

# ORIGINAL

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NUCLEAR REGULATORY COMMISSION

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Committee on Reactor Safeguards

(Public Meeting)

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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PERIODIC MEETING WITH ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS

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Public Meeting

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

Thursday, July 11, 1985

The Commission met in public session, pursuant to  
notice, commencing at 9:30 o'clock a.m., Nunzio J. Palladino,  
Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

- Nunzio J. Palladino, Chairman
- James K. Asselstine, Commissioner
- Frederick M. Bernthal, Commissioner
- Lando W. Zech, Jr., Commissioner

## 1 STAFF AND PRESENTERS SEATED AT COMMISSION TABLE:

2 S. Chilk

3 M. Malsch

4 D. Ward

5 W. Kerr

6 C. Wylie

7 F. Remick

8 D. Okrent

9 H. Lewis

10 D. Moeller

11 J. Ebersole

12 H. Etherington

13 R. Axtmann

14 P. Shewmon

15 M. Carbon

16 C. Siess

17 G. Reed

18 C. Mark

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## P R O C E E D I N G S

CHAIRMAN PALLADINO: Good morning, ladies and gentlemen.

We have with us this morning members of the ACRS to brief the Commission on two subjects: ACRS activities related to consideration of seismic events and emergency planning, and then safety goals.

The discussion regarding emergency planning, seismic considerations had originally been scheduled for a previous meeting -- I believe it was the May meeting, but we did not get to it at that time.

With respect to considering seismic events in emergency planning, the Commission last met with the ACRS on this subject in October 1984.

Subsequently, on December 18th, 1984, the Commission issued a proposed rule. The proposed rule offered the opportunity for comment on the position of the majority of the Commission that earthquakes need not be considered in emergency planning.

Regarding safety goals, in early 1983 the Commission published a policy statement that contained provisional safety goals in numerical design objectives. The two-year evaluation period for this policy has recently expired, and the Commission is presently considering what, if any, revisions are necessary before issuing a final safety goal policy

1 statement and plan for implementation.

2 We look forward to our discussion with the ACRS.

3 But before turning the meeting over to the ACRS chairman, do  
4 any of my fellow Commissioners have any opening remarks?

5 COMMISSIONER ASSELSTINE: No.

6 COMMISSIONER BERNTHAL: No.

7 COMMISSIONER ZECH: No.

8 CHAIRMAN PALLADINO: Thank you.

9 Then let me turn the meeting over to Mr. Dave Ward.

10 MR. WARD: Thank you, Mr. Chairman. We also look  
11 forward to our discussions, and we will get right on with it.

12 Dade Moeller will take the lead on the seismic  
13 planning discussion, and David Okrent will take the lead on  
14 the quantitative safety goals. So I will ask Dr. Moeller to  
15 begin now.

16 MR. MOELLER: Thank you.

17 Over the past few months the ACRS Subcommittee on  
18 Reactor Radiological Effects and Onsite Evaluation have met  
19 with the NRC Staff, and we have met with representatives of  
20 FEMA, and then we have called in a number of consultants to  
21 discuss the subject of emergency planning as related to  
22 natural phenomena, and with a specific emphasis on  
23 earthquakes.

24 As a result of these discussions and deliberations,  
25 we have reached certain conclusions and want to share some of

1 those with you this morning.

2 The thoughts that I will be sharing with you will  
3 consist of conclusions that the subcommittee has reached, as  
4 well as conclusions that the committee in general has reached.

5 The conclusions that the committee as a whole  
6 reached were submitted or presented to you in our recent  
7 letter on that subject.

8 Our first conclusion was -- and this was in our  
9 letter -- we see no technical reason for the exclusion of  
10 earthquakes from the natural phenomena to be considered in  
11 offsite emergency planning for nuclear power plants.

12 Many natural phenomena, including hurricanes, floods  
13 and tornadoes, as well as earthquakes could impede the  
14 effectiveness of emergency response. Because the frequencies  
15 and severities of these events vary over a wide range from one  
16 geographic area to another, we believe that the degree to  
17 which these natural phenomena should be considered has to be  
18 plant-specific and site-specific.

19 Secondly, we believe that only limited consideration  
20 of earthquakes is appropriate.

21 Having said that they should be considered, we  
22 believe that only limited consideration is appropriate.

23 Consideration of the impact of natural events need  
24 not be elaborate, nor need it involve significant, if any,  
25 added cost. The major effort should be to become aware of the

1 problems and the alternative approaches for their resolution.

2 In some cases, such consideration may lead to a  
3 decision that no specific response or action is required. And  
4 I would emphasize that a key point is what is meant by  
5 consideration.

6 To us, the consideration of earthquakes does not  
7 mean that you must go out and strengthen all the bridges that  
8 might fail if an earthquake occurs; or it does not mean you  
9 must build alternate roads for evacuation in case the existing  
10 roads should be covered by landslides or so forth.

11 We believe, as I will point out in just a few  
12 minutes, that it mainly means evaluating what might disturb  
13 normal emergency response in case an earthquake occurred,  
14 either at some time close to the time of the accident.  
15 Because of the very low frequency of occurrence of many  
16 natural events, it may not be appropriate to impose major new  
17 requirements. And here is the point:

18 Rather, the goal should be to assure that emergency  
19 plans as developed contain sufficient flexibility to cope with  
20 the potential added impact of such events.

21 COMMISSIONER BERNTHAL: Did I hear you just say in  
22 case the earthquake occurs at some time close to the accident

23 MR. MOELLER: We considered in our thinking two  
24 possible scenarios, you might say. One was that the  
25 earthquake caused the accident, so it was the initiator. The

1 other was that an accident occurred and an earthquake happened  
2 to occur some time close to it.

3 COMMISSIONER BERNTHAL: Do we normally consider one  
4 in a hundred million events?

5 MR. MOELLER: Oh, the probability of that is  
6 extremely remote.

7 COMMISSIONER BERNTHAL: Miniscule. Then why are we  
8 talking about it?

9 MR. MOELLER: Well, certainly I, in speaking of it,  
10 did not mean that it had a probability of a sufficiently high  
11 nature that it should be considered. It is just simply one of  
12 the two potentialities that were in fact written in the  
13 Staff's material that was presented to us, and so we therefore  
14 --

15 COMMISSIONER BERNTHAL: I see. You don't  
16 necessarily agree that it's sufficiently probable, at least  
17 that particular case, that it deserves special consideration

18 MR. MOELLER: I personally do not.

19 COMMISSIONER BERNTHAL: Okay. Thank you.

20 MR. MOELLER: Going on. For example, for sites  
21 where an earthquake is capable of severely damaging emergency  
22 travel routes is sufficiently likely to occur, the local  
23 offsite authorities should have the benefit of studies  
24 indicating the types and potential locations of such damage.

25 The study of this kind that was performed for the

1 region surrounding the Diablo Canyon site appears to us  
2 sufficient to meet the need.

3 Thirdly, a review of the history of the NRC  
4 regulatory process shows that the potential impacts of  
5 earthquakes have for many years been given detailed  
6 consideration in the design, construction and operation of  
7 nuclear power plants.

8 And the same is true relative to emergency  
9 planning. Although FEMA does not consider the potential  
10 impacts of earthquakes on nuclear power plant emergency  
11 planning on a formal basis, the representatives with whom we  
12 met stated that for some time they had considered the impacts  
13 of earthquakes on an informal basis.

14 Examples of such considerations are the requirements  
15 for the development of multiple mechanisms for communication  
16 and for the identification of alternative routes for  
17 evacuation.

18 Fourthly, and this touches somewhat on Commissioner  
19 Bernthal's remarks, although it might be possible to rule out  
20 consideration of the impact of certain natural events, such as  
21 earthquakes on the basis of their very low probabilities, we  
22 believe that the wide range of uncertainties in such  
23 probabilities compromised this approach.

24 Now this was a subcommittee conclusion, not a Full  
25 Committee conclusion.

1           In addition, we were influenced by the fact, as you  
2 know, that PRAs for several nuclear power plants indicate that  
3 earthquakes, despite their low probability, may be significant  
4 contributors to the risk of core melt accidents, and that  
5 would be the earthquake as an initiator, not an earthquake at  
6 the same time.

7           The fifth item, we noted that FEMA is coordinating a  
8 national earthquake hazards reduction program --

9           COMMISSIONER ASSELSTINE: Let me stop you and ask  
10 you on that other point, the potential for the earthquake  
11 being a contributor or a cause of a problem in a plant. Is  
12 your concern only with a very large earthquake that would be  
13 larger than the safe shutdown earthquake? Or does that  
14 potential extend to lesser earthquakes, at least as far as you  
15 are considering it? Do you think the issue should be  
16 considered for emergency planning purposes?

17           MR. MOELLER: I would probably call upon other  
18 members of the committee to really respond to that, since  
19 there are others far more expert in that area than I.

20           COMMISSIONER ASSELSTINE: Well, you can defer it,  
21 then.

22           MR. OKRENT: Well, I will offer an opinion. The  
23 studies that I have seen to date suggest that at the SSE  
24 level, barring some really gross oversight, you do not expect  
25 serious trouble at the plant. It is for levels somewhat above



1 the safe shutdown earthquake that that question starts to  
2 begin to have a possibility of being considered.

3 COMMISSIONER BERNTHAL: It seems to me also -- I  
4 don't know whether you agree or not -- but it's also erroneous  
5 to attach a sharp cut-off kind of concern to SSE, that your  
6 concern goes up in some exponential proportion, I suspect, to  
7 the Richter scale event.

8 So if it is a 6.5 event on Diablo, you might have  
9 some minor concern. At 7.5 you begin to have concern. AT 8.5  
10 you are seriously concerned. And it is not like I'm concerned  
11 if it's more than 7.5 or .75 g, if you will -- I'm not  
12 concerned if it's .70. It seems to me that goes without  
13 saying.

14 MR. OKRENT: I think what you say is valid, both in  
15 the plant and offsite.

16 COMMISSIONER BERNTHAL: Certainly.

17 COMMISSIONER ASSELSTINE: There are certain trigger  
18 points in the emergency plans for different plants that  
19 require actions, emergency planning actions at certain  
20 levels. Why shouldn't you look at the complicating effects of  
21 earthquakes on emergency planning at those levels, quite apart  
22 from whether the event actually causes a radiological release  
23 from the plant? If in fact the emergency plan has been  
24 devised for the site, say, at certain levels, maybe the  
25 operating basis earthquake, for example, emergency planning



1 actions have to be taken, people have to get to the site,  
2 states and local governments have to activate their centers or  
3 make preparations to activate their centers.

4 Why shouldn't you look at the complicating effects  
5 of earthquakes on those kinds of arrangements that are  
6 specifically called for under the plans at those levels, quite  
7 apart from the concern about whether that event will actually  
8 trigger a radiological release?

9 MR. KERR: I guess I don't understand the question.  
10 Did the rest of you?

11 MR. MOELLER: Well, I think I do.

12 What you are saying is let's assume that a nuclear  
13 power plant is operating and an earthquake occurs which  
14 damages offsite bridges or landslides over the roads, but not  
15 enough to affect the nuclear power plant. And you are  
16 questioning should not at that point, since the normal  
17 emergency plan response could not be implemented in the normal  
18 manner, should you not take that into consideration?

19 COMMISSIONER ASSELSTINE: Yes. And in fact where  
20 the plant itself requires emergency actions.

21 For example, I understand that the Diablo plant  
22 requires that at the level of the operating basis earthquake,  
23 the plant has to be shut down, certain emergency actions have  
24 to be taken prior to licensing under the plan. If that's the  
25 case, why don't you have to ensure that those arrangements can

1 in fact take place, that they will occur? The plan is  
2 sufficiently flexible to permit those actions taking place as  
3 required under the plan.

4 MR. MOELLER: I presume that you would. I think  
5 what you are saying makes sense.

6 CHAIRMAN PALLADINO: Well, would you consider -- let  
7 me take a different situation. Let's assume you're in a part  
8 of the country where a severe snow storm happens once every  
9 275 years, with some uncertainty. Would you plan for or would  
10 you take that and the complicating effect in planning for  
11 emergencies under the circumstances you are talking about now

12 MR. MOELLER: My understanding is that unusual snow  
13 storms are taken into account in emergency planning. Whether  
14 a storm that occurs once every so many years, I would not  
15 know.

16 CHAIRMAN PALLADINO: Well, I don't think we take  
17 into account every situation in every part of the country.  
18 What I am getting at is that if you are going to make it  
19 site-specific, then you do look at the frequency of the event  
20 that you are considering, and there are some parts of the  
21 South that hardly ever see snow, and maybe there is one part  
22 there that hasn't had a severe snow storm in 275 years.

23 I am asking, would you protect in that situation?

24 MR. MOELLER: I can't answer for a certain number of  
25 years. But I do agree totally with you that hurricanes are

1 considered where they're likely to occur; major snow storms  
2 would be considered on the site.

3 CHAIRMAN PALLADINO: Well, what I'm getting at is  
4 the frequency that you expect the natural phenomena is a  
5 factor.

6 MR. MOELLER: Absolutely.

7 CHAIRMAN PALLADINO: And I would say, well, then, a  
8 similar factor would apply with regard to earthquakes? I mean  
9 not the same factor, but the same kind of consideration.

10 COMMISSIONER BERNTHAL: I'm not sure you all realize  
11 that you stepped into a simmering discussion left over from  
12 yesterday.

13 COMMISSIONER ASSELSTINE: Oh, I think they realize  
14 it.

15 [Laughter.]

16 COMMISSIONER BERNTHAL: We were subjected to the  
17 modern day equivalent of McCarthyism yesterday, directed at  
18 technology and those whose job it is to regulate technology.  
19 So that is what is going on here.

20 MR. MOELLER: Right.

21 CHAIRMAN PALLADINO: It may be a continuation of the  
22 same kind of thinking, but nevertheless I think it is  
23 pertinent to this discussion, the frequency of natural  
24 phenomena. It is important.

25 MR. EBERSOLE: Well, it seems to me that the

1 probability of ordinary injuries and hospital cases and need  
2 for ambulance services and some other things would transcend  
3 by far a consideration of the need to look at transportation  
4 difficulties in the course of earthquakes, even into large  
5 cities like Los Angeles.

6 I hear very little about this sort of thing being  
7 done. It seems to me we are beating a very small dog to death  
8 here.

9 MR. LEWIS: Well, the issue is, what fraction of the  
10 time and facilities that you need for normal emergency  
11 planning are out of service in an emergency action? That's a  
12 question you raised. What fraction of the time they're out of  
13 service and whether that's a big deal.

14 I don't think, you know, clearly if something is  
15 absolutely essential, that is different from when it is simply  
16 desirable. For example, you know, an aviation analogy, you  
17 fly twin-engine airplanes, and you like to have both engines,  
18 but that doesn't mean that when one engine is lost and you've  
19 lost your redundancy, you land instantly. You simply -- you  
20 have a reasonable chance of going on and completing your  
21 mission on the one engine.

22 And isn't that the case here? You don't want to  
23 shut down the plant when you lose your capability to do  
24 emergency planning on the chance that there may be core melt  
25 in the interim.

1           COMMISSIONER ASSELSTINE: I couldn't agree with you  
2 more, Hal, and, in fact, I agree very much with the comment  
3 that Dade raised, too, about the extent of consideration that  
4 this issue has to require. But I think there's a difference  
5 between saying, should we look, to a limited extent, to see  
6 whether the plans have sufficient flexibility, the very point  
7 you just raised, whether if communications are out for a very  
8 limited period of time, this is going to make any practical  
9 difficulty, or whether if a telephone line comes down, there's  
10 a radio that's available, or whether if one road happens to be  
11 impaired for some reason to a limited extent, there's another  
12 road that's available.

13           That, I think, is a different question, though, from  
14 saying, should we simply rule out any consideration at all,  
15 and under what circumstances do we have enough confidence that  
16 the uncertainties are sufficiently low for emergency planning  
17 purposes, recognizing that in essence that is the planning for  
18 improbably events, that we have sufficient confidence to say,  
19 "We don't even have to look at that, not to any extent, not to  
20 a limited extent, not at all."

21           I think that's really the heart of the question. I  
22 couldn't agree with you more. You don't shut down plants; you  
23 don't land airplanes or whatever when you have a limited  
24 impairment.

25           The question is, do you plan, though? Do you, for

1     example, thing in advance, what are my procedures if I lose an  
2     engine, and under what circumstances do I shut down? Do I try  
3     to land, or I continue to fly?

4             And I think that's closer to the analogy of  
5     emergency planning. What do you think about, in terms of the  
6     flexibility, and that's a different question from how much you  
7     have to give to the issue.

8             MR. LEWIS: I think that's what Dade said.

9             COMMISSIONER ASSELSTINE: I think that's exactly  
10     what Dade said, right.

11            CHAIRMAN PALLADINO: But again, I think the  
12     frequency of the postulated natural phenomenon is important.

13            MR. MOELLER: Absolutely.

14            COMMISSIONER BERNTHAL: I'd like to get beyond  
15     instincts and feelings and what seems to be reasonable and  
16     things like that, and ask whether you gave some serious  
17     thought to numbers and probabilities here and different types  
18     of natural phenomena, because, as you know, that is one of the  
19     considerations in the current, ongoing rulemaking? And the  
20     thought has occurred to me, as my colleagues know, that there  
21     really do seem to be two rather different types of events,  
22     distinguishable -- and easily distinguishable, I believe -- on  
23     the basis of numbers, not feelings, and those are tornados  
24     and earthquakes, because they are both random events with very  
25     severe consequences, but at very, very limited locations, a



1 very low probability at any given point.

2 And I'm just wondering if you gave any serious  
3 thought to the numbers that are associated with such things?

4 MR. OKRENT: May I offer an individual comment?

5 Except for a few of the old plants, tornado  
6 protection is supposed to have been provided, and it's  
7 supposed to have been provided such that an event which  
8 exceeded the protection provided should be a very  
9 low-probability event indeed.

10 The Staff has recently been modifying its  
11 requirements, and in the process, that probability may be  
12 increasing a little bit, but it is still, so far as I can  
13 tell, the experts say, a relatively low probability or  
14 frequency per year that a tornado would lead to a severe core  
15 damage accident, a lesser probability, except again for a  
16 limited number of plants, than an earthquake doing the same  
17 thing.

18 The earthquake likelihood of producing both a  
19 core-melt accident and possibly a release ends up for many -- I  
20 won't say all of the plants -- for which this kind of  
21 evaluation has been done in a PRA, to be in the same ballpark  
22 as other events which -- frequency-wise -- that might lead to  
23 a significant release.

24 So if you are going to think about emergency  
25 evacuation, the tornado, on the one hand, seems to be a lower

1 frequency event from the chance of it producing coremelt,  
2 although it may be a higher frequency event from the point of  
3 view of it hitting the site, in some size, let's say. Small  
4 earthquakes, of course, are all around us.

5 So I think the committee doesn't view the earthquake  
6 as being disconnected from the chance of coremelt.

7 On the other hand, we do think it is not a likely  
8 kind of accident, and I think what we try to say in our letter  
9 is that with some study of the surroundings, the local  
10 authorities would have this kind of information, and one could  
11 then anticipate, given an earthquake, it might be you'll have  
12 a landslide here or a bridge collapse there. You don't know,  
13 in fact, which way the earthquake is going to be coming from.  
14 You can't predict strictly what the damage will be. But at  
15 least the vulnerable -- the more vulnerable areas can have  
16 been identified, and the emergency people, the police or the  
17 sheriff, can say, "Well, if we need to evacuate, we'd better  
18 check by helicopter or whatever to see that that route is  
19 available, or call someone if the phone is up or whatever, so  
20 that we can alter the route that we would have taken."

21 And there can be some of that kind of pre-planning.

22 Now they are doing that kind of pre-planning on some  
23 scale for dam failures now in California, certainly. I don't  
24 know if FEMA requires it everywhere. They are trying to think  
25 about it in connection with certain other kinds of things that



1 might cause a need for evacuation.

2 A heavy rainstorm strikes me as something very  
3 different. It is very unlikely to cause a severe core  
4 accident. On the other hand, it might hamper evacuation if  
5 you need it.

6 COMMISSIONER BERNTHAL: And it's a much higher  
7 probability.

8 MR. OKRENT: It's a higher probability. So  
9 therefore when you are planning emergency evacuation, you say,  
10 well, you know, let's just say, since the chance is whatever  
11 it is, one in twenty or something depending on where you live  
12 -- in Florida, maybe more -- let's make sure we've thought  
13 about it in what we're doing, but not that it's something  
14 coupled to the event.

15 COMMISSIONER BERNTHAL: But it seems to me, I'm  
16 hearing everything you're saying and hearing very few numbers,  
17 which is the point I was making, and it seems to me that it's  
18 time to get this stuff on a rational basis, because I could as  
19 well suggest that on the coast of California, you really ought  
20 to be looking at flash floods coming down canyons and taking  
21 out bridges and the probability of that, which for flash flood  
22 type events on the West Coast, rains tend to be heavy and more  
23 sustained than they are, perhaps, in the Rocky Mountains or  
24 other such places.

25 But it just seems to me that there hasn't been a

1 very careful job done with the numbers on this thing. I'm not  
2 frankly sure that it's worth all the effort it might entail,  
3 but since this has aroused such controversy, it just may be  
4 that the effort needs to be made. And you've got tornados and,  
5 earthquakes, which seem to me, at least in terms of  
6 probability as events, the probability of severe damage at any  
7 given location being very low in those events, whereas  
8 normally in emergency planning, our benchmark has been to plan  
9 for the annual event or less, you know -- one-year, ten-year,  
10 whatever it is. I believe that's written down somewhere.

11 COMMISSIONER ASSELSTINE: I don't think that's  
12 right. I think that's inconsistent with what the Staff said  
13 in the July 5th memorandum.

14 COMMISSIONER BERNTHAL: Well, in any case, that is  
15 somewhere in the NRC history and lexicon. We tend to plan for  
16 things we reasonably expect to occur, not necessarily every  
17 year, but roughly annual events.

18 COMMISSIONER ASSELSTINE: I think that's wrong.

19 MR. KERR: In a sense, what we are planning for is  
20 an evacuation.

21 COMMISSIONER BERNTHAL: That's right.

22 MR. KERR: And an evacuation should occur, I think  
23 -- well, let me put it this way -- an evacuation is needed  
24 only if one has severe core damage accompanied by a  
25 significant release.

1 COMMISSIONER BERNTHAL: Well, we've already agreed,  
2 I think, that we're not talking about the random coincident  
3 event. I think we agree that that's such low probability that  
4 we normally don't worry about that.

5 MR. KERR: But if you look at the probability of  
6 severe core damage accompanied by significant release, what is  
7 the probability of the annual frequency? It's maybe 10 to the  
8 -5 per year, 10 to the -5 or 10 to the -6. So we are already  
9 doing emergency planning for something which we expect to have  
10 an extremely low frequency.

11 Now evacuation may occur more frequently than that.  
12 What I am asking is, when does one need it? One needs it if  
13 one has severe core damage followed by significant release.

14 COMMISSIONER ASSELSTINE: Bill, I guess I would  
15 disagree with that characterization of emergency planning. I  
16 don't think that emergency planning is just evacuation. I  
17 really think emergency planning is a full range of  
18 activities. In fact, I think we've tried to stress that on a  
19 number of occasions.

20 Ultimately, one of the things you may be most  
21 concerned about is a severe core damage accident with the  
22 release that would entail evacuation, or a situation in the  
23 plant that has that potential that would require the various  
24 preliminary steps to get ready for that kind of activity.

25 MR. KERR: The question was not when you would do

1 something. My question was, when do you need it? And you  
2 need it only if the thing occurred. You might evacuate, you  
3 might take precautionary actions, but you are really planning  
4 for an event whose occurrence you expect to be very, very low.

5 COMMISSIONER ASSELSTINE: I agree with you that that  
6 is a major element of concern, but I don't think -- that is  
7 when you need an evacuation; that is not necessarily when you  
8 need emergency planning. I think you may need emergency  
9 planning in a much broader range of situations.

10 MR. KERR: I'm not asking when you need emergency  
11 planning. I'm saying you are planning for an event which  
12 occurs, we think, on the average, about once every 10 to the  
13 -5 or once every 10 to the -6 years.

14 No how often you need to plan, how often you need to  
15 exercise, when you may exercise those plans is another  
16 question.

17 CHAIRMAN PALLADINO: I think Paul had a question.

18 MR. SHEWMON: Yes. I am some bothered by the fact  
19 that this discussion keeps talking about evacuation. I think  
20 there are some good studies which you can see which suggest  
21 that the best thing to do is to try to convince people they  
22 should stay inside instead of getting on crowded, deteriorated  
23 roads.

24 But the other thing, with regard to Bernthal's  
25 comment, the numbers you are seeking are around. I would urge

1     you not to push too hard for them or to believe them when you  
2     see them, because one argument on this earthquake problem that  
3     we devote a great deal of effort to is that the main reason  
4     that we have to devote effort to it is, is because the  
5     probabilities are so uncertain that you end up defending  
6     against the one end of the distribution, just because of your  
7     ignorance, and I think, as you know, when you start pushing on  
8     these, the problem of putting them out is, somebody might  
9     believe they have some meaning.

10                   [Laughter.]

11                   COMMISSIONER ASSELSTINE: Is it fair to say that  
12     what you really have is a sliding scale, without trying to  
13     attach numbers?

14                   If you had an initiator that had a high probability  
15     of causing the worst kind of accident, and it was a relatively  
16     frequent initiator, clearly you would want to study that in  
17     great detail and plan for it in very minute detail and  
18     thoroughly review it.

19                   If you have a situation where you have a relatively  
20     frequent event, but virtually no possibility of causing an  
21     accident, you would want to consider that because of the  
22     simultaneous independent accident plus the relatively frequent  
23     event.

24                   If you had a situation where you had a relatively  
25     infrequent event, but a high potential or a high risk that it

1 would cause a very serious accident, it seems to me you would  
2 want to consider that to at least a certain extent.

3 And then the last case where you have a low  
4 probability event and very little likelihood that it would  
5 cause a severe accident, those you would discount.

6 But that third category strikes me as the one where  
7 earthquakes fall -- fairly low probability, but the need to at  
8 least do some consideration because of the potential that it  
9 could be an accident initiator at the plant.

10 Am I wrong on that?

11 MR. KERR: I agree with you in principle, but one  
12 has to be careful, because as I've pointed out to some of my  
13 colleagues, that Lake Michigan contains enough water to drown  
14 everybody in the state of Michigan, and yet we don't really  
15 try to do much to protect against that.

16 You know it is a very high consequence accident, so  
17 one has to be -- even there, one has to exercise some caution.

18 COMMISSIONER ASSELSTINE: But if you add substantial  
19 uncertainty on the probability question of that event  
20 occurring, it seems to me that it's a matter of prudence that  
21 indicates that you want to at least take some look at it,  
22 maybe a limited look, maybe only to assure yourself that there  
23 is sufficient flexibility there to accommodate those kinds of  
24 problems.

25 MR. SHEWMON: I don't think there's any disagreement



1 with that.

2 CHAIRMAN PALLADINO: Let me ask a question. In  
3 considering natural phenomena and the impact of the natural  
4 phenomena on emergency planning, especially for a circumstance  
5 where there is some event at the plant, not radiological, for  
6 which you have to get people there, do we consider scrub  
7 fires, forest fires?

8 As a matter of fact, I just came back from  
9 California, and they're having a lot of them, and they seem to  
10 occur -- I don't know -- pretty frequently. In my lifetime, I  
11 have read a lot about them.

12 Is that considered in emergency planning? I mean,  
13 should it be? They extend for some duration of time, so the  
14 probability is better than an earthquake that they will  
15 encompass a period of time where you need to get something to  
16 the plant.

17 MR. SIESS: I suspect if you looked at it, you'd  
18 find that they are considered in California.

19 CHAIRMAN PALLADINO: In emergency planning?

20 MR. SIESS: I would think the FEMA people would do  
21 it. They would not in Illinois.

22 CHAIRMAN PALLADINO: I see. But do they --

23 MR. SIESS: I don't know. But I said, if you  
24 looked, I'll bet you they do.

25 COMMISSIONER ASSELSTINE: Or should be, if they

1       aren't.

2               MR. MOELLER: I can't cite a specific example, but I  
3       recall that brush fires have been considered for certain  
4       plants, yes.

5               COMMISSIONER BERNTHAL: It is an annual event in  
6       California.

7               MR. LEWIS: Well, I haven't been to California in  
8       two weeks, but my wife told me it is pretty bad around our  
9       house.

10              COMMISSIONER BERNTHAL: But that gets back to the  
11      point -- I am sorry to be unwilling to give up on data, and I  
12      think I have been in the business long enough that I have a  
13      healthy skepticism about numbers, especially when it is black  
14      art like seismic prediction -- but I just don't think,  
15      based, frankly, on a look at some of the numbers that this  
16      agency has adopted for tornadoes, for example, and some of the  
17      numbers that the experts even on tornadoes use, I just don't  
18      think there has been a very careful job done in doing a  
19      quantitative evaluation of the various natural phenomena,  
20      including brush fires, I am sure.

21              The argument we are in right now really comes down  
22      to a procedural argument, but I think that from the standpoint  
23      of the ACRS, it would be in my judgment maybe worthwhile to  
24      really try and do a more rigorous job in looking at some of  
25      these numbers.



1 I don't know whether that can be of assistance in  
2 the current rulemaking or not.

3 COMMISSIONER ASSELSTINE: Has the Committee looked  
4 at the Staff's July 5th memorandum or not? It is fairly  
5 recent, so I'm not sure you-all have seen it.

6 MR. WARD: No, we have not, unless some individual  
7 has.

8 CHAIRMAN PALLADINO: Which memorandum?

9 COMMISSIONER ASSELSTINE: Bill Dircks' July 5th  
10 memorandum to us. He has got some numbers in there. Perhaps  
11 it would be useful in connection with the earthquake and  
12 emergency planning rulemaking. The argument that the Staff  
13 seems to make is that the probabilities, to the extent that  
14 you can rely on the numerical probabilities for the  
15 earthquakes, even larger earthquakes above the SSE, are within  
16 range of the other occurrences that are routinely considered  
17 for emergency planning.

18 It might be useful for the Committee, if it hasn't  
19 done so, to the extent that it is going to pursue this issue,  
20 to look at the memorandum, look at the numbers and try and, I  
21 guess, address Commissioner Bernthal's question within the  
22 context of the numbers that are there.

23 But I guess I would also like to know whether your  
24 feeling is this should be based very heavily on that kind of  
25 probabilistic approach or whether one ought not to place very

1 heavy reliance on the numbers.

2 MR. LEWIS: Well, you know, just speaking for  
3 myself, obviously the numbers are important. You don't take  
4 into account -- for example, in the case of tornadoes, which I  
5 did look at a while back, we are talking about numbers which  
6 are comparable with the probability of the extinction of the  
7 Earth by the Nemesis star which has been postulated by  
8 people. That's the kind of thing we are talking about.

9 So if you look at the numbers, I just want to  
10 reemphasize what I think Paul Shewmon said a while back. You  
11 have to be very careful that -- in particular numbers provided  
12 by your Staff tend to be conservative numbers, and if you are  
13 trying to really make an estimate of whether something is  
14 important, you have to look a little bit beyond the numbers  
15 that you find in the normal NRC literature.

16 COMMISSIONER ASSELSTINE: The point that the Staff  
17 makes is that one of the issues they are having difficulty in  
18 grappling with is dealing with the question why emergency  
19 plans should not consider the complicating effects of very  
20 severe earthquakes, i.e., two to four times the safe shutdown  
21 earthquake, whose return frequency is  $10$  to the minus  $4$  to  $10$   
22 to the minus  $5$ , while current emergency plans concern  
23 themselves with plant accidents whose estimated return  
24 frequency are also in this range.

25 So that is at least one of the difficulties the

1 Staff is having.

2 COMMISSIONER BERNTHAL: Yes. I am trying to get  
3 away from the argument about earthquakes, and I hope it is not  
4 being lost here, Mr. Chairman. The request that I would  
5 suggest at least lodging with the ACRS is to support the  
6 Commission's decision to carry through with the generic  
7 rulemaking here, and to me a generic rulemaking means that we  
8 take a generic look at natural phenomena and try and get some  
9 sensible numbers for these things, and numbers that put things  
10 in the proper perspective by relating them to other natural  
11 phenomena that are equally improbable, perhaps.

12 I don't know whether those are brush fires or being  
13 hit on the head by a meteorite or what they are, but I think  
14 some sense needs to be made all of all this, and tornadoes  
15 comes to mind because when you look at the numbers in any  
16 detail at all, one becomes very suspicious about the overall  
17 treatment that has been made, particularly in some areas of  
18 the country.

19 But we have a generic rulemaking going on here, and  
20 it seems to me that it deserves a generic look.

21 COMMISSIONER ASSELSTINE: Well, that is a very  
22 different rule than the proposed rule. What you are talking  
23 about now is saying here is a numerical cut-off, and the rule  
24 would say whatever accident the initiator may be -- it could  
25 be natural phenomena, it could be any other accident initiator

1 -- below a certain probability you don't consider those at  
2 all.

3 But that is very different from what the Commission  
4 proposed in its proposed rule.

5 CHAIRMAN PALLADINO: But it is not outside the scope  
6 of the rulemaking.

7 COMMISSIONER ASSELSTINE: No, it's not.

8 CHAIRMAN PALLADINO: As a matter of fact, that is  
9 the kind of comment that we would look for, possibly.

10 MR. REMICK: For clarification, I ask is this the  
11 rulemaking that the Commission indicated it would do after its  
12 San Onofre decision?

13 COMMISSIONER BERNTHAL: It is out for public  
14 comment.

15 COMMISSIONER ASSELSTINE: It is the one the  
16 Commission did after the Diablo Canyon decision.

17 MR. REMICK: But it was the one that was discussed  
18 at the San Onofre --

19 COMMISSIONER ASSELSTINE: Yes, but that is  
20 different, I think, from what Commissioner Bernthal has just  
21 described. The issues are related, but --

22 CHAIRMAN PALLADINO: Well, there was a proposal in  
23 the rulemaking, but the proposal doesn't exclude other  
24 alternatives, and I think that is what Commissioner Bernthal  
25 is trying to explore, to try to get some data so we can put

1 the whole thing into perspective.

2 COMMISSIONER ASSELSTINE: But as I understand that  
3 proposal, it would be to say here is a standard that we will  
4 use to decide what accident initiators should and should not  
5 be considered. If you meet the standard for a given site, then  
6 you will examine those contributors, whether they be  
7 earthquakes or rain or hurricanes or fog or human error or  
8 equipment malfunction or whatever. You will consider those  
9 for that particular site if they fall within the bound.

10 MR. OKRENT: What is the date of the Diroks  
11 memorandum?

12 COMMISSIONER ASSELSTINE: July 5th.

13 CHAIRMAN PALLADINO: It doesn't have a lot of  
14 data. It has a couple of numbers.

15 MR. LEWIS: That was a Friday when no one was  
16 working.

17 COMMISSIONER BERNTHAL: It was a Friday when no one  
18 was working, and a few numbers in there also illustrate why  
19 one shouldn't always trust the Staff, but I won't go into  
20 that.

21 MR. OKRENT: How about the date? Was that accurate?

22 COMMISSIONER BERNTHAL: There is an interesting  
23 logical piece there that, nearly as I can tell, relates two  
24 things because they happen randomly to have similar numbers  
25 and for no other reason whatsoever that I can see.

1           MR. OKRENT: What I am getting at is since it was  
2 known that this was going to be a topic between the ACRS and  
3 the Commission, it would have been helpful --

4           COMMISSIONER ASSELSTINE: I'm sorry you didn't have  
5 it.

6           MR. WARD: Fred, I guess your concern is, given  
7 doubts about really getting quantitative about this sort of  
8 thing, you are concerned that there really isn't even a  
9 logical consistency.

10          COMMISSIONER BERNTHAL: No, I don't believe there is  
11 because there is no credible set of numbers. What does appear  
12 to be clear based on numbers is that at least two types of  
13 natural phenomena stand out as different from the others, just  
14 like being hit on the head by a meteorite stands out as being  
15 different from others.

16          But the fact is that I don't believe there has been  
17 a serious attempt to really quantify the probabilities of  
18 these different things. And I'm not saying that you look for  
19 a sharp cut-off, necessarily. It's your job, I guess, to make  
20 a suggestion. You probably recommend some sort of sliding  
21 scale of concern. But I don't think it has been a very good  
22 job generically on this issue.

23          MR. MARK: I am a little surprised at what you say,  
24 Fred. The earthquake numbers may be not very good numbers,  
25 but there has been millions of dollars spent in trying to get

1 numbers and to draw curves of earthquake frequency at various  
2 locations for every plant, and those numbers may not be worth  
3 the paper they are written on, but new ones wouldn't be  
4 either.

5 COMMISSIONER BERNTHAL: No, you are misunderstanding  
6 me. I am not suggesting that new numbers on earthquakes would  
7 be any better. The problem is that for this issue, this  
8 particular rulemaking on natural phenomena -- and I grant, as  
9 Jim suggests, I am extending the specific director of the  
10 rulemaking, which is toward earthquakes as a natural phenomena  
11 -- but if you look across the board and ask has there been a  
12 relative bordering or sense given to all natural phenomena,  
13 maybe earthquakes have been done as well today per se as they  
14 possibly can be, and in fact that was the basis of a recent  
15 Commission decision, but that doesn't answer the question of  
16 whether earthquakes have been placed in proper perspective  
17 relative to tornadoes, for example.

18 I won't approach the question of whether tornadoes  
19 and the NRC's treatment of those quantitatively is accurate or  
20 not. I suspect it is not as well studied as earthquakes. But  
21 then one gets to things like, well, what about brush fires?  
22 What about flash floods in certain areas? What about other  
23 natural phenomena? And where do they stand on the spectra of  
24 relative risk, and which ones of these deserve consideration  
25 for the country as a whole or for separate parts of the



1 country or whatever we happen to come up with?

2 MR. MARK: Well, I don't want to pretend the  
3 situation is good and clean and clear, but there has still a  
4 great deal of thought been put into massive rainstorms,  
5 hurricanes, and some of the things that one is used to  
6 seeing. About brush fires I suspect there is perhaps not as  
7 much known, and perhaps in none of these cases are actual  
8 solid, financially useful numbers available.

9 COMMISSIONER ASSELSTINE: It does seem to me that  
10 the point Commissioner Bernthal is raising, though, is sort of  
11 at the heart of consideration of which way we go if we go with  
12 the rule. The assumption, I think, that underlies the  
13 proposed rule that has been out for comment is that we know  
14 enough both about the absolute probabilities of earthquakes  
15 and tornadoes and the relative probabilities of those two  
16 natural phenomena as compared with other natural phenomena to  
17 say that these two should be excluded all together from any  
18 consideration as to their impact on emergency planning.

19 If you cannot say that, then another alternative may  
20 well be to address the kind of question that Commissioner  
21 Bernthal raised, which is is there some threshold for all  
22 phenomena that should be applied, recognizing that you are  
23 going to have to look at each site and decide which phenomena  
24 may meet the threshold or may not meet the threshold for that  
25 particular site. But I think that is a very different question



1       than was put forward in the proposed rule by the Commission.  
2       That was that we know enough both about the absolute  
3       probabilities and have sufficient confidence in them and their  
4       relation to other natural phenomena to say that the two can be  
5       ruled out all together for every site in the country.

6               CHAIRMAN PALLADINO: Chester Siess had a comment.

7               MR. SIESS: I would like to inject a note of  
8       cynicism. I think the Commission is overestimating the  
9       effectiveness of its policies or regulations on the actual  
10      effectiveness of offsite emergency preparedness or offsite  
11      emergency plans.

12              I don't care what you get written into those  
13      emergency plans; if the local officials really don't think it  
14      is going to happen, they are not going to be as prepared. I  
15      think the people out there, whether it is Illinois and  
16      tornadoes or California and brush fires, or California and  
17      earthquakes, know what their natural hazards are. They  
18      probably haven't got the slightest idea what 10 to the minus 5  
19      means, but they know what their natural hazards are, and those  
20      are the ones they are thinking about.

21              Now, you can't make them think about the others  
22      effectively. You can get something written in the plan, but  
23      they won't believe it. I have seen it in a number of other  
24      instances.

25              So the numbers I don't think mean a thing to them,

1 and I don't think your regulations are going to make that much  
2 difference when it really comes down to what they practice,  
3 what they plan, what they think about and what they worry  
4 about.

5 COMMISSIONER ASSELSTINE: That sounds more like the  
6 common sense approach which I think the Staff was taking in  
7 previous years.

8 MR. SIESS: Which is very difficult to take  
9 legally. Fortunately, I'm not in a position where I have to  
10 take it legally.

11 [Laughter]

12 COMMISSIONER ASSELSTINE: That is simply to say what  
13 is it that people recognize as a concern in this particular  
14 area and are the plans flexible enough, have people thought  
15 about the issue enough to be able to deal with it.

16 MR. WARD: Mr. Chairman, I would like to suggest  
17 that you can assume that the Committee will give some  
18 additional consideration to this. I think that there are some  
19 things, information we need to develop and discuss among  
20 ourselves.

21 I had hoped that we would be able to devote more  
22 than half the time to the second item on the agenda today.

23 I would suggest that we move on to that, if it is  
24 agreeable to you.

25 COMMISSIONER BERNTHAL: Let me just make a comment

1 about Carson's remark. If what you suggest is true, then it  
2 seems to me the job is easy. If there is a large body of data  
3 and numbers that just haven't been ranked and properly  
4 collated, then it's an easy job.

5 MR. MARK: Well, some are much better based than  
6 others. None are really well based.

7 COMMISSIONER BERNTHAL: Right. Okay.

8 COMMISSIONER ZECH: Mr. Chairman, if I may make one  
9 comment before you move on to the next subject.

10 First of all, I appreciate what the ACRS has done to  
11 date on this very important matter, and I hope that you will  
12 continue after you receive the Staff paper and other papers, I  
13 hope you will continue to give us some kind of a report or  
14 recommendation or some kind of a further review of this  
15 subject, because what you say does mean a lot to me.

16 I think we ought to take a common-sense approach to  
17 the whole subject. It seems to me that we are dealing with  
18 uncertainties and probabilities and statistics, that we can't  
19 really bet on 100 percent. But just because of that, I think  
20 it is important that we try to come up with the most  
21 reasonable, prudent and common-sense rule that we possibly  
22 can.

23 It may not be perfect, but I think it should at  
24 least satisfy most of us that it is the right thing to do. So  
25 what you come up with, I just want to say I will review, as I

1 have in the past, but I would like to get a further report  
2 from you, and I will review it very carefully, and it will be  
3 very meaningful to me.

4 COMMISSIONER ASSELSTINE: I again apologize that you  
5 all did not get the Staff's memorandum, but I would like to  
6 ask you to take a look at the alternatives that are described  
7 there. It sounds to me like the direction you are moving in  
8 is very close to the alternative that Mr. Diroks indicated he  
9 is thinking along the lines of. But I think that that would  
10 useful to look into.

11 COMMISSIONER ZECH: And just one last thought, if I  
12 may. You didn't tell us whether you had a unanimous vote on  
13 the ACRS, and perhaps that is not too important, but I know  
14 that there are diverse views. But it would seem to me that if  
15 you can, to pound out those views as best you can, to give us  
16 not only consensus but as close to unanimous as you can, even  
17 though recognizing that there are different points of view.  
18 I'd kind of appreciate knowing that we had a pretty strong  
19 consensus from the ACRS.

20 MR. WARD: Well, our letter of June 10th, of course,  
21 didn't address all of the issues discussed here today, but it  
22 was a strong consensus. There were no minority opinions and  
23 so forth.

24 COMMISSIONER ZECH: Oh. Well, that's good to know.

25 CHAIRMAN PALLADINO: Well, we will look forward to

1 the additional information you can provide us.

2 MR. WARD: Okay. Let's go on to the next topic,  
3 then, and I ask Dave Okrent to take the lead.

4 MR. OKRENT: Since I have the floor, I offer the  
5 last comment on the previous subject.

6 MR. WARD: Oh, you're out of order.

7 MR. OKRENT: My own opinion is that hurricanes and  
8 earthquakes are the two I would look at as having the  
9 potential for disrupting large areas from the evacuation point  
10 of view, and having the potential for being an initiator of an  
11 accident. For whatever that's worth. Rather than tornadoes.

12 The issue of safety goals. The committee has been  
13 reviewing this quite actively during the last two months and,  
14 in fact, had some meetings before then. It was relatively  
15 close to a committee position at the last ACRS meeting, but  
16 did not quite reach it, and what I will try to do today is  
17 speculate on what a committee position may be. Recognizing  
18 that as of now, I do not have a recommendation, or at least we  
19 don't have a copy of a recommendation from the EDO to you.

20 [Laughter.]

21 COMMISSIONER ASSELSTINE: I was wondering what your  
22 position was going to be based on.

23 MR. OKRENT: We have seen a draft, but they say that  
24 is strictly a draft and not to be viewed seriously.

25 MR. MARK: It's based on wisdom, uncorrupted by the



1 Staff position.

2 [Laughter.]

3 MR. OKRENT: We do have the benefit of various  
4 me: randa written by senior members of your staff, such as  
5 Mr. Denton, Mr. Minogue.

6 COMMISSIONER ASSELSTINE: That includes the June 12  
7 Denton memorandum?

8 MR. OKRENT: Yes. And, of course, the report of the  
9 safety goal steering group. And I should note that we at the  
10 subcommittee meeting yesterday -- in one case representatives  
11 came in and presented different points of view.

12 We also heard yesterday from Lester Lave, who I  
13 think is a well-known economist who consults both the NRC and  
14 the ACRS, and Prof. Douglas McClain from the University of  
15 Maryland, in the area of philosophy. They both were  
16 participants in the first and second panels reviewing NUREG  
17 0880 in its early formative years. So they are familiar with  
18 what the NRC has been going through in this. And I will come  
19 back to some of their comments in a minute.

20 Again, remember, I will be speculating, but in  
21 summary my guess is that the ACRS will say it thinks the NRC  
22 is not now ready to reaffirm and implement the 1983 safety  
23 goal policy in its original or some slightly modified form.

24 CHAIRMAN PALLADINO: Did you say the NRC or ACRS?

25 COMMISSIONER ASSELSTINE: The NRC is not.

1           MR. OKRENT: That the NRC, the Commission is not now  
2 ready. We believe progress has been made. The effort needs  
3 to continue. But the form of the goals and the plan for  
4 implementation are not yet well enough developed.

5           In part, this view I think arises from an ACRS  
6 examination of the situation, but I think in part -- and again  
7 now I'm speaking for myself -- if one looks at the very  
8 considerable differences that exist among members of your  
9 senior staff with the original proposal, one might use that to  
10 say you are not quite ready.

11           But the ACRS independently agrees.

12           COMMISSIONER BERNTHAL: That we are not ready?

13           MR. OKRENT: That you are not ready; right. I will  
14 go on.

15           COMMISSIONER BERNTHAL: We are very used to not  
16 being ready.

17           COMMISSIONER ASSELSTINE: Or we should not be ready.

18           MR. OKRENT: I anticipate now again that the  
19 committee will emphasize that greater attention be placed on  
20 working toward an adequate core melt objective. And by  
21 working toward, I mean working the reactors towards.

22           CHAIRMAN PALLADINO: What do you mean, a better core  
23 melt criteria? You mean like 10 to the minus --

24           MR. OKRENT: An adequate core melt objection. I'll  
25 come back to that.



1 CHAIRMAN PALLADINO: Oh. Okay.

2 MR. OKRENT: And the identification and use of a  
3 containment performance objective, and that the committee will  
4 be concerned that the safety policy statement doesn't give  
5 sufficient emphasis to defense-in-depth, and there is concern  
6 that inappropriate reliance maybe placed on benefit-cost  
7 analysis.

8 Now, again, I should note that if the committee  
9 writes a letter this meeting, it would be based on the  
10 information that it has now, and try to offer such advice as  
11 they can, expecting that we would offer comments again when it  
12 had the recommendations from the EDO.

13 CHAIRMAN PALLADINO: Why will the ACRS not wait for  
14 the Staff document on the safety goal?

15 MR. OKRENT: I think --

16 CHAIRMAN PALLADINO: Because I haven't seen the  
17 safety goal document. I have had briefings, we have had  
18 discussions, but I don't know where the Staff is going to  
19 finally come out.

20 MR. WARD: I think one reason that we expressed in  
21 our discussion prior to this meeting was that we think it  
22 might be useful for us to try try to influence the Staff  
23 document through a letter this month, or a report this month.  
24 That opinion is not unanimous among the committee members.

25 COMMISSIONER BERNTHAL: Yes. I want to support that

1 attitude. In fact, I want to commend you. I don't know  
2 whether it was your idea or ours, but you have come before us  
3 prior to meetings of the Full Committee and prior to coming  
4 down with the Full Committee recommendation and thinking on  
5 this matter, and in my judgment, that is the kind of thing  
6 that we need. And I certainly hope that we can continue a  
7 discussion here very candidly and, you know, we all get used  
8 to speaking on the record with a transcript, but that's okay,  
9 and get your views on this matter.

10 Part of the reason I would like to encourage you to  
11 go ahead independently, especially on one aspect of this, is  
12 that it is almost a matter of philosophy and, in fact, the  
13 stage is being set already by the media.

14 One of the newspapers a few weeks ago picked up in a  
15 very negative and highly partisan way, I would say, on the  
16 fact that an attempt is being made now finally, for the first  
17 time in this Administration, to reach some uniform consensus  
18 on risks and what Congress should ultimately accept and the  
19 country should be willing to accept in risks in all areas.

20 That was viewed as somehow being inappropriate and  
21 was viewed in a most negative way when, in fact, two members  
22 of the House of Representatives a couple of years ago  
23 introduced a bill -- Jim Martin, who is now governor of North  
24 Carolina and, as you know, a certified chemist, I believe was  
25 co-sponsor, along with Mr. Ritter, I think, of that bill,

1 where they attempted to approach the same question.

2 The first part of this question of safety goal  
3 should not in fact be the responsibility of the NRC. It is  
4 just that we are having to go ahead with it because Congress  
5 won't do it. That is a question of should we accept an  
6 additional tenth of a percent or 1 percent or whatever it is  
7 of risk associated with operation of nuclear power plants.  
8 That shouldn't be our judgment, that should be the Congress'  
9 judgment.

10 MR. KERR: For whatever it's worth, one of our  
11 consultants, when we were considering this question early on,  
12 said of course Congress should do this, but Congressmen are  
13 much too smart to get involved --

14 [Laughter.]

15 MR. KERR: And they are going to insist that the  
16 Commission do it.

17 COMMISSIONER BERNTHAL: Well, but there is hope  
18 because there was that introduction of the bill. And I don't  
19 know whether it cleared the committee. I don't think it  
20 cleared the full House, but there is hope, I think, that  
21 better heads may prevail and that there will be some  
22 uniformity and order in this process.

23 But, anyway, that's a long story, and I commend you  
24 for getting started early on it, because some of us, I don't  
25 think, need to wait for a Staff paper. Your thoughts are, if

1 anything, going to be equally as useful as the Staff's, if not  
2 more so in certain areas.

3 CHAIRMAN PALLADINO: Well, the reason I raised the  
4 question, we had been getting input from the ACRS periodically  
5 on this subject, and I thought the focal point was now to be  
6 the results of the implementation study. I would never deny  
7 the ACRS the opportunity or certainly the privilege of sending  
8 us information any time they have it, or even comments and  
9 opinions.

10 MR. WARD: Well, I think that was our original  
11 intent, but things have gotten a little more complicated than  
12 that. The Staff is obviously having difficulty pulling  
13 something together, so some of us at least think it would be  
14 useful for us to put in our advice.

15 Let me ask Forrest --

16 MR. REMICK: I would like to make a couple  
17 comments. I would like to emphasize that the committee really  
18 hasn't decided its position, and there are strong differing  
19 views, and I hope that the Committee does not come out with  
20 what we have just heard. They might.

21 I also question whether we should be writing you a  
22 letter at this meeting. I welcome the opportunity to give you  
23 our views here, but we are at the stage in my mind that there  
24 has been a two-year evaluation program and the Staff would  
25 evaluate that and provide their judgment to you. And it seems

1 to me at the moment we don't know what that is.

2 We do have this steering group report, and we could  
3 provide comments on that. We do not have the Staff's  
4 position. They came and they talked to us yesterday on what  
5 their thinking is, but we don't know what the target is to  
6 make comment.

7 It seems to me that if we take all these various  
8 things, including some of the consultants' comments that we  
9 might differ with, if we tried to write you a letter with all  
10 of our views and all of these possibilities, I think it's  
11 going to be very confusing at this stage.

12 My own personal preference would be to give you a  
13 letter when we know what has been recommended to you.

14 CHAIRMAN PALLADINO: Well, you will have to decide  
15 -- you will have to decide whether you are going to send us a  
16 letter or not. We always welcome advice from the ACRS. My  
17 question related to what I thought was the focus of the new  
18 effort, and that was the Staff's implementation plan.

19 COMMISSIONER BERNTHAL: I would like to talk about  
20 something today, though, in the time that remains on what your  
21 opinions are.

22 MR. OKRENT: Well, if I could have proceeded, I  
23 would have said --

24 [Laughter.]

25 MR. OKRENT: -- I would have said that in large part

1 we will comment on the safety goal steering group report, but  
2 we will bring in some aspects of the additional memoranda from  
3 Minogue or Denton and so forth.

4 But in the process we will be trying to formulate  
5 committee opinions. So with regard, in fact, to the safety  
6 goal steering group report, we agreed with many of the  
7 findings and conclusions.

8 In fact, we think that group deserves commendation  
9 for having come out with a fairly good product for such a  
10 difficult task, even though we are going to disagree here, at  
11 least tentatively with some of the things they have  
12 recommended.

13 But we agree with them, for example, that PRA  
14 methods and insights have been very valuable in prioritization  
15 and in development of regulatory positions on generic safety  
16 issues and on plant-specific safety issues.

17 And we agree with them that PRA has limitations that  
18 must be understood when the results are used, and that the  
19 results of a PRA should normally be used in conjunction with  
20 traditional safety review methods in making regulatory  
21 decisions.

22 We agree, at least tentatively, with them that the  
23 statement of the qualitative goals in the 1983 safety policy  
24 statement appears to be satisfactory.

25 There may be further ACRS discussion about the



1 concern raised by, for example, Mr. Denton's memo, and also  
2 earlier raised by Commissioner Asselstine about, does one's  
3 estimate of the likelihood of a core melt by the year 2000 or  
4 2020 have some special significance or warrant some special  
5 consideration?

6 The committee has not really addressed this yet, so  
7 I will just say that that is one of the topics it just hasn't  
8 addressed.

9 We agree with the Steering Committee that for sites  
10 where no people reside within a mile of the plant, for  
11 purposes of the calculation, ordinarily an individual should  
12 be assumed to reside at one mile from the site boundary, and  
13 in applying the latent cancer fatality safety goal, we agree  
14 with the Steering Group, it is better to consider the  
15 population within ten miles rather than fifty miles, as  
16 proposed in the 1983 policy statement.

17 We don't look upon this goal as a societal risk  
18 goal, the ACRS. It's really some kind of an individual risk  
19 goal. It averaged over fifty miles, now over ten miles, and  
20 as Mr. Denton said, perhaps if it's an individual risk goal,  
21 you should make it over one mile. That's something that the  
22 committee has not yet addressed for a final time.

23 The Steering Group proposed to use the general  
24 principle that no more than about ten percent of any  
25 quantitative design objective should be accounted for by a



1 single major issue or accident. We know that many other  
2 regulatory groups are using that approach.

3 On benefit/cost analysis, the Steering Group  
4 proposed that averted onsite costs in a coremelt accident  
5 should be included in benefit/cost analysis. Several senior  
6 Staff members have expressed concern that benefit/cost  
7 analysis performed under the 1983 safety policy statement will  
8 support only minor expenditures for reduction of coremelt  
9 frequencies, relatively large compared to 1 times 10 to the -4  
10 per reactor year, and that hence "defense in depth" was  
11 jeopardized.

12 They recognize that the inclusion of averted onsite  
13 costs and benefits is controversial, and in some cases  
14 suggested possible alternatives. And now I am being perhaps a  
15 little more speculative as to where the ACRS will come down,  
16 but certainly I expect the ACRS to state that the limitations  
17 of benefit/cost calculations are such that these calculations  
18 should not be the only, nor necessarily the most important  
19 criteria in decisionmaking concerning safety and the  
20 accomplishment of "defense in depth."

21 I am not sure whether the committee will make any  
22 recommendation on a specific recipe for cost/benefit  
23 analysis. I won't try to predict that.

24 I will note that at the subcommittee meeting  
25 yesterday, both Mr. Lave and Mr. McClain stated very

1 positively that the only way to do cost/benefit analysis  
2 analysis in their minds, if you do it, is to include all  
3 significant costs and all significant benefits, and that the  
4 1983 was deficient in that regard.

5 My personal opinion is that the majority, if not the  
6 bulk of the social science community would support that  
7 position. Certainly all that I know support that, the points  
8 of view that Mr. Lave and Mr. McClain expressed in that  
9 regard. They don't view that as exactly economic regulation,  
10 and we have their statements, by the way, if you would care to  
11 have copies of them, and we can make them available.

12 CHAIRMAN PALLADINO: Yes.

13 COMMISSIONER BERNTHAL: You might -- I don't know; I  
14 haven't thought this through very carefully, but it came up  
15 recently in the context of the severe accident policy. You  
16 might want to look, though -- I hate to say this -- you might  
17 want to get a lawyer and see how that approach squares with  
18 our mandate under the law, under the Atomic Energy Act.

19 MR. OKRENT: In fact, I invited a lawyer and a  
20 psychologist as well, but the lawyer was traveling -- they  
21 were both traveling. We invited people who had participated  
22 in the workshops on the 1983 safety -- well, on NUREG-0880, so  
23 that they had familiarity with the development. They weren't  
24 coming in cold.

25 It turned out, as I say -- Mr. Baron, who is the

1 lawyer, was traveling, and we couldn't get him.

2 CHAIRMAN PALLADINO: Have you looked into the  
3 industry point of view on this one?

4 MR. OKRENT: I am very conscious of the industry  
5 point of view. I don't think -- my recollection is that it's  
6 not unanimous, but there's a very large majority which has a  
7 direction which I would expect.

8 MR. REMICK: None of them came to address this  
9 yesterday.

10 CHAIRMAN PALLADINO: Are you talking about the  
11 industry?

12 MR. OKRENT: The industry.

13 CHAIRMAN PALLADINO: I am not sure that I would have  
14 necessarily expected it, but I will wait to see.

15 MR. OKRENT: But I think, my own opinion now is,  
16 industry may not be representative of the country, and the  
17 responses that you got may not be a representative sample of  
18 the country either. But that's a personal opinion.

19 CHAIRMAN PALLADINO: No. But I think understanding  
20 their rationale would be very important, because if they have  
21 a good one, it's worth considering, but if they don't, then we  
22 won't consider it.

23 MR. OKRENT: Well, again, one of the feelings I had  
24 was, we are engineers talking only to engineers in this  
25 building. In another life, I am forced to talk about people

1 in other parts of, let's say, the arts and sciences. And I  
2 find a very illuminating -- let me put it that way --  
3 perspective that I have to balance against the perspective  
4 that one gets around this table and the table downstairs.

5 MR. KERR: There is a viewpoint that cost/benefit  
6 analysis is immoral.

7 MR. OKRENT: In effect, one hears that one also.

8 COMMISSIONER BERNTHAL: That was the essence of the  
9 article that I referred to a bit earlier, and I think that the  
10 failure in the philosophy and the ethos, I guess, is to  
11 understand that you use dollars for want of a better  
12 normalization. There are other normalizations I'm sure one  
13 could use. You could choose to use life-shortening, I  
14 suppose.

15 MR. OKRENT: No, but there are people -- and I don't  
16 mean the Union of Concerned Scientists -- a large body of  
17 people who have written that you really should not use  
18 cost/benefit analysis of even decision analysis in arriving at  
19 this kind of decision, and there is a man named Lee Merkoffer,  
20 who wrote a rather interesting report on decision analysis  
21 methodology and devoted a whole chapter to all of the articles  
22 which say why you shouldn't use decision analysis.

23 COMMISSIONER BERNTHAL: Well, they are just arguing  
24 for ALARA basically, aren't they?

25 MR. OKRENT: I am saying there are differences of

1 opinion. But let me go on, because I'm getting more towards  
2 some important areas.

3 I expect that the committee will come up with a  
4 recommendation that the Commission, when it develops a new  
5 statement of safety policy -- that the Commission could state  
6 that near compliance or even better, with a mean core melt  
7 frequency of 10 to the -4 per reactor year, is an NRC  
8 objective for all but a few small existing reactors.

9 CHAIRMAN PALLADINO: I missed the sentence. Could  
10 you repeat it again?

11 MR. OKRENT: Yes. I expect that the committee may  
12 well recommend that the Commission should state its policy --  
13 is that near compliance with a mean core melt frequency of 10  
14 to the -4 per reactor year or better -- that means a lesser  
15 number -- is an NRC objective for all but a few small existing  
16 reactors, and that prudence will tend to take priority over  
17 benefit/cost analysis in working toward this goal.

18 Now this is not unlike the recommendations of  
19 Mr. Minogue. Mr. Denton went much further, I would say, in  
20 his memo. But this is something that has evolved within the  
21 committee. It's not a final -- again I'm speculating --

22 COMMISSIONER BERNTHAL: 10 to the -4, you said?

23 MR. OKRENT: A mean. 10 to the -4. I want to  
24 emphasize mean. And to go on --

25 COMMISSIONER ASSELSTINE: Well, the safety goal that

1 has been out is a median 10 to the -4, isn't it?

2 MR. OKRENT: Well, if I recall correctly, the safety  
3 goal just say 10 to the -4, and the Staff --

4 COMMISSIONER ASSELSTINE: Interpreted it as a  
5 median. Oh, that's right.

6 COMMISSIONER BERNTHAL: Let me make sure I  
7 understand what you're saying. You're saying that the  
8 committee is evolving toward that position, or am I --

9 MR. LEWIS: Well, you shouldn't take this quite so  
10 seriously. You know, Dave is reading from a draft letter that  
11 has not been approved by the committee, and will not in the  
12 form that he's reading it.

13 [Laughter.]

14 CHAIRMAN PALLADINO: We'll put you on notice, then.

15 MR. LEWIS: Well, you shouldn't quibble about the  
16 numbers.

17 COMMISSIONER BERNTHAL: Well, that's all right. But  
18 I will quibble about the principle, then. It's not a  
19 quibble. That's why I think this kind of exchange is useful.

20 isn't it true that Britain has sought to achieve a  
21 10 to the -6 core melt goal? Now I gather they are backing off  
22 from that and that Europeans in general have sought to achieve  
23 10 to the -5.

24 MR. OKRENT: I will come to that later in my  
25 comments.

1 COMMISSIONER BERNTHAL: All right.

2 MR. OKRENT: I'm sorry to have to use that line. I  
3 will rush through them quickly.

4 I already said that I expect the committee to  
5 recommend development of a containment performance guideline,  
6 and I will reiterate that.

7 I expect the committee to come down strongly that  
8 the Staff should not use median and should use mean values  
9 when it is assessing core melt frequencies or cost/benefit  
10 calculations. And Dr. Lewis will go further into that topic  
11 later.

12 COMMISSIONER BERNTHAL: Is the difference  
13 significant?

14 MR. OKRENT: I will let Dr. Lewis go into that  
15 topic, and I will try to stay very --

16 COMMISSIONER BERNTHAL: This is like the speech that  
17 never ended.

18 MR. OKRENT: The Steering Group of Safety Goals  
19 proposed a number of detailed implementation procedures. The  
20 committee believes that the operating limits proposed as  
21 professional guidelines are in some instances not sufficiently  
22 conservative and in some cases not clear. The committee has  
23 questions on these proposed operating limits and wants to  
24 discuss them in more detail with the Staff and recommends --  
25 and now I'm speculating -- that they not be adopted at this



1 time.

2 In a letter dated back on September 15, '82, the  
3 committee stated that mean -- median, rather -- should be  
4 used, and that an operational level for core melt of 10 to the  
5 -3 per reactor year is too large. That number reappears in  
6 this implementation as a median number. So that gives you an  
7 example of one of our difficulties. But it's not the only  
8 one.

9 I might note that if the Commission were to decide  
10 as a matter of policy that it would try to seek achieving a  
11 mean core melt frequency of 10 to the -4 per year or better for  
12 existing reactors, the systematic methodology to be used in  
13 review of various reactors as part of the severe accident  
14 policy might be a mechanism.

15 Now the committee, I expect, will give emphasis to  
16 the Commission's policy that future reactors be safer.

17 CHAIRMAN PALLADINO: What?

18 MR. OKRENT: That future reactors, reactors to be  
19 designed -- and, for example, in France, the stated safety  
20 objective is that the chance of serious release from all  
21 sources should be less than 10 to the -6 per reactor year.  
22 And during the course of the inquiry on Sizewell B in the  
23 United Kingdom, the Nuclear Installations Inspector has  
24 defined a similar goal, and the Italians have for their future  
25 plants.

1           CHAIRMAN PALLADINO: And what was the goal, aside  
2 from the number?

3           MR. OKRENT: 10 to the -6 per reactor year for a  
4 serious release.

5           CHAIRMAN PALLADINO: Oh, for a serious release.  
6 That is different, though, from a core melt.

7           MR. OKRENT: From containment.

8           CHAIRMAN PALLADINO: Yes. It's more like out  
9 limiting dose, in a sense.

10          MR. OKRENT: Now there was a time when the Sizewell  
11 was recommending 10 to the -6 for core melt, but I think they  
12 have gone to 10 to the -5 for core melt, as I think the  
13 Italians and, in fact, I think the ACRS may well recommend  
14 that for future reactors, reactors to be designed, that the  
15 target core melt frequency mean, again, be 10 to the -5 per  
16 reactor year.

17           I think that is probably enough speculation on my  
18 part.

19          MR. WARD: Thank you, Dave.

20           I think we have two or three other members who would  
21 like to comment.

22           Forrest, why don't I give you a chance first.

23          MR. REMICK: All right, fine.

24           The comment was made that defense in depth would be  
25 compromised. I personally do not see that because I think at

1     least in the study group they are recommending that the safety  
2     goals only be used in conjunction with normal judgment, and I  
3     think prudent normal judgment would maintain that defense in  
4     depth. So I don't see that argument, although I have heard  
5     it.

6             CHAIRMAN PALLADINO: This is the argument on using  
7     defense in depth in what way?

8             MR. REMICK: Well, that because of the fact of the  
9     benefit-cost, there would be some cases that perhaps you could  
10    not justify modifications which you would need for defense in  
11    depth, and I do not follow that argument unless you are going  
12    to use the safety goal as your only mode of decision making,  
13    and I do not foresee that, nor is it recommended to you.

14            As far as the two consultants, I don't differ with  
15    them from an economist's viewpoint of how you do a  
16    cost-benefit analysis. You look at all benefits and you look  
17    at all costs. But I don't think that is what we are  
18    considering here. This regards the question of whether the  
19    Commission has the authority or the mandate to get into  
20    averted costs to the licensee and so forth. It overlooks  
21    that. It is an idealistic view.

22            The question came up did we have any industry  
23    views. No, we only had views of two individuals and no views  
24    of those who might have opposing views to that, and there are  
25    some. I think the question of whether it amounts to economic

1 regulation or not is a red herring, and the question really is  
2 how far goes the authority and what mandate does the  
3 Commission have.

4 My own personal view is that the Atomic Energy Act  
5 says that you are to protect health and safety of the public.  
6 That is your primary function.

7 COMMISSIONER ASSELSTINE: It also says minimize  
8 danger to life and property.

9 MR. REMICK: Yes.

10 COMMISSIONER BERNTHAL: But we have never practiced  
11 that.

12 COMMISSIONER ASSELSTINE: That may mean we are not  
13 carrying out our statutory mandate.

14 COMMISSIONER BERNTHAL: Well, that is clearly ALARA,  
15 and ALARA has been manifestly rejected in most quarters by the  
16 Congress.

17 MR. WARD: Well, you haven't practiced that. I  
18 can't really agree with that.

19 COMMISSIONER BERNTHAL: Well, to minimize to me  
20 means ALARA, and the fact is the Congress in a number of forum  
21 -- and I haven't figured out yet what the plural of "forum"  
22 is, but many times has, I think, rejected the idea of ALARA  
23 now as being an impractical objective.

24 COMMISSIONER ASSELSTINE: Well, I am not aware of  
25 one.

1 COMMISSIONER BERNTHAL: Well, that was the old  
2 debate that I thought at least was partially settled by now.

3 MR. OKRENT: I believe the British policy is that a  
4 private company is responsible for safety to the extent that  
5 it should be as good as is practical.

6 MR. SIESS: Well, practical is an engineering term.

7 MR. OKRENT: Right, but they can be taken to court,  
8 for example, if they have not used something in that sense.

9 COMMISSIONER BERNTHAL: On the basis of practical.

10 MR. OKRENT: Yes.

11 COMMISSIONER BERNTHAL: They must have better courts  
12 than we do.

13 MR. OKRENT: They may.

14 CHAIRMAN PALLADINO: Well, why don't we let Forrest  
15 go ahead.

16 MR. REMICK: That's fine. I just wanted to give you  
17 some examples of where I would differ with what I believe  
18 Dave's personal views are, and I'm telling you what my  
19 personal views are. I don't think we have any Committee  
20 position on this.

21 MR. WARD: Dr. Lewis has something.

22 MR. LEWIS: I would appreciate a couple of minutes  
23 just to emphasize two points that have been brought up earlier  
24 which are issues of a little bit of contention. I think it is  
25 reasonable to speculate that there will be changes in the

1 numbers that Dave has spoken about -- I just want to say that  
2 again -- before you get a real letter from us.

3 The second point. A question has been raised as to  
4 why we should be talking to you now before the Staff comes in,  
5 and I just want to emphasize my strong view that we should.  
6 We have a responsibility to advise you, and in fact, I think  
7 that there are sufficiently severe problems within the Staff  
8 on dealing with some of these issues that I am about to talk  
9 about that unless we advise you now, it is guaranteed that  
10 there will be an even more difficult conversation later  
11 when you do get the Staff recommendations.

12 With that proviso, we have heard a great deal from  
13 the Staff, and I may still have 2-1/2 friends left and I am  
14 about to lose them.

15 CHAIRMAN PALLADINO: Where, on the Staff?

16 [Laughter.]

17 MR. LEWIS: No.

18 MR. WARD: I think you are optimistic.

19 MR. LEWIS: You are right, I may not lose any, and  
20 that is consistent with what I just said.

21 The Staff has had a great deal of trouble coming to  
22 grips with all the things that go with the questions of  
23 uncertainty which are bound up with the issue of the safety  
24 goal and with the adoption of the safety goal, and I don't  
25 think -- you know, it has been said before. I don't think you

1 are ready to issue a statement. That is quite clear. But I  
2 don't believe that the Staff is ready to make a recommendation  
3 to you on a statement to be issued because of these questions.

4 I will go through a couple of them very, very  
5 quickly.

6 The issue of uncertainty is absolutely bound up with  
7 how you interpret a goal. A goal has to be computed in a  
8 reasonable way, and reasonable is not a legal term, and then  
9 what you do with it has to be interpreted in a reasonable  
10 way. And at the Subcommittee meeting yesterday, we heard all  
11 sorts of views about the question of whether the goal is just  
12 something you look at, applaud at and pat yourself on the back  
13 and then put into a closet and go on about your normal  
14 business, or whether it is to be taken seriously in the  
15 regulatory process.

16 We heard such a divergence of views that it is,  
17 again, clear to me that the issue hasn't been grappled with  
18 sufficiently well. Perhaps it never can be, but you have to  
19 grapple with it; otherwise, this will all be an empty,  
20 time-wasting exercise.

21 And the safety goal is, in my personal view, part of  
22 a whole package that you are involved in which includes the  
23 backfitting rule and the severe policy statement, which is an  
24 effort to somehow limit the open-endedness of the regulatory  
25 process; and to treat the safety goal as if it is something to



1 be put onto a shelf is to abrogate that really laudable  
2 responsibility you have taken on, obviously, as you said,  
3 Fred, well ahead of the rest of the game, but that is the way  
4 it is with leadership.

5 But the question of uncertainty permeates it. I  
6 said yesterday for the record -- and I feel that way very  
7 strongly -- I regard it as a real disgrace that your Staff  
8 members come in still talking about medians after all the  
9 water that has gone over the bridge and under the dam, or  
10 maybe the reverse of that, on that subject.

11 There is absolutely no legitimate reason for people  
12 to be talking about medians if they are really talking about  
13 the probabilities of accidents. Obviously, if you know a  
14 distribution extremely well, you can define it in terms of the  
15 median, the mean, the 95 percent point or the 6.87 percent  
16 point. You can do that if you know it very well.

17 But the whole issue that you are dealing with, the  
18 great uncertainty in which you don't know these distributions  
19 very well, there is only one measure of a distribution that  
20 survives addition, and that is the mean. There is no other  
21 measure that does. And your Staff continues to come in  
22 talking about medians, although there has been notable  
23 progress. I regard it as really a disgrace that the issue  
24 didn't end when it was first brought up because I see no merit  
25 to continuing it.

1                   COMMISSIONER BERNTHAL: Could I ask a question? I  
2   am going to reveal my thorough ignorance, I'm afraid, but I  
3   am not sure what you are talking about when you talk about  
4   mean and median. With respect to what, is my question.  
5   Are we talking about the universe of reactors, and that for  
6   that universe of reactors, the calculated, if you wish, PRA  
7   core melt or something is on a distribution curve, and is it  
8   the mean and median, then, for that group that we are talking  
9   about, or am I talking about a calculated curve for a single  
10  reactor where you are defining a mathematical -- more  
11  mathematical, at least, if that is possible -- mean and  
12  median?

13                   I'm not sure what I'm talking about here.

14                   MR. LEWIS: Okay. Let me respond to that. First of  
15  all, I don't think mathematical is a dirty word. I don't  
16  think academic is dirty word, either. But that is, of course,  
17  a defect in me. No, we are talking about both, Fred. We are  
18  talking about both the distribution associated with the  
19  divergences among reactors, but we are also talking about  
20  uncertainties that come from genuine ignorance about  
21  individual reactor component failure probabilities,  
22  probabilities for particular containment disruption events,  
23  probabilities for all sorts of things in which there is no  
24  precision and there is a great deal of uncertainty.

25                   When all of these things are put together, they

1 produce a distribution of possible probabilities, and it is  
2 that distribution of possible probabilities, if you will  
3 forgive the term, on which we are talking about median versus  
4 mean. That's the issue.

5 COMMISSIONER BERNTHAL: But it would be an entirely  
6 different thing to demand that for a given reactor, you carry  
7 out a calculation and then put in all your uncertainties, and  
8 then you end up with some probability distribution and attach  
9 your safety goal for each and every reactor requiring that  
10 that be, let's say,  $10^{-4}$  for core melt, as  
11 opposed to saying that you are only going to demand that of  
12 the universe of reactors where some are going to be much  
13 better and some are going to be, presumably, considerably  
14 worse.

15 Which one are we talking about?

16 MR. LEWIS: We are talking about both because the  
17 issue of the distribution of probabilities arises within a  
18 given reactor both from a distribution of the quality of parts  
19 -- they come from different factories and things like that --  
20 and also from just plain ignorance, from the fact that we  
21 don't know things and have to estimate them.

22 In addition, you can convolute that with the  
23 distribution of reactors; and then the question of whether you  
24 apply a single criterion for the population of reactors or  
25 different criteria for individual ones is a regulatory issue,

1 not a probability issue.

2 COMMISSIONER BERNTHAL: I understand that, yes. But  
3 which should it be?

4 MR. LEWIS: What do you mean, which should you be  
5 dealing with? That is a regulatory issue.

6 COMMISSIONER BERNTHAL: I don't understand why you  
7 -- if you set a safety goal, it seems to me you require  
8 everybody to cross the goal.

9 CHAIRMAN PALLADINO: Well, you can define it as a  
10 safety goal where you say, look, just so long as the group on  
11 the average meets it.

12 COMMISSIONER BERNTHAL: How can you possibly do  
13 that, because that would mean accepting in principle 10 to  
14 the minus 1 for a given outlier reactor?

15 CHAIRMAN PALLADINO: Well, I would put some bounds  
16 on it anyhow, but it depends on what you are seeking. But if  
17 you are seeking freedom from pollution, it is the average that  
18 may be the right one.

19 COMMISSIONER BERNTHAL: Well, sure.

20 MR. LEWIS: Well, this isn't entirely pertinent,  
21 although you will have to grapple with it.

22 CHAIRMAN PALLADINO: But is there that much  
23 difference between the median and the mean?

24 MR. LEWIS: I am coming to that. Allow me to come  
25 to that. As Dave said, had I been allowed to continue --

1 [Laughter]

2 COMMISSIONER ASSELSTINE: Oh, please continue.

3 MR. LEWIS: Yes, there is. There is a big  
4 difference. And these things we have just been talking about  
5 are extremely interesting and I will be happy to talk to you  
6 about them privately or publicly anytime because they are  
7 important. They go to the question of how you set a safety  
8 goal in the face of the inevitable uncertainty.

9 Now, the difference between median and mean. There  
10 seems to be a widespread impression in your Staff that there  
11 is a factor of 3 difference between the median and the mean.  
12 I have no idea where that came from, but it is absolutely  
13 widespread, and you referred earlier, Jim, to I think Harold  
14 Denton's June 12th letter. It suffers from that defect because  
15 although it is laudable in the sense that it recommends going  
16 to medians, in the first paragraph it calculates --

17 MR. WARD: You misspoke.

18 COMMISSIONER ASSELSTINE: It recommends going to  
19 means.

20 MR. LEWIS: Oh, gosh. One day in this building does  
21 that to me.

22 [Laughter]

23 But it recommends going to the means, and that is  
24 absolutely laudable, but in the first paragraph, there is  
25 quoted a median core melt probability, and then the

1     caloulation of the probability that there will be one or more  
2     than one core melt event. I had trouble following that  
3     calculation until I realized that what he had done was to  
4     multiply the median by 3 and then calculate it as if it were  
5     the mean, and that is a widespread misapprehension.

6             The difference between the median and the mean  
7     depends on the shape of the distribution. If you follow the  
8     normal practice around here, which has no basis for it, of  
9     assuming that all distributions are log normal, then I can  
10    give you some numbers. I can tell you that if the log normal  
11    standard deviations are plus or minus a factor of 4, then  
12    indeed you do get a factor of 3 between median and mean. If  
13    they are plus or minus a factor of 10, you get a factor of 14  
14    between median and mean.

15            It really depends on the distribution. So to state  
16    a median and translate it to a mean suggests that you know the  
17    distribution, which in very few cases do you know.

18            Now, I have to say that one of your Staff people  
19    yesterday, who was defending the median, said that it is a  
20    better measure because it is independent of the width of the  
21    distribution, and that is simply not true.

22            MR. WARD: I think you meant defending the median.

23            MR. LEWIS: Defending the median. Am I doing this  
24    constantly? Well, I'm just trying to defend the issue.

25            MR. WARD: No, just every now and then.



1 MR. LEWIS: Well, three times and I am out.

2 He was defending the median and said that the median  
3 was independent of the width of distribution. That's simply  
4 not true. And I mention this not to castigate him but to say  
5 that your Staff has yet to come to real grips with this issue.

6 The question came up yesterday, one of my old  
7 favorites, of whether your one-tenth of one percent is meant  
8 to be changed as the rate of cancer in the normal population  
9 changes, and one of your Staff people said yes. I said, well,  
10 as the population ages and more of us begin to die of cancer,  
11 are we going to relax nuclear regulation? The answer I got  
12 was yes, and that means again that you don't have it in the  
13 pocket there.

14 I'm not going to go into great details, but again,  
15 in Harold's letter of June 12th he recommends a factor of 10  
16 reduction in the core melt objective. He doesn't say whether  
17 he means median or mean, and it is not all that clear what it  
18 is, and it could be a very big difference.

19 CHAIRMAN PALLADINO: But I thought his difference  
20 was based on whatever you met before, he wants to go 10  
21 lower.

22 MR. LEWIS: Well, of course, one didn't know what  
23 one met before. I believe that you should instruct your  
24 Staff -- I will make one constructive comment. You should  
25 instruct your Staff not to come to you with any number that



1 doesn't specify whether it is a median or a mean. It seems  
2 like a simple enough requirement, and you haven't got it yet.

3 COMMISSIONER BERNTHAL: Let me ask one additional  
4 question.

5 MR. LEWIS: I am finished.

6 COMMISSIONER BERNTHAL: I guess I am skeptical that  
7 with the kind of errors we typically talk about in this  
8 business, or uncertainty is a better word, which tend to run  
9 into orders of magnitude rather than factors of 3, who cares?  
10 A factor of 3 is lost in the weeds, it seems to me.

11 MR. LEWIS: Not at all. Not if you specify it as a  
12 safety goal it's not lost at all. I must say I agree with you  
13 that there are uncertainties on the order of a factor of 10,  
14 but that is no excuse for not doing things logically.

15 COMMISSIONER BERNTHAL: Okay. Well, I don't  
16 disagree with that.

17 MR. LEWIS: But in fact, just these orders of  
18 magnitude of uncertainty are what you have to deal with if you  
19 decide how to use a safety goal. They are there. They are not  
20 going to be erased.

21 COMMISSIONER BERNTHAL: They are in the curve, true.

22 MR. WARD: I guess I would just like to say one  
23 thing, although I think Dave may have mentioned it. I think  
24 the developing consensus of the committee is expressed in the  
25 draft letter from last month. I think it is accurate to say

1 we think that the implementation plan is not ready to be  
2 used. But I wouldn't want to that be misinterpreted. I think  
3 we do believe that a lot of progress has been made, and we  
4 continue to believe that it's very important the effort be  
5 continued.

6 And I think we retain the expectation that something  
7 practical is going to come out of this. So I don't want the  
8 whole tone of this to be discouraging as far as the concept of  
9 the safety goal.

10 MR. LEWIS: I agree with that.

11 CHAIRMAN PALLADINO: You are basing your statement  
12 they are not ready on the steering group report?

13 MR. WARD: No.

14 CHAIRMAN PALLADINO: Well, you don't have the other  
15 one. I don't know how you could base it --

16 MR. WARD: That's right. Well, we based it last  
17 month on the steering group report.

18 CHAIRMAN PALLADINO: You see, what I'm worried about  
19 if you say that, well, they might agree with you and say, oh,  
20 yeah, you're right, we had better not get anything out right  
21 now, and I think we would lose something if they didn't at  
22 least cope with the issue at the present time.

23 COMMISSIONER ASSELSTINE: The sense I was getting,  
24 though, was that it was not just the steering group's report,  
25 but the various viewpoints that seemed to be held within

1 various quarters of the Staff about there are some fundamental  
2 questions about the elements of the goal.

3 MR. KERR: It seems to me that the committee is  
4 taking a bit of a risk in writing at this point, and they  
5 might make a mistake. But we have talked about this, whether  
6 we should write now, and as has been pointed out, it is not  
7 unanimous. But several of us -- and I am one of them -- think  
8 that our concerns that we have, we would hope you would listen  
9 to and profit from our comments. And they are real  
10 fundamental issues.

11 CHAIRMAN PALLADINO: I wasn't arguing that you  
12 shouldn't write a letter. I said your statement about whether  
13 we are ready or not is based on the steering group report.

14 MR. KERR: But it is also based on extrapolation of  
15 where we think the Staff now finds itself.

16 MR. SIESS: To say you are not ready to issue a  
17 final policy statement is not saying that you are not ready to  
18 go ahead with work on the safety goal. And if we say that you  
19 are not ready for a policy statement, that really doesn't tell  
20 the Staff to quit. I hope not.

21 CHAIRMAN PALLADINO: Well, that's what I hope.

22 MR. WARD: No, that's the point I was trying to  
23 make.

24 CHAIRMAN PALLADINO: Yes, it's based on their  
25 present state of knowledge, and they may come up with some gem

1       between now and then.

2               MR. WARD: This is a pioneering effort. It is  
3       complex.

4               MR. LEWIS: I want to support that very strongly.  
5       All my negative comments were not meant to stop doing it. I  
6       think it would be absolutely magnificent if this agency took  
7       the leadership in actually coming to grips with the question  
8       of quantitative goals and with the uncertainties of how to  
9       feed them into decisionmaking. It would be magnificent.

10              COMMISSIONER BERNTHAL: I'm glad you said that,  
11       because for all the brickbats this agency takes that people  
12       tend to forget whether it has been the Price Anderson, I think  
13       coming to be landmark legislation, or whether its consistent  
14       analysis of risk in pioneering that effort and now the safety  
15       goal issue, or even whether it's the widespread use of what  
16       amounts to scientific courts in our hearing process, we don't  
17       get the credit we deserve in this agency. And I say we. For  
18       those of us who are contemporaries for the last 20 or 30  
19       years. This agency has pointed the way in many of these areas  
20       and yet many folks in this city fail to recognize that, as we  
21       learned again yesterday.

22              MR. WARD: I am glad to hear you say that, Fred. I  
23       certainly agree with it.

24              COMMISSIONER ASSELSTINE: I think Carson has a  
25       comment.

1           MR. MARK: I was hoping to address the question on a  
2 slightly different matter to Dr. Palladino. We hear a lot  
3 about cost-benefit analysis. We find many times written down  
4 a change will be made if it is cost effective. Let's stretch  
5 the imagination and suppose you have a really good  
6 cost-benefit estimate and you are inclined to believe that the  
7 estimate was done right. That is perhaps asking quite a bit.

8           But to what extent under such conditions do the  
9 Commissioners or you, Mr. Chairman, regard yourself as bound  
10 to either act or not act according to the value of this  
11 cost-benefit analysis? Is it only one of the things which you  
12 feel needs to be looked at? And you are perfectly free to say  
13 it says it isn't worth it, but in my bones I am darned sure it  
14 is so I'm going to say yes.

15           CHAIRMAN PALLADINO: Well, I always reserve the  
16 right to use my deep instinct and not be bound by a  
17 cost-benefit analysis. But it is one factor.

18           However, I haven't seen one yet that on which I had  
19 to make a decision.

20           COMMISSIONER ASSELSTINE: Carson, I would also say  
21 that that is at the heart of the question of what to do about  
22 the backfitting rule. Do you adopt a rule that says -- and  
23 this will have to be your basis, and that's one of the  
24 potential pitfalls of a very strict rule that ties everyone's  
25 hands.

1 MR. WARD: Joe, could you clarify "you haven't seen  
2 one yet"?

3 CHAIRMAN PALLADINO: Oh, I haven't been confronted  
4 with a cost-benefit situation where I say, well, by golly, now  
5 I've got to make a decision whether it's cost effective.

6 COMMISSIONER BERNTHAL: I think that's true, except  
7 in the broadest sense.

8 MR. WARD: Oh, you mean there's never been an issue  
9 where the cost-benefit analysis was pivotal?

10 CHAIRMAN PALLADINO: We talk a lot about  
11 cost-benefit analysis, but we haven't faced the decision where  
12 they say, well, now, our deterministic approach says we ought  
13 to move on this side of the issue, our cost-benefit says we  
14 ought to move on that side of that issue, and we had to weight  
15 them.

16 I don't think I have even had a good cost-benefit  
17 that came into the equation except in general terms.

18 COMMISSIONER ASSELSTINE: I do seem to remember,  
19 though, the case of the PORV on CE plants where I think your  
20 intuitive judgment was that that is something that should be  
21 there, but the cost-benefit analysis went the other way.

22 MR. WARD: But the Commission would only postpone  
23 the decision, only to accept a delay in a final decision. But  
24 that's the one I was thinking of, too.

25 COMMISSIONER BERNTHAL: That's right, that's



1       probably the only case, certainly, that's been in my  
2       experience.

3               MR. OKRENT: Well, first, let me note that this  
4       question of the status of the safety goal thing, the words  
5       that I had were that the NRC is not ready to reaffirm and  
6       implement the 1983 safety goal policy statement in its  
7       original or even some slightly modified form. That leaves  
8       room for a modification, in other words.

9               As you say, EDO may come up with a formula that in  
10       fact keeps everybody convinced. I do want to note that if you  
11       read what your own senior staff are writing, I think you can  
12       sense a rather deep sense of disquiet with what the situation  
13       would be if the 1983 safety goal policy were to be retained  
14       with the cost-benefit calculation as so defined.

15              And I think that's what you see in Mr. Minogue's and  
16       Mr. Denton's and Mr. Ernst's and, in fact, in the steering  
17       group's report, for different reasons, sometimes, but  
18       nevertheless similar.

19              In fact, I have that same feeling. I guess in a  
20       sense I am the one who pushed the ACRS to recommending to the  
21       Commission that they institute this and they prepare a  
22       proposal, and I must say if I thought the 1983 policy were  
23       going to be adopted as it was, a look at the backfitting  
24       amendment were going to be strictly implemented on  
25       cost-benefit in that way, the severe accident policy would



1 have worked all that way, I would feel like I had done the  
2 country a disservice by raising the question originally.

3 I feel that strongly.

4 I think it does need change, in my opinion.

5 CHAIRMAN PALLADINO: Well, I don't know what's  
6 behind your thinking. Are you going to propose something else  
7 besides cost-benefit as an approach?

8 MR. OKRENT: Well, I'll give you one example. I  
9 find myself, in estimated core melt frequency 4 times 10 to  
10 the minus 4, for reactors at the most populated site in the  
11 country, disquieting, as something to be left for the rest of  
12 the plant life.

13 I as a Commissioner would not sit still for that  
14 situation. I wouldn't shut them down, but -- and of course  
15 that's the estimate with some, as Mr. Lewis has said, big  
16 uncertainty on both sides.

17 But, nevertheless, if that is the average prediction  
18 of a core melt by the year 2000, that is sizeable and the  
19 flagship, if you will, has got such a high number, it seems to  
20 me personally -- I'm not speaking at all for the ACRS -- well,  
21 not a good --

22 CHAIRMAN PALLADINO: Incidentally, I share your  
23 view.

24 MR. OKRENT: But in reading the Commission position  
25 on any point, I couldn't find any hint of that. You were

1       faced with certain specific yes-or-no things, but that  
2       question in fact wasn't one directly raised to you, I think  
3       you might say.

4               COMMISSIONER BERNTHAL: I just remembered another  
5       cost-benefit thing that had slipped my mind. That was the  
6       ATWS thing which seemed to be small cost for substantial  
7       benefit.

8               COMMISSIONER ASSELSTINE: Dave, if I could ask you,  
9       the sense I get is that there are fundamental questions and  
10      disagreements within the Staff on the committee about some of  
11      the key issues involved in the safety goal.

12              The typical approach that we use here is we sit  
13      back, all of this goes on, and then finally we get the paper  
14      dumped in our laps and we have to make decisions about is this  
15      acceptable, do we want to make some modifications here and  
16      there. All right.

17              The question is so fundamental. Are the  
18      disagreements so significant that perhaps the Commission ought  
19      to get more directly involved now before that process works  
20      its course? Or do you think that the process can deal with  
21      these kinds of issues in the manner in which we have  
22      approached these kinds of things in the past through our  
23      typical process?

24              MR. OKRENT: Well, that is a hard -- I'm not sure I  
25      have a basis you should change your process. I must say I was

1 surprised, pleasantly surprised to learn of the depth of  
2 opinion among your senior staff, that they wanted to work the  
3 core melt -- their estimates of core melt frequency to a lower  
4 number than on the average, and for each individual one, and  
5 in fact, you know, this includes essentially -- I don't know  
6 where the EDO sits, but as far as the bulk of your other  
7 senior staff, every single one that I have heard express an  
8 opinion was concerned that way. And the steering group  
9 included a lot of people.

10 COMMISSIONER ASSELSTINE: Yes, I was surprised at  
11 that, too. In fact, when I looked at Mr. Denton's letter and  
12 then I looked down the concurrence list, virtually every one  
13 of the senior technical people and the people whose technical  
14 judgment we rely on, the same with Research, that's right,  
15 appear to feel very strongly that there are some fundamental  
16 questions here that are not addressed by the earlier safety  
17 goal and should be.

18 MR. OKRENT: I have to assume when the EDO  
19 recommends something, it will either somehow have worked this  
20 out or there will be a different professional opinion.

21 MR. REMICK: Could I attempt to respond to that?

22 If I were to advise Mr. Asselstine on that at the  
23 moment I would say no, the Staff is trying right now and  
24 stepping in might interfere with that. I think when they come  
25 to you with their recommendation, they should tell you what

1 the various views on this are, and at that time you shouldn't  
2 hesitate, if you aren't satisfied, to explore all those views.

3 But I think at this particular moment my personal  
4 advice would be it's probably a little premature.

5 COMMISSIONER BERNTHAL: Well, I think the real value  
6 of your coming here -- and I hope we will do this more in the  
7 future, and frankly, I was going to suggest, Mr. Chairman,  
8 that we try and plan for more than two hours when this group  
9 is in town and spend maybe three hours, half morning, half  
10 afternoon or however it best works, to do just this kind of  
11 discussion. Because what you achieve by it, at least for the  
12 Commission, is -- what shall I say, a willing suspension of  
13 belief, maybe, when the Staff comes before us and --

14 COMMISSIONER ASSELSTINE: At least an appreciation  
15 of the issues.

16 COMMISSIONER BERNTHAL: That's right.

17 I had one question that I'm not sure we're going to  
18 have time to discuss, but let me toss it out and we can not  
19 discuss it if we don't have time.

20 It is my understanding that there is at least one  
21 school of thought in the Staff that wants to move away from a  
22 definition based on core melt, to a definition based on loss  
23 of primary system, I guess is the way it was put to me, loss  
24 of primary system integrity, or something like that.

25 MR. OKRENT: Core melt through the primary system.

1 It's with the release of radioactivity.

2 COMMISSIONER BERNTHAL: Well, however. It's a  
3 different definition. Whether or not we have time, I was  
4 curious as to how that would square with the international  
5 community, and my concern is that we not come forward with a  
6 number that is a funny number compared to what the  
7 international community has adopted. And I understand the  
8 difficulties with the core melt criteria. Nobody is quite  
9 sure what a core melt is right now.

10 Is there any comment on that? Or do we have time?

11 MR. SIESS: The British criteria must assume that it  
12 is out of the primary system.

13 MR. OKRENT: And the containment.

14 MR. SIESS: I think they assume that the containment  
15 isn't there.

16 MR. OKRENT: Well, in fact, originally, you are  
17 correct. NII did not want to take credit --

18 MR. SIESS: I personally like the idea of  
19 considering the core in the containment, because now you have  
20 the core -- if you look from the outside in, you've got the  
21 containment, which is there to protect the environment. As  
22 long as that core is inside the primary system, it's got two  
23 barriers between it and the public. But once the core gets  
24 into the containment you are now up against your containment  
25 barrier.

1           And I think it puts some emphasis on containment  
2 performance criteria that you don't get if you lump core melts  
3 into this whole mishmash of 40 different kinds.

4           So it makes a lot of sense to me to put the core  
5 where it is challenging the last barrier, and then start  
6 looking at that barrier.

7           COMMISSIONER BERNTHAL: I thought a fair part of the  
8 argument in favor of what you are apparently also suggesting  
9 was that you also get a cleaner analysis, that the numerology  
10 is very difficult because of the uncertainty in the core melt  
11 phenomena itself. Is that wrong?

12          MR. SIESS: Well, it puts you one more step in the  
13 calculation to where the coolant goes. Now I don't know  
14 whether that simplifies something or complicates it.

15          MR. KERR: I would say that it does introduce  
16 uncertainty here. You can come closer, I think, to  
17 calculating the conditions under which core melt is likely to  
18 occur and that's in effect what one now does, than you can in  
19 calculating the likelihood that given that set of conditions,  
20 one is going to melt through say the vessel or get into the  
21 containment or whatever.

22          COMMISSIONER BERNTHAL: So you are saying it's more  
23 difficult to calculate the loss of primary system integrity?

24          MR. KERR: Yes.

25          MR. WARD: Yes.



1           MR. SIESS: And then the Staff tells us it's even  
2 more difficult to calculate the containment performance. But  
3 if you really want to give the consequences --

4           CHAIRMAN PALLADINO: Paul has a comment, then I have  
5 one.

6           MR. SHEWMON: It may be more difficult, but it's a  
7 difficulty that one should not spurn because where you really  
8 get in trouble is not when somebody thinks they have lost  
9 their last pump. It's after you find that you can't restore  
10 that pump and the core has melted and it gets out into the  
11 countryside, and so if you talk about only core melt and when  
12 you lose the last pump, you are likely to end up putting your  
13 emphasis where it really doesn't help protect the public as  
14 much as you could with a more realistic description and  
15 analysis of what will lead to public health problems.

16           COMMISSIONER BERNTHAL: I see. And it becomes more  
17 complex, among other reasons, because of human intervention.  
18 That has to be taken into the mix. If you've got a core melt,  
19 too, and now breach the primary system.

20           MR. SHEWMON: It's one of the things that isn't  
21 taken into the mix now. And there's also the thing that Chet  
22 has leaned on of, gee, we've got a containment, we ought to  
23 make sure it's a good containment and then take some credit  
24 for it. And you make people worry more about that if indeed  
25 that came in as part of the consideration.



1           CHAIRMAN PALLADINO: Let me make a comment. I think  
2       this is a very worthwhile discussion and I expect we could go  
3       on for at least another hour. I will point out we have an  
4       affirmation, we have agenda planning, and we have to be on our  
5       way to the Hill by 1:30, and so I would suggest that we thank  
6       the Committee. We look forward to your submittals and adjourn  
7       the meeting.

8           Before we adjourn, I would suggest that the  
9       Commission meet in about five minutes, prepared both for  
10      affirmation and agenda planning.

11           [Whereupon, at 11:35 a.m., the meeting was  
12      adjourned.]

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5 This is to certify that the attached proceedings  
6 before the United States Nuclear Regulatory Commission in the  
7 matter of Commission Meeting

8  
9 Name of Proceeding: Periodic Meeting with Advisory Committee  
10 on Reactor Safeguards (Public Meeting)

11 Docket No.:

12 Place: Washington, D. C.

13 Date: Thursday, July 11, 1985

14  
15 were held as herein appears and that this is the original  
16 transcript thereof for the file of the United States Nuclear  
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19 (Signature)

(Typed Name of Reporter) Suzanne B. Young

20  
21  
22  
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6/14/85

SCHEDULING NOTES

TITLE: PERIODIC MEETING WITH ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

SCHEDULED: 9:30 A.M., THURSDAY, JULY 11, 1985 (OPEN)

DURATION: 2 HRS

PROPOSED TOPICS:

- ° ACRS ACTIVITIES RELATED TO CONSIDERATION OF SEISMIC EVENTS IN EMERGENCY PLANNING (POSTPONED FROM 5/10/85 ACRS-COMMISSION MEETING),
- ° SAFETY GOALS

DOCUMENTS: 6/10/85 LETTER FROM D. WARD TO CHAIRMAN PALLADINO



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

June 10, 1985

Honorable Nunzio J. Palladino  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Dr. Palladino:

SUBJECT: ACRS COMMENTS ON THE CONSIDERATION OF EARTHQUAKES IN OFF-SITE  
EMERGENCY PLANNING

During its 302nd meeting, June 6-8, 1985, the Advisory Committee on Reactor Safeguards completed its review of the proposed amendment to 10 CFR 50, "Emergency Planning and Preparedness for Production and Utilization Facilities." This topic was also considered during the 301st ACRS meeting on May 9-11, 1985, the 297th meeting on January 10-12, 1985 and during a joint meeting of our Reactor Radiological Effects and Site Evaluation Subcommittees on January 3-4, 1985. During these reviews the Committee had the benefit of discussions with the NRC Staff, representatives of the Federal Emergency Management Agency, and invited experts. The Committee also had the benefit of the documents referenced, including the public comments submitted to the NRC on the proposed amendment.

On the basis of these discussions, we offer the following comments:

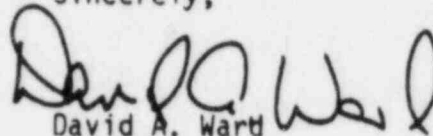
1. We see no technical reason for the exclusion of earthquakes from the natural phenomena considered in off-site emergency planning for nuclear power plants. However, we believe that only limited consideration of earthquakes is appropriate. For sites where an earthquake capable of severely damaging emergency travel routes is sufficiently likely to occur, the local off-site authorities should have the benefit of studies indicating the types and potential locations of such damage. The study of this kind already performed for the region surrounding the Diablo Canyon site would clearly meet the intent of this comment.
2. In the assessment of the impact of natural events on emergency planning, the major effort should be to identify potential problems and to devise alternative approaches for their resolution. This would include requirements for assuring appropriate means for communication, for identifying alternative routes for the evacuation of the local population, and for identifying circumstances under which sheltering might be a more effective response than evacuation. In many cases, such assessments may lead to a decision that no further response or action is required. The goal should be

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to assure ~~that~~ emergency plans, as developed, contain sufficient flexibility to cope with the potential added impacts of such events.

We hope you will find these comments useful.

Sincerely,

  
David A. Ward  
Chairman

References:

1. U. S. Nuclear Regulatory Commission, 10 CFR Part 50, "Emergency Planning and Preparedness for Production and Utilization Facilities," Proposed Rule, Federal Register, Vol. 49, No. 247, pp. 49640-49643 dated December 21, 1984
2. Sixty-one public comments received by S. J. Chilk, Secretary of the Commission, in response to Reference 1.
3. Correspondence from the following in response to requests for information regarding this subject:
  - a. Andre Messiah, Ministry of Industry, Service Central de Surete, des Installations Nucleaires, France, dated March 29, 1985
  - b. I. A. Breest, Federal Minister of the Interior, Federal Republic of Germany, dated March 22, 1985
  - c. Thayer from Taipei, Taiwan, dated April 24, 1985 (Limited Official Use)
  - d. T. Taniguchi, Ministry of International Trade and Industry, Japan, dated April 20, 1985
  - e. M. Wakasa, Reactor Regulation Division, NSB, STA, Japan, dated April 19, 1985
  - f. G. Mandeus, Director Information Services, Swedish Nuclear Power Inspectorate, dated April 16, 1985
4. TERA Corporation, "Earthquake Emergency Planning at Diablo Canyon," Volumes 1-3, dated September 2, 1981

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C&amp;R (Natalie)

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

Meeting Title: Periodic Meeting with Advisory Committee on Reactor Safeguards (ACRS)

Meeting Date: 7/11/85 Open ☒ Closed ☐

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1. TRANSCRIPT

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2. Ltr Ward to Palladino 1dtd 6/10/85

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