: As I stated before, Governor Brown
4 has no objection to the FSAR and the staff exhibits we'll
5 wait on.

6 JUDGE WOLF: Mr. Bright has a comment about the
7 pagination that the Reporter should hear.

8 JUDGE BRIGHT: We didn't realize at the time this
9 last pre-hearing conference came up that we were really going
10 to have to reach back into the record that we had compiled
11 previously. So, we started numbering the pages one. We have
12 since concluded that that was an egregious error on our part
13 and therefore we would like to have you change the page num-
14 bers.

15 On the 28th, they would run 10,183 to 10,389. And
16 on the 29th, they would run from 10,390 to 10,555. And you
17 will notice that the transcript copies which you get for
18 today will start with 10,556, God willing.

19 (Pause)

20 JUDGE WOLF: Mr. Fleischaker, or counsel, are you
21 ready for cross examining? _

22 MR. FLEISCHAKER: Yes.

23 JUDGE WOLF: Very well. Do you wish to proceed
24 now, then?

25 MR. REYNOLDS: I address several preliminary



1 questions to Mr. Shiffer, if I may.

2 CROSS EXAMINATION

3 BY MR. REYNOLDS:

4 Q Mr. Shiffer, you prepared on behalf of PG & E, the
5 answers to Joint Intervenor's interrogatories concerning
6 emergency planning, did you not?

7 A (Witness Shiffer) Yes.

8 Q Do you have a copy of those interrogatory responses?

9 A I think so.

10 (Pause)

11 Q If I have one, I can provide you with, if it's
12 trouble.

13 A Okay.

14 Q It's Interrogatory 6A, which I want to focus on.
15 Would you please read Interrogatory 6 and the response --
16 Excuse me. Interrogatory 6, 6A and your response.

17 A The interrogatory says, "Does the Applicant contend
18 that the Applicant, state and local emergency response plans
19 for Diablo Canyon as they are presently constituted comply
20 with the Commissions revised emergency planning regulations
21 effective November 3, 1980; the final regulations on
22 emergency planning, 45 Federal Register 55402, August 19,
23 1980?"

24 A, is provide a direct answer to the question.

25 The answer is no.



1 Q Did you give that response to that interrogatory?

2 A Yes.

3 Q Thank you. Did you also prepare on behalf of
4 PG & E, the supplemental answers to Joint Intervenor's
5 Interrogatories 9A and 11A?

6 A Yes. I think so. Yes.

7 Q Were you duly authorized to prepare those supple-
8 mental answers on behalf of PG & E?

9 A Yes.

10 Q Are those answers true and correct to the best of
11 your knowledge and belief?

12 A Yes.

13 MR. REYNOLDS: I have copies of that and I think
14 we will submit that as Joint Intervenor's Exhibit 111 for
15 identification.

16 MR. NORTON: Excuse me, Your Honor, are we going
17 to mark pleadings submitted as exhibits? These are pleadings
18 in the case. They are already in. They're verified answers.
19 Why are we duplicating that?

20 JUDGE WOLF: I don't see any reason for it.

21 MR. REYNOLDS: All right. That's fine. If they
22 are part of the record and we can rely on them, that's the
23 whole point. Thank you.

24 MR. LANPHER: Could I get a clarification, please?

25 JUDGE WOLF: Sure.



1 MR. LANPHER: It's my understanding, since they're
2 under oath and properly answered under oath in the part of
3 the record as evidence, can be cited from proposed findings,
4 etcetera. Is that correct?

5 JUDGE WOLF: Repeat your question?

6 MR. LANPHER: I'm a little confused by Mr. Norton's
7 objection, because in some of the previous hearings we have
8 marked interrogatory responses as exhibits. I just want it
9 clear that these interrogatory responses may be cited as
10 evidence in this proceeding in our proposed findings of fact.

11 MR. OLMSTEAD: Mr. Chairman, I would like to
12 respond to that before -- because I don't agree with Mr.
13 Norton's characterization of their status.

14 JUDGE WOLF: You may respond.

15 MR. OLMSTEAD: We went through this in -- the
16 Board, of course, wasn't here when we were arguing in front
17 of the Appeal Board, but we went through this before and while
18 I agree that interrogatory responses and depositions and --
19 are admissions against the party who made them and therefore
20 are evidence, I think that they're not receivable until a
21 person has an opportunity to object to portions there to and
22 offer other portions for purposes of relying on them as
23 evidence. Therefore, I agree with the approach that Joint
24 Intervenors used. If Mr. Norton wants to put the whole thing
25 in, fine, but I'm not going to agree to every single



1 interrogatory response coming in without the appropriate
 2 opportunity to enter proper objections as to relevancy. As
 3 the Board knows, the scope of discovery is somewhat broader
 4 than the scope of the issues of any proceeding and what may
 5 be relevant for purposes of discovery, may not be relevant
 6 for purposes of the hearing itself.

7 I hate to keep making these technical points, but
 8 I would like to keep that distinction maintained on the record.

9 JUDGE WOLF: Mr. Norton.

10 MR. NORTON: Mr. Olmstead misunderstood me or
 11 perhaps I misspoke. I'm not saying that they're into evidence,
 12 but they are already in the record.

13 JUDGE WOLF: That's right.

14 MR. NORTON: All I'm saying is why duplicate --
 15 We're at 10,555 now. Why duplicate things that are already
 16 in the record. I didn't say they were in evidence. I said
 17 they were in the record. Certainly, ask any questions you
 18 want of any of them and obviously you'll get that testimony,
 19 then, into evidence. But, they are certainly in the record.
 20 They are not in evidence. I was no way implying that it was.

21 JUDGE WOLF: That was my understanding of his
 22 position.

23 MR. OLMSTEAD: My problem with that approach is
 24 that the way the question was put to the witness was simply
 25 to ask him if a particular question had been asked him if he



1 prepared the answer and he said yes. He did not read every
2 single one of them into the record. So, there is no reference
3 in the record to indicate that that piece of evidence is in.
4 So, I see nothing wrong with marking those particular pages
5 in exhibits, making the appropriate motions to move them into
6 the record, save the witness having to read the responses all
7 the time.

8 If we're going to read the whole response, that's
9 another way to do the same thing.

10 MR. REYNOLDS: No. That's part of the point in
11 doing it this way. I think we can save time by not having to
12 read the responses into the record. Simply submit the docu-
13 ment itself into the record and we can move on to something
14 else.

15 MR. NORTON: If it's in interest of saving time,
16 we'll go along with it.

17 JUDGE WOLF: Well, are you going to make an offer,
18 then, of the --

19 MR. REYNOLDS: Yes, I'm going to make an offer, but
20 I was going to have the witness identify it first.

21 This should be marked as Joint Intervenor's
22 Exhibit No. 111..

23 (Whereupon, the above-
24 mentioned document was
25 identified as Joint
Intervenor's Exhibit
No. 111.)



CROSS-EXAMINATION (Resumed)

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BY MR. REYNOLDS:

Q Mr. Shiffer, could you please identify that document?

A (Witness Shiffer) Well, the document is a submittal from PG & E to Judge Wolf, which contains answers to Interrogatories 9(a) and 11(a).

Q And did you prepare those responses to Interrogatories 9(a) and 11(a)?

A Yes, I did.

MR. REYNOLDS: I would now move Joint Intervenor's Exhibit 111 into evidence.

MR. LANPHER: No objection from Governor Brown.

MR. NORTON: No objection.

MR. OLMSTEAD: No objection.

JUDGE WOLF: Without objection, Joint Intervenor's Exhibit 111 marked for identification is received in evidence.

(Whereupon, Joint Intervenor's Exhibit 111, having been marked for identification, was received in evidence.)

BY MR. REYNOLDS: —

Q Now, Dr. Brunot, you were employed by PG & E from May, 1970, through 1979; is that correct?

A (Witness Brunot) I believe that is right, yes.

Q Have you previously appeared as a witness on behalf



2
1 of PG & E?

2 A Yes, I have.

3 Q On how many occasions?

4 A In Federal Hearings?

5 Q No, not limited to Federal Hearings.

6 A Oh, I think we would have to decide how broad to make
7 that, because there were two or three Federal ones, and two or
8 three State ones, and then a lot of other informal ones.

9 Q Thank you. Now, if we could turn to your testimony.

10 On Page 4, Line 9, you state, in effect, that the
11 fission product inventories following low-power testing will
12 be "much less" than 1/20th of the full power value, and you
13 list those values in Table I; is that correct?

14 A That is right.

15 Q Isn't it true that the radionuclides significantly
16 contributing to thyroid exposure pose the major short-term
17 health consequences?

18 A Both those that go to the thyroid and others that
19 affect the whole body.

20 Q So whole body exposure would also pose serious,
21 prompt health consequences?—

22 A I am sorry, I couldn't hear.

23 Q Your answer, if I understand it correctly, is that
24 both radionuclides going to thyroid exposure and whole body
25 exposure pose significant, prompt health consequences; is that



3
1 correct?

2 A That is right.

3 Q I wonder if you would turn to Page 18 of NUREG-0654,
4 please.

5 A I don't have that.

6 Q I have a copy.

7 (The witness was handed the document.)

8 A Yes, I have it.

9 Q Now, in the left column are listed radionuclides with
10 significant contribution to thyroid exposure; is that right?

11 A Yes.

12 Q I wonder if you would take the radionuclides which
13 are listed in this left column and compare them with your
14 Table I and state for the record the values which you have
15 assigned -- five percent of full-power value which you have
16 assigned to these individual radionuclides.

17 A Starting with I-131, and you would like to have the
18 five percent values?

19 Q Yes, which I believe are listed in the right-hand
20 column of your Table I.

21 A They are listed in the center column.

22 Q I am sorry, I am interested in the ratio.

23 A You are interested in the ratio?

24 Q Yes.

25 A The ratio for I-131 is 21. For I-132 -- excuse me,



4
1 I skipped one here.

2 I-132 is 20; I-133 is 20; I-134 is 20; I-135 is 20;
3 Sr-132 is 20.

4 Q Thank you. Now, if you would go to the middle column
5 on Page 18 of NUREG-0654, and if you would read the ratio,
6 full-power to 5 percent power, for each of the radionuclides
7 listed listed as contributing to whole body exposure.

8 A For I-131, again, it is 21; Te-132 is 20; Xe-133 is
9 20; I-133 is 20; Xe-135 is 20; I-135 is 20; Cs-134 is 320;
10 Kr-88 is 21; Cs-137 is 440.

11 Q So with the exception of Cs-134 and Cs-137, the ratio
12 for each of the other radionuclides is either 1 to 20 or 1 to 21;
13 is that correct?

14 A I believe so, yes.

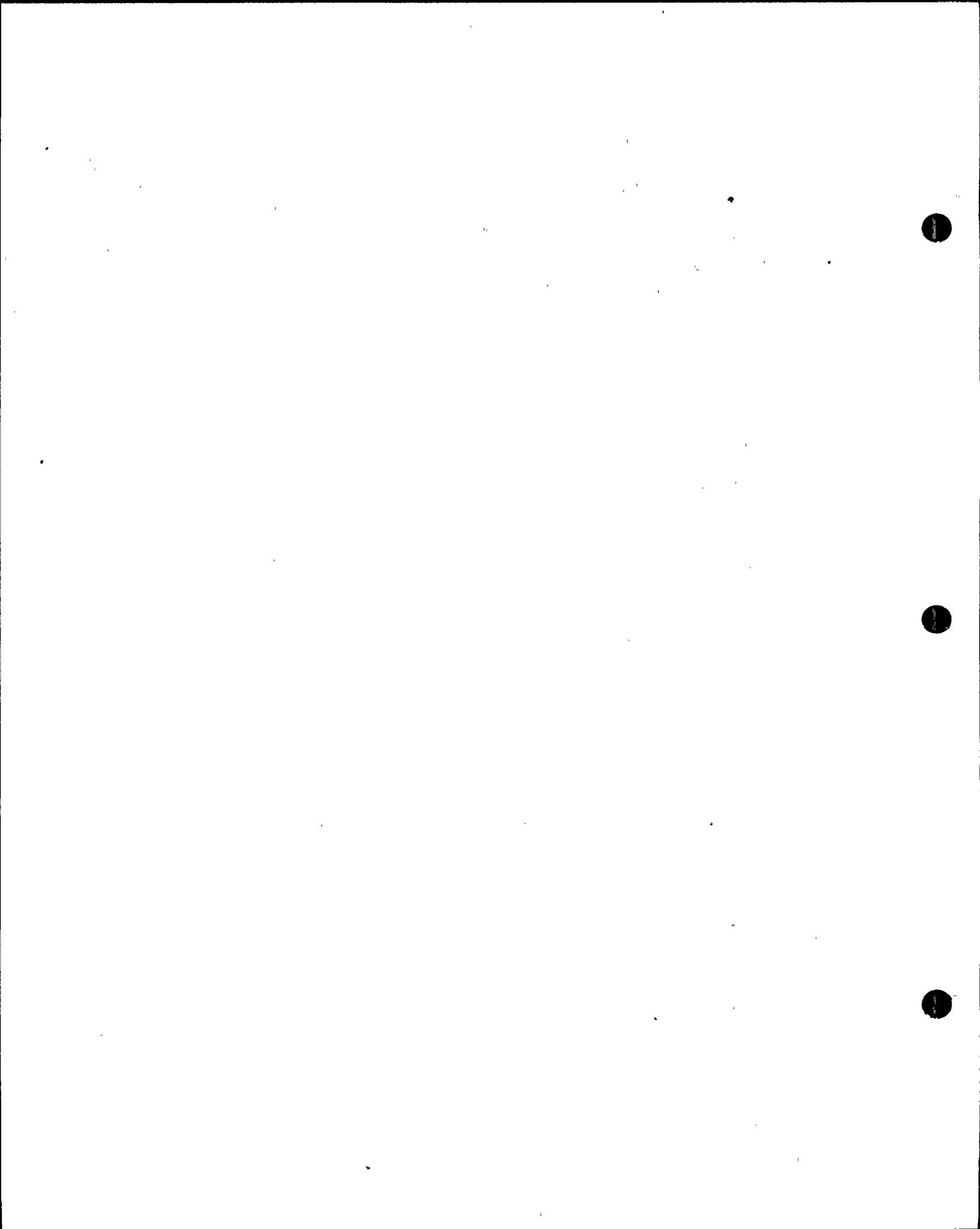
15 Q Now, on Page 11, Line 15, of your testimony, you
16 refer to the reduction of core inventories of significant
17 isotopes by a factor of 20 to 400 at low power. Now, if we
18 focus only on the significant radionuclides with the major,
19 prompt health consequences due to thyroid and whole body --

20 A Excuse me. Are you talking from Page 11, or some-
21 thing else?

22 Q Yes, Page 11, Line 15.

23 A It doesn't say that. Oh, this one here? All right.

24 Q I am sorry, beginning on Line 15 and continuing
25 through Line 17.



5
1 A I have it.

2 Q Could you please read, beginning at Line 15?

3 A "Because the core inventories of significant isotopes
4 are from a factor of 20 to 400 less for operation during the
5 low-power tests, the distances at which any given exposure could
6 occur are correspondingly lower."

7 Q Now, if we focus only on the significant radionuclides
8 with the major, prompt health consequences due to thyroid
9 and whole body exposure, which are the radionuclides which we
10 have been discussing, isn't a factor of 20 or more an appropriate
11 estimate?

12 A Yes, it is.

13 Q Also on Table I, it is, I am sure, just a typo-
14 graphical error. In the third line from the top, shouldn't
15 that be "Curies times 10^{+6} ," rather than to the negative 6?

16 A No, it shouldn't.

17 I am sorry, but this is kind of a difference which
18 you see in a number of textbooks in both ways. You see these
19 numbers tabulated both times 10^{+6} and times 10^{-6} , depending
20 on the way in which you present the information.

21 I understand your confusion, but the number, the
22 10^{-6} is a correct way of tabulating the numbers.

23 Q All right, fine.

24 On Page 8, Line 11, you refer there to "components
25 and systems" which ". . . may not be completely on line by the



6
1 time of low-power testing." Could you specify, please,
2 precisely which systems and components you are referring to?

3 A This section I put in as a possible risk increase
4 factor and, at this time, I -- this was a draft testimony, and
5 at the time I submitted the testimony, I had not checked with
6 the Plant Manager and with the Project Manager on these things.

7 Since that time, I have found that there are essentially
8 ly no components and systems which are required for full-power
9 operation which will not be on line at the time of low-power
10 testing.

11 So that, in fact, there is no risk increase factor
12 due to this.

13 Q You are changing your testimony; is that correct?

14 A Yes.

15 Q All right. Did you consider and include the technical
16 specification exceptions attached to the draft forms of
17 license submitted by PG & E?

18 A I am sorry, would you say that again? Did I consider
19 what?

20 Q Yes. Did you consider and include the technical
21 specification exceptions which are attached to the draft forms
22 of license submitted by PG & E?

23 A I have not reviewed those things recently.

24 Are you speaking again in connection with this
25 Item Number 2?



7
1 Q Yes.

2 A I have not recently looked at the technical specifica-
3 tions, and so I did not include that in my consideration.

4 The specifications, of course, are a document,
5 rather than a component and system.

6 Q Fine. Thank you. On Page 8, Line 16, you refer to
7 "features of the emergency plans for full power operation
8 which are not complete."

9 Would you specify, please, which features of the
10 emergency plans you considered and included in your analysis?

11 A This was a general judgment factor which I put in,
12 and I could not specify particular features of the emergency
13 plans. In this case, it was an impression gathered, and it
14 was a judgment based on an impression gathered in discussions
15 and mostly by listening to other people who were involved in
16 preparing the emergency plan.

17 Q I take it then that you did not set forth any of
18 these emergency plan items and detailed fault tree and entry
19 analyses of the Diablo Canyon proposed low-power test program;
20 is that correct?

21 A I don't know what fault tree or entry analysis
22 has to do with this thing.

23 Q All right. Your risk analysis then is based on, at
24 least for this particular item, on your judgment as to what
25 that risk increase would be; is that right?



8 1 A That is correct. The judgment is based, as I said,
2 significantly on impressions gained during discussions with
3 other people who have been working on preparing the emergency
4 plans.

5 Q Precisely how did you arrive at the quantification
6 of this factor? What things did you consider in arriving at
7 your conclusions?

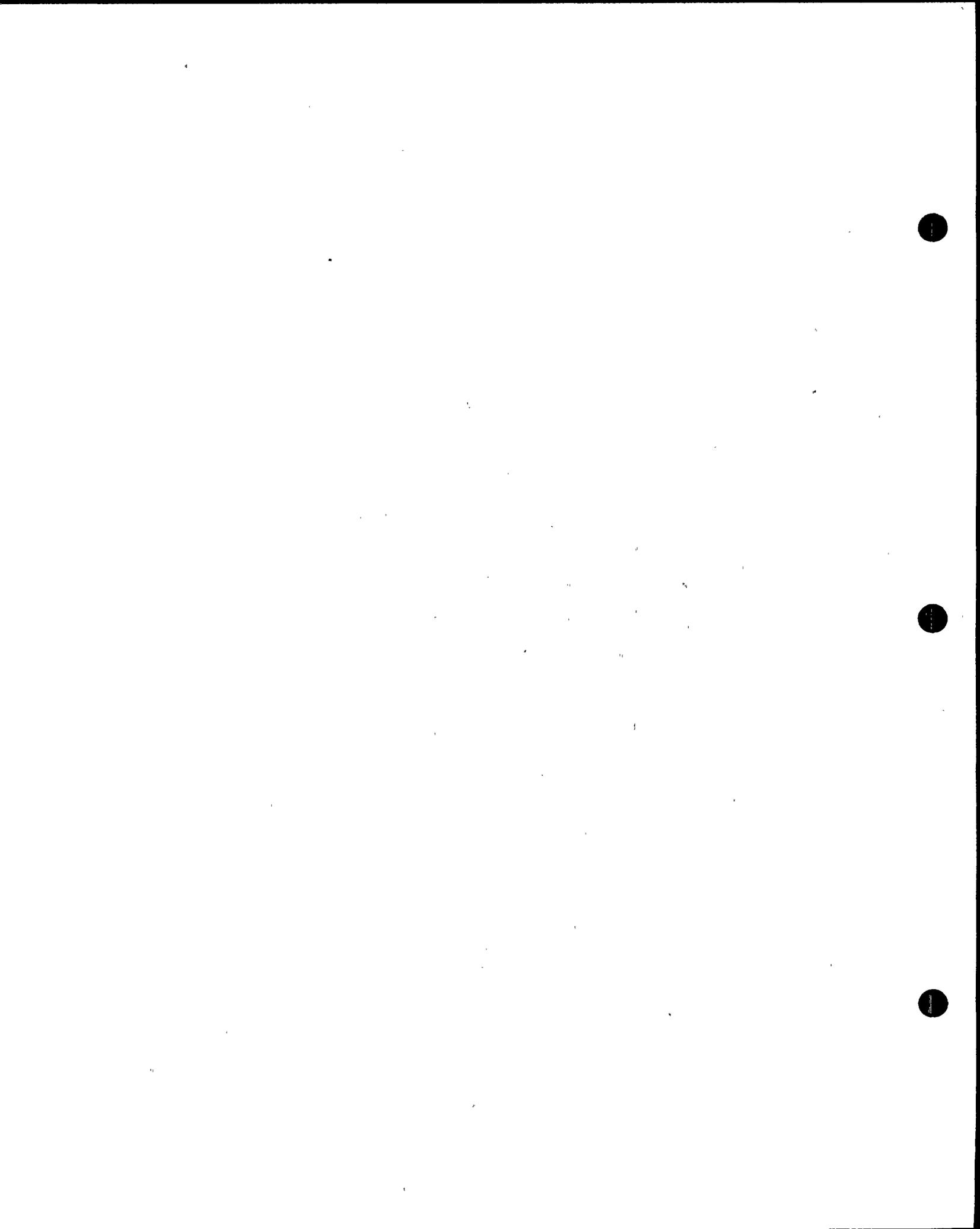
8 A There was no precise determination on any of these
9 particular factors this one included. Some of them were on
10 the basis of my own judgment and knowledge of the technical
11 factors, and others were on the basis of impressions gained
12 talking to other people who are involved in this.

13 Q Did you include a risk increase factor for added
14 reliance on operator action in the face of any technical
15 specification exceptions which would apply to the low-power
16 test program?

17 A I originally had, in an early draft of this, a factor
18 for added reliance on operators and also another factor for
19 the influence of the augmented staff of engineers available
20 during that period.

21 After discussions with people, Mr. Shiffer and others,
22 we decided those were so marginal; both were so marginal, one
23 in the positive direction and one in the negative, that they
24 tended to wash each other out.

25 So I did not include an explicit factor of increase



1 or decrease for that situation.

2 Q So once again, in your judgment, what you did was to
3 determine that the increase reliance on operator action was
4 counter-balanced by the augmented personnel which will be
5 present during the low-power test program?

6 A Yes, in a general way, that is right.

7 Q On Page 8, Line 22, you refer to the augmented staff
8 available during testing. Precisely, by how many employees
9 would the staff be augmented?

10 A I am sorry, I don't know that. I think I can have
11 Mr. Shiffer help with that. I just don't know.

12 Q If you did not know at the time you did the analysis,
13 what was the basis for giving weight to that particular factor?

14 A I don't think the weight given to that factor has
15 to do with how many people there are, principally. It has
16 to do with the additional staff that is needed in carrying
17 out performance tests and initial tests.

18 So it is not necessarily the number of people that
19 is there. It is the type of people there that is more important.
20 For example, the power plant engineers and some of the design
21 engineers that are involved in the systems, would be there to
22 assist in the testing and evaluating the tests.

23 Q Mr. Shiffer, can you help with the actual number
24 of the augmented staff?

25 A (Witness Shiffer) Well, as discussed in my testimony



10 1 on Page 5, it says -- and I will read a line: "At a minimum,
2 during periods of fuel loading and low-power testing, there
3 will be three PG & E engineers and two Westinghouse engineers
4 on each shift." That is a minimum commitment. In addition
5 to that, there is ordinarily more than that.

6 Q And will these extra personnel be present on the
7 weekend shift, for example?

8 A If we are doing this kind of testing, and things,
9 yes, they will.

10 Q And the same would apply for the graveyard shift?

11 A Absolutely.

12 Q On Page 6, Line 16, Dr. Brunot, you refer to increased
13 time available to "conduct emergency operations," and you assign
14 a risk increase factor of five to 10.

15 In this quantification, you rely, at least in part,
16 on operator action to diagnose and respond correctly to an
17 accident; is that correct?

18 A That is right.

19 Q Now, you cited the Kemeny Report in Part 3 of your
20 testimony. Do you recognize it as one of the major studies
21 of the TMI accident?

22 A I beg your pardon? Do I realize what?

23 Q Do you recognize it as one of the major studies
24 arising out of the Three-Mile Island accident?

25 A Yes.



11 1 Q Isn't it true that the Commission cited inappropriate
2 operator action as a major contributor to the TMI accident?

3 A Yes, that is right.

4 Q Isn't it true also that, according to the Kemeny
5 Commission, there was confusion for about two days, even among
6 NRC personnel, concerning the true seriousness and nature of
7 the accident at TMI?

8 A I don't recall those words, but I wouldn't be surprised.
9 I hate to answer "yes," because I believe you may be
10 quoting, and I don't have it.

11 Q I do have a copy, which I can give you. One moment.

12 A Would you tell me the page you are reading from?

13 Q Yes. Would you please turn to Page 39?

14 MR. NORTON: Excuse me, Your Honor.

15 I understand that the Joint Intervenors have objected
16 to Dr. Brunot's use of the Kemeny Commission and referring to
17 it in his testimony, but are they waiving that objection now
18 by cross-examining him on that? If they are, that is fine. I
19 have no objection, but I don't see how they can have it both
20 ways.

21 MR. REYNOLDS: No, I explicitly stated, in objecting
22 to Part 3 of Dr. Brunot's testimony, that I was not objecting
23 to his use of the Kemeny Commission Report. I was only
24 objecting on the grounds of relevance.

25 We recognize that the Kemeny Commission Report is a



12 1 document of great importance with respect to the Three-Mile
2 Island accident, and we believe that there are certain passages
3 which are relevant to the issues which are being considered here.

4 BY MR. REYNOLDS:

5 Q Now, would you turn to Page --

6 MR. NORTON: Excuse me, Your Honor.

7 JUDGE WOLF: Just a moment.

8 Do you have something further to say?

9 MR. NORTON: Yes, Your Honor. I am still unclear.

10 Is it relevant when they want to use it, but not relevant as
11 used by Mr. Brunot? I would like to get the exact nature of
12 their objection. I just, again, don't understand how it can
13 be relevant for them and irrelevant for others.

14 MR. LANPHER: I think we are going around in circles.

15 I believe the Board has ruled that this evidence has
16 been received. They may have proffered a relevance objection
17 before; that doesn't mean they waive it. But since you have
18 ruled, they can certainly proceed on this line of questioning.

19 JUDGE WOLF: You may proceed.

20 MR. REYNOLDS: Thank you.

21 BY MR. REYNOLDS: --

22 Q Now, on Page 39 of the Kemeny Commission Report, I
23 wonder if you would read Paragraph 8 for the record.

24 A "Although the NRC personnel were on-site within
25 hours of the declaration of a site emergency and were



13

1 in constant contact with the Utility, the NRC was not
2 able to determine and to understand the true seriousness
3 and nature of the accident for about two days, when the
4 fact of extensive core damage and the existence of the
5 hydrogen bubble were generally recognized within NRC."

6 Q Thank you.

7 On Page 9 of your testimony, Line 7, you refer to
8 the "over-all risk of events leading to accidental releases. . . ."

9 Correct me if I am wrong, but aren't you referring
10 actually to the probability of events, rather than risk of
11 events?

12 A Well, what distinction do you make, sir, between "risk"
13 and "probability" of events, here? The risk of events in this
14 sense is the probability or frequency of events.

15 Q I wonder if you would define the term "risk of events,"
16 as you intended there?

17 A The "risk of events" here means the frequency or the
18 probability. "Frequency" is probably a better term.

19 Q You would use "risk" and "probability" synonymously;
20 is that right?

21 A In this sense here? Yes, that is right.

22 Q On Page 10 of your testimony, at Line 8, you refer
23 to "safety analyses." Isn't it true that safety analyses
24 consider only design-basis accidents?

25 A You mean in general? No, it considers -- in general,



14 1 safety analyses can consider a wide range of events.

2 Q Would safety analyses consider a Class 9 accident
3 an accident beyond --

4 A "Class 9" is a definition in the context of the annex
5 to Appendix D of Part 50, and it is sort of a non-group of
6 accidents. Safety analyses, as used in the context of the
7 FSAR's and the SER's, don't use Class 9's. They don't use
8 Class 1 through 8, either. That is in the context of environ-
9 mental reports.

10 Q So in the context of the FSAR and the SER and the
11 environmental reports, if I understand you correctly, you say
12 that they do not consider Class 9 accidents; is that correct?

13 A No, it is not correct. If my answer is "no," then
14 it is going to be interpreted as meaning they don't consider
15 them. They don't consider that particular classification
16 scheme, either Class 1, 2, 3, 4, 5, 6, 7, 8 or 9. That classi-
17 fication scheme is not used in safety analyses reports.

18 Q For each of the five reports which you have listed
19 on Page 10, 1 through 5, do they consider accidents beyond the
20 design basis? For example, a breach of containment?

21 A The environmental report and the final environmental
22 statement consider accidents, including the possibility of
23 breach of containment. These accidents are put in a Class 9,
24 generally, in which the consideration of this group of accidents
25 is done, and the judgments are made on the basis of their



1 frequency.

2 Yes, they are considered.

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4 // // // //

5 (Please continue to the next numbered page.)

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t8 1g 1 MR. REYNOLDS: I would like to mark an Exhibit as
2 Joint Intervenor's Exhibit 112 for identification.

3 (Whereupon, the above-mentioned
4 document was marked for
5 identification as Joint
6 Intervenor's Exhibit No. 112.)

7 MR. REYNOLDS: The title of this document is
8 Final Environmental Statement Related to the Nuclear
9 Generating Station, Diablo Canyon Units 1 and 2.

10 Could you turn, please, to page 7-3?

11 MR. OLMSTEAD: Excuse me, Mr. Chairman. I would
12 like the marking of Joint Intervenor's Exhibit 112 to show
13 that it is really not the final environmental impact
14 statement, but pages 7-1 through 7-7 of the final
15 environmental impact statement.

16 MR. REYNOLDS: Thank you. And I am informed that
17 this entire environmental statement is already part of the
18 record.

19 MR. OLMSTEAD: I believe that is correct. I don't
20 happen to have the Exhibit number right here, but the FES
21 is a part of the record in these proceedings.

22 JUDGE WOLF: Does it have an Exhibit number?

23 MR. OLMSTEAD: I believe it does, but it is an
24 early -- I would have to go back and dig it out. I can do
25 that if you would like. I don't think it is necessary here,



t8 2g 1 because this Exhibit is only those six pages.

2 JUDGE WOLF: You don't think it is necessary for
3 what?

4 MR. OLMSTEAD: I have no objection to their marking
5 this as an Exhibit, as long as we indicate it is only those
6 pages.

7 JUDGE WOLF: Yes, very well.

8 MR. REYNOLDS: All right, I am just doing this as a
9 matter of convenience. If -- it seems to me to be easier
10 just to refer to it as -- by that Exhibit number.

11 BY MR. REYNOLDS:

12 Q Could you turn to page 7-3, please?

13 A (Witness Brunot) Yes.

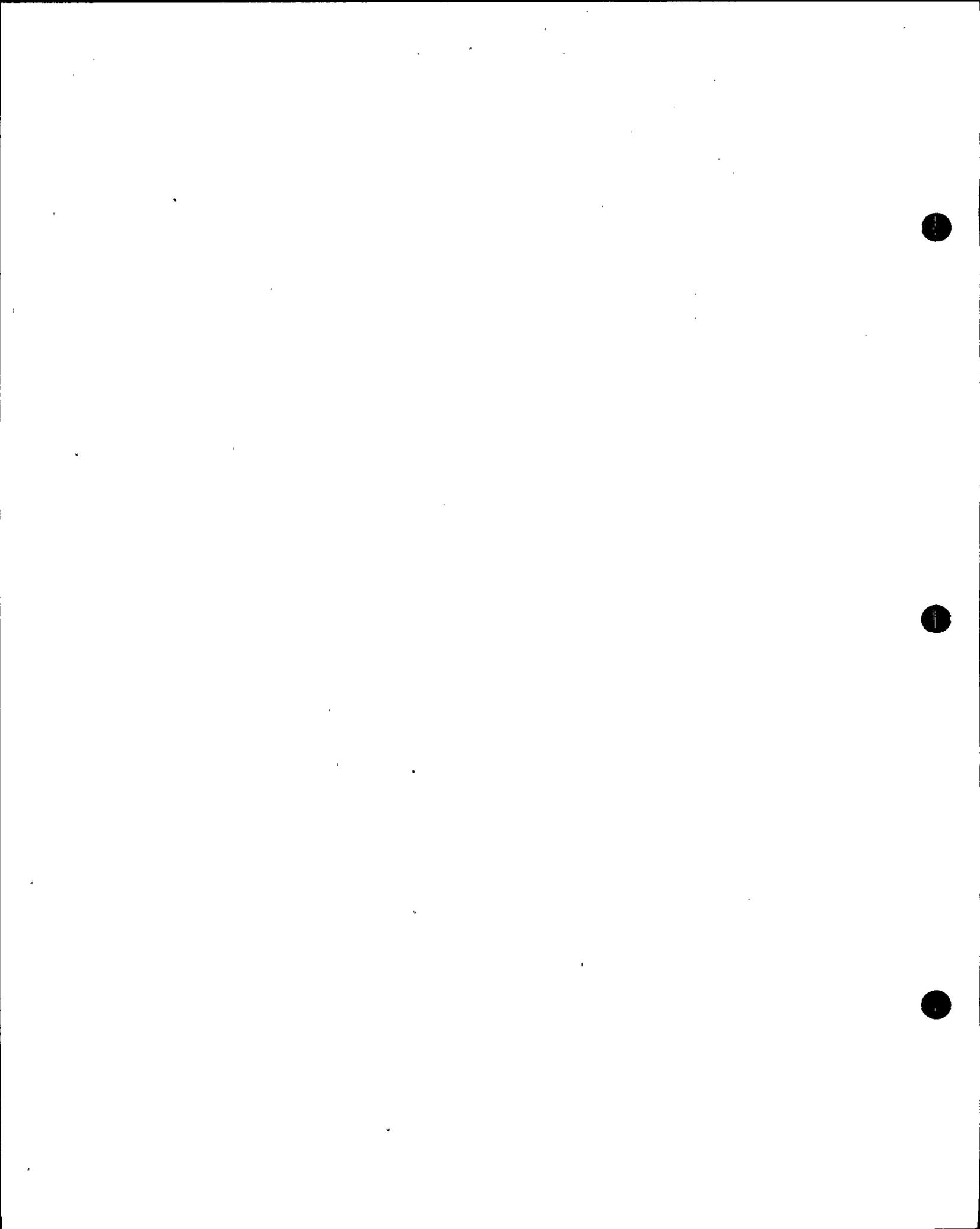
14 Q Now, in the column on the left, it says, under the
15 title "Classes," it says "9". Could you read the
16 description, please?

17 A It -- the description is hypothetical sequences of
18 failures more severe than Class 8.

19 Q And then under Applicant's exception -- excuse me,
20 Applicant's examples?

21 A None.

22 Q Isn't it true based on this, that they did not
23 consider hypothetical sequences of failures -- they did not
24 consider examples of hypothetical sequences of failures more
25 severe than Class 8?



t8 3g 1 A No. As I pointed out, the consideration of
2 so-called Class 9 accidents is done both in the FES and the
3 Environmental Report by consideration of their frequency.
4 The meaning of this table is that no examples were shown in
5 which the consequences were evaluated. The frequency of
6 such events was considered, and if you will look at the other
7 pages here that you have got, you will see what was done.

8 Q What probability analysis was cited in support of
9 the conclusion?

10 A There was no explicit probability analysis required
11 or presented, either in the Final Environmental Statement,
12 or in the Environmental Report.

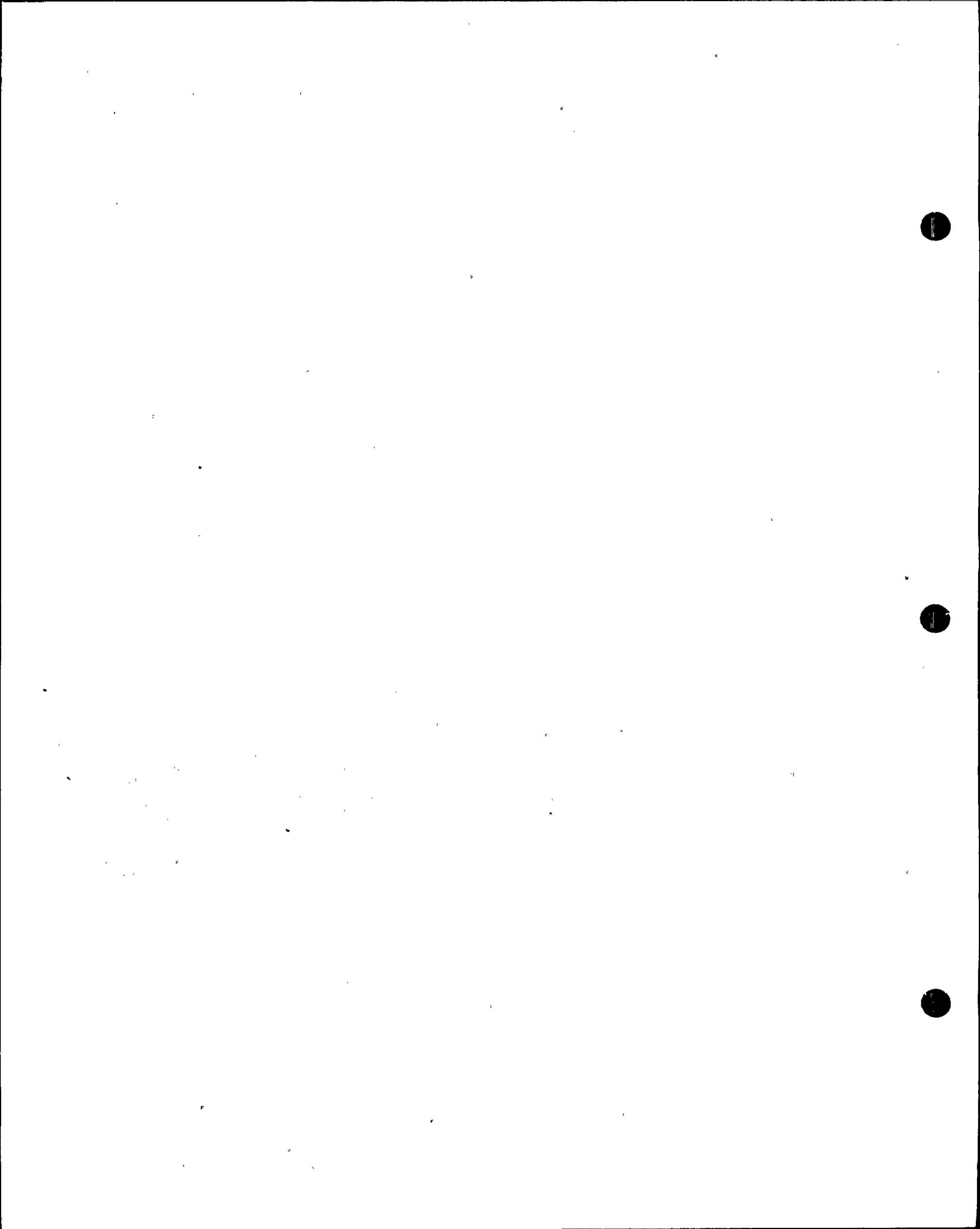
13 Q Then it is largely engineering judgment, is that
14 correct?

15 A What is engineering judgment?

16 Q The conclusion that there was insufficient
17 frequency?

18 A It is a judgment based -- it is a judgment made both
19 by the Applicant in the Environmental Report, and by the NRC
20 staff in the Environmental Statement, yes.

21 Q On page eight, you discussed risk increase factors
22 associated with the Diablo Canyon low power test program.
23 Do any of these five reports cited on page 10 consider and
24 allow for increased risk due to break-in failures, during the
25 low power test program?



t9 4g

1 A The Final Safety Analysis Report and the Safety
2 Evaluation Report includes a consideration of the full life-
3 time period of all components. That includes the early
4 periods and also includes the break-in periods.

5 As a matter of fact, that is one of the reasons why
6 I guess I mentioned that the low power test program is done
7 so that these things can be identified.

8 For example -- well, I don't know if I should
9 elaborate, but in the Safety Analysis Reports, components are
10 required to be qualified for a certain service, and they are
11 qualified for their full service, meaning from the beginning
12 to the end, and during that time, their failure rate may vary
13 from -- through the different periods.

14 Q Isn't the analysis, though, in the FSAR, for example,
15 predicated on the assumption that the full technical
16 specification requirements will be met?

17 A No. The component qualifications process is really
18 pretty much separate from the technical specifications
19 limits. That is, the -- when a component is designed and
20 selected and qualified and so forth, that is fairly remotely
21 related to the final technical specifications that are
22 issued for part of the plant.

23 There are thousands of components for which there
24 are no technical specifications, if you are referring to the
25 operating technical specifications, and they have -- these



t8 5g 1 thousands of components have specifications of their own that
2 are not called technical specifications.

3 Q But the technical specification exceptions which
4 are being applied specifically to the low power test program
5 would not apply to full power operation, is that correct?

6 A I think I would like to defer on this to Mr.
7 Shiffer. I know that some of the technical specifications
8 apply, the full power ones apply, and some of them don't, but
9 beyond that I am not really familiar with that.

10 Q That is adequate. Would these, any of those five
11 reports, consider increased risk due to features of the
12 emergency plans for full power which are not complete?

13 A Features in the emergency plan which are not
14 complete?

15 Q Excuse me. Let me rephrase that. Features in
16 the emergency plan which will not be complete prior to fuel
17 load at Diablo Canyon.

18 A I don't know of any. Again, I would have to -- I
19 would have to defer to someone else on that.

20 JUDGE WOLF: Mr. Reynolds, when you come to a point
21 where it would be convenient to recess, would you let me
22 know?

23 MR. REYNOLDS: We have reached that point.

24 JUDGE WOLF: We will take a ten-minute recess, then.

25 (Brief recess.)



t8 6g 1 JUDGE WOLF: On the record.

2 Mr. Reynolds, are we ready to proceed?

3 MR. REYNOLDS: Yes. I would like to have two
4 documents marked for identification. The first will be
5 Joint Intervenor's Exhibit 113, I believe, and it is the
6 proposed form of licenses for Units 1 and 2 of the Diablo
7 Canyon Facility.

8 (Whereupon, the above-mentioned
9 document was marked for
10 identification as Joint
11 Intervenor's Exhibit No. 113.)

12 MR. REYNOLDS: And the second is Joint Intervenor's
13 Exhibit 114, and it is the Report of the President's
14 Commission on the Accident at Three-Mile Island, or the
15 Kemeny Commission Report, pages -- well, the sections
16 entitled Overview, Findings, and Recommendation, and I would
17 note for the record that it is in two parts, so why don't --
18 just for the record, we will mark it 114(a) and 114(b).

19 (Whereupon, the above-mentioned
20 documents were marked for
21 identification as Joint
22 Intervenor's Exhibits Nos.
23 114(a) and 114(b).)

24 BY MR. REYNOLDS:

25 Q All right, Dr. Brunot, if we could turn to page 12?



t8 7g 1 A (Witness Brunot) Of what document?

2 Q Of your testimony, I am sorry, line 21, page 12,
3 line 21. You state there that --

4 A Yes.

5 Q -- the actual power profile planned for the low
6 power test series results in significantly lower actual
7 fission product generation than the profile used for the
8 inventories in Table I.

9 Isn't it true that the Proposed Form of License
10 authorizes operations at levels not in excess of 167
11 megawatts thermal, five percent of rated power?

12 A Let me look at it. That is one of the things you
13 gave me, right?

14 Q Yes, it is. That would be Joint Intervenor's
15 Exhibit 113 for identification.

16 A And what page is that?---

17 Q That would be page three.

18 A And what part?

19 Q Maximum power level.

20 A Yes, I see that.

21 Q Isn't it also true that the term of the license
22 authorized or stated to be authorized in this Proposed Form
23 of License is one year?

24 A Well, I --

25 Q I direct you to page six of the License.



t8 8g 1 A Yes, I see number -- item F.

2 Q Would you read that item, please?

3 A Item F is, this license is effective as of the date
4 of issuance, and shall expire one year after that date.

5 Q Turning to page 14, line 6 of your testimony, you
6 state that the releases of radioactive materials to the
7 environment were far lower than would have been predicted
8 using conservative licensing calculations, and you are
9 referring to the releases of radioactive materials at the
10 Three Mile Island Nuclear Power Plant.

11 In fact, isn't it true that the sequence of events
12 which occurred during the TMI accident would not have been
13 analyzed as part of the licensing process?

14 A Some of the sequence of events are included in
15 analyses that were done at that time, and some were not.
16 That is right.

17 Q So, all of the --

18 A The sequence of events -- in no accident, it is
19 impossible to predict the full sequence of events in any real
20 accident, because it involves operator actions and
21 activities and changes in parameters during the later stages
22 of the accident that are unique to each real accident.

23 Q It was a multiple failure accident, isn't that
24 correct?

25 A I think -- yes, you could call it that.



t8 9g 1 Q And are multiple failure accidents normally
2 analyzed as part of the licensing process?

3 A Yes, they are.

4 Q Could you define the single failure criterion,
5 please?

6 A Can I define the single-failure criterion?

7 Q Would you define it, if you can?

8 A In a general way. I can't state the exact words
9 in the standard, but I can give you the -- in a general way,
10 what it means is that when the criterion is used, the system
11 being analyzed is expected to continue and perform what it
12 is supposed to do with some single failure occurring in the
13 system. That is, it is supposed to continue to do what it is
14 supposed to do, even though a single failure occurs somewhere
15 in the system.

16 Q Don't the analyses used in the licensing process
17 require that accident sequences be analyzed using the single
18 failure criterion?

19 A Systems are analyzed using the single failure
20 criterion.

21 Q And they are not analyzed for multiple failures as
22 a matter of course?

23 A No, that -- you asked me a different question. You
24 asked me whether accidents were, and I said accidents are
25 analyzed using multiple failures assumed.



t8 10g 1 Q All right.

2 A Systems themselves are isolated and designed and
3 must perform in accordance with the single failure-criterion.

4 Q And they are not required as part of the licensing
5 process to -- to survive or to function in the case of a
6 multiple failure, is that right?---

7 A Well, I am sorry, but when you say "they," it is
8 rather general.

9 Q I am sorry, systems.

10 A Some are and some are not. Some involve
11 assumptions, some design of some systems involve assumptions
12 that include more than one failure in that system.

13 Q What example of that can you give, for Diablo
14 Canyon?

15 A I would say, recollecting the system for -- the
16 system and systems for handling the hydrogen build-up in the
17 containment require, first of all, two methods to handle the
18 hydrogen in Diablo Canyon. There has to be a suitable method
19 for venting, and also a suitable method for burning the
20 hydrogen, and both of those systems, each of those systems
21 perform basically the same function, but they are two
22 systems.

23 Each -- within the design of each of those systems,
24 they must meet single failure criterion, so even though they
25 are to perform the same function, there are two systems,



t8 11g 1 either one of which can handle the job.

2 Each individual system is required to meet the
3 single failure criterion, as double pumps and valves and so
4 on.

5 Q Can you think of any other --

6 A That is --

7 Q Excuse me. You hadn't finished your answer.

8 A -- as I recall, and if you give me a few minutes,
9 I will probably think of some others.

10 Q Okay. If you can --

11 A Maybe Mr. Shiffer could think of some, but --

12 Q Yes, could you think of one other example, and Mr.
13 Shiffer, if you could think of one, that would be fine.

14 A (Witness Shiffer) Well, one that comes to mind is
15 in the containment cooling systems, we have both spray
16 systems and fan cooler systems. There is five fan coolers,
17 for example. It takes three to do a reasonable job, so you
18 could actually lose more than one.

19 Also, there is redundancy between the sprays and
20 the fan coolers, so there is different combinations of things
21 that would adequately cool the containment, so you could
22 stand more than a single failure in that group -- complex of
23 systems. It is one that comes to mind.

24 Q For safety analysis, though, they are analyzed based
25 on the single failure criterion, is that correct?



t8 12g

1 A: Each system --
2 Q Each system is analyzed --
3 A -- individually --
4 Q -- that is correct.
5 A -- uses the single failure criterion, that is right.

6 MR. REYNOLDS: All right, I would like to have a
7 document marked for identification. That is to be Joint
8 Intervenor's Exhibit 115. This is entitled Volume I, Three
9 Mile Island, a Report to the -- excuse me, the title is
10 Three Mile Island, a Report to the Commissioners and to the
11 Public, Volume I. This is the Rogovin Commission Report
12 and it includes pages 147 through 152.

13 JUDGE WOLF: Mr. Reynolds, before you go on, you
14 said that you wanted 114 marked as (a) for -- was it the
15 accident at Three Mile Island, was that the one?

16 MR. REYNOLDS: Yes.

17 JUDGE WOLF: And the other one is the Commission
18 findings, that is to be (b)?

19 MR. REYNOLDS: Yes.

20 JUDGE WOLF: Right.

21 MR. REYNOLDS: They are part of the same report.
22 They were just stapled separately.

23 ///

24 ///

25 ///



t8 13g 1. (Whereupon, the above-mentioned
2 document was marked for
3 identification as Joint
4 Intervenor's Exhibit No. 115.)

5 BY MR. REYNOLDS:

6 Q Dr. Brunot, would you turn to page 148?

7 A (Witness Brunot) Yes, I have it.

8 Q And would you read, please, the paragraph beginning
9 "Their study shows?"

10 A Their study shows that the greatest --

11 MR. NORTON: Excuse me. Are we being asked, Your
12 Honor -- are -- am I to understand that we are having Exhibits
13 marked and then having them read before they are offered into
14 evidence? That is a procedure we have not followed
15 heretofore.

16 Again, I think we all know what this document is,
17 but I have a problem with Joint Intervenor's picking a few
18 pages out of it, having it marked as an Exhibit, and then
19 having a witness read it that is not their witness, and then
20 moving those few pages into evidence.

21 That is not the normal course in which documents
22 are -- proper foundation is laid for a document to be moved
23 into evidence, and until a document is in evidence, it is not
24 proper to be read by a witness.

25 JUDGE WOLF: Well, he can question about the



t8 14g

1 document marked for identification.

2 MR. NORTON: I understand that, but he is asking --

3 JUDGE WOLF: Where the line is drawn is sometimes
4 difficult, Mr. Norton. Do you want to make a firm objection
5 to this paragraph --

6 MR. NORTON: Yeah, I object to this being read. I
7 have no objections to him asking questions, if he wants to
8 have him read it in private and ask him a question, fine, but
9 to read the document, I certainly do, without it being in
10 evidence.

11 MR. REYNOLDS: I have no objection to offering this
12 into evidence.

13 BY MR. REYNOLDS:

14 Q Dr. Brunot, are you familiar with the Rogovin
15 Commission Report?

16 A (Witness Brunot) I have scanned it. I have not --
17 I don't remember reading these pieces. I wouldn't remember
18 it unless I read over it again.

19 Q Do you recognize the Rogovin Commission Report as
20 one of the major studies arising out of the Three Mile Island
21 accident?

22 A Yes.

23 MR. REYNOLDS: I offer this into evidence.

24 MR. LANPHER: Governor Brown has no objection.

25 MR. NORTON: I am posing that objection, because of



t8 15g 1 the fact that only a small selected piece of it is being
2 offered into evidence. The Rogovin Report certainly -- I am
3 sure this Board has taken cognizance of it, and has probably
4 read it.

5 However, I don't think it is proper to take one
6 page, or in this case eight pages, whatever it is, out of a
7 rather lengthy document, and hand it to someone and say, do
8 you know what it is, and they say yeah, and say okay, we are
9 offering it into evidence. That is not the proper way to
10 get a document into evidence. My real problem is -- I have
11 no real problem with this, except that is a terrible precedent
12 to set as a way to get a document into evidence, so I am going
13 to object to it on the technical basis that I am stating.

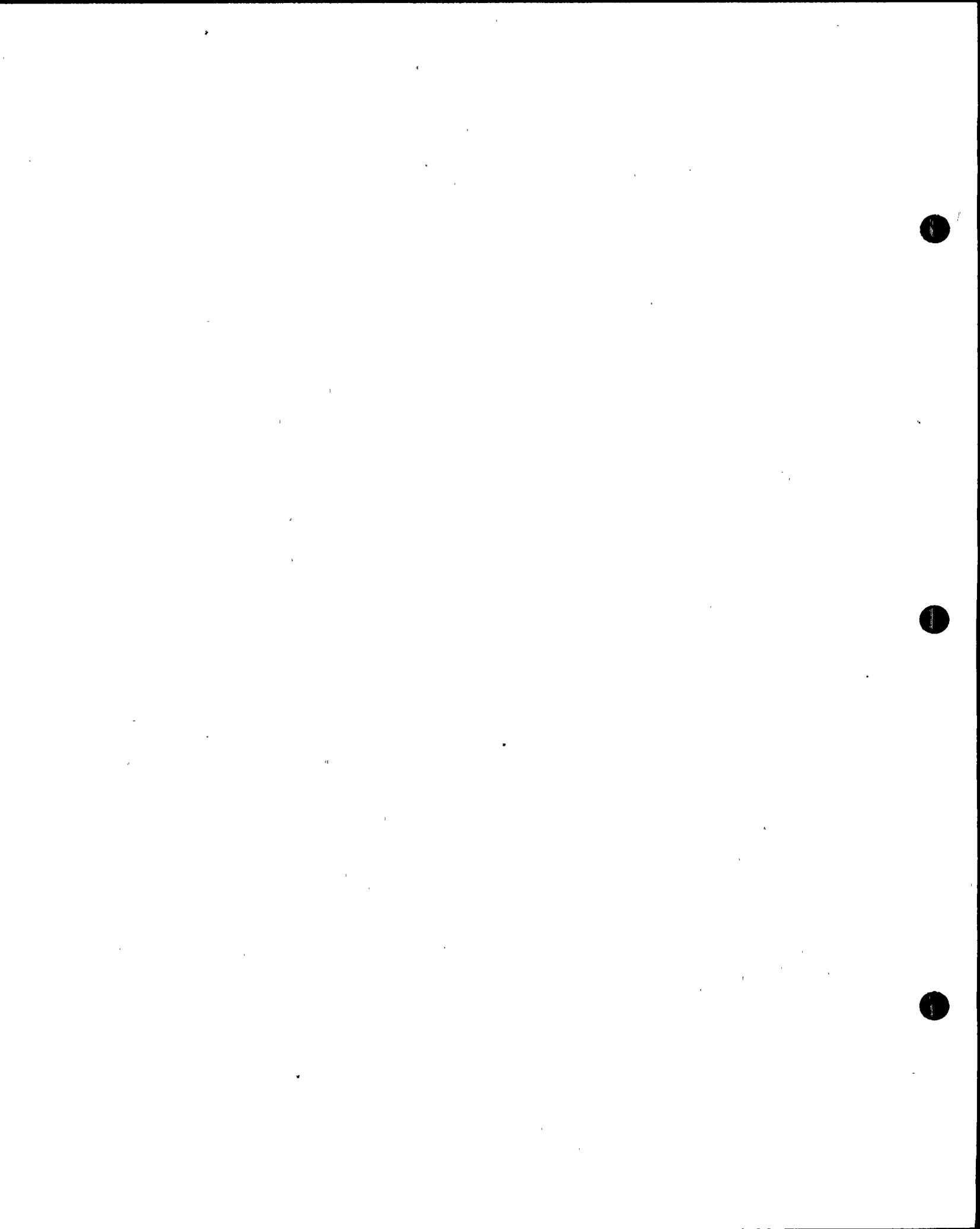
14 JUDGE WOLF: Staff, do you have any comment?

15 MR. OLMSTEAD: No, sir.

16 MR. REYNOLDS: - In response to Mr. Norton, I might
17 just -- just state that the precedent was set earlier today
18 with his use of the -- or Dr. Brunot's use of the Kemeny
19 Commission Report, where only certain selected portions were
20 submitted into evidence.

21 MR. OLMSTEAD: Mr. Chairman, as staff Counsel, I
22 have a suggestion for you, and that is if you would just take
23 official notice of the document.

24 JUDGE WOLF: I was going to suggest that we intend
25 to take judicial notice of the document in any event, so we



t8 16g
1 will do that, and I don't think that -- for convenience's
2 sake, if you have an argument to make out of this, why that
3 is --

4 MR. REYNOLDS: That is satisfactory. Do I under-
5 stand you correctly to mean that the Board will also take
6 notice of the entire Kemeny-Commission Report?

7 JUDGE WOLF: That is correct. That is, you know,
8 you will have to tie it in on --

9 MR. REYNOLDS: Yes.

10 JUDGE WOLF: -- and argue the relevance of the
11 material that you used from it.

12 MR. REYNOLDS: Okay.

13 BY MR. REYNOLDS:

14 Q Dr. Brunot, now would you please read the paragraph
15 beginning, "Their study shows?"

16 A (Witness Brunot) Their study shows that the
17 greatest risk of an accident comes not from the design basis
18 accidents such as the large loss of coolant accident, but from
19 small loss of coolant accidents, and relatively routine
20 transients compounded by multiple failures or human error,
21 having a higher probability of occurrence than a large pipe
22 break.

23 These types of potential accident sources have,
24 however, been all but ignored by the NRC in the regulatory
25 review process. The Three Mile Accident-involved, of course,



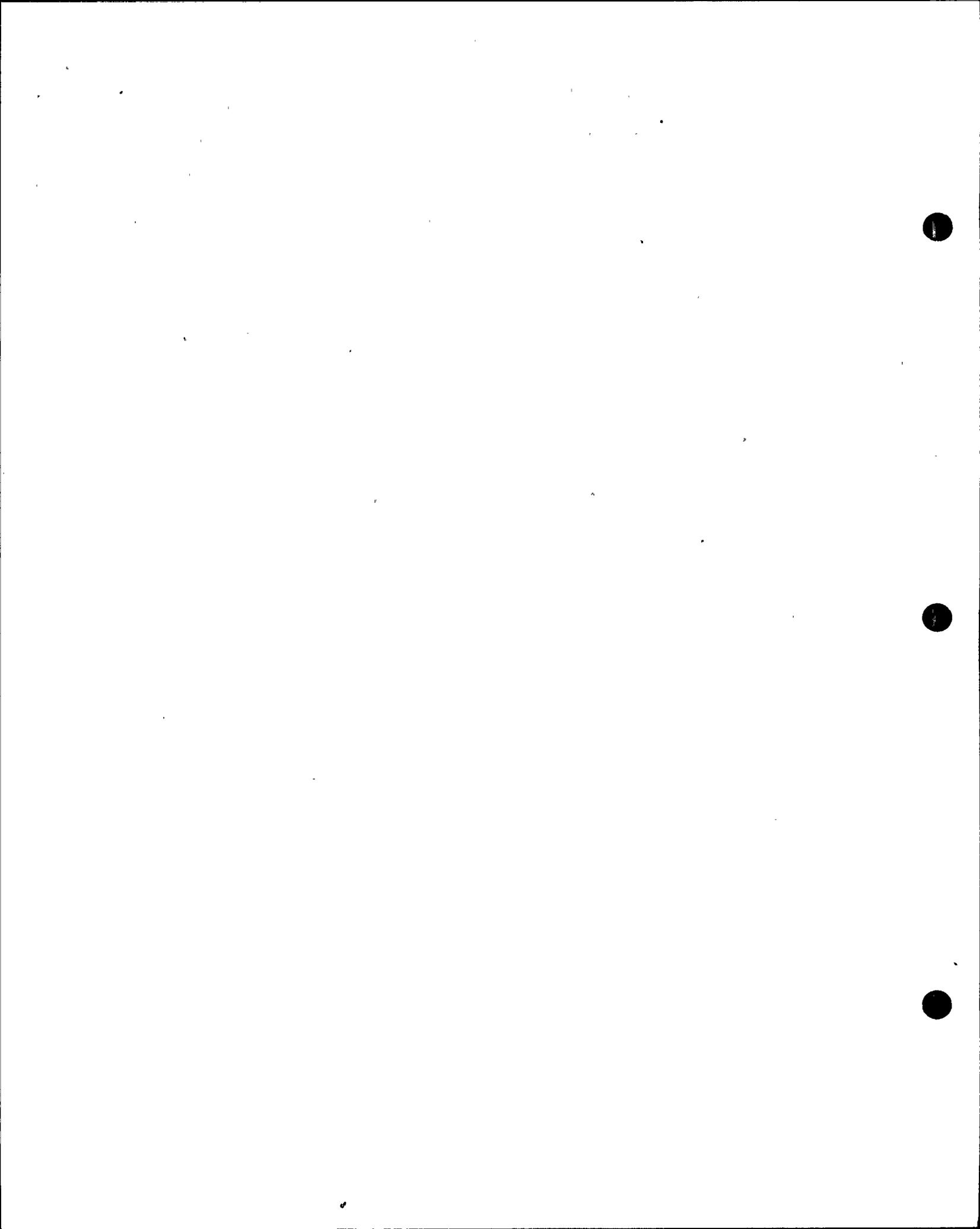
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1 all the four elements mentioned; a routine loss of feedwater
2 transient, which should have been easily handled by plant
3 safety systems, a stuck-open valve causing a small loss of
4 coolant accident at a confusing time, and in an unexpected
5 place, the top of the pressurizer, misleading instrumentation
6 and operator error in cutting down the effectiveness of the
7 emergency core cooling system.

8 Q Would an accident of this kind have been analyzed
9 in the normal course of the licensing procedure, or would it
10 have been analyzed in a safety analysis?

11 A As I said before, portions of it, the early portions
12 of it would be the events. The later portions of it would not
13 be. It is not possible to predict the responses to certain
14 events in the later stages of an accident, either the
15 operator responses or the exact performance responses of the
16 system, so that parts of it are considered in safety analysis
17 reports, and I think you are referring to prior to the time of
18 the TMI accident, because of course since then, the FSAR
19 includes some analysis of these families of accidents.

20
21 /// PLEASE CONTINUE READING NEXT NUMBERED PAGE ///

22
23
24
25



1 BY MR. REYNOLDS:

2 Q Now, when you say the SFAR. Do you mean the
3 Diablo Canyon FSAR?

4 A Right.

5 Q Does the Diablo Canyon FSAR specifically look at
6 this accident sequence? The entire accident sequence.

7 A This specific accident sequence could have and
8 happened only at Three Mile Island because of the character-
9 istics. I don't know whether to interpret your question --

10 Q Where the accident sequences set out in the Diablo
11 Canyon FSAR?

12 A Most of the sequences are described in Chapter
13 15. There are some parts of them that are in connection with
14 the response of emergency systems that are in Chapter 6 and
15 some in Chapter 9.

16 Q Has Chapter 15 been revised since the Three Mile
17 Island accident?

18 A I believe so, but let me check, because there is
19 someone else here that would know what those changes were.

20 (Pause)

21 Some of the materials in response to the -- and
22 I'm just repeating what I have heard. Some of the materials
23 --

24 Q I wonder then --

25 A Yes.



1 Q You heard from Mr. Shiffer, is that correct?

2 A Sure.

3 MR. REYNOLDS: I wonder if Mr. Shiffer could
4 respond.

5 WITNESS PATTERSON: I don't believe --

6 MR. REYNOLDS: Excuse me. I wonder if you could
7 just identify yourself for the record?

8 WITNESS PATTERSON: Oh, Mr. Patterson.

9 I don't believe that we revised the FSAR to in-
10 clude a Three Mile Island type of accident. We have submitted
11 numerous special reports to the Commission on that subject
12 and doing accident analysis-type stuff and we have relied
13 heavily on the generic Westinghouse small break analysis. If
14 I remember right, that's WCAP 9600 and we relied on it as --
15 for the majority of our submittal.

16 BY MR. REYNOLDS:

17 Q Has the review of WCAP 9600 been completed by the
18 NRC?

19 MR. NORTON: Excuse me. I believe that's a ques-
20 tion for the NRC.

21 BY MR. REYNOLDS:

22 Q Are you aware of whether or not the NRC has
23 completed --

24 JUDGE WOLF: I'll sustain the objection. He can
25 ask the NRC.



1 MR. REYNOLDS: Fine, fine.

2 BY MR. REYNOLDS:

3 Q Moving on. Page 14, line 10.--

4 A (Witness Brunot) Of what?

5 Q Of your testimony.

6 A All right.

7 Q You state that inspite of serious loss of cooling
8 for an extended period of time, the core did not undergo
9 massive melting and you cite Kemeny Report, page 31. I wonder
10 if in Joint Intervenor's Exhibit No. 114A, you could direct
11 us to the precise language which supports that statement?

12 A I marked these things A and B, so I think I can.
13 Page 31 -- Am I looking at the right page?

14 (Pause)

15 Okay, Item C at the top, line 3, it says, "The
16 study estimates that the amount of fuel that may have melted
17 by this process is from zero to a few tons."

18 Q I wonder if you could read the entire paragraph
19 C, please?

20 A "An NRC study suggests that some of the fuel may
21 have become liquid at temperatures above 3500 degrees Fahren-
22 heit by dissolving in a zirconium zirconium oxide mixture.
23 The study estimates that the amount of fuel that may have
24 melted by this process is from zero to a few tons. An
25 independent analysis by Oregon National Laboratories suggest



1 that the formation of such a mixture was unlikely."

2 Q Would you read on the previous page, please, para-
3 graph D, at the bottom?

4 A "Fuel temperatures may have exceeded 4000 degrees
5 Fahrenheit in the upper thirty to forty percent of the core.
6 Approximately thirty to forty tons of the fuel. Temperatures
7 in parts of the damaged fuel that were not effectively cooled
8 by steam, may have reached the melting point of the uranium
9 oxide fuel, about 5200 degrees Fahrenheit."

10 Q Does this suggest that some degree of melting may
11 have taken place?

12 A Certainly some degree. It says explicitly. But
13 my conclusion was, in spite of serious loss of cooling for
14 an extended period of time, the core did not undergo massive
15 melting.

16 Q Isn't it true that the Kemeny Commission concluded
17 that they did not know the exact state of the core?

18 A Well, I'd like to see where that is. I wouldn't
19 be surprised. I don't think anyone knows the exact state of
20 the core.

21 Q I direct your attention to page 15 of Joint Inter-
22 venor's Exhibit No. 114A. .

23 A I'm sorry. Page 15 of the -- Are we Kemeny, again?

24 Q Yes. It's exactly the same thing that you are
25 holding.



1 A Okay. I'm on page 15.

2 Q And if you would look at the paragraph beginning,
3 "The accident got sufficiently out of hand."

4 A I see it.

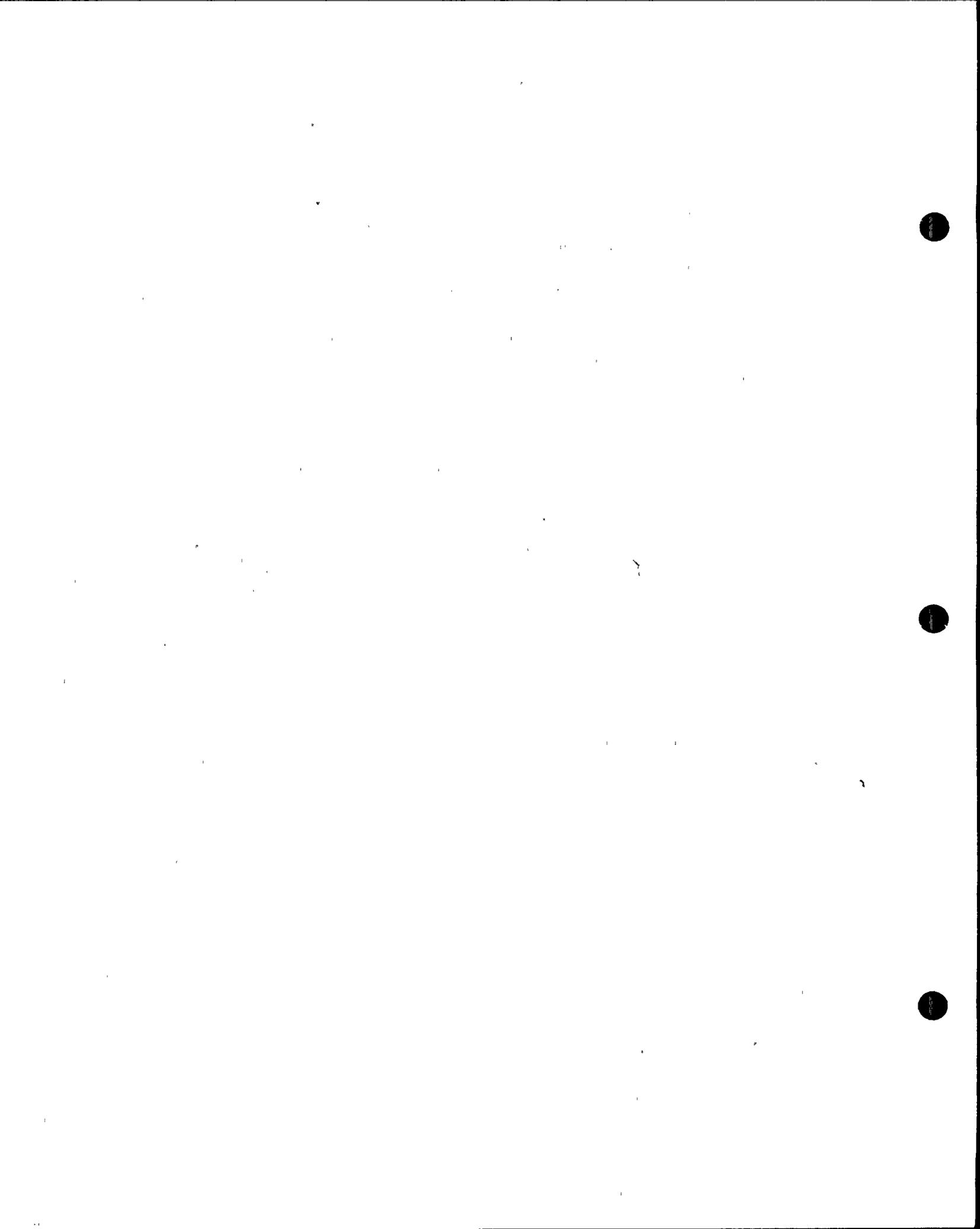
5 Q Would you read that paragraph, please?

6 A Read the paragraph? All right.

7 "The accident got sufficiently out of hand, so that
8 those attempting to control it were operating somewhat in
9 the dark. Well, today the causes are well understood. Six
10 months after the accident, it is still difficult to know the
11 precise state of the core and what the conditions are inside
12 of the reactor building. Once an accident reaches this stage,
13 one that goes beyond well understood principles and puts those
14 controlling the accident into an experimental mode, this
15 happened during the first day, the uncertainty of whether an
16 accident could result in major releases of radioactivity is
17 too high. Adding to this the enormous damage to the plant.
18 The expensive and potentially dangerous clean-up process that
19 remains and the great costs of the accident, we must conclude
20 that whatever worse could have happened, the accident had
21 already gone too far to make it tolerable."

22 Q Now, on page 16 and 17 of your testimony, Dr.
23 Brunot, you quote the Kemeny Commission with respect to off-
24 site doses resulting from the Three Mile Island accident.

25 MR. NORTON: Excuse me. Your Honor, again I want



1 to interrupt. I don't know if the Board filed that last
 2 serious of questions of page 15 that we just read from. Again,
 3 it is not an original copy of the document. The Intervenors
 4 have conveniently bracketed and underlined where they want
 5 and then photocopied it and had it marked saying that it is
 6 a copy of the document. It is with that editorial process.

7 This has happened in hearings before. I would
 8 simply ask that if the Intervenors do this, they so inform
 9 us so that we know what pages they have marked and where they
 10 have underlined and so on and that it is in fact not a copy
 11 of the document as they have represented.

12 MR. REYNOLDS: We would certainly apologize if there
 13 were any markings, but I think the Board will notice that
 14 there is really very little marking.

15 JUDGE WOLF: We'll disregard any markings in the
 16 document as offered.

17 BY MR. REYNOLDS:

18 Q Now, on page 16 and 17, you discussed the off-site
 19 doses. Although the off-site doses were low for the TMI
 20 accident, isn't it true that significant amounts of radio-
 21 active fission products existed in the containment, the
 22 auxillary building and tanks in the primary system?

23 A Yes.

24 Q Therefore, a substantial percentage of those
 25 radioactive fission products had been released into the



1 environment, the off-site health consequences could have been
2 orders of magnitude greater than what actually occurred.
3 Isn't that correct?

4 MR. NORTON: Object. That assumes facts not in
5 evidence. It's improper, hypothetical. He's saying if the
6 accident had been worse, would it have been worse.

7 JUDGE WOLF: Would you repeat the question, please?

8 MR. REYNOLDS: Yes. If a substantial percentage --

9 JUDGE WOLF: Wait a minute. I want to hear the
10 question, back, please.

11 MR. REYNOLDS: Oh, I'm sorry.

12 JUDGE WOLF: Off the record.

13 (Whereupon, the question was read back.)

14 JUDGE WOLF: On the record.

15 Mr. Norton?

16 MR. NORTON: Again, I'll withdraw my objection.

17 If he wants to answer the question, fine, but it's an impro-
18 per hypothetical.

19 JUDGE WOLF: Staff, do you have any --

20 MR. OLMSTEAD: If the objection is withdrawn, I
21 guess I have no comment.

22 JUDGE WOLF: I can't understand you.

23 MR. OLMSTEAD: If the objection is withdrawn, I
24 guess I have no right of comment. I'll pass.

25 JUDGE WOLF: Have you withdrawn the objection?



1 MR. NORTON: Yes.

2 (Laughter.)

3 MR. REYNOLDS: Shall I repeat the question?

4 JUDGE WOLF: Yes, please.

5 BY MR. REYNOLDS:

6 Q If a substantial percentage of those radioactive
7 fission products had been released into the environment, the
8 off-site health consequences could have been orders of magni-
9 tude greater than what actually occurred. Isn't that correct?

10 A Well, you asked about a substantial percentage
11 and you speculate about orders of magnitude greater and I
12 would say yes.

13 Q Isn't it true that the Regovin Commission conclu-
14 ded that the TMI accident came within thirty to forty minutes
15 of an irreversible melt down of the reactor core?

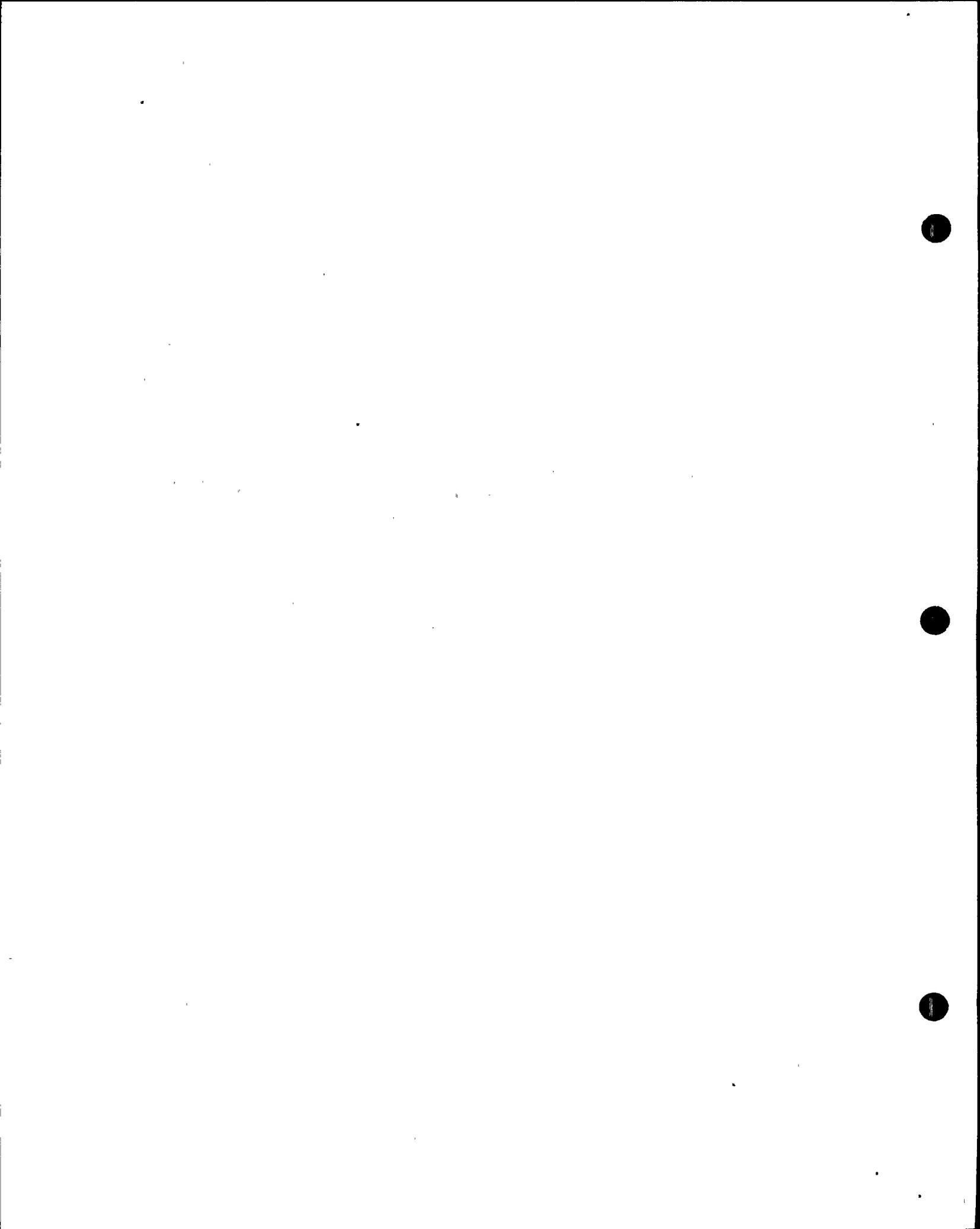
16 A I am not familiar enough with the Regovin Report.
17 You'd have to show it to me, if you want me to say whether
18 it concluded those things.

19 MR. REYNOLDS: Is any member of the panel familiar
20 enough to respond to that question?

21 JUDGE WOLF: I don't think any of these witnesses
22 are in a position to answer that question.

23 MR. REYNOLDS: All right. I'll withdraw the
24 question.

25 I have no further questions for Dr. Brunot.



1 JUDGE WOLF: Mr. Brown, are you --

2 MR. LANPHER: I'm handling the cross examination
3 of Dr. Brunot. It is my understanding that the Joint Inter-
4 venors would complete their examination of the panel, since
5 they presented all of the PG & E witnesses. Then, I would go.
6 That's the way it was --

7 MR. REYNOLDS: I'm prepared to go along with that.

8 JUDGE WOLF: Go ahead and complete your examination.

9 MR. REYNOLDS: Now, I'm not sure which member of
10 the panel wrote which section. So, if I address a question
11 to the panel, I assume the one --

12 MR. NORTON: Perhaps to help you out, Mr. Shiffer
13 is the chairperson of the testimony, so to speak and you can
14 direct your questions to him and he will, of course, if some-
15 one else is more appropriate to respond, will invite them to
16 do so.

17 MR. REYNOLDS: Fine.

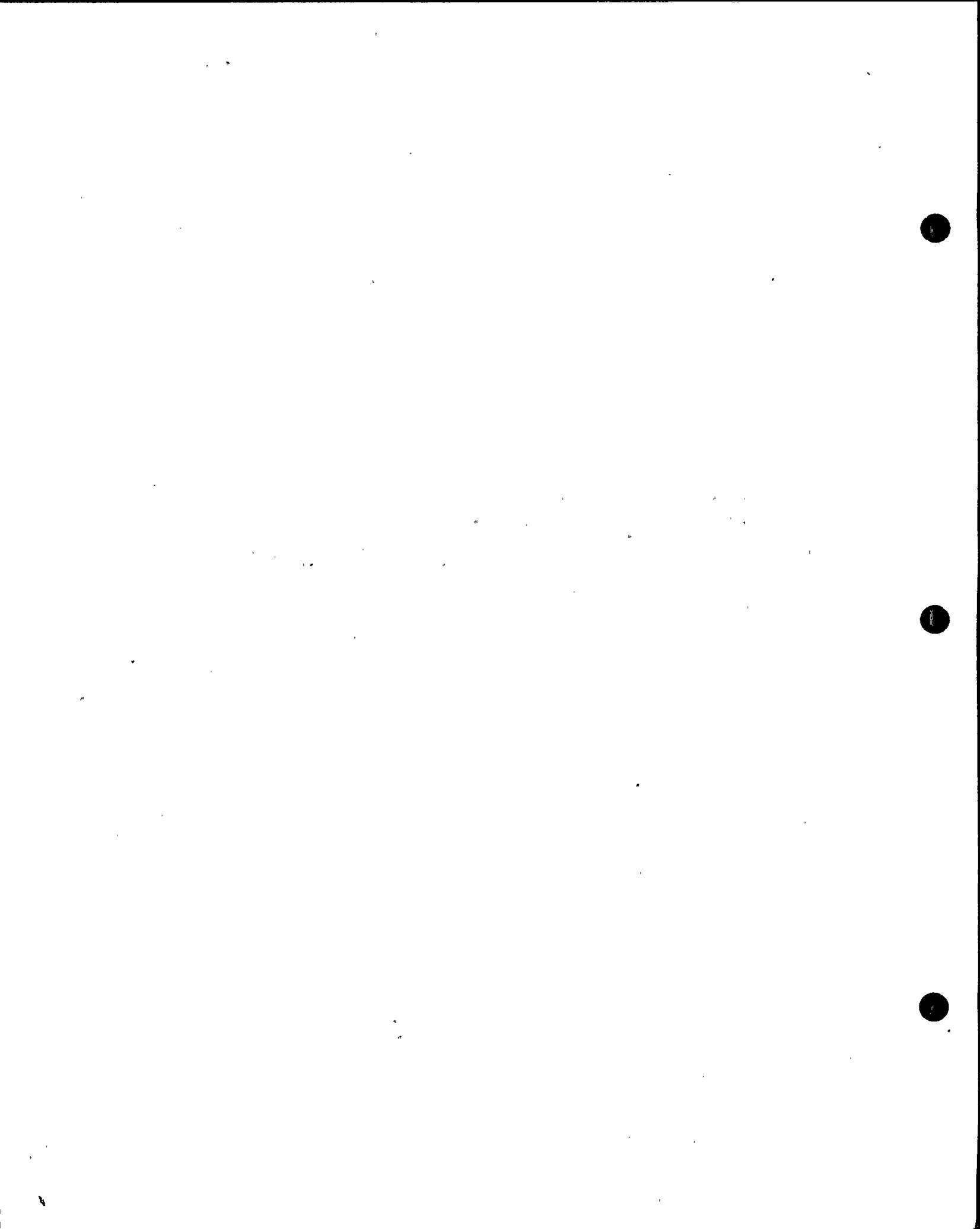
18 BY MR. REYNOLDS:

19 Q Mr. Shiffer, you stated in the introduction that
20 revision two to the Diablo Canyon On-Site Emergency Plan was
21 submitted to the NRC in February 1980. That's the most
22 recent revision, isn't that correct?

23 A (Witness Shiffer) That's correct.

24 Q When is Revision Three due to be issued?

25 A When is it due to be issued?



1 Q Yes.

2 A Well, it's in draft form. It's our desire to have
3 it in the middle of June.

4 Q Is its completion depended to some extent on the
5 revision completion and approval of state and local plans?

6 A That is hard to say. I guess I would say that
7 probably it is to some extent.

8 Q Has PG & E committed to comply with NUREG-0654
9 by the time Revision Three is issued?

10 A No, I would say that -- No, we'll commit to comply
11 with 0654 by the full power.

12 Q On page two, line 16, you refer to site implementing
13 procedures. I wonder if you could define precisely what is
14 meant by site implementing procedures?

15 A Well, okay. At the plant we have a number of de-
16 tailed procedures which describe how one actually implements
17 various things in the emergency plan. That's what I mean
18 by that.

19 Q Have these implementing procedures been incorpor-
20 ated, included into the Diablo Canyon plan?

21 A No, they're not physically included in the Diablo
22 Canyon plan.

23 Q On page two, line 10, you refer to REG Guide 1.101.
24 That REG Guide has been withdrawn by the NRC. Isn't that
25 correct?



1 A That's correct.

2 Q Do you know what the reason for the withdraw was?

3 A Because it was superceded by NUREG-0654.

4 Q On page 4, line eleven, the section marked, On-site
5 Organization. No, excuse me. Organization.

6 A I'm sorry. That was page four, line eleven?

7 Q Yes. Page four, line eleven.

8 A Yes.

9 Q You describe the on-site emergency coordinator as
10 the head of the on-site emergency organization with, quote,
11 overall responsibility for all assessment, corrective and
12 protective actions taken by company personnel at or near the
13 plant site, unquote. Does that responsibility include command
14 of the control room activities?

15 A It does on an interim bases. When the emergency
16 first -- If an emergency first takes place, the on-shift shift
17 foreman -- well the on-shift shift foreman has command and
18 control responsibility in the control room. He would also
19 have to act as a site emergency coordinator. Ultimately,
20 someone else would be brought in to act as a site emergency
21 coordinator, but somebody in the control room with the qual-
22 ifications of the shift foreman would maintain command and
23 control responsibility.

24 Q If there is conceivably a dispute between the
25 emergency on-site coordinator and the -- we'll say the shift



1 foreman in charge of the control room, is the shift foreman
2 whose decision will control?

3 A If any time there is a decision that is made
4 regarding a conduct of an operation like the operational
5 state of the reactor or something of that nature, the man
6 with command and control responsibility in the control room
7 has the authority. In order to -- Well, the man who makes
8 decisions regarding the operational state of the reactor has
9 to be a senior licensed operator and only -- He could not
10 be overruled by anybody other than a senior licensed operator
11 who had officially relieved him in the control of that respon-
12 sibility.

13 Q So, then the emergency coordinator's responsibility
14 is limited with respect to matters having to do with the
15 control room. Is that right?

16 A That is correct.

17 Q Is this limitation stated any where in the emergen-
18 cy plan?

19 A I don't know explicitly. I'd have to go back and
20 look at the words. That is one of the kinds of things that
21 will be stated more explicitly in Revision Three. The general
22 requirements for designating this command and control function
23 is a post-TMI requirement. So Revision Three will explain that
24 much more explicitly than Revision Two does.

25 Q So, your answer -- I'm sorry. I didn't mean to



1 interrupt. Go ahead.

2 A But, it is a well-known principle that the man with
3 the license -- the licensed operator -- the senior licensed
4 operator is the man who has to run the reactor, and make those
5 kinds of decisions.

6 Q So, can we take it that your answer then, with
7 respect at least to the existing Diablo Canyon plan is that
8 that limitation is not specified?

9 A Well, it is not specified in emergency plan to
10 date in Revision Two of the plan. However, there have been
11 implementing procedures -- administrative procedures that
12 have been written subsequent to this Revision Two of the Plan
13 which very specifically states that. The gist of those
14 procedures will be included in Revision Three of the Plan.

15 Q On page five at line one, you state that, quote,
16 significant changes in the plant staff -- excuse me. There
17 have been several significant changes made in the plant staff
18 in the past year, unquote.

19 MR. NORTON: Excuse me. That was not end quote.

20 MR. REYNOLDS: Well -- excuse me. Ellipse, end
21 quote. If you would like me to read the entire sentence, I
22 will, but it's not really relevant to the question.

23 BY MR. REYNOLDS:

24 Q How many personnel will be on-site at any given
25 time during the day or not, on the average?



1 MR. NORTON: Excuse me. I'm going to object.
2 Insufficient foundation. Are we talking about full power?
3 Are we talking about low power? This is a low power hearing.

4 BY MR. REYNOLDS:

5 Q Let's talk about low power.

6 A Well, it's a difficult-question to answer on the
7 average, because it's like, you know, what is the average
8 between a millionaire and a man who is flat broke. There is
9 a tremendous difference in this. So, I'll have to think about
10 this for a minute.

11 Q I wonder if you could do it on a per shift bases.
12 Let's take the day shift.

13 A On the day shift, you have, of course, looking at
14 the operational staff, which you have the shift foreman --
15 As I specify in the testimony, you have seven operators. You
16 have a shift technical advisor. Two instrument men. A
17 radiation protection chemistry man. A clerk. But in addi-
18 tion to that on the day shift, it would be -- you know, you
19 must have in round numbers without counting it up, you know,
20 probably 200 other people that are around.

21 Q Does that figure include visitors as well as
22 personnel?

23 A Include visitors? No, I'm talking about plant
24 staff members.

25 Q So the 200 for you would be limited to personnel?



1 PG & E personnel?

2 A Yes. In round numbers. I mean, it's a lot on the
3 day shift.

4 Q Now, if you augment that with visitors, how many
5 would you have?

6 A If I augment that with visitors? I don't have a
7 precise number for how many visitors I might have at any
8 given moment.

9 Q Can you estimate how many visitors might be on-
10 site during a given day of low power testing?

11 A Visitors on a given day during low power testing?
12 I would say, if you want to include a person like a Westing-
13 house technical advisor as a --

14 Q I'm including everybody.

15 A That is a visitor?

16 (Pause)

17 We very unofficially estimate ten.

18 Q So, 210?

19 A Very unofficially, yes.

20 Q Let's take the weekend shift. I wonder if you
21 could estimate what the total personnel and the total in-
22 cluding visitors would be.

23 MR. NORTON: Excuse me. I'm going again to object.
24 Are we talking about low power testing? Are we talking
25 about tests that are intended to be run during low power.



1 testing? Are we talking about something else? And does the
2 question assume that a test is being run at the time? Or
3 does it assume that a test is not being run at that time?

4 JUDGE WOLF: I think that's a fair objection. Will
5 you clear up the question, please?

6 MR. REYNOLDS: Sure.

7 BY MR. REYNOLDS:

8 Q During a time when the test is being run on a
9 weekend, how many personnel would there be on site and how
10 many personnel in addition to visitors and I don't mean just
11 people there serving some sort of technical function, but
12 I mean visitors touring the plant, for example?

13 ////

14 ////

15 ////

16 ////

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25 (Proceedings continued on next numbered page.)



1 Q On Page 5, Line 20, there is a reference to "interface
2 between the Company and local officials."

3 A I am sorry, that was on what line?

4 Q Line 20.

5 A On Page 5, again?

6 Q Page 5.

7 A Yes, okay. I am with you.

8 Q Are all interfaces between company, state, local,
9 federal and private organizations and agencies specified and
10 illustrated through block diagrams in the on-site plan?

11 A No.

12 Q Has PG & E communicated these interfaces to existing
13 state and local agencies?

14 A Yeah, I would say we have communicated them. Yes.

15 Q In what manner?

16 A Well, in some cases, it is letters of agreement. In
17 other cases, it is just discussions; various things.

18 Q Now, these letters of agreement are included as
19 Appendix 7 to the on-site plan; is that right?

20 A That is correct.

21 Q Now, I am going to ask a series of questions on
22 these miscellaneous agreements. I have copies for everybody,
23 if that is necessary. But if people have them, there is no
24 point in duplicating that.

25 Would you like a copy?



(

2
1 A Well, I don't have any in front of me.

2 Q All right.

3 (The witness was handed the document.)

4 MR. REYNOLDS: We can mark this Joint Intervenor's
5 Exhibit 116 for identification.

6 (Whereupon, Joint Intervenor's
7 Exhibit Number 116 was marked
8 for identification.)

9 BY MR. REYNOLDS:

10 Q Do you have that in front of you?

11 A Yes, I do.

12 Q Excuse me. Mr. Shiffer, do you have a copy of that?

13 A Yes, I do.

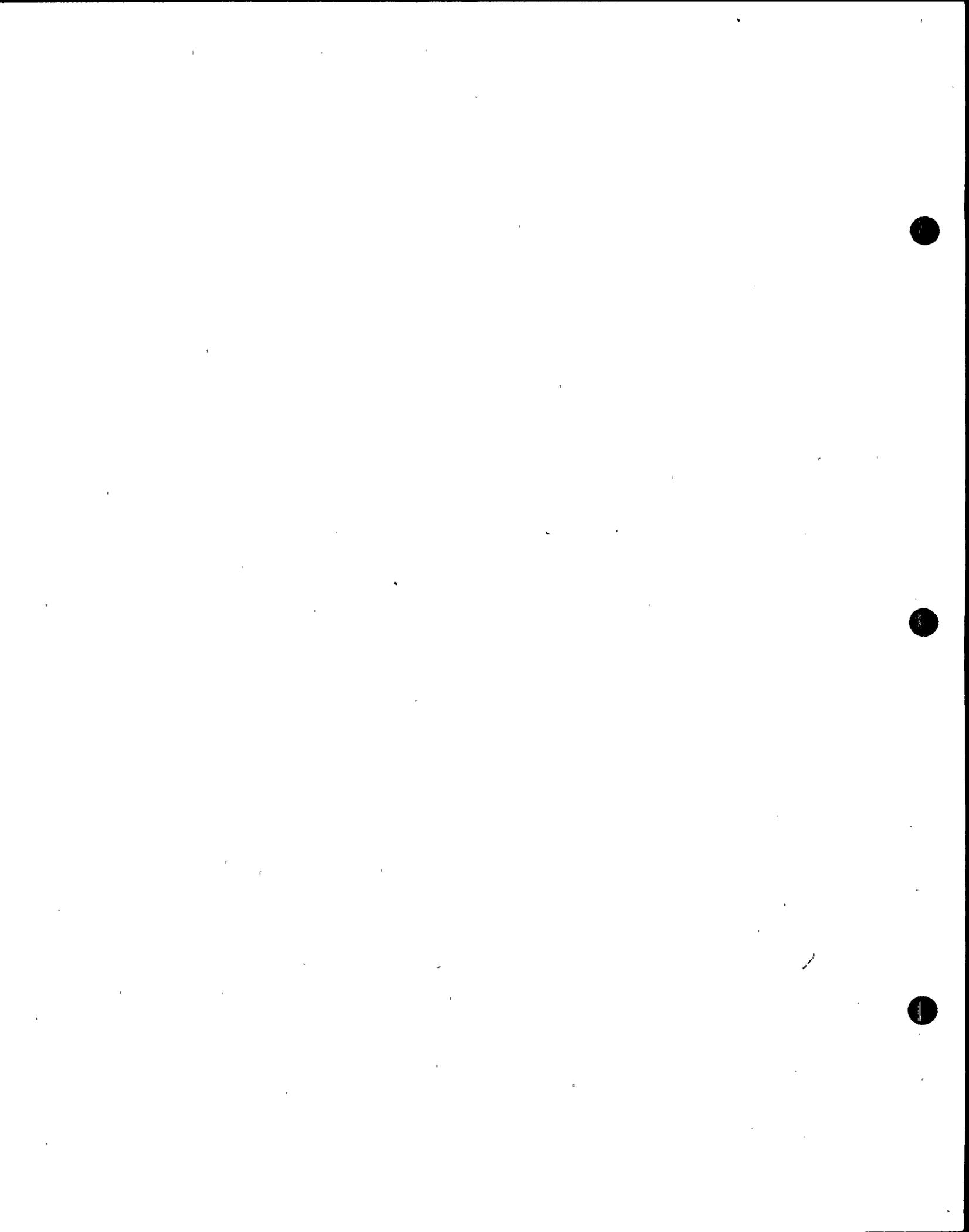
14 Q The first is a letter from the U. S. Coast Guard
15 dated December 10th, 1977. Has there been any more recent
16 or specific agreement or communication with the Coast Guard
17 from PG & E?

18 A No, there hasn't.

19 Q You will notice on Page 2 of this letter that there
20 are several telephone numbers. Do you know when those numbers
21 were most recently checked,--if ever?

22 A The one to the Commander of the Coast Guard group
23 in Monterey, I made a phone call to them about three weeks ago
24 on that phone number.

25 Q The other number?



3 1 A The other number, I don't know the last time that
2 was checked.

3 Q Do you know if these are 24-hour numbers?-

4 A Not specifically; no, I don't.

5 Q The second letter is from the California Department
6 of Forestry, dated February 13, 1979.

7 A Yes.

8 Q This letter is now out of date; isn't that correct?

9 A I am sorry, this letter is what, now?

10 Q It is now out of date; isn't that correct?

11 A Well, the letter of understanding was rescinded by
12 the CDF here a couple of weeks ago.

13 Q And what was the reason stated by CDF for rescinding
14 the agreement?

15 A The reason stated was that they felt they had to
16 develop an internal emergency plan for Diablo Canyon, and also
17 they had to obtain some radiation protection training.

18 Q The third letter involves the Field Ranch. Is this
19 letter also out of date?

20 A Yes, it is.

21 Q No agreement was, in fact, reached with the Field
22 estate; isn't that right?

23 A No, that is correct; there is no agreement.

24 Q The next letter is from the San Luis Ambulance
25 Service, Inc., dated February 15, 1974.



4
1 A Yes.

2 Q Has there been any more recent and specific agreement
3 with the San Luis Ambulance Service?

4 A No, we have not gotten an updated letter from them.
5 We talk to them routinely, but we have not received a new letter.

6 Q Now, Section 5.3:2.3 of the Diablo Canyon emergency
7 power plant on-site plan refers to this agreement with the San
8 Luis Ambulance Service, doesn't it?

9 A I will have to look at the Plan. I assume that is
10 correct.

11 Q Do you have a copy? I have a copy if you don't.

12 (The witness was handed the document.)

13 I will give you the cite again. That is Section
14 5.3.2.3.

15 A Yes.

16 Q That Section states that the San Luis Ambulance
17 Service has agreed to "handle cases of personal injury at
18 Diablo Canyon, including those involving radioactive contamina-
19 tion."

20 A Yes.

21 Q In looking at the letter, however, I see no specific
22 commitment by the San Luis Ambulance Service to handle cases
23 involving radioactive contamination.

24 A Yes. In their answering letter, that is true. It
25 infers it, from the last sentence, in the sense that it says --



5 1 it refers to "decontamination."

2 Q It is very possible to infer from that last sentence,
3 is it not, that someone else might be handling the decontamina-
4 tion? In other words, in that last sentence, there is nothing
5 to indicate that San Luis Ambulance Service, -itself, has agreed
6 to handle decontamination; is that right?

7 A No, absolutely no. In fact, the letter that they
8 refer to states -- in other words, our letter to them, which
9 is being referred to in this particular case, states that if,
10 in handling a radioactively contaminated patient, "We will, in
11 fact, monitor for them and provide any decontamination of
12 their facilities and equipment."

13 So it does not say that they will decontaminate --
14 if I understood your question, it does not say that they will
15 decontaminate.

16 Q Is that proposal, which is referred to in the letter,
17 also included in the Plan?

18 A No. I guess it was not included in the Plan. Our
19 letter to them is not in the Plan; that is correct.

20 Q The letter says nothing about the commitment in terms
21 of the number of ambulances or the number of potential victims
22 or injured persons that can be handled by the San Luis Ambulance
23 Service, does it?

24 A No, it does not.

25 Q The next letter is from the Department of Administrative



6 1 Management, San Luis Obispo County, and it is dated December 18,
2 1972.

3 A That is right.

4 Q Has there been any more recent communication or
5 agreement with the Department of Administrative Management?

6 A No. Of course, we routinely work with the County,
7 but that letter is really obsolete, I would say. In other words,
8 there is no more recent agreement.

9 Q Isn't it true that at the time this letter was written,
10 there was no such Office of Civil Defense and Disaster?

11 A I cannot say that. I assume that Russell K. Powell,
12 who signed the letter, knows how the County was organized at
13 that time.

14 Q The next letter is California Department of Health,
15 dated December 18, 1972. It refers to an Emergency Assistance
16 Plan. Is that Emergency Assistance Plan included?

17 A No. The State of California, of course, has an
18 Emergency Assistance Plan.

19 Q Is that the same thing as the Emergency Assistance
20 Plan referred to in this letter?

21 A Probably not, because I think this letter pre-dates
22 the State of California Emergency Plan, but it has been super-
23 seded by that.

24 Q Now, the final letter is St. Francis Memorial
25 Hospital in San Francisco.



7
1 A Yes.

2 Q Do you have any more specific agreement with St. Francis
3 Hospital?

4 A No.

5 Q Does it specify in the Plan anywhere what the capacity
6 of that Hospital is for patients which might come from Diabolo
7 Canyon Nuclear Power Plant?

8 A No, it does not.

9 Q Are there any specifications of the number of trained
10 doctors?

11 A In the --

12 Q In St. Francis.

13 A In the Emergency Plan?

14 Q Yes.

15 A No, there is not.

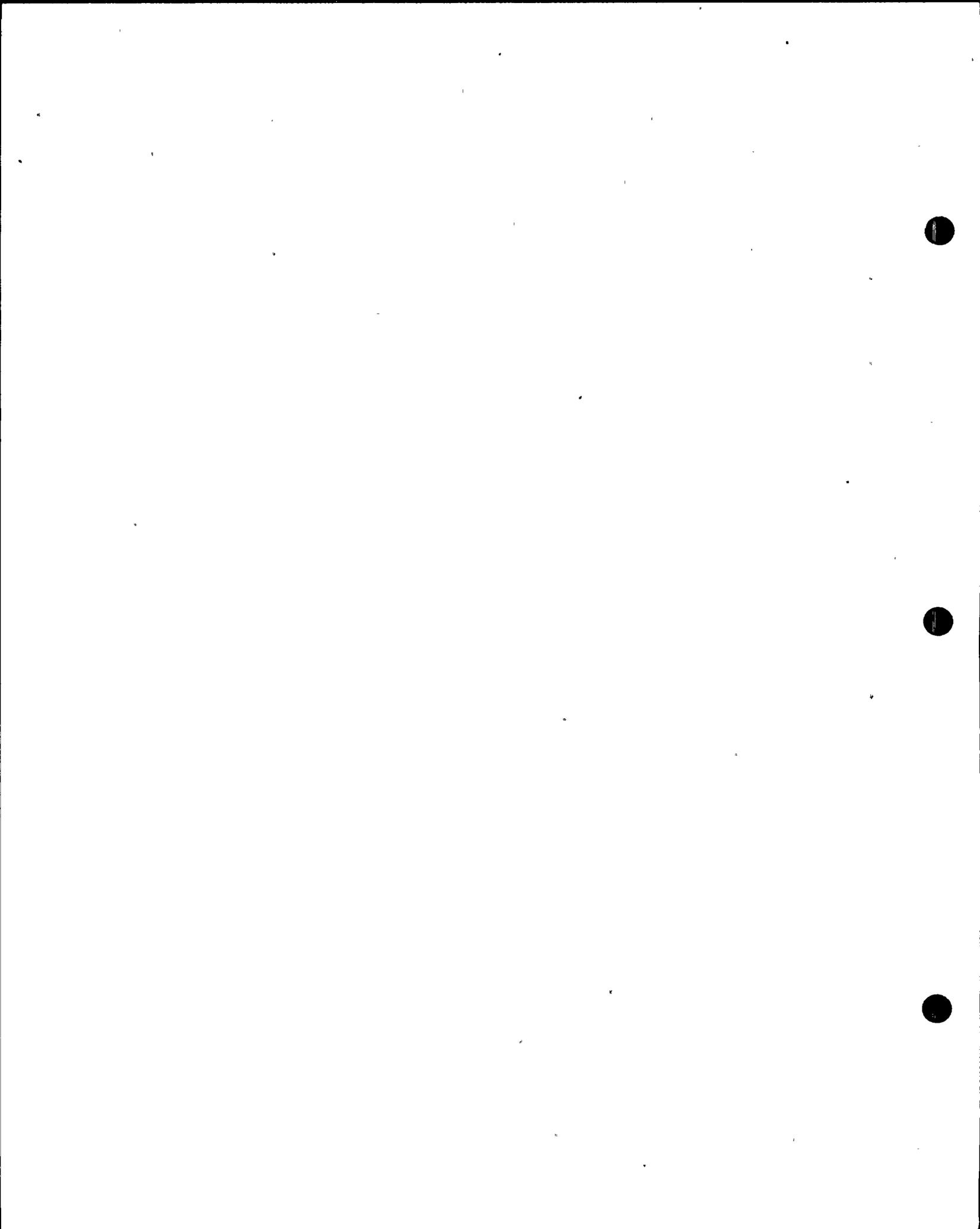
16 Q Is there any specification of the extent of treatment
17 which will be provided by St. Francis?

18 A I don't believe so, in the Region II Plan, no.

19 MR. REYNOLDS: I have no more questions on this
20 exhibit.

21 BY MR. REYNOLDS: _

22 Q On Pages 7 to 11 of your testimony, you describe
23 the emergency response facilities. These include the Technical
24 Support Center, the Operational Support Center and the off-site
25 Emergency Operations Facility.



1 You contend that, at the time of fuel loading, these
2 three facilities will comply with all the NUREG-0696 criteria?

3 A No.

4 Q On Page 7, Line 18, you describe the Technical
5 Support Center. Does the Technical Support Center at Diablo
6 Canyon contain up-do-date, as-built drawings, schematics and
7 diagrams of the plant structures and systems to the component
8 level and the in-plant location of these systems?

9 A It will, at the time of fuel-loading; yes, sir.

10 Q And will those as-built drawings be up-to-date?

11 A Yes, we have a terminal for our records, Corporate
12 Records Management System, computerized Records Management
13 System, in the TSC, which contains up-to-date drawings.

14 Q Now, you say that it will be at the time of fuel-
15 loading?

16 A Well, it is there. That particular system is there,
17 and I believe it is functional right today. In addition to
18 that, we will undoubtedly put some hard copies in, too. We
19 haven't got that outfitted today, because there is still a
20 small amount of work going on in that.

21 Q I am sorry, you said "hard copies?"

22 A Hard copies of certain of the more important --
23 "hard copies" being a piece of paper, as opposed to a TV screen.

24 Q On Page 10, Line 3, you state that, "The OSC serves
25 as a staging area for support personnel who are called in to



9 1 the site." So certain on-site personnel also report there, or
2 is that just limited to off-site personnel?

3 A Oh, okay. The idea is that all personnel, whether
4 on-site or off-site who are originally called in, would report
5 to the OSC for then subsequent deployment.

6 Q Now, when someone reports to the OSC, what would
7 occur? What occurs, as a matter of course, in an emergency?

8 MR. NORTON: I object. I would like to know who it
9 is that reports to the OSC. Is it Mr. Reynolds or is it
10 somebody that would be useful in an emergency? I want to
11 know who we are talking about.

12 JUDGE WOLF: I sustain the objection, Mr. Reynolds.

13 MR. REYNOLDS: Fine.

14 BY MR. REYNOLDS:

15 Q Let's take the on-site personnel.

16 MR. REYNOLDS: Is that sufficiently specific,
17 Mr. Norton?

18 MR. NORTON: Well, you are asking a question, what
19 is going to happen to him? Well, you have to identify who it
20 is, obviously, to answer that question.

21 MR. REYNOLDS: All right. I withdraw the question.
22 I withdraw the question.

23 BY MR. REYNOLDS:

24 Q What kinds of support equipment are stored in the OSC?

25 A Well, the OSC, of course, is the Security Building,



10 1 and we do have two what we call "emergency evacuation kits"
2 stored there, which are small kits that contain radiological
3 monitoring equipment for surveying. We have a number of radios
4 there. We, at one time -- just a moment.

5 Okay. We are going to continue to store two radio-
6 logical monitoring kits, emergency kits, in the OSC. There
7 are, of course, a lot of other routine equipment there. You
8 know, there are toilet facilities, there are kitchen facilities,
9 and things like that.

10 Q I am more interested, I think, in the emergency
11 support equipment.

12 A Basically, the emergency equipment there is -- there
13 are some radios, two radiological emergency kits, and two
14 what we call "evacuation kits," which are sort of abridged
15 radiological emergency kits that would be taken by evacuees
16 from the site.

17 That is the main stuff that is stored there.

18 Q Would the OSC also contain things like respiratory/
19 protective equipment or protective clothing, portable lighting
20 and things of that nature?

21 A No, we are not going to store that at that location.

22 Q Where would that be stored on-site?

23 A Well, it is stored in a variety of places. Respira-
24 tors, for example, there are some in the Control Room, there
25 is some in the Technical Support Center, there are some down



11 1 by the normal radiation access control area. I am told there
2 is some in our special fire-protection locker for smoke inhala-
3 tion. So most of this equipment is stored in a variety of
4 places.

5 Q For personnel from either off-site or on-site who
6 go to the OSC, would there be any respiratory protective
7 equipment for them, or protective clothing, or would they be
8 expected to stop by someplace else on the way to the OSC to
9 pick up things like that?

10 A No. Ordinarily, there would not be protective clothing
11 or respirators at that location.

12 Q On Page 10, Line 10, you state that the Emergency
13 Operations Facility is approximately 11 miles northeast of the
14 site. How far is the distance by road?

15 A Well, by the normal access road, I would say it must
16 be on the order of about 25 miles, I would guess, approximately.

17 Q Could you describe the size and condition of the
18 road, please?

19 A Well, for the first six miles, it is the access road
20 leading generally south outside of the plant, between the plant
21 proper and Avila Beach, which is a black-top, two-lane road,
22 paved road. Then you run along San Luis Bay Drive, I guess for
23 while, through the town of Avila Beach. Then you would cut
24 across the bridge by the entrance to San Luis Bay Inn and go
25 over -- which I guess is a two-lane road, over to the freeway;



12 1 cut across the freeway, and then you are on Highway 101. You
2 would carry that up into San Luis Obispo, and then you would
3 take Highway 1 over to the Sheriff's Office.

4 Q Is there an alternate route, in the event that the
5 main access route would be obstructed?

6 A Well, depending on what part of the main access route
7 would be obstructed --

8 Q Assuming it is entirely obstructed.

9 A Entirely obstructed?

10 Q I see what you mean. I am sorry.

11 Assuming it is obstructed in Avila Beach.

12 A In Avila Beach. Well, yeah, I could get out of Avila
13 Beach by, for example, going again down Harford Drive. Then
14 there is the road that runs along at Port San Luis. You could
15 cut up through the golf course, bypass Avila Beach, and end
16 up on San Luis Bay Drive, and continue on from there.

17 That would be one way to do it.

18 Q Assuming that the road south from the site is
19 obstructed, what is the alternate route?

20 A Then I would have to go north, through the Fields
21 Ranch.

22 Q And what is the distance on that road?

23 A Well, it would be less.

24 Q And what is the condition of that road?

25 A Well, the Fields road is a dirt road, basically, and



13
1 it runs about four miles. I guess it is around four miles --
2 six miles, I am sorry. Six miles north to the Park, and then
3 you get on the road that Montana De Oro State Park, which is
4 a paved road, and that leads you out into Baywood Park, and
5 then, in the most direct route, I guess you would go across
6 Southbay Boulevard, up to Highway 1, and then over Highway 1.

7 Q On Page 7, Line 24, you state that the TSC is a
8 seismic Class I structure. Is the OSC also a seismic Class I
9 structure?

10 A I don't know that. I would have to find that out
11 exactly.

12 Q Is there anyone on the panel who would know the
13 answer to that question?

14 A Before I would answer, I would rather find out. We
15 can find that answer out and tell you about it.

16 Q I would appreciate it if you would do that.

17 A Yes, I will.

18

19 // // // //

20 (Please continue on the next numbered page.)

21

22

23

24

25



t11 1g

- 1 BY MR. REYNOLDS:
- 2 Q Please turn to page 16, if you would do that?
- 3 A (Witness Shiffer) Yes, I will.
- 4 Q I assume that the interim emergency operations
5 facility is not a seismic Class I structure, is that correct?
- 6 A That is correct.
- 7 Q Moving to your communications discussion, beginning
8 on page 12, how do the on-site personnel responsible for
9 communications know whom to contact throughout the course of
10 an emergency?
- 11 A How do they know whom to contact?
- 12 Q Yes.
- 13 A That would be an implementing procedure that would
14 give them a phone list.
- 15 Q Is that -- will that be specified in the emergency
16 plan prior to fuel load, or at the time of fuel load?
- 17 A Well, in general terms, it is discussed in the
18 emergency plan.
- 19 Q I am talking in more specific terms, as to the
20 precise individual that has to be contacted.
- 21 A Ordinarily, that level of detail is not included in
22 the emergency plan. It would be included in an implementing
23 procedure. It would be more like agencies that would be
24 contacted in the emergency plan.
- 25 Q Right, and that is -- the implementing procedures



t11 2 1 are not incorporated in the plan at this time?

2 A Well, they don't get incorporated into the plan per
3 se. They are a separate document.

4 Q So you are saying, that even when Revision 3 comes
5 out, that this specific information will not be in the plan?

6 A I will have to -- to answer that question, I will
7 have to look more closely at 0654 to see what level of detail
8 they require, but I doubt that it will be specific
9 individuals' names. It will certainly -- I mean, it will be
10 something like, for example, contact the Watch Commander at
11 the Sheriff's Office.

12 Q That is by title, then, is that correct?

13 A Well, in that case it is by title. In a case like,
14 say the California Office of Emergency Services, it would be
15 whoever is on -- I don't know what the title of the person is
16 that is on their control -- you know, their around-the-clock
17 emergency phone, but you know, there is a phone line to the --
18 there is a special number you contact. I have no idea who the
19 person is, but it is -- they have a switchboard for that.

20 Q Okay, well I guess what I am trying to get at is at
21 the time of fuel load, will the plan include the specific --
22 you know, the persons named by title who are to be contacted
23 in the event of an emergency?

24 A Well, I -- I basically, I think it is more agencies,
25 that it will say contact the State Office of Emergency



t11 3g 1 Services, and I don't -- I don't believe it will give a title
2 of a person.

3 Q All right.

4 A It will be more of an organization.

5 Q Will the phone numbers be included in the plan?

6 A In the implementing procedures, yes.

7 Q For those persons? But okay, it will not be
8 included in the plan at the time of fuel load, is that your
9 answer?

10 A That is right. There won't be any -- no, at the
11 time of fuel loading, the plan will be as it exists.

12 Q Does the plan currently required 24-hour manning of
13 communication links?

14 A 24-hour manning of communication links at the site,
15 are you talking about, or at off-site locations?

16 Q Yes, at the site.

17 A Well, it does in the sense that the plant staff is
18 manned 24 hours a day, and the initial communications would
19 come from persons in the -- at the plant staff. So in other
20 words, you would call a person from the control room, and
21 there is somebody in the control room 24 hours a day, so in
22 that sense, it --

23 Q But the plan does not specifically state a
24 particular individual --

25 A No, it does not.



t11 4g 1 Q -- who shall man --

2 A No, it does not.

3 Q All right. Now, on page 16 you discuss
4 radiological monitoring. On page 16, line 17, you refer to
5 32 environmental sampling stations on and off site.

6 A Yes.

7 Q Are each of these 32 environmental sampling stations
8 included on Table 7.3-2 and 7.3-3 in the Diablo Canyon
9 Nuclear Power Plant Emergency Plan?

10 A No. They would be -- I will have to look at those
11 tables, but I am sure they are not, because those have been
12 added subsequent to that plan. It -- the table you refer to
13 probably discusses the 21 that are described on line 7.

14 Q On page 24, line 7, you refer to the agreement with
15 the San Luis Ambulance Service. Now, you talked before about
16 whether or not the agreement specified certain things, as for
17 example number of ambulances. Do you know how many
18 ambulances are available at the San Luis Ambulance Service?

19 A No, I do not. I assume it is one, but they may have
20 more than one.

21 Q Do you know how many persons per ambulance -- well,
22 let us see. Do you know how many -- do you know how many
23 persons, injured persons, an ambulance will hold? That
24 ambulance will hold?

25 A I would assume it would depend to some degree on



t11 5g 1 what was the nature of the injury. I mean, if a person was
2 required to lay down flat, I presume the ambulance would hold
3 one person.

4 Q For planning purposes, what have you assumed the
5 capacity of the ambulances would be?

6 A Basically just one person.

7 Q How frequent is the training of the drivers for San
8 Luis Ambulance Service?

9 A Basically they get their training by participating
10 in the drills, and we ordinarily would conduct at least one
11 of those a year.

12 Q You say you ordinarily would do so. Have you been
13 holding those once -- on an annual basis?

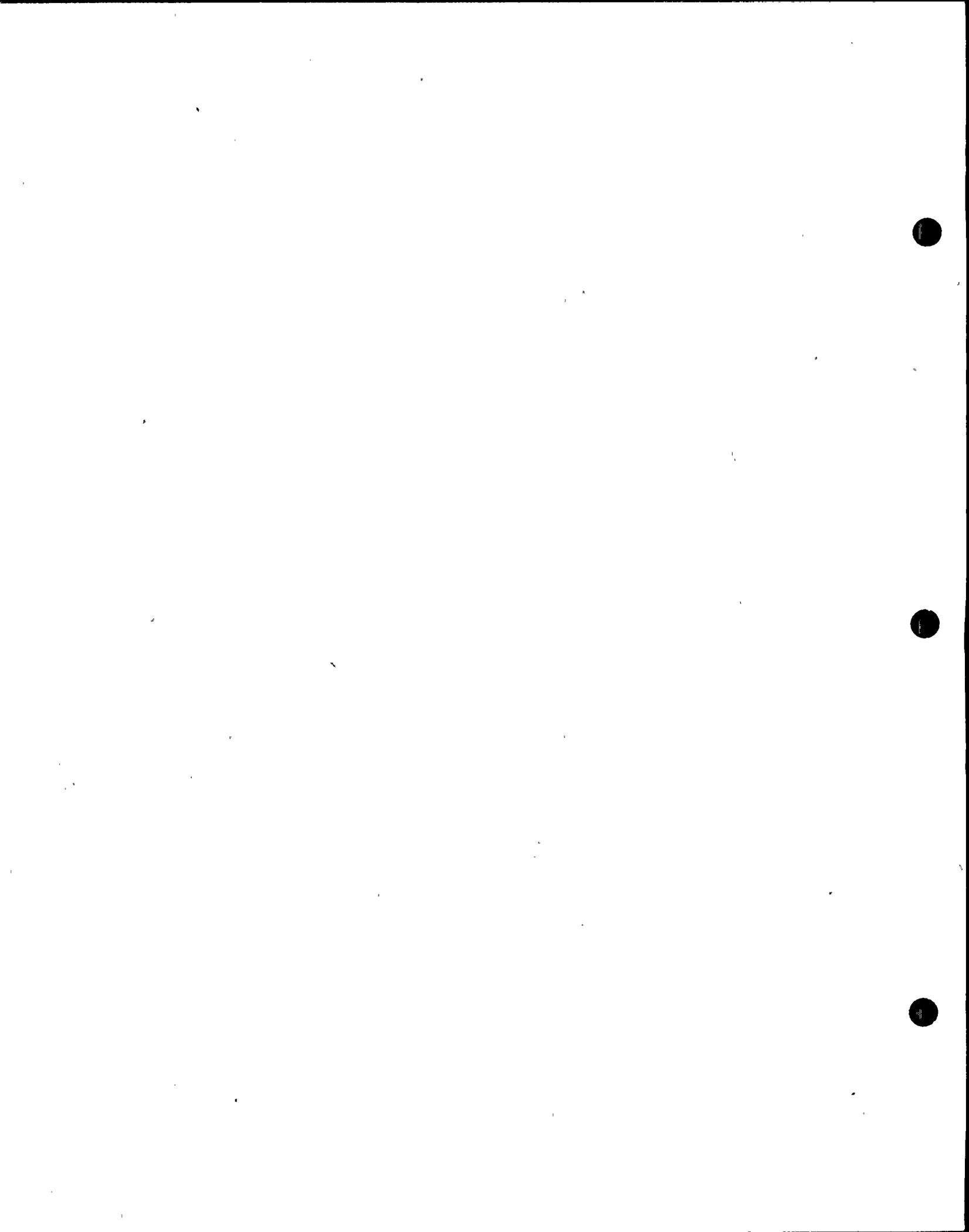
14 A Well, we have done -- we have done three of those,
15 the most recent of which was August, 1980. We have another
16 one coming up in -- probably next month.

17 Q How many drivers from San Luis Ambulance Service
18 have you actually trained?

19 A I can't answer that question. I don't know.

20 Q Can anyone on the panel answer that question?

21 A No, I doubt that we can. I don't know that there
22 is any special training really at all required for the
23 ambulance driver, since any -- of course, anytime we would
24 carry a patient of that nature, that was contaminated, we
25 would send a monitor, you know, a trained person, with them.



t11 6g 1 Not only for the benefit of the ambulance, but also to
2 inform the people at the hospital as to what the situation
3 was.

4 Q So the drivers themselves do not have any
5 radiation handling training?

6 A I don't know to what degree. We did conduct a
7 course, and it slipped my mind here -- it is discussed in the
8 testimony here -- we did last year have a doctor come down
9 and talk to the people at the ambulance service on handling
10 of radiation patients, but it is not something that we had
11 done previously. We did it last year, though.

12 Q How much time does it take to get an ambulance to
13 the site, from its point of origin?

14 MR. NORTON: I am going to make the obvious
15 objection, that that depends on the point of origin, and we
16 would like to know that.

17 BY MR. REYNOLDS:

18 Q Assuming the point of origin is the San Luis
19 Ambulance Service?

20 A (Witness Shiffer) I would say about 20 minutes.

21 Q What route would they take to the site?

22 A Assuming their point of origin, they are -- San Luis
23 Ambulance is located on Santa Rosa Street, so you would come
24 down Santa Rosa Street towards Highway 101, get on the
25 freeway, go south, and then go through Port San Luis -- you



t11 7g 1 know, San Luis Bay Drive, and up the access road.

2 Q Assuming the road leading South from the site toward
3 Avila Beach is blocked, what route would they take?

4 A If that were totally blocked, the -- really, the
5 only other route they could take would be through the Fields
6 Ranch.

7 Q Have there been any drills on the Fields Ranch
8 Road?

9 A No.

10 Q Do you know how much time it would take to get the
11 San Luis Ambulance Service from the site using the Fields
12 Ranch Road?

13 A No, I have never tried to drive that. I mean, it
14 is a shorter distance, but of course the -- six miles on the
15 Fields Ranch Road itself, is a dirt road. It wouldn't be
16 a tremendous difference in time, I would guess. You know,
17 about the same.

18 Q So you haven't planned for --

19 A But I don't know exactly. I have never really tried
20 to time it, no.

21 Q You haven't planned for that eventuality,
22 contingencies?

23 A We don't expect that to be a very likely
24 occurrence that they would have to do that, that is right.

25 Q On page 24 -- I guess, I assume the answer to the



t11 8g 1 question is no, is that right?

2 A Yes.

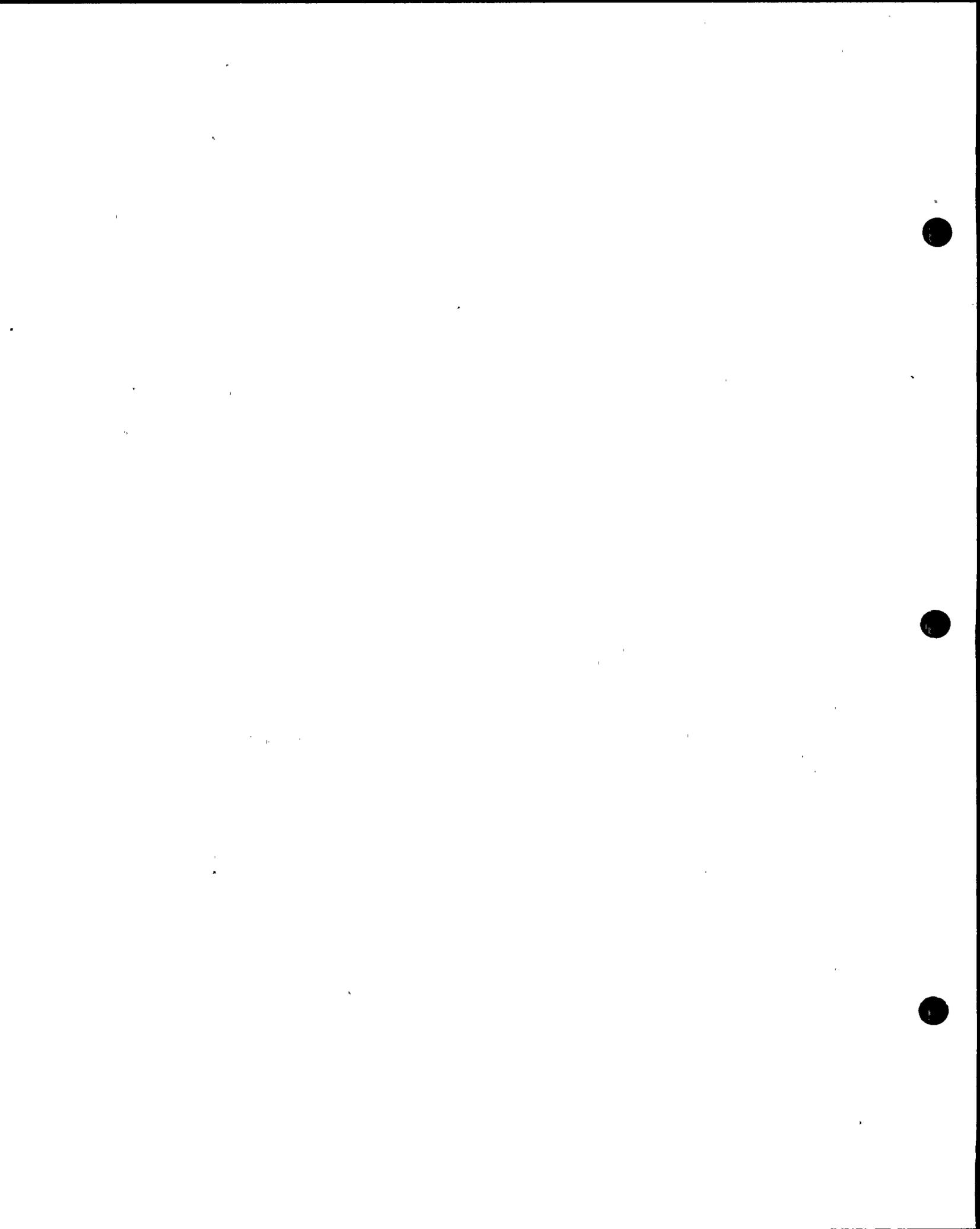
3 Q Page 24, line 15, you refer to the NuCon
4 contaminated personnel carrier?

5 A Yes.

6 Q I wonder if you could describe what that is?

7 A That is a -- I am trying to think of a way to
8 describe it here. It is a plastic -- have you ever seen --
9 do you know what a gurney looks like, I guess, or one of
10 these basket stretchers, I would guess? It is a plastic
11 basket stretcher that a person would lay in. It has a
12 plastic cover over the top of it, and it sits on a wheel
13 arrangement, and it has several special features that it has
14 an internal drain system, for example, if you had a person
15 laying in this with the top off and you were washing them,
16 or something, you know, you could collect the drains, that
17 kind of thing; although it is not really a feature we would
18 use, you can put the cover on -- it has an internal
19 ventilation system, of course, so the person wouldn't
20 suffocate, and you can work on a person through a glove box
21 arrangement, you know, with the gloves, the rubber gloves
22 through the side of the thing, so you wouldn't have to
23 actually touch a person. That is not something that we
24 would ordinarily use.

25 But it is basically a plastic-enclosed stretcher



t11 9g
1 with an enclosed ventilation system, an enclosed drain
2 system and glove box type capability.

3 Q Under what circumstances would you use that
4 contamination carrier?

5 A If I had a -- if I had a highly contaminated person
6 that was being transported from the site, I might put him into
7 that, and it would probably cut down the possibility of
8 getting some contamination transferred to the ambulance?

9 Q How many of those do you have?

10 A We have one on the site, and there is one located
11 at the hospital.

12 Q On page 24, line 23, you refer to the attendance
13 by French Hospital staff members at a course in Oak Ridge,
14 Tennessee. When did they attend that course?

15 A I have that written down. I don't have it with me.
16 It has been -- I think there has been more than one session.
17 It has been over the last couple of years. I would have to
18 go back and consult my notes. If you -- I can give you the
19 exact dates. I don't happen to have it here at the table.

20 Q Thank you.

21 A But it has been in the last couple of years.

22 Q Yeah, I would appreciate it if you would do that.

23 A You want that?

24 Q Yes.

25 A In fact, I should be making a list here. There is



t11 10g 1 two things. One is the seismic of the security building, and
2 the other is one -- what dates? -- Okay. What dates these
3 people attended.

4 Q Right. That brings to mind one other question on
5 the seismic aspect of the emergency facilities. The
6 permanent emergency off-site facility, will that be a Seismic
7 Class I structure?

8 A That system -- I mean that building has not yet been
9 designed, so I hesitate to commit to that, I -- at this
10 point in time. We haven't --

11 Q When do you expect that will be designed?

12 MR. NORTON: Excuse me. I think that will be a
13 requirement of the NRC, not -- NRC regulations. You know, as
14 to whether it will or will not be done. I am not saying that
15 it is a requirement that it will be.

16 MR. REYNOLDS: Well, let me rephrase the question.

17 MR. NORTON: Whatever it is will be a requirement of
18 the NRC regulations.

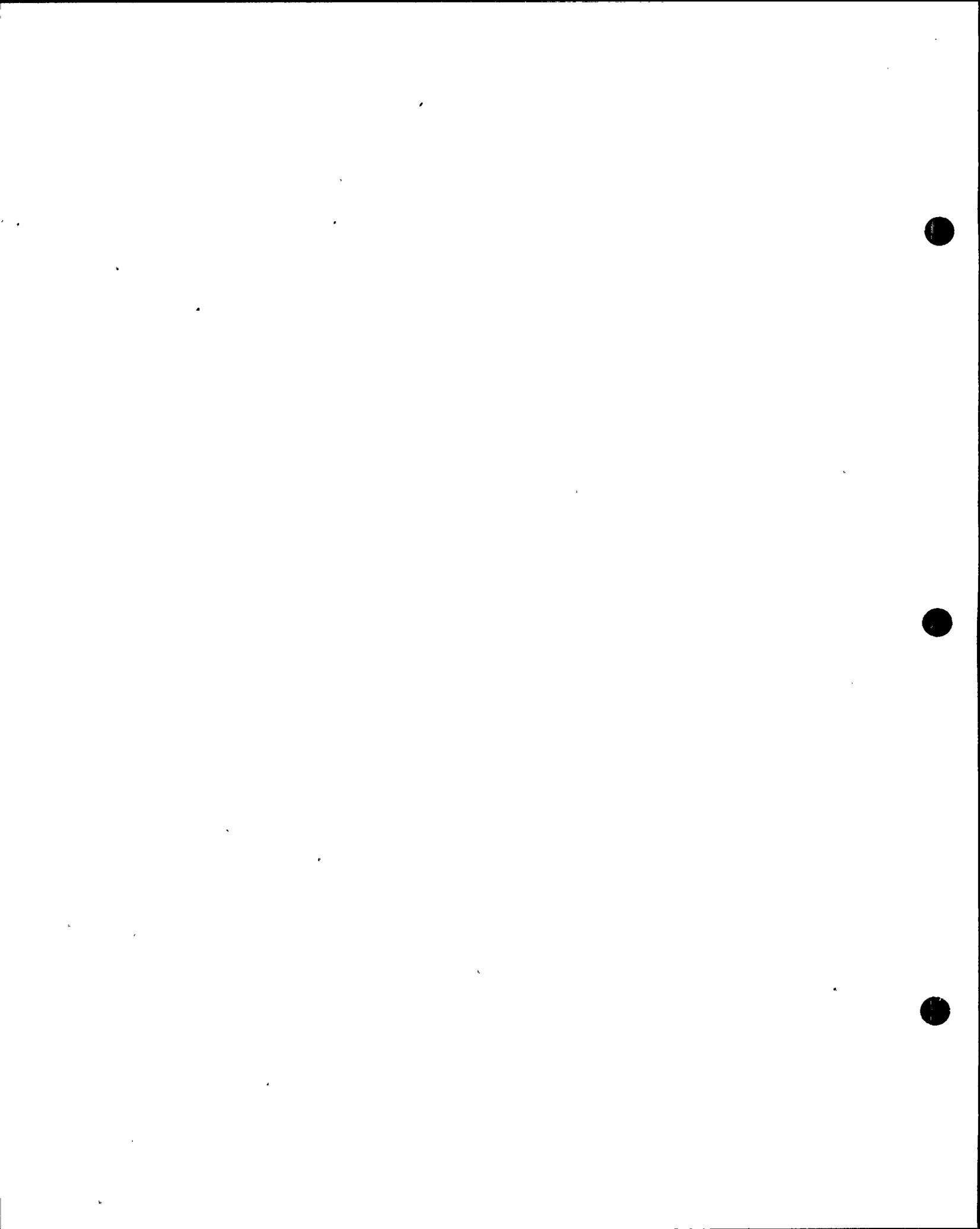
19 BY MR. REYNOLDS:

20 Q Will that facility, that permanent facility, be
21 constructed prior to full power?

22 A (Witness Shiffer) No.

23 Q And you do not know at this time whether or not it
24 will be a Seismic Class I structure?

25 A I don't -- well, I don't believe it is required to



t11 11g 1 be, but -- in a generic sense. I would have to go back and
2 check on NUREG 0696. I -- without me looking at it, I think
3 it says in there that it is a substantial structure of good
4 engineering design, or something like this, I believe.

5 I mean, obviously if it is required to be Class I
6 in NUREG 0696, we will make it Class I. We will seriously
7 consider making it Class I anyway, but --

8 MR. NORTON: Excuse me, Your Honor. We have an
9 answer to the question about the OSC. It is not a Category
10 I structure, nor is it required to be a Category I structure,
11 by the regulations, but these gentlemen didn't know the
12 answer, and the engineers tell me it is not.

13 JUDGE WOLF: Well, you can hardly testify.

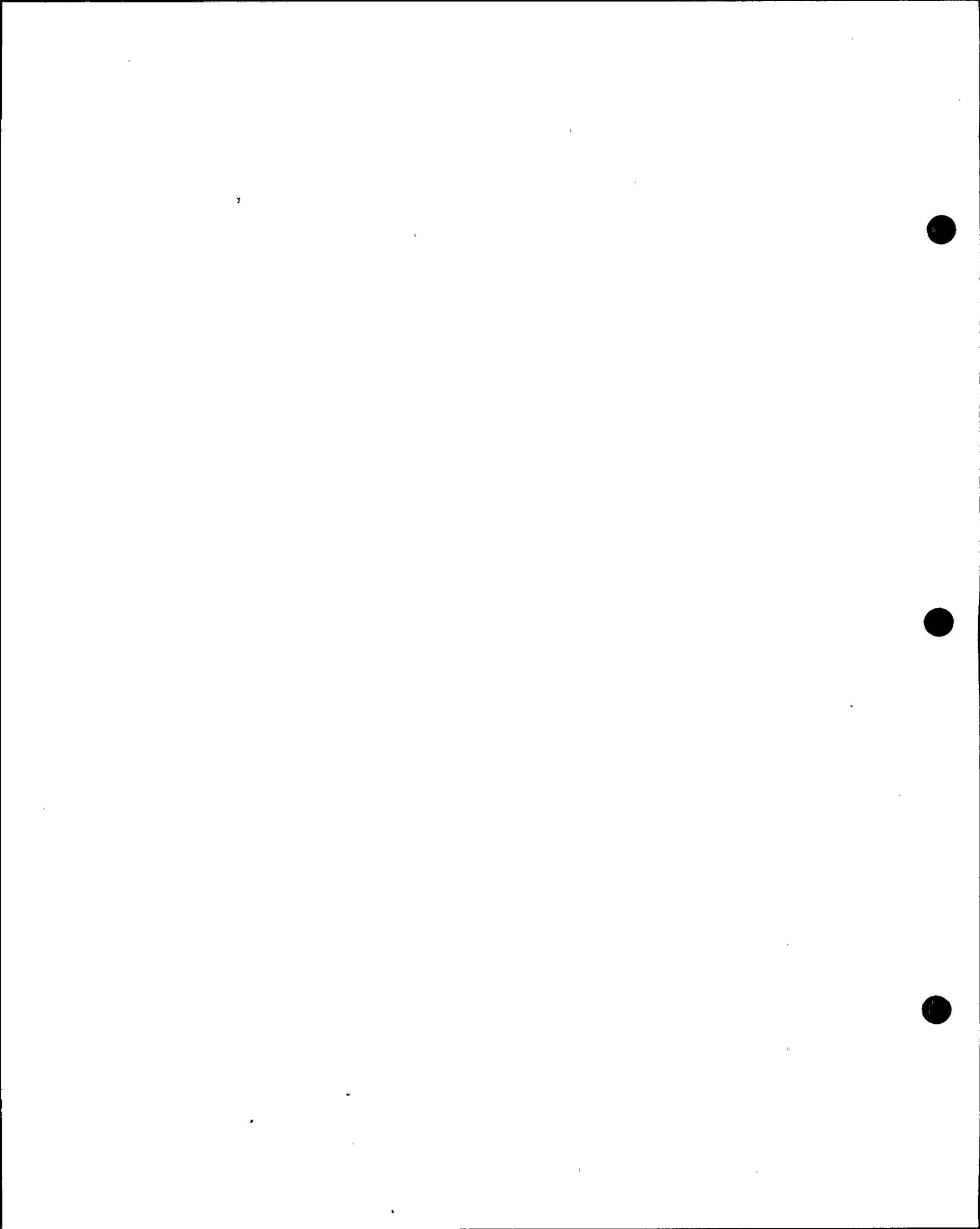
14 MR. NORTON: I understand that. They just wanted
15 the information supplied, and these gentlemen can't testify
16 either, if they don't know the answer, and they have
17 testified they don't know the answer.

18 MR. LANPHER: Excuse me. Could Mr. Norton tell us
19 the source of the information? Is it in the FSAR or what?

20 MR. NORTON: It is in the seismic hearings. That
21 was gone into. In fact, it is in the security hearings, too,
22 which you attended, Mr. Lanpher.

23 MR. LANPHER: Bruce, don't be telling -- don't tell
24 stories.

25 JUDGE WOLF: You might supply us tomorrow with the



t11 12g
1 reference in the -- wherever it is filed, in the --

2 MR. NORTON: It is in the record.

3 MR. REYNOLDS: Yes, if you would supply that, I
4 appreciate it.

5 BY MR. REYNOLDS:

6 Q On page 25, line 10, you refer to three drills
7 involving the transport and treatment of a simulated
8 contaminated accident victim at French Hospital. Perhaps
9 you already answered this, but do you know how many people
10 were involved in those drills?

11 A (Witness Shiffer) How many victims or people total?

12 Q I think your testimony says there was one victim,
13 is that right?

14 A Oh, okay. Yeah, it does. That is correct.

15 Q How many trainees were involved in each drill?

16 A I can't tell you exactly how many. There were
17 several hospital people, and a couple or three people from
18 the plant involved, and I just don't know how many.

19 Q Can you find that information out also?

20 A I will have to look. I am sure we can dredge it
21 up, yeah.

22 Q Fine. Do you maintain a list of trained people at
23 the hospital?

24 A Do I maintain a list?

25 Q Yes..



t11 13g 1 A I know which ones we have sent, but I don't -- sent
2 to classes or conducted training. Whenever we conduct a
3 training session, we get a list of the people who attended,
4 but I don't keep track of --

5 Q You don't make a master list of all the people who
6 have been trained?

7 A No, I don't maintain that. -- I know -- again, I know
8 the ones that we have sent the things, and I generally know
9 who has attended classes that we have attended -- or we have
10 conducted, but I don't know -- I can't guarantee that I know
11 every person who might have attended a class that was
12 conducted internally, for example.

13 Q So you do not keep a list of these people to
14 determine whether they are still at the hospital, or for
15 example, at the ambulance service?

16 A I don't personally. Our chemical and radiation
17 protection engineer talks to the hospital continuously and he
18 may know better than I. I don't.

19 Q All right. On page 25, line 16, you refer to an
20 agreement with Saint Francis Memorial Hospital in San
21 Francisco. How do you transport any injured persons to the
22 hospital, any radiation victims?

23 A You would have to transport them -- you could
24 transport -- well, you could transport them by vehicle, or
25 you would probably have to transport them by some aircraft,



t11 14g 1 like the company plane, for example.

2 Q Is this contingency specified in the plan? In other
3 words, does the plan specify the means of transportation to
4 Saint Francis Hospital?

5 A No, it does not.

6 Q For someone who is seriously injured, has a serious
7 radiation injury, what would be the means of transportation
8 that you would use to get to Saint Francis Hospital?

9 A Well, first --

10 MR. NORTON: Excuse me. I would like to object and
11 have a definition of the question of what a serious radiation
12 injury is. Are we talking about a serious injury and then
13 radiation, or radiation normally, or what? The question is
14 confusing. --

15 MR. REYNOLDS: All right. I will strike the
16 question.

17 BY MR. REYNOLDS:

18 Q Under what circumstances would you send a person
19 suffering a radiation injury to Saint Francis Hospital?

20 A (Witness Shiffer) The main -- the main one would
21 be, I believe, if a person was burned. They have a fine
22 burn unit. Ordinarily, though, we would try to use the
23 local facility.

24 Q Which is?

25 A French Hospital.



t11 15g 1 Q Assuming French Hospital is full, has no room for
2 any other injured persons, is that when you would send them to
3 Saint Francis Hospital?

4 A Yes, although even there, generally what I would
5 try to do is take the person to French Hospital, and for
6 example, conduct any immediate first-aid type medical
7 attention he might need and get him decontaminated. Then I
8 would transport him. I mean, ordinarily, I would -- you know,
9 obviously if the guy needed immediate medical attention, I
10 would take him to French Hospital. I would -- while I am
11 doing that, I would decontaminate him there, and then if he
12 needed some treatment that French couldn't provide is when I
13 would move him to Saint Francis.

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15 /// PLEASE CONTINUE READING NEXT NUMBERED PAGE ///

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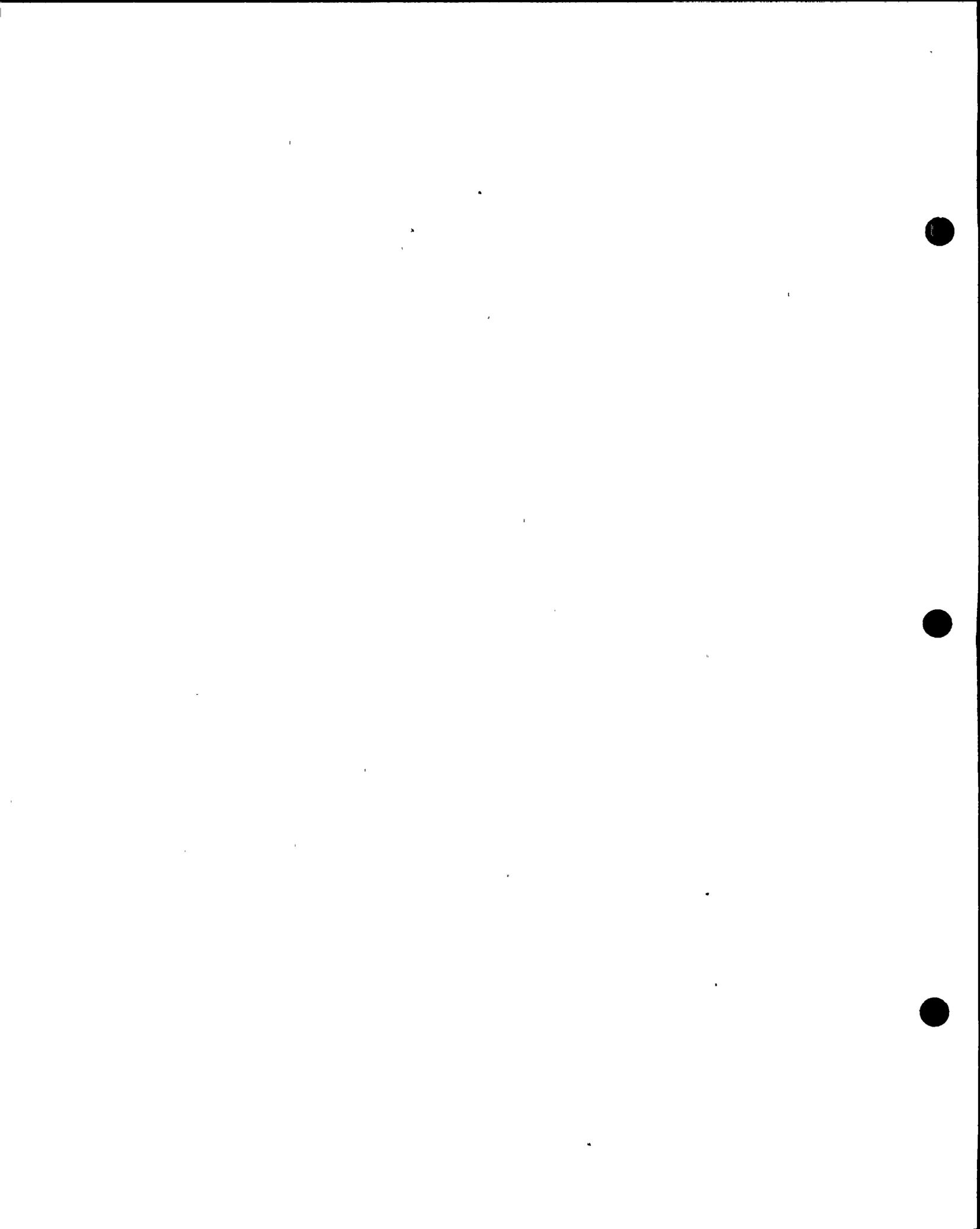
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1 Q Are there facilities for decontamination at the
2 site?

3 A At the site?

4 Q Yes.

5 A Yes.

6 Q Would decontamination of an injured person gener-
7 ally take place at the site or at French Hospital?

8 A Generally, it would take the site.

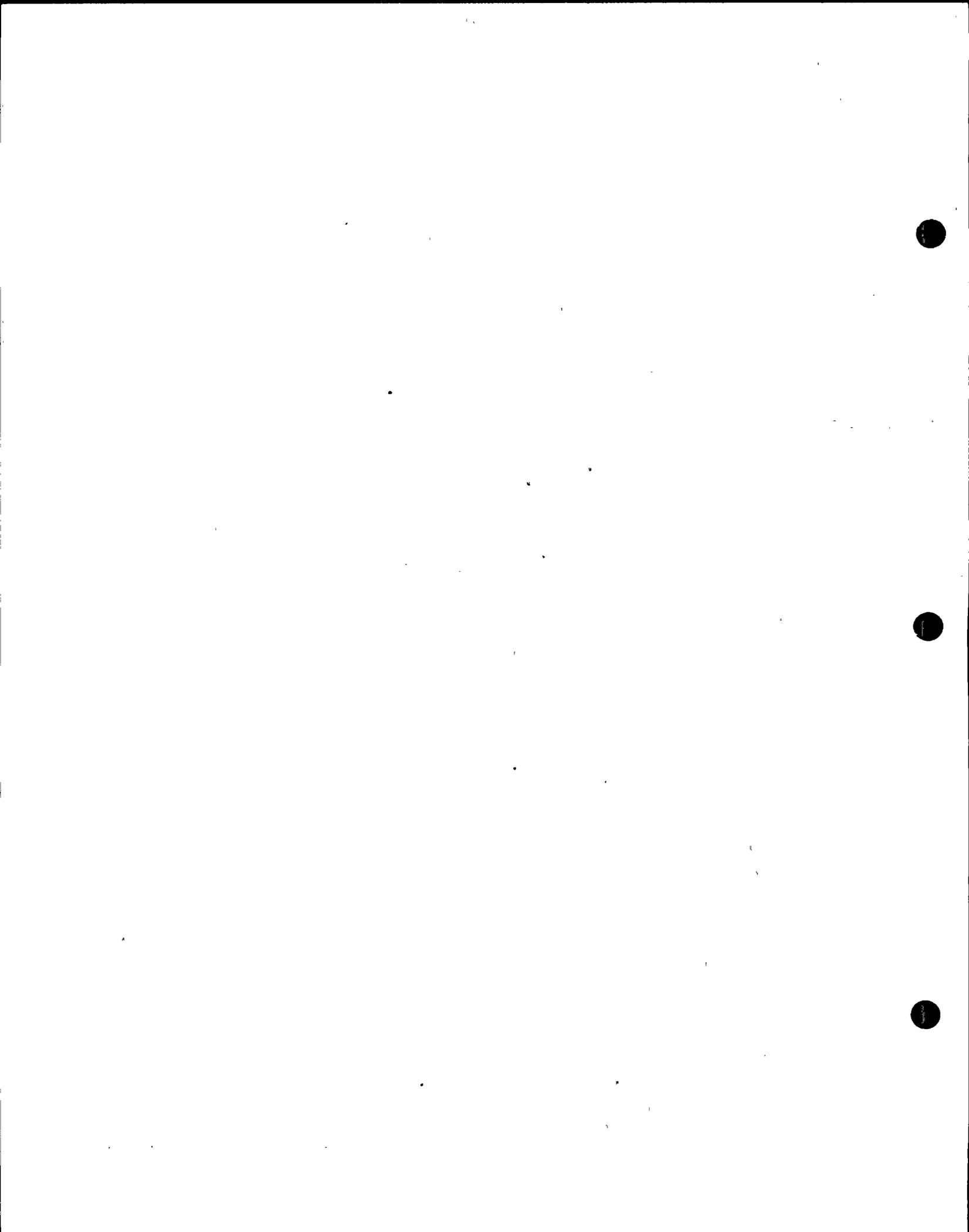
9 Q Under what circumstances would it take place at
10 French Hospital?

11 A Only if medical conditions prevented us from doing
12 it at the site, really. During the period of time, for
13 example, -- We would do the best we can to decontaminate the
14 guy at the site before we put him in the ambulance. If, for
15 example, the guy had a badly broken leg or something or maybe
16 he had some contaminated clothing on. I wouldn't want to
17 take his clothing off at the site. I would let a doctor do
18 that. So, I would not attempt to decontaminate that, for
19 example, at the site.

20 Q Is there a doctor on site?

21 A No, there is not.

22 Q On page 26, line two, you state that the public
23 warning in the event of a radiological accident will be
24 carried out by local agencies. What is PG & E's responsibil-
25 ity with respect to public notification?



1 A Well, of course, under the new requirement, it's
2 our responsibility to assure that there is a -- Under the
3 new requirements to provide a public warning system that
4 gives you warning out to ten miles -- an early warning system.

5 Q Will that early warning system be functional prior
6 to fuel load?

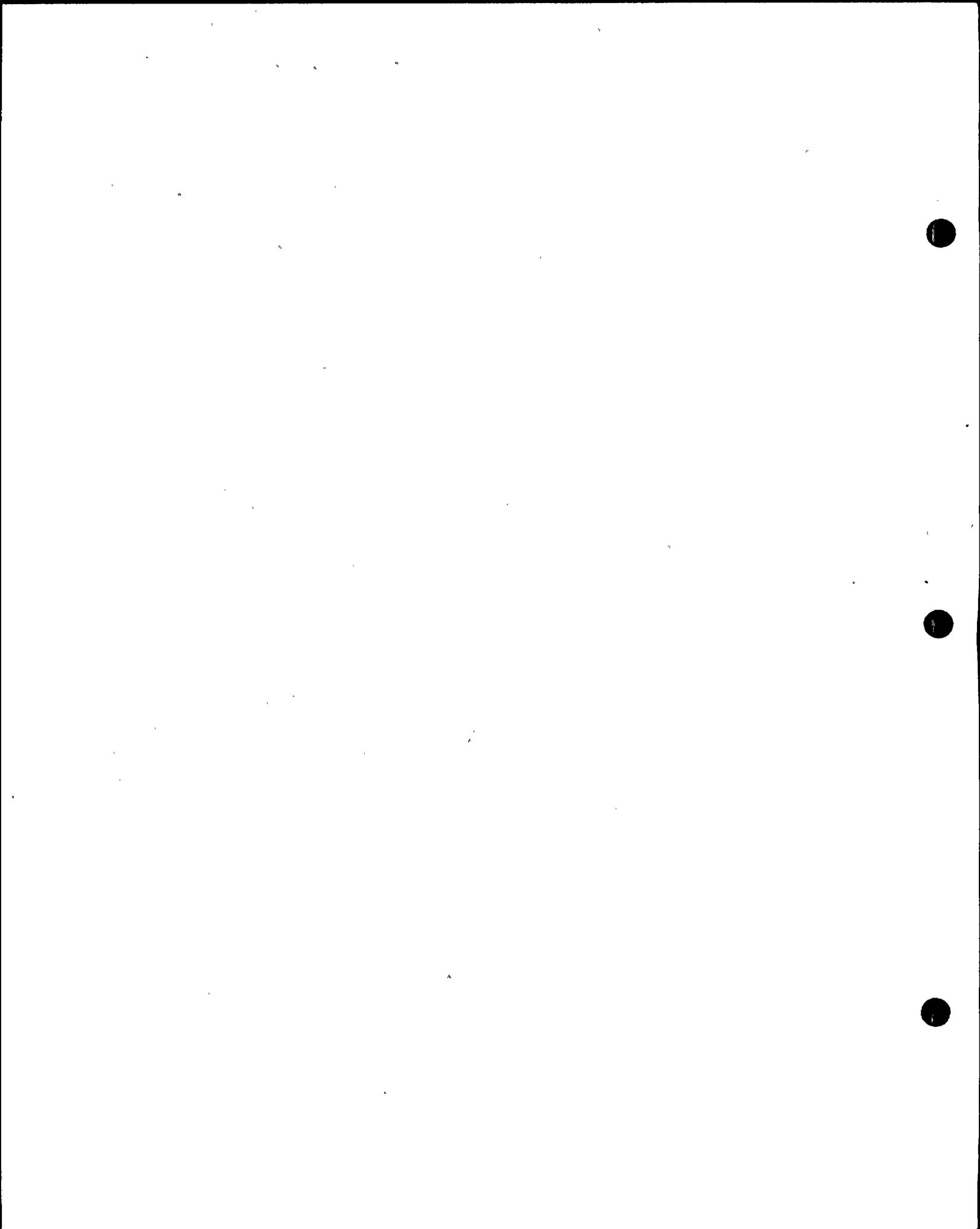
7 A I can't commit to that. We hope to have it at
8 least partially functional some time this summer.

9 Q But you don't know what time this summer?

10 MR. OLMSTEAD: Mr. Chairman, this is a good point
11 for me to interpose a technical objection to this line of
12 questioning. It's somewhat repetitive. Joint Intervenor has
13 put in Joint Intervenor's Exhibit No. 111 and at the beginning
14 of this session, Board members, I thought, indicated that
15 they wanted reference to NUREG-0654 or the Commission's
16 Regulation where applicable.

17 If you'll look at attachment 9-2 of that exhibit,
18 you'll find that those sections on public notification alert
19 indicate in this document that the procedures are not yet
20 provided. Information supplied on those procedures are not
21 yet provided, etcetera, etcetera. This is identified as
22 identification areas where the plant is not judged fully
23 complied with those 0654 evaluation criteria.

24 So, I haven't objected up to now, because I thought
25 this line of questioning would be rather quick and if we're



1 going to go through the testimony line by line, I'm going to
2 object everywhere it's repetitive of the admission of the
3 Applicant that they don't comply with the procedure. As I
4 think the parties are willing to stipulate, the Applicant
5 does not yet comply with the emergency planning criteria
6 of the NUREG-0654.

7 (Pause)

8 JUDGE WOLF: Would you tell the Board where you're
9 going with this line of questioning? What you hope to
10 ellicit from --

11 MR. REYNOLDS: Well, that particular question was
12 directed to the date at which the early warning system would
13 be operational. I don't believe that that was covered in the
14 Applicant's responses to the supplemental interrogatories.
15 I think there have been a number of questions which have gone
16 beyond the questions that are in those interrogatories them-
17 selves -- the responses in those interrogatories.

18 Really, I'm trying to get some further discussion
19 of a number of those things that were referred to -- to a
20 number of the subjects to which the answer is related.

21 JUDGE WOLF: You may continue, but we don't want
22 repetitious material if it's already covered.

23 MR. REYNOLDS: All right. I'll certainly try to
24 avoid that.

25 MR. OLMSTEAD: Mr. Chairman, I would like to point



1 out that the date that these things aren't going to be
2 operational are irrelevant here if they're not going to be
3 operational prior to fuel load.

4 MR. REYNOLDS: Excuse me, but I believe that Mr.
5 Shiffer said that he wasn't sure whether it would be opera-
6 tional prior to fuel. He said, in fact, they hope to get
7 some of it on line and I was trying to get some idea when
8 the system would be on line.

9 MR. OLMSTEAD: We've already had discovery here and
10 the issue as I understand the contention is that Joint
11 Intervenors believe that they should comply with certain of
12 these requirements by fuel load and they have indicated those
13 requirements that they do not intend to comply with by fuel
14 load or that they do not currently comply with and it seems
15 to me the parties, in order to understand where the proceeding
16 is going, are entitled to know which requirements you're
17 contending they should comply with, if you disagree with
18 their responses to the interrogatory. That's the nature of
19 my objection.

20 BY MR. REYNOLDS:

21 Q Mr. Shiffer, are you changing your response to that
22 interrogatory?

23 A I'm getting confused here. It says in the testi-
24 mony, if you look at the last line of that section of the
25 testimony.



1 MR. REYNOLDS: Fine. I'll move on.

2 BY MR. REYNOLDS:

3 Q Does the Diablo Canyon Emergency On-Site Plan
4 contain the initial and follow-up messages to be sent from
5 the plant in the event of an emergency?

6 A The implementing procedures contained in outline
7 of a -- yes, they contain an outline of the type of informa-
8 tion that would be transmitted -- The basic outline would be
9 the same initial and follow-up in the things that you report,
10 the nature of the accident, wind conditions, radiologic
11 conditions. Those kinds of things. Those are in our imple-
12 menting procedures.

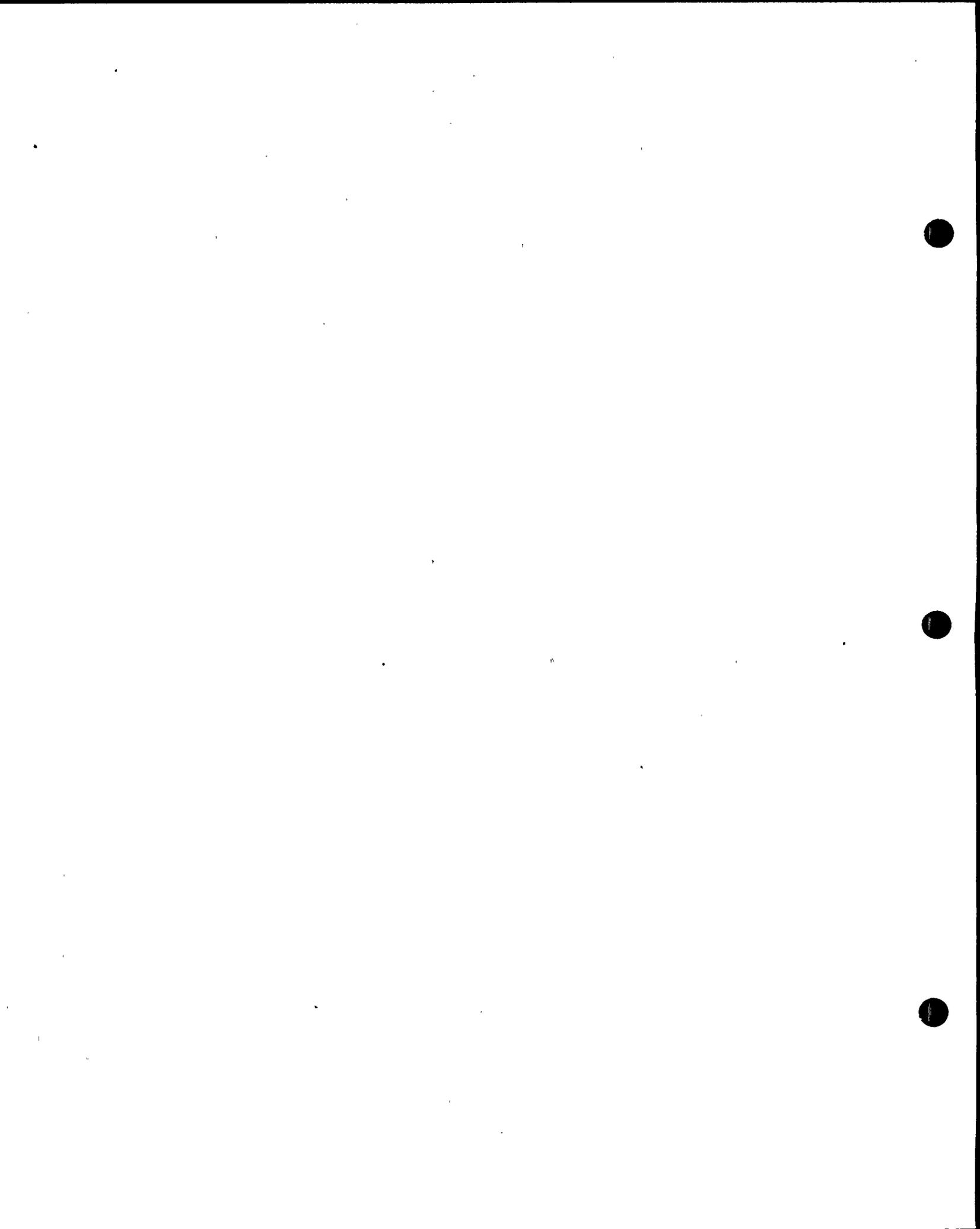
13 Q But, you do not specify the precise wording of
14 the messages. Is that right?

15 A No, they do not. I've never been able to figure
16 out a way to precisely word an emergency message before the
17 emergency. I don't know how I would do it.

18 Q On page 29, line -- beginning at line 12 and
19 continuing through 14, you state that the California Depart-
20 ment of Forestry is responsible for providing back-up support.
21 You also describe a letter rescinding the letter of under-
22 standing. Without the CDF personnel, you have no back-up
23 with the fire brigade. Is that right?

24 A If they did not respond. That's correct.

25 Q Have any coordinated Applicant, state and local --



1 Has any coordinated Applicant, state and local exercise been
2 held for Diablo Canyon?

3 A There's been two exercises held that were coordin-
4 ated local Applicant with marginal state involvement.

5 Q Did those drills involve the public?

6 A Only as observers. In other words, during --
7 there was in both cases, there were members of the public
8 in the audience at the Board of Supervisors chambers in San
9 Luis Obispo which is where at during the course of those
10 two exercises the County emergency group convened.

11 Q On page 30, at line nine, you refer to two general
12 site drills in 1977 and 1979 involving the mobilization of
13 all on-site personnel. During either of those drills were
14 there any personnel on-site who did not participate as would
15 be required in the event of a real emergency?

16 A No, everybody participated that was on the site.

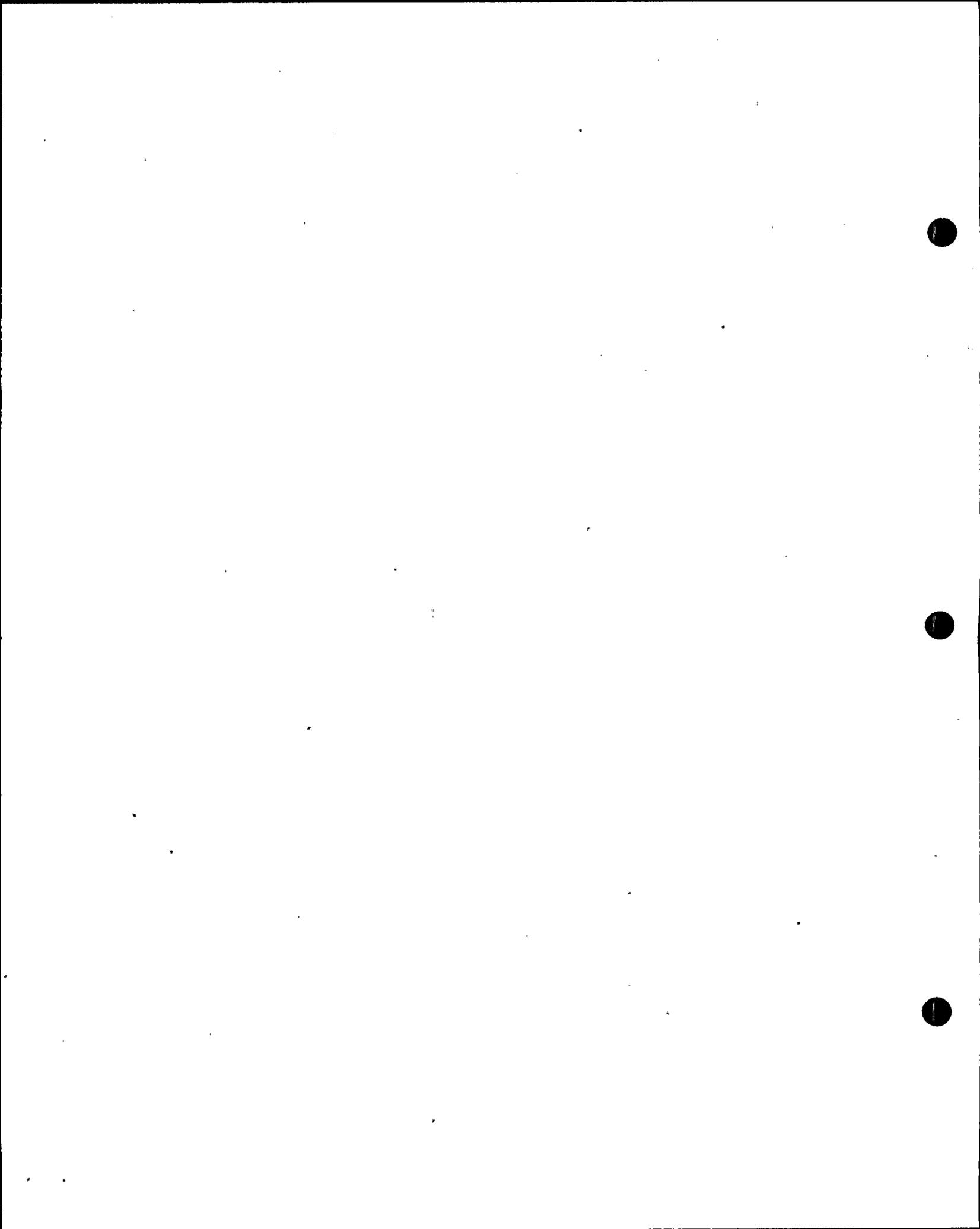
17 Q Were all nonessential persons including visitors
18 to the site evacuated?

19 A No, they were not evacuated. They were mobilized,
20 however.

21 Q Does the existing emergency plan require communi-
22 cation drills?

23 A No, I don't believe that it specifically mentions
24 it. We do have a --

25 Q Does the plan require those?



1 A No, the plan does not require that.

2 Q Does the plan require fire drills?

3 A Yes.

4 Q How often?

5 A Quarterly.

6 Q Does that mean four times a year?

7 A Right.

8 Q Does it require medical emergency drills?

9 A I believe it does. I'll have to look it specifi-
10 cally, but I think it does, yes.

11 Q If you could check that, I would appreciate it,
12 Radiological monitoring drills. Does the plan
13 provide for those?

14 A Yes.

15 Q How often?

16 A Without looking at it, I'd say it requires at least
17 one annual drill that involves some sort of an off-site
18 release type of thing where you would have some radiological
19 monitoring type involvement.

20 MR. OLMSTEAD: Mr. Chairman, I'm going to object
21 again. That's covered in Interrogatory No. 111 which has
22 been admitted into evidence, two and two. No discussion
23 provided.

24 MR. REYNOLDS: Judge Wolf, I'm almost finished.
25 I'll be done in five minutes. If that helps.



1 JUDGE WOLF: Proceed for five minutes.

2 (Laughter)

3 BY MR. REYNOLDS:

4 Q On page 32, line 21, you refer to, quote, full-
5 scale exercises of the revised company, state and local plans
6 in August 1981, end quote. In the event that all of the plans
7 including local and state are not completed -- also the
8 Applicant plan -- are not completed by that time or all
9 equipment is not available, will the exercise be postponed
10 or will it be held in any event?

11 A No, I would guess that the exercise would be
12 postponed. It would depend on the nature of the deficiency
13 whether you could have a meaningful exercise without some
14 specific thing.

15 Q So, you would assume that it would be postponed.

16 A You would have to evaluate the specific deficiency
17 and see whether it would make it worth -- whether it would
18 make it invalid or not worthwhile to conduct the exercise.

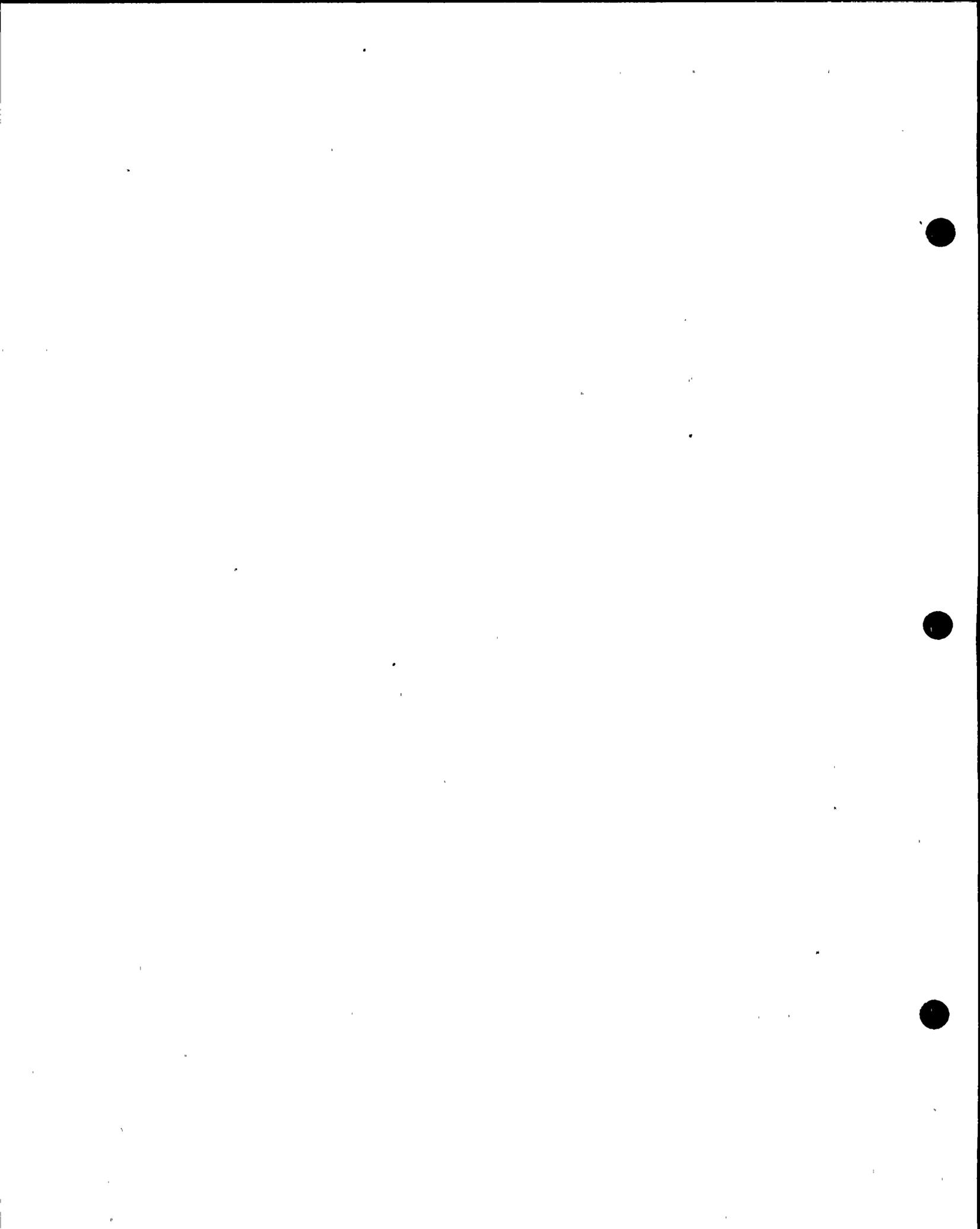
19 Q On page 36, line 11, you rely upon dose results
20 for design bases accident. Is that true?

21 A Yes.

22 Q Class nine accident is not a designed bases
23 accident, is it?

24 A Yes, that's true.

25 Q Is an accident involving a breach of containment



1 a design bases accident?

2 A No, the design bases accident includes leakage in
3 the containment.

4 Q What amount of leakage?

5 A I'm sorry, what?

6 Q What amount of leakage?

7 A I believe it's a design bases leakage.

8 Q And what is that? What is a designed bases
9 leakage?

10 WITNESS BRUNOT: Should I answer?

11 MR. REYNOLDS: Yes, please.

12 WITNESS BRUNOT: A tenth of a percent per day
13 for the first, I believe, 24 hours and half that for the
14 remaining period.

15 BY MR. REYNOLDS:

16 Q So, any accident involving a release greater than
17 that amount is not a designed bases accident. Is that right?

18 A (Witness Brunot) That's right.

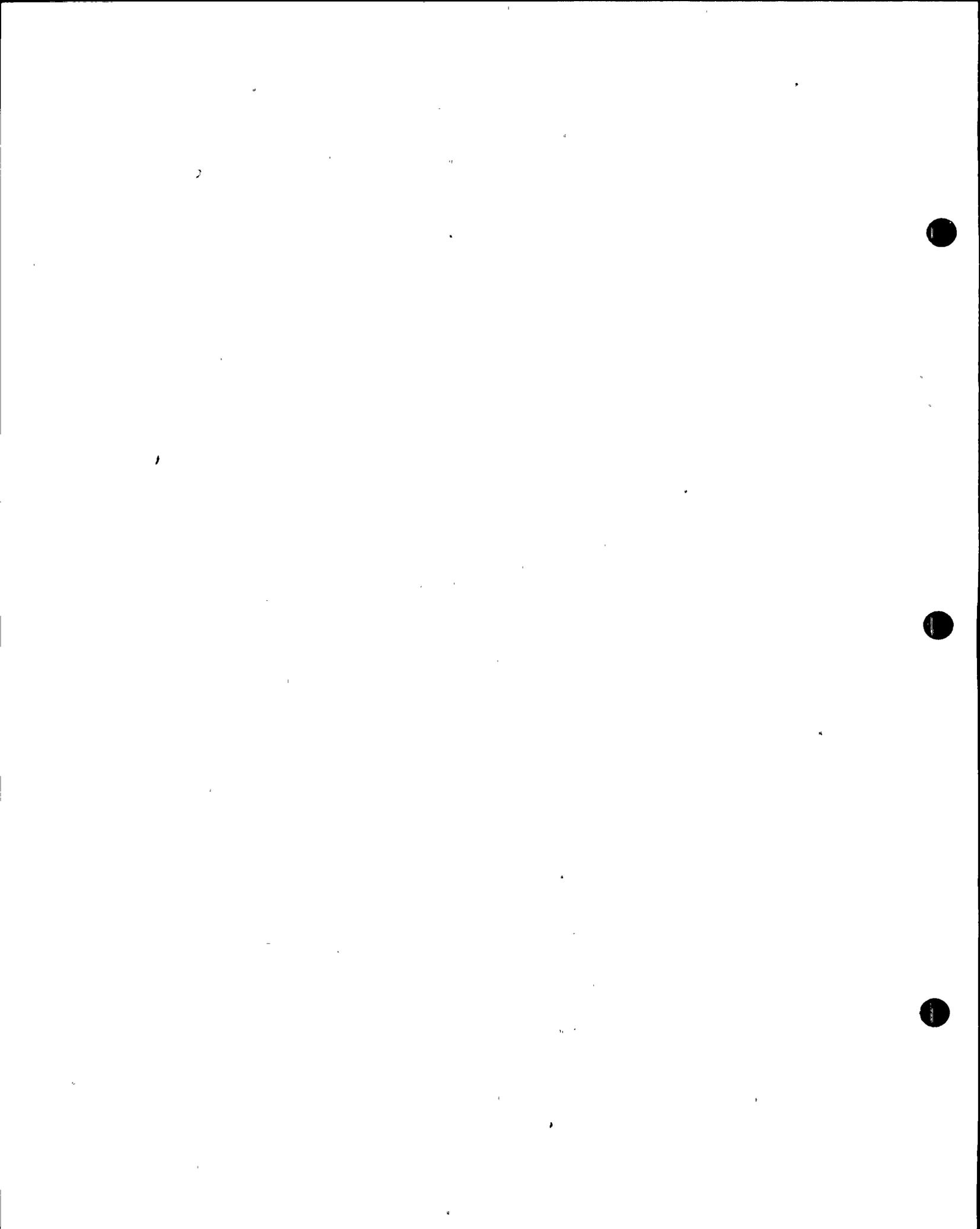
19 MR. NORTON: I think Dr. Brunot answered, but it
20 wasn't in the microphone. I don't know if you did get it.

21 MR. REYNOLDS: No, I'm sorry. I didn't hear it.

22 WITNESS BRUNOT: That's right.

23 MR. REYNOLDS: Thank you. I have no further
24 questions of this panel.

25 (Pause)



1 JUDGE WOLF: State of California is an interested
2 State. Governor Brown?

3 MR. LANPHER: Judge Wolf, I'm prepared to start
4 now. If the Board would prefer, if we're going to break soon,
5 it might be more expeditious to gather my notes together and
6 to be ready to go first thing in-the morning. Whatever the
7 Board prefers. You had mentioned earlier that we would stop
8 approximately five, but I don't know.

9 JUDGE WOLF: We've lost so much time. I think
10 we can go for a few minutes after five. I think it would
11 be worthwhile if you would proceed at this time.

12 MR. NORTON: Excuse me, Your Honor, Mr. Chairman.
13 I would like to make a correction for the record. I believe
14 this is the second time you've referred to Governor Brown as
15 the State of California.

16 JUDGE WOLF: I understand --

17 MR. NORTON: He is not the State of California.

18 JUDGE WOLF: I understand.

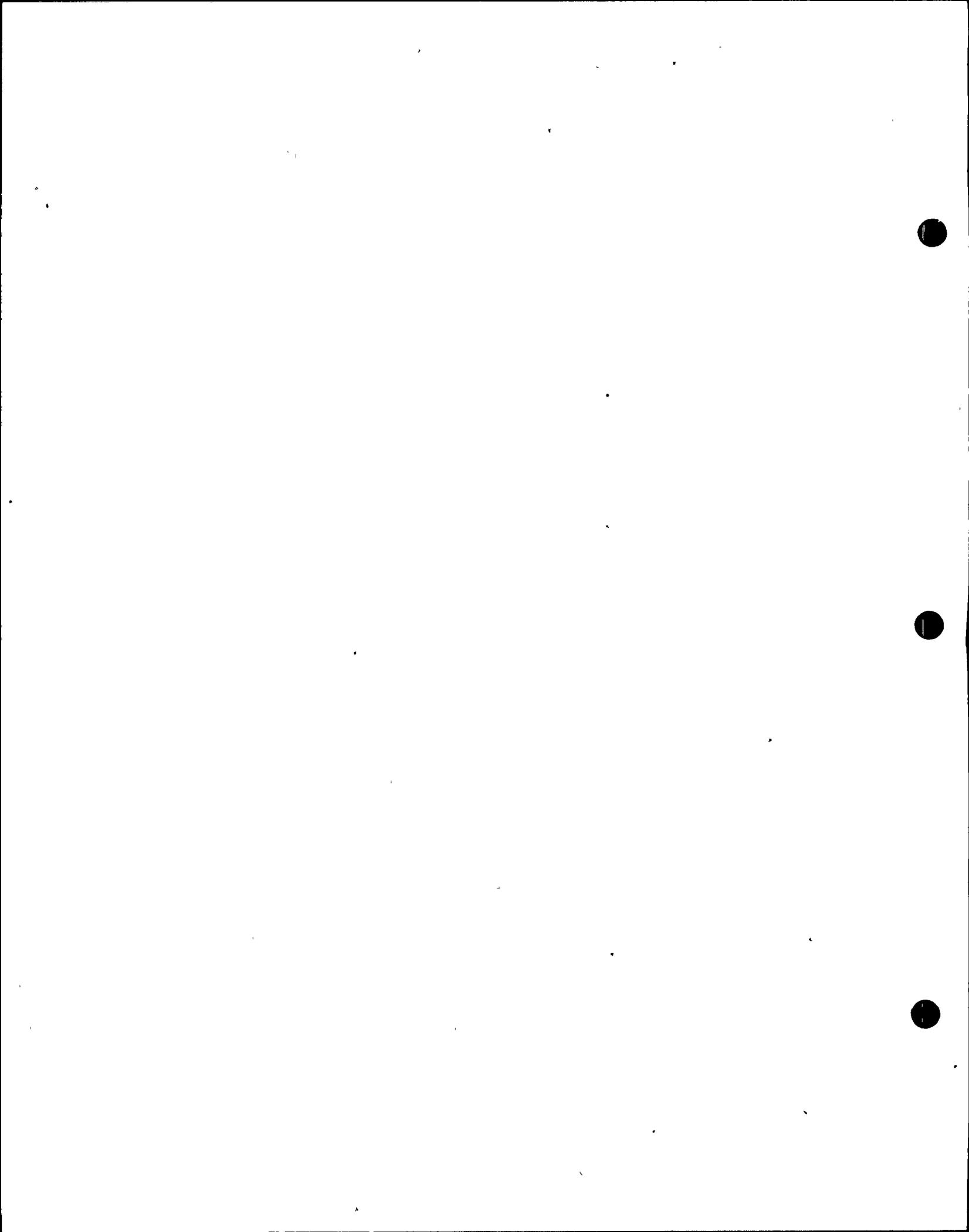
19 (Laughter)

20 MR. LANPHER: Judge Wolf, can I have just three
21 minutes to gather a few notes together?

22 JUDGE WOLF: Sure.

23 MR. LANPHER: First, my co-counsel wants to make
24 a comment.

25 MR. BROWN: I just have to, Judge Wolf, because



1 this repetitious childish remark continues to come back every
2 time Mr. Norton plays this same old matter. Governor Brown,
3 as everyone knows here is the Governor of the State of
4 California and as such, chief executive. He represents the
5 people and exercises the authority of that office.

6 (Wild applause and cheering)

7 JUDGE WOLF: Off the record.

8 (A brief recess)

9 JUDGE WOLF: On the record.

10 Are you ready, Mr. Lanpher?

11 MR. LANPHER: Yes, sir.

12 JUDGE WOLF: You may proceed.

13 CROSS EXAMINATION

14 BY MR. LANPHER:

15 Q Dr. Brunot, I'd like to start by addressing a
16 number of questions to you and to follow up on a couple of
17 matters that I was a little confused on from some of the
18 responses that you gave to Mr. Reynolds.

19 If you could turn to table one to your testimony.

20 A Yes, I have it.

21 Q Thank you. The first nuclide, the full power
22 equivalent cycle is 14.3 is listed there. That's the number.

23 I understand that to be 14.3 million curies. Is that correct?

24 A That's right.

25 Q You attempted to explain before and I didn't follow



1 how the curies times ten to the minus six which is referenced
2 above that can lead to that number being 14.3 million curies.
3 Can you explain that again for the record?

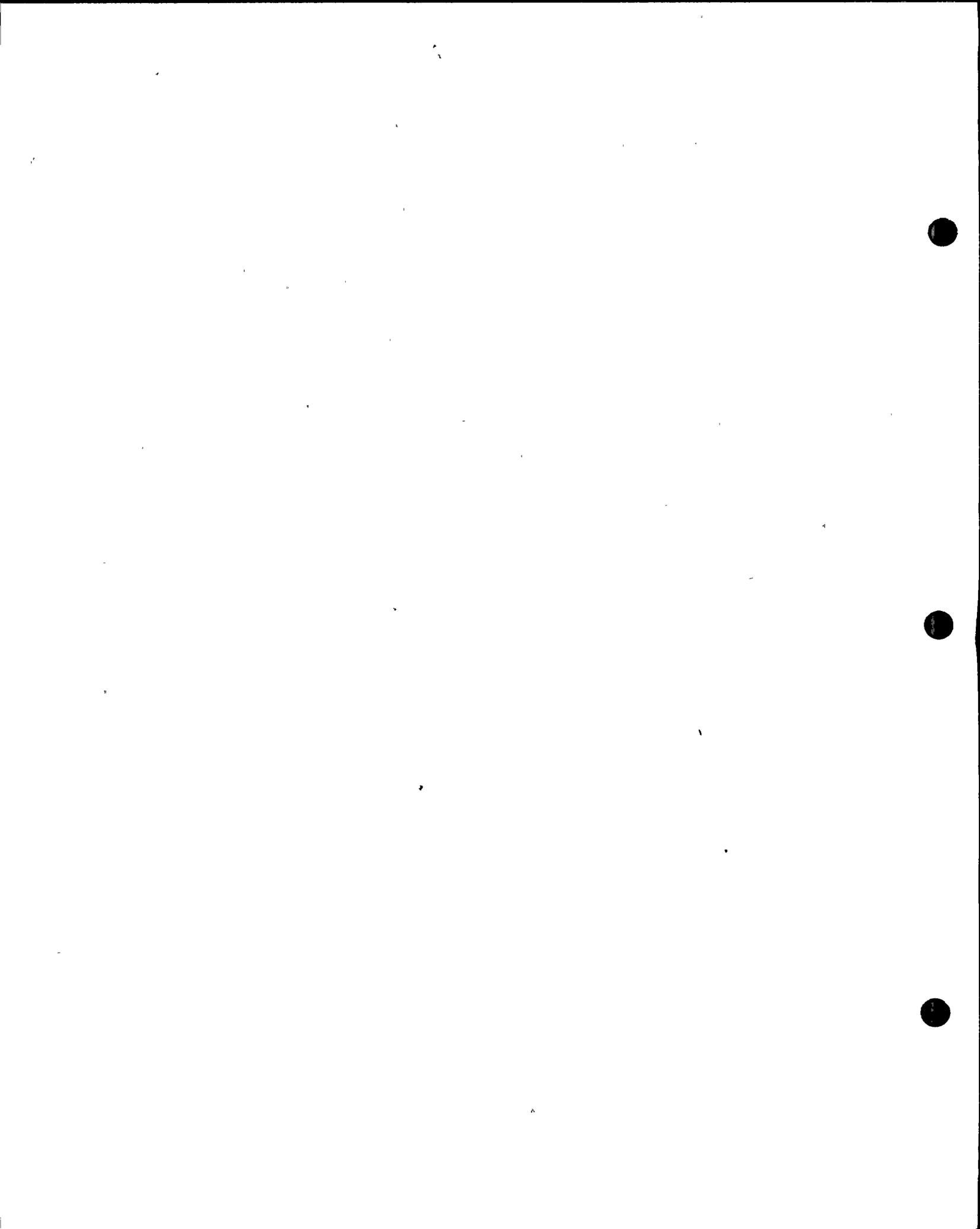
4 A Yes. The number -- The way to look at it is the
5 number that is in the column, 14.3, is equal to what is in
6 the parenthesis above. That is it is equal to curies times
7 ten to the minus six. Now, if you divide both sides of that
8 little equation by -- or rather multiply both sides by ten
9 to the sixth; on the right side you will have the number of
10 curies and on the left side of the equals, you'll have 14.3
11 times ten to the plus six.

12 As I said, numbers using these kinds of exponents
13 are tabulated both ways in texts books. Sometime the number
14 is the positive exponential is there and sometimes the
15 negative.

16 Q I think our confusion was that in the FSAR table
17 which you referenced at page four of your testimony, I believe
18 they used the positive exponential. Anyway to clarify all
19 of those numbers, for instance, the column under the full
20 power equivalent cycle under 14.3 and on down. Those are in
21 millions of curies, correct?

22 A That's right.

23 Q Thank you. Dr. Brunot, on page 9 in your testimony
24 you make the statement that the objectives of quote, unquote,
25 risk analysis and quote, unquote, safety analysis, are the



1 same. Could you describe what those objectives are?

2 A Yes, the objectives, in general, are to determine
3 how safe a particular facility or operation or machine is.
4 That's the general objective.

5 Q Fine. That was my understanding, also, but the
6 techniques for reaching the bottom-line conclusion that the
7 plant is going to operate within regulatory requirements is
8 somewhat different, aren't they?

9 A No.

10 Q When I speak about a risk analysis, hereafter, I
11 am going to talk about a probabilistic risk analysis. Okay?

12 A Okay.

13 Q And when we talk about safety analysis and we talk
14 about the kind of analysis which you have referenced in your
15 testimony, the Final Safety Analysis Report. When we speak
16 of a probabilistic risk analysis, we would be referring to
17 studies like WASH 1400. Would you agree?

18 A Yes. Since about 1974 and later, that term, has
19 been more widely used for the kinds of analysis that has
20 explicit probabilistic numbers in it.

21 Q And is it true that a study such as Wash 1400 which
22 we use as an example here would include both the vent tree
23 and fault tree analysis and also consequence modeling?

24 A Yes.

25 Q Is it also true that the purpose of that kind of



1 a probabilistic risk analysis is to come up with a risk factor
2 which roughly could be stated to be the probability of the
3 release times the probability of the consequences.. Is that
4 also true?

5 A Well, that's one of the purposes that that kind
6 of analysis could be done for. ---It's very often a purpose
7 to identify particular dominant sequences of particular
8 events. It has a number of purposes depending on what stage
9 of a project you use it in. It can be used as a design tool
10 or as an assessment tool after you're finished or that sort
11 of thing..

12 Q Indeed, you wouldn't have to perform, so to speak,
13 both sides of a probabilistic risk analysis? For instance,
14 if you were trying to find some dominant failure modes, you
15 could in fact just do ventry and fault tree analysis on the
16 failure side with respect to containment and other systems
17 within the reactor to try to find the dominant failure modes.
18 Is that correct?

19 A Well, if you're referring --

20 MR. LANPHER: Excuse me. Could we go off the
21 record for one second?

22 JUDGE WOLF: Yes. Off the record.

23 (Off the record.)

24 JUDGE WOLF: On the record.

25



1 BY MR. LANPHER:

2 Q Do you recall where we were?

3 A You were starting to say -- The question seemed
4 to be, couldn't you do the probabilities without the conse-
5 quences. Is that what you mean to say?

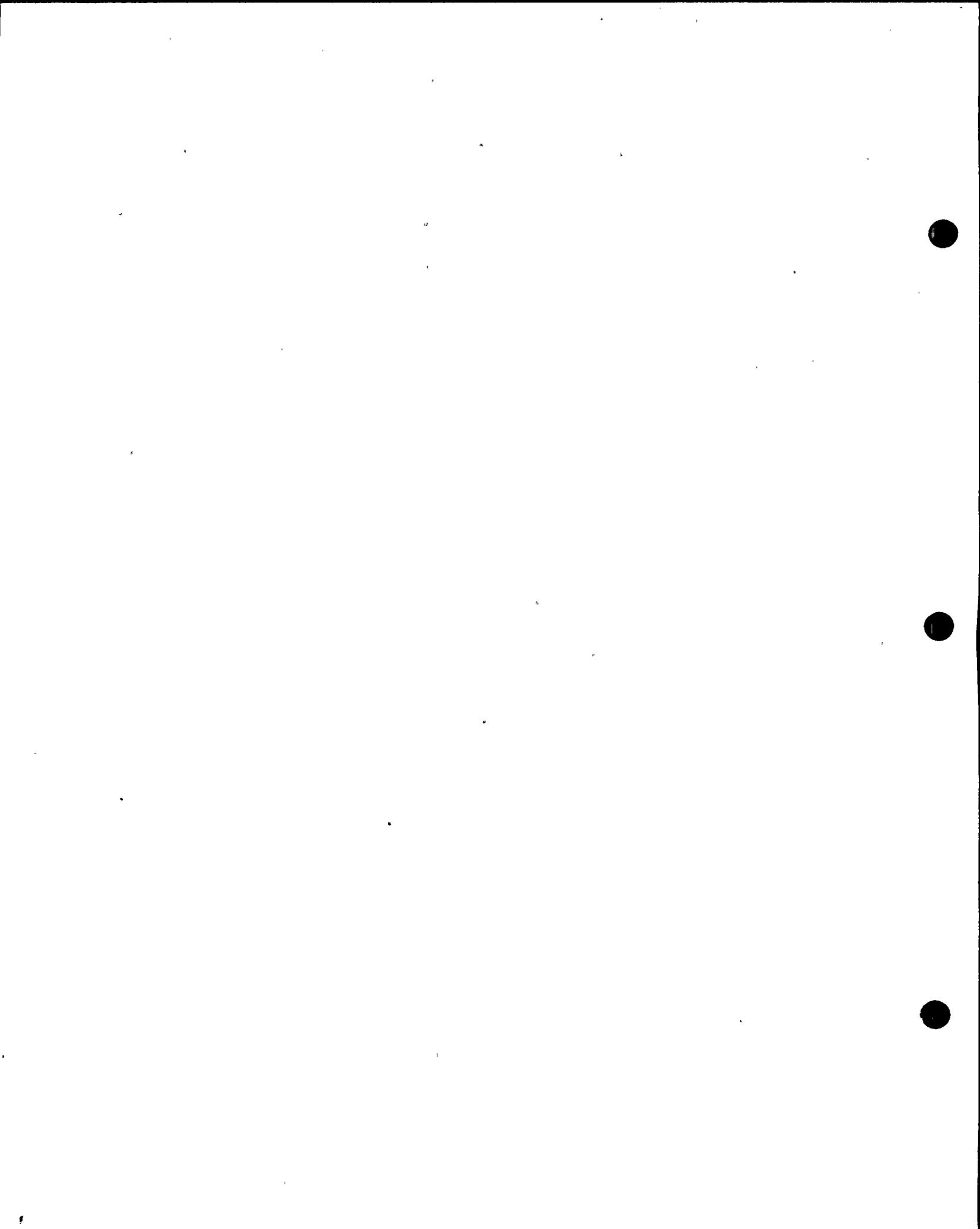
6 Q Well, depending on your purpose in performing the
7 task. If your purpose was to try to determine the dominant
8 failure modes of the particular system within your reactor
9 or your power plant, you wouldn't necessarily also have to
10 do the consequence modeling side.

11 A If you mean the consequence modeling to refer to
12 the off-site public consequences, that's correct. If you
13 mean the consequences to include the definition of events,
14 that you're concerned with, the answer is no.

15 Q Thank you for --

16 A You have to define events to get probabilities of
17 those events.

18 Q When I use consequence modeling, at that point
19 it's my understanding that the consequence modeling is
20 to take a release. You have found a failure mode by which
21 for instance containment is failed and you don't expect it to
22 happen, but there is a sequence of events, highly improbable,
23 containment fails and then the consequence modeling would be
24 to say so much gets out of the containment; what is the
25 consequence? Under certain wind conditions and sheltering



1 conditions and depending the heat of the plume and these
2 kinds of factors. Consequence modeling would be the predic-
3 tive tool to take that assumed release and to determine what
4 happens and the population factors and other things would be
5 taken into account.

6 A Yes.

7 Q Is that the way you understand consequence modeling?

8 A Yes, in that context, yes.

9 Q Earlier, you also said that one of the purposes
10 of probabilistic risk analysis was to try to determine the
11 dominant failure modes. Is that correct?

12 A Yes.

13 Q Has that kind of probabilistic risk analysis been
14 performed for Diablo Canyon Nuclear Power Plant?

15 A That kind of think in the Diablo Canyon Power
16 Plant is included in the report -- in partly in the report --
17 the Final Safety Analysis Report in a different way than it
18 is done today, meaning since 1974 or so. So, the answer is
19 yes, the dominant failure modes are identified and are studied
20 and modeled in the Final Safety Analysis Report. They are not
21 done expressed in the same way in terms of event and fault
22 trees that you'll see in a very recent probabilistic risk
23 analysis.

24 Now, there is one exception to that and that is
25 there is an amendment 52 to the final Safety Analysis Report



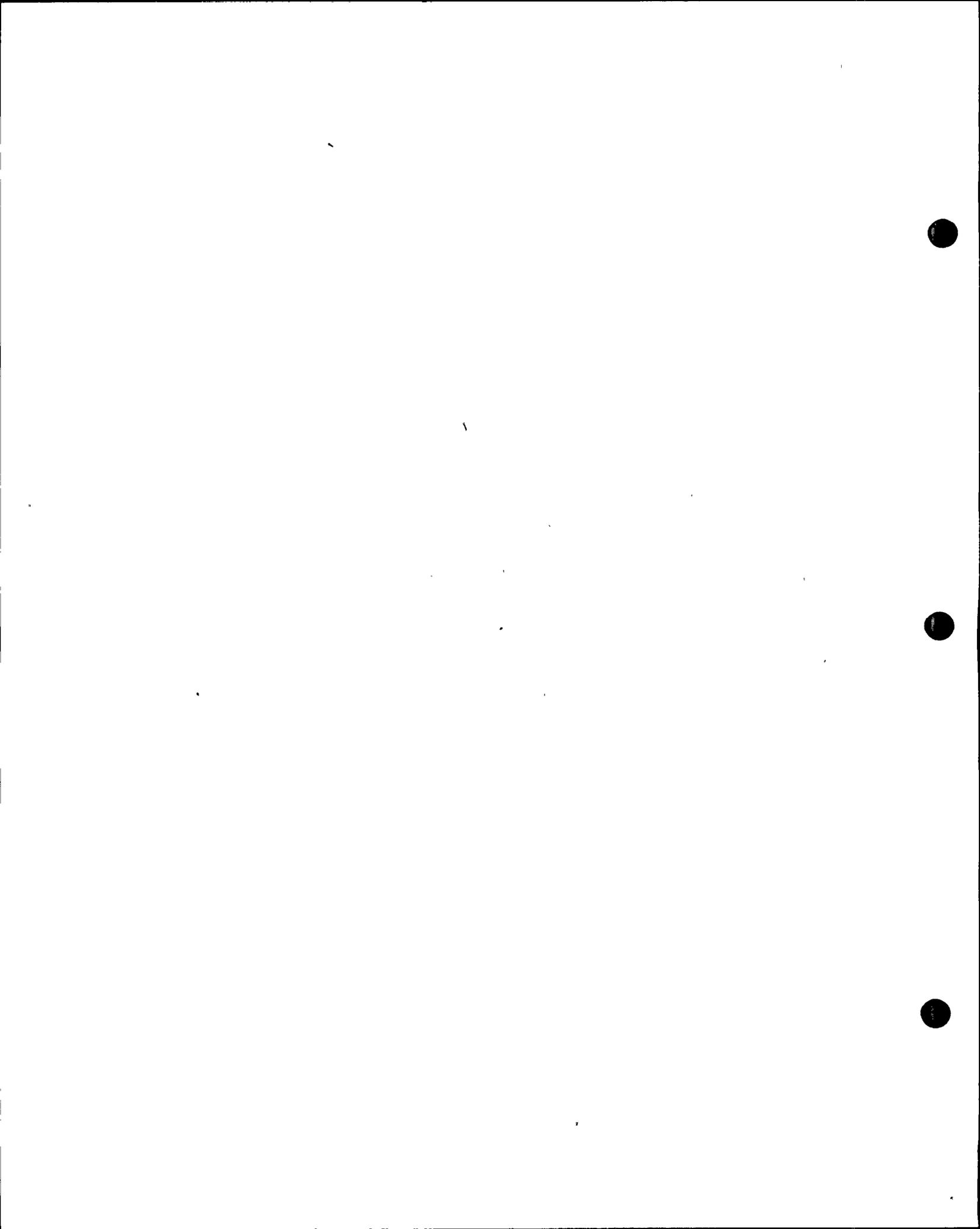
1 which considered seismic events and in that particular one,
2 that was a probabilistic risk analysis and that one did
3 use fault trees and event trees and that sort of things and
4 expressed the failure modes in that way.

5 Q To clarify amendment 52 to the FSAR, which I
6 believe you referenced in your testimony, that was for the
7 seismically induced accidents. Is that correct?

8 A Right.

9 Q You refer to a -- I don't recall exactly the
10 words that you used, but you referred to an earlier kind of
11 a safety analysis which was used prior to this amendment 52.
12 Would this be, to use the terms that you were describing
13 earlier with Mr. Reynolds, a more judgmental analysis of the
14 failure modes?

15 A No. Judgment is used in -- just as much in
16 probabilistic risk analysis in using that new term as it is
17 in the -- what you refer to as the earlier kind of analysis.
18 It's used in the safety analysis reports. The amount of
19 detail that is carried out in the safety analysis reports is
20 very much greater on most aspects of systems and components.
21 That is, all the descriptions of the components and the
22 systems are much more detailed. Their performances described
23 in terms of the full range of the performance parameters and
24 so forth, whereas there is a broader and less detailed look
25 taken in probabilistic safety analysis.



1 Q I think you've almost answered my next question,
2 because what I wanted you to do next was to distinguish
3 probabilistic risk analysis from safety analysis. They have
4 the same objectives, basically, to determine whether the
5 power plant can operate within regulatory requirements.

6 A I didn't answer yes to that. You didn't ask me
7 that.

8 Q I thought I had asked that and gotten an affirma-
9 tive answer earlier.

10 A No.

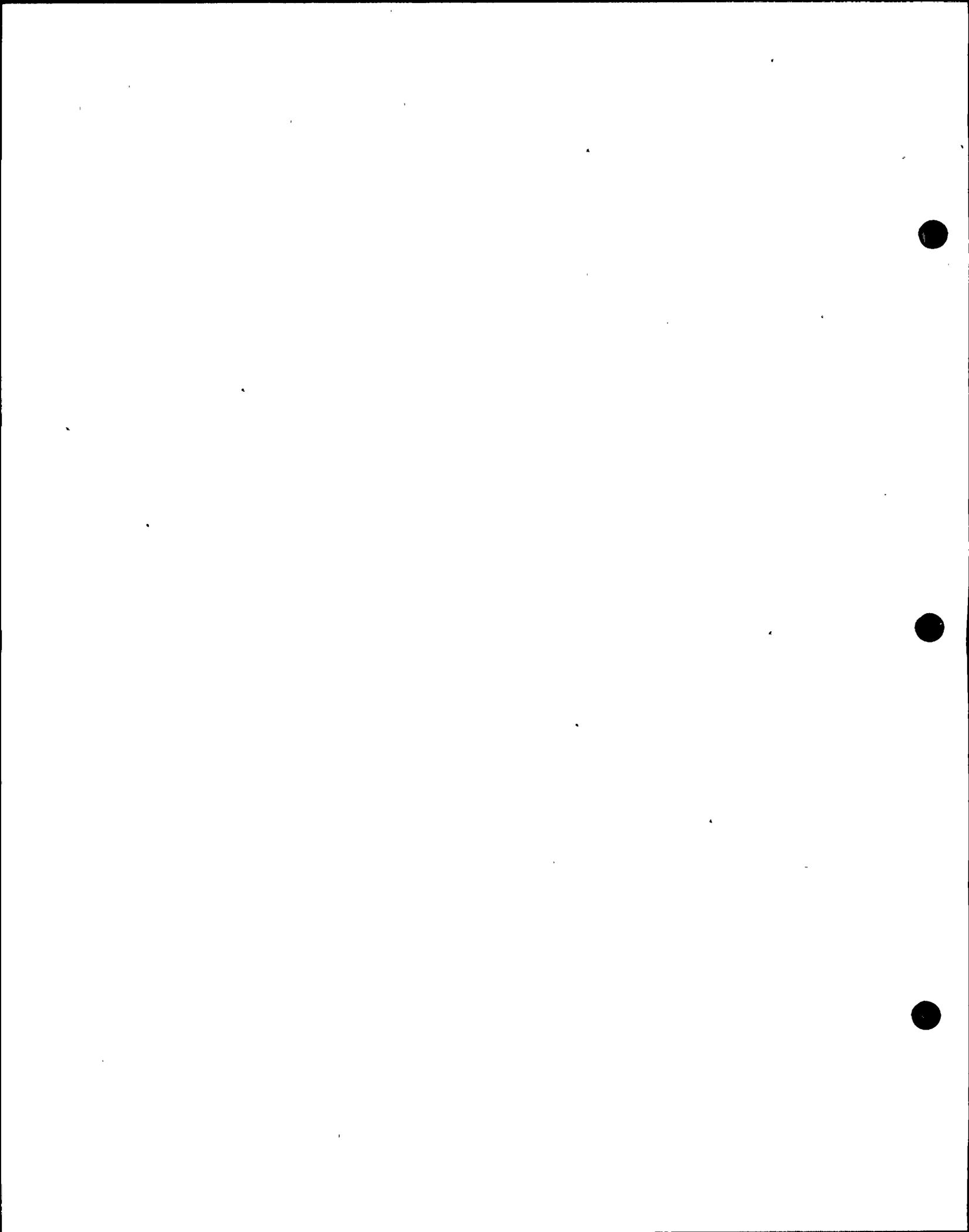
11 Q But you said earlier that they had basically the
12 same objectives. Right?

13 A Yes, but you went on to say what that objective
14 was and --

15 Q Please tell me how my characterization was in-
16 correct?

17 A Well, you said that they were both used to deter-
18 mine if the plant met some regulatory requirements and that's
19 not the case. What I said was the purpose, they were both
20 to determine how safe the plant is or was depending on what
21 stage they were done. At this time, probabilistic risk
22 analysis is not used for the majority. In fact, it's hardly
23 used at all, in the question of whether the plant meets
24 regulatory requirements.

25 Q In fact, the analysis that you would use to



1 demonstrate compliance with regulatory compliance would be
2 the safety analysis. Is that correct?

3 A That's right. Safety analysis in the narrow sense
4 of what was done in the final safety analysis report.

5 Q When we're referring to a safety analysis, this is
6 a deterministic approach, is it not? You take a failure and
7 then a second failure and seek to demonstrate that the plant
8 can comply with whatever requirements are applicable at that
9 point. Show it can come to safe shut down or whatever. Is
10 that correct?

11 A That's a point on which I personally differ from
12 people in the risk analysis field. Very often they make a
13 contrast by calling the safety analysis in the safety analysis
14 reports, deterministic and the newer kind of explicit risk
15 analysis probabilistic. There is in fact no dichotomy. There
16 is in fact no clear division between one kind and the other.

17 JUDGE WOLF: I'm sorry. We have about five more
18 minutes. Someone has this space beginning at five-thirty.
19 If you could wind up in that time, I would appreciate it.

20 MR. LANPHER: Judge Wolf, I think I'm at a con-
21 venient stopping point. I may have a couple of follow ques-
22 tions tomorrow morning. I just wanted to clarify in my own
23 mind the differences between risk and safety analysis and
24 I'm going to be going more directly to his testimony in the
25 morning.



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JUDGE WOLF: Very well, then, we'll adjourn until
nine a.m. to meet in this hall.

(Whereupon, at 5:05 p.m., the hearing was recessed
until 9:00 a.m. the following morning.)



This is to certify that the attached proceedings before the
Nuclear Regulatory Commission

in the matter of:

Date of Proceeding: May 19, 1981

Docket Number: 50-275/323

Place of Proceeding: San Luis Obispo, California

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

John V. Bowers

Official Reporter (Typed)

John V. Bowers

Official Reporter (Signature)

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