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NUCLEAR REGULATORY COMMISSION

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PERIODIC BRIEFING BY ADVISORY COMMITTEE  
ON REACTOR SAFEGUARDS

- - - -

PUBLIC MEETING

Nuclear Regulatory Commission  
One White Flint North  
Rockville, Maryland

Thursday, January 11, 1990

The Commission met in open session, pursuant to notice, at 2:00 p.m., Kenneth M. Carr, Chairman, presiding.

COMMISSIONERS PRESENT:

KENNETH M. CARR, Chairman of the Commission  
THOMAS M. ROBERTS, Commissioner  
KENNETH C. ROGERS, Commissioner  
JAMES R. CURTISS, Commissioner  
FORREST J. REMICK, Commissioner

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## STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

CARLYLE MICHELSON, Chairman, ACRS

CHARLES WYLIE, Vice Chairman, ACRS

JAMES CARROLL, ACRS

DAVID WARD, ACRS

WILLIAM KERR, ACRS

CHESTER SIESS, ACRS

PAUL SHEWMAN, ACRS

HAROLD LEWIS, ACRS

IVAN CATTON, ACRS

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

2:00 p.m.

1  
2  
3 CHAIRMAN CARR: Good afternoon, ladies and  
4 gentlemen.

5 I'd like to welcome the members of the  
6 Advisory Committee on Reactor Safeguards and  
7 congratulate Mr. Michelson on his new appointment as  
8 Chairman of the ACRS and Mr. Wylie as Vice Chairman.

9 The purpose of today's meeting is for the  
10 ACRS to brief the Commission on four specific matters,  
11 their views on how the staff and the ACRS positions  
12 differ on the concept of adequate protection as it  
13 relates to the safety goals, the status of activities  
14 on containment design criteria, the status of the  
15 reevaluation of the ACRS role in the review and  
16 evaluation of reactor operating experiences, and  
17 highlights from the ACRS meeting with Canada's Atomic  
18 Energy Control Board Advisory Committee on Nuclear  
19 Safety.

20 Copies of the recent correspondence related  
21 to these topics are available at the entrance to the  
22 meeting room.

23 I might add that it's interesting to have a  
24 former member of the ACRS on the right side of the  
25 table here.

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1 MR. SHEWMAN: It made more room on this  
2 side.

3 CHAIRMAN CARR: Right.

4 Do any of my fellow Commissioners have any  
5 opening comments?

6 If not, Mr. Michelson, you may proceed with  
7 your presentation.

8 MR. MICHELSON: Thank you, Mr. Chairman. As  
9 you pointed out, we have four principal areas for  
10 discussion this afternoon. With your permission, I'd  
11 like to put them in a slightly different order,  
12 starting out with our containment performance criteria  
13 first.

14 In each case, we have a lead presenter who  
15 will make a short presentation and then we'll follow  
16 it with questions and answers. So, in the case of  
17 containment performance criteria, David Ward is the  
18 lead presenter.

19 MR. WARD: Several months ago, with the  
20 Commission's urging, and in fact the Commission's  
21 direction, the ACRS undertook a program that will  
22 attempt to develop new containment design criteria.  
23 Now, we intend that these would be applicable for  
24 future designs. By that I mean for plants that are  
25 not yet designed. So, we don't see these as

1 necessarily applicable to the so-called evolutionary  
2 set of designs, by which I mean the ABWR, the SP/90  
3 and the CE 80+. We do see them as being applicable to  
4 what have been called the passive designs, the smaller  
5 plants which have not yet been designed in detail, and  
6 to others, possibly even including LMR and HTGR  
7 plants, although much of the focus of our effort is  
8 directed toward LWRs to the extent that any new  
9 containment criteria are general enough they could be  
10 applicable to any type of reactor plant.

11 CHAIRMAN CARR: How would they affect the  
12 EPRI design requirements for the so-called passive or  
13 the -- beyond the evolution?

14 MR. WARD: Well, they could affect those  
15 definitely. I'm not sure what those will be, but we  
16 would, in fact, hope to influence those by our  
17 program.

18 The reason for this -- we've talked about  
19 this before, so I'll just summarize it very briefly--  
20 is that present LWR containments are specifically  
21 designed for a design basis accident which is, in  
22 fact, the LOCA accident. This is really as a sort of  
23 a stand-in. They're a surrogate for core damage  
24 accidents for which containments are really intended.

25 We think that enough is now known about

1 severe accidents, through experience, but especially  
2 through research of the last ten years or so, that  
3 there's a new containment design criteria more  
4 explicitly addressing severe accident phenomena and  
5 the so-called severe accident issues can be developed.

6 So, we've taken, first, an information  
7 gathering step. We've gathered information and I'll  
8 have to say opinion from a number of experts. In  
9 fact, at four subcommittee meetings over the past few  
10 months, we've heard from 25 invited experts. These  
11 individuals represented a number of institutions and  
12 types of institutions, vendors, architect engineers,  
13 major national labs, your staff at the NRC, consulting  
14 firms, utilities and EPRI. We got quite a range of  
15 opinions.

16 I'm not going to go into that in a technical  
17 way, but they range from what I might call the  
18 suggestion that we should stand pat, that the existing  
19 design criteria are good enough and we should continue  
20 with those, and they range to suggesting that  
21 containment design really should consist of a shell, a  
22 means to cool a molten core, and some sort of a  
23 filtered vent system for venting any excess pressure  
24 that's created by any means in an accident so that the  
25 shell remains intact.

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1 Well, this is -- there's a lot of  
2 information. I guess I can say there's considerable  
3 enthusiasm from the presenters and from others we've  
4 talked to about what we're attempting here. But some  
5 doubts have been expressed about whether we're going  
6 to be able to come up with anything that's useful in  
7 the near-term. We still think we can. We're now in  
8 the process of digesting what we've heard and what  
9 we've gathered from other sources. We've been hearing  
10 research results and analyses over the past several  
11 years.

12 Our subcommittee is going to consider a set  
13 of proposals at our next meeting, which is on February  
14 28th, and following that we believe we can develop  
15 some information that we could put in the sort of  
16 paper that the Commission was requesting. I'm hopeful  
17 that we can get that out in the spring.

18 COMMISSIONER REMICK: All set of proposals?

19 MR. WARD: From the ACRS.

20 COMMISSIONER REMICK: You said the  
21 subcommittee is going to consider a set of proposals.

22 MR. WARD: Yes.

23 COMMISSIONER REMICK: Oh, I see.

24 MR. WARD: Okay. The subcommittee is going  
25 to start considering some proposals at the end of

1 February and then we'll bring those through the full  
2 committee process --

3 COMMISSIONER REMICK: Okay.

4 MR. WARD: -- and evaluate them.

5 I don't know if any other members, Carl,  
6 would like to say anything on this. Doctor Siess has  
7 been very active in this.

8 CHAIRMAN CARR: And that paper is the one we  
9 asked you to give us on the scope and the schedule  
10 and --

11 MR. WARD: Yes, that's it. I was afraid you  
12 were going to say the date when we asked us to give it  
13 and I was a little embarrassed.

14 CHAIRMAN CARR: You said spring.

15 MR. WARD: Yes.

16 CHAIRMAN CARR: We asked for it sometime a  
17 little earlier than that, I think.

18 MR. WARD: Yes.

19 CHAIRMAN CARR: But I'm hopeful we can get  
20 it in in time so that it leads the work that EPRI is  
21 trying to do before we -- because we've now held up  
22 all the designers to wait for the EPRI document in the  
23 situation. So, you've become the controlling factor,  
24 perhaps, if you don't watch out.

25 COMMISSIONER REMICK: Was there any

1 consistent thread of suggestions of the people that  
2 you had in, any couple topics that seemed the majority  
3 of the people emphasized?

4 MR. WARD: Yes. I'm a little hard put right  
5 now to summarize it in that way for you.

6 COMMISSIONER REMICK: Okay.

7 MR. WARD: I wish I could, but I just can't.

8 COMMISSIONER REMICK: Yes.

9 COMMISSIONER ROGERS: Will you be able to  
10 address this question of defense in depth insofar as  
11 it relates to the HTGR and LMR reactors?

12 MR. WARD: We're certainly going to grapple  
13 with that. In fact, in these 25 invited experts, we  
14 heard from LMR people and high temperature gas reactor  
15 people. So, we have their views and we are going to  
16 try to -- we're certainly going to consider them.

17 MR. SHEWMAN: And some of these consider the  
18 passive safety or most of them were --

19 MR. WARD: Right.

20 CHAIRMAN CARR: Any other questions on that  
21 subject? Okay. Let's proceed.

22 MR. MICHELSON: The next agenda item that  
23 we'd like to discuss is the ACRS views on the NRC  
24 safety goal policy and its relationship to the onset  
25 of adequate protection. Again, David Ward is lead on

1 this.

2 MR. WARD: Well, over the past couple years  
3 we've furnished a good bit of advice to you, perhaps  
4 more than you wanted to hear, on how the safety goal  
5 policy might be used, how the policy might be  
6 implemented. That's what we've -- several letters.  
7 We mentioned in one of them sort of on the oblique  
8 because it had come up -- the staff had initiated  
9 this -- we made some comments on how the safety goal  
10 might relate to the concept of adequate protection.  
11 The Commission couldn't figure out exactly what we  
12 meant by this and, in fact, you concluded that what we  
13 said seemed to be at odds with what the staff saw as  
14 the relationship between the safety goal and the  
15 concept of adequate protection.

16 So, we got together with the staff and we've  
17 had a number of interactions. The staff has attempted  
18 to boil that all down in a SECY paper, which I believe  
19 has just been issued, SECY-89-375, and they do, in  
20 fact, I think, give a good summary of what we meant.  
21 It seems not really to differ from the staff's  
22 position on the use of the term "adequate protection."

23 In 89-375, in the summary, they quote from  
24 the November 20th, 1989 letter of the ACRS where we  
25 said, "We do not attempt to equate the safety goals to

1 adequate protection in the sense in which the courts  
2 have recently considered it." The staff goes on to  
3 say, "On this key point therefore, the ACRS and the  
4 staff positions do not differ." I agree with that. I  
5 think we do not.

6 Just by way of explaining -- well, I hope it  
7 will explain what we did mean. I'd like to quote a  
8 couple short paragraphs from our February 16th, 1989  
9 letter and the staff also quotes these in this SECY  
10 paper.

11 This is from our letter now. "The term  
12 'adequate protection' has importance in legal areas of  
13 safety regulation. Although it is needed and used  
14 with apparent precision in legal instruments, its  
15 technical definition is not precise. In general, it  
16 is accepted as equivalent to the term 'with no undue  
17 risk to public health and safety,' often used in other  
18 contexts. Another term, 'in full compliance with  
19 regulations,' is used as a surrogate on occasion for  
20 either of these.

21 "We believe that the safety goal should play  
22 an important but indirect role in defining adequate  
23 protection. Ideally, compliance with the Commission's  
24 regulations is a suitable surrogate for defining  
25 adequate protection of the public. However, we

1 believe that the adequacy of the regulation should be  
2 judged from the viewpoint of whether nuclear power  
3 plants as a class licensed under these regulations  
4 meet the safety goals."

5 So, we were not really attempting to provide  
6 a lawyerly definition of adequate protection. Our  
7 understanding is that the term is used in regulations  
8 only in the backfit rule. That's 50.109. We believe  
9 a backfit rule of some sort is important and we also,  
10 as we've stated in our letters on the safety goal, we  
11 believe that all, the entire body of regulation should  
12 be in conformance with the safety goal policy, not  
13 vice versa. In other words, we don't see that the  
14 safety goal policy should be developed to be in  
15 conformance with, for example, the backfit rule. It,  
16 in fact, should be the other way around.

17 Now, whether the backfit rule presently is  
18 in conformance with the safety goal policy, we don't  
19 have an opinion at the present time and I'm not sure  
20 we're interested in trying to establish one. But we  
21 believe, and we've suggested in a couple of our  
22 letters, that there should be a program within the  
23 staff to systematically review the entire body of  
24 regulations, which would include then the backfit  
25 rule, to determine how the body of regulations is

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1 serving the purposes of the safety goal policy.

2 Well, I think -- in fact, Doctor Lewis had  
3 some additional views on that. I don't know if you'd  
4 like to mention that, Hal.

5 DOCTOR LEWIS: Why don't you just go on.

6 MR. WARD: Well, that's really all I had to  
7 say at this point.

8 DOCTOR LEWIS: Okay. Well, no, I really  
9 have nothing to add. People sometimes -- there are  
10 really three things at issue which people do sometimes  
11 mix up. One is the body of regulations. The other is  
12 the safety goal and the third, which is probably the  
13 most important, is how safe the plants really are out  
14 there. We've concentrated and this letter  
15 concentrates on relating the body of regulations to  
16 the safety goals. I guess I've independently written  
17 you a letter which says you ought to also try to  
18 relate the safety goals to the actual safety of the  
19 plants and that somebody ought to do that one day.  
20 But that's the only additional thing I would add. I  
21 still believe that, but that's my personal view.

22 CHAIRMAN CARR: Yes, sir, Counselor?

23 MR. PARLER: Mr. Chairman, would I be out of  
24 order if I would ask permission to make a brief  
25 comment?

1                   CHAIRMAN CARR:   Go right ahead, as long as  
2                   the reporter knows who you are.

3                   MR.   PARLER:       I'm Parler, William, in the  
4                   illegal office.

5                   This February the 16th, '89 ACRS letter and  
6                   the November the 20th letter do include the paragraphs  
7                   that were read about the term "adequate protection."  
8                   That paragraph puzzled me for quite a long period of  
9                   time.  It suggests that there is an area, perhaps a  
10                  considerable area, in which the term "adequate  
11                  protection" is only meaningful in the legal arena.  I  
12                  always thought that the term in the Atomic Energy Act  
13                  was the fundamental basis for the actions that this  
14                  Commission took.

15                  But, in any event, the important distinction  
16                  that I want to make is this.  The term "adequate  
17                  protection" does have certain specific legal  
18                  consequences.  For one thing, unless you make the  
19                  finding, as I've already said, of adequate protection,  
20                  you can't license a nuclear power plant.  If you do  
21                  license one and you can no longer make the finding of  
22                  adequate protection, you've got to take -- or you  
23                  should take enforcement action.

24                  Under the backfit rule, if you have to take  
25                  a particular action in order to achieve the level of

1 adequate protection, you don't worry about the backfit  
2 rule. Costs are not a consideration.

3 So, those are the legalisms. But the  
4 underpinning for the determination of whether or not  
5 there is an adequate protection finding that can be  
6 made, that does not have a legal input. That's from  
7 the technical staff. That's what the Agency is all  
8 about, as I understand it, and I wish that that  
9 distinction had been made in this paragraph.

10 Thank you.

11 CHAIRMAN CARR: Thank you.

12 COMMISSIONER REMICK: Dave, I know the  
13 Committee in the past wanted to be sure that the  
14 Commission understood that this area of adequate  
15 protection was not the only area where perhaps the  
16 Committee and the staff differed. I assume that that  
17 is still the Committee's position, that there are  
18 other areas that we differed on the implementation.  
19 Is that still the Committee's --

20 MR. WARD: Yes, that's correct. There were,  
21 I think, four other points where our February '89  
22 letter still had some differences with the draft of  
23 the staff paper which was to provide for the final  
24 process, I guess, of implementation of a safety goal.  
25 We, in fact, thought some of these other areas were

1 more significant than concerns about the -- well, the  
2 definition of the term "adequate protection."

3 CHAIRMAN CARR: Do you have problems with  
4 the SECY-89-375 paper?

5 MR. WARD: No.

6 CHAIRMAN CARR: Okay. Is it fair to say  
7 that if this is adequate protection and you're down  
8 here and you've got to shut down or get fixed to get  
9 above that, somewhere between here and the safety goal  
10 a backfit analysis is required if you're going to make  
11 a change to a plant. Is that the way you are trying  
12 to tell me?

13 MR. WARD: Not me.

14 CHAIRMAN CARR: That's the way I understand  
15 it. Maybe it's too simple a picture.

16 DOCTOR LEWIS: I have a problem with that.

17 DOCTOR SIESS: I don't know, but I think one  
18 of your problems is whether adequate protection is  
19 here or here or here. I think we don't have a  
20 definition of adequate protection other than the  
21 circular definition Mr. Parler just gave us.

22 CHAIRMAN CARR: It's up here.

23 DOCTOR SIESS: Yes. I mean if we let the  
24 plant operate, then by definition it provides adequate  
25 protection.

1                   CHAIRMAN CARR: That's right. If it didn't,  
2 we'd shut it down.

3                   DOCTOR SIESS: I agree with you about being  
4 above and below, but there's a long argument about --

5                   CHAIRMAN CARR: Well, but the plant's  
6 operating, so it's above the adequate protection line  
7 per se.

8                   DOCTOR SIESS: Yes.

9                   CHAIRMAN CARR: Or on it or whatever. Now,  
10 if we're about to make it do something, we're  
11 admitting we're trying to make it do something to keep  
12 it above that line and we do the backfit analysis if  
13 it's an already operating plant. Now, somewhere up  
14 here safety goals exist that we're going to decide the  
15 whole body of operating reactors will someday--  
16 that's why we want to look at our regulations, not at  
17 the plant, but at the regulations. Is that the way we  
18 see it?

19                   DOCTOR LEWIS: Yes, that's right. And, in  
20 fact, the only place I had a problem with what you  
21 said was that you were talking about a plant when you  
22 said adequate protection and safety goal and you've  
23 just --

24                   CHAIRMAN CARR: Well, the safety goal is  
25 certain not -- I mean down here we shouldn't -- the

1 safety goal, while it applies, it shouldn't affect  
2 anybody who's already at the adequate protection  
3 level.

4 DOCTOR LEWIS: Well, no. The adequate  
5 protection, as Mr. Parler said, is really in the eye  
6 of the beholder. He didn't say it that way, but I  
7 think that's the way I interpret it. I could think it  
8 conceivable, and I may well be wrong on the legal  
9 point, conceivable for the Commission, although it  
10 would be a dumb thing to do, to set a safety goal --

11 CHAIRMAN CARR: We do some dumb things, yes.

12 DOCTOR LEWIS: Well, you know, we've all  
13 done dumb things. Here we are. But I could imagine a  
14 situation in which the Commission decided that the  
15 safety goal numbers in the light of experience and so  
16 forth are too low and set a new adequate protection  
17 level. You have trouble justifying that, but adequate  
18 protection is a regulatory issue and the safety goals,  
19 as you've said and we've recommended many times -- I  
20 think the letter we're reading was signed by a  
21 gentleman named Remick -- have said that the safety  
22 goals are to be used to judge the adequacy of the --

23 CHAIRMAN CARR: But the safety goals, if you  
24 used them that way, would require you to change the  
25 regulations.

1 DOCTOR LEWIS: Yes, that's right.

2 CHAIRMAN CARR: And then the regulations  
3 would require you to change adequate protection.

4 DOCTOR LEWIS: Well, you actually -- you  
5 could presumably change the level of safety of the  
6 plants without changing the regulations by exhorting  
7 people to do better.

8 CHAIRMAN CARR: Well, that's INPO's job.

9 MR. WARD: Yes.

10 CHAIRMAN CARR: Okay.

11 COMMISSIONER CURTISS: I do have one  
12 question, following up on that point, because I'm not  
13 sure I still grasp the position that the ACRS is  
14 taking. If I understand what you're saying, the  
15 safety goal ought to be the vehicle that's used to  
16 judge the adequacy of the regulations.

17 MR. WARD: Correct.

18 COMMISSIONER CURTISS: And if it is true,  
19 and let's just stipulate for the moment that the  
20 regulations as a body reflect what is necessary to  
21 achieve adequate protection, why is it that you are  
22 not therefore saying that the safety goal ought to be  
23 used to judge what is, in essence, adequate  
24 protection?

25 MR. WARD: You know, I think we're coming

1 perilously close to saying that. I mean in plain  
2 English terms, to me, that's what it means. But I  
3 think there is a special meaning, legal meaning of the  
4 term "adequate protection," and I'm not sure we can  
5 really fit it on this scale, as Chairman Carr is  
6 attempting to. That's a problem.

7 COMMISSIONER CURTISS: It is, as the General  
8 Counsel points out, a legal term or has legal  
9 consequences, but it's a technical judgment. I guess  
10 I'm wondering why you're shying away from the  
11 conclusion that the safety goal ought to be used to  
12 judge adequate protection, whether it's because of  
13 some consequence that flows from that or some anxiety  
14 about the legal implications of making that  
15 connection. But everything you said leads to that  
16 conclusion in my mind.

17 MR. WARD: Well, I think the term "adequate  
18 protection," if the body of regulations is providing  
19 assurance that the public is being adequately  
20 protected against risks from the operation of the  
21 population of plants, but we're reluctant to attempt  
22 to use the safety goal to define the term "adequate  
23 protection" for an individual plant.

24 CHAIRMAN CARR: Well, isn't it fair to say  
25 that the safety goal is not based on a strong

1 technical basis?

2 MR. SHEWMAN: It is fair. May I comment?

3 CHAIRMAN CARR: And therefore you can't use  
4 it to define adequate protection, in my opinion.

5 COMMISSIONER CURTISS: I do think that's a  
6 policy question and maybe the distinction between --

7 MR. KERR: All of our discussion here has  
8 seemed to implicitly assume that the safety goals  
9 represent a higher level of protection than adequate  
10 protection. I don't think we know that. In fact, I  
11 would say there is some evidence to suggest that  
12 existing reactors may be better than the safety goal  
13 and this is part of our difficulty. We do not have a  
14 good quantitative estimate of what the current body of  
15 reactors is producing in terms of risk.

16 CHAIRMAN CARR: Yes. I read you all's  
17 statement as saying you'd really like to modify the  
18 safety goal a little bit in your hierarchical  
19 structure to give it a little more of a foundation.

20 MR. KERR: I'm saying that defining the  
21 safety goal can be done, it seems to me, without  
22 worrying about where reactors are. This is a policy  
23 decision that says, "In our wisdom as a Commission,  
24 this is what we think one should try to achieve." One  
25 needs to be reasonably realistic. There's no point in

1 setting something that's obviously impossible to  
2 achieve.

3 But we have not, I think, as yet, connected  
4 the decision that was made and I personally think that  
5 the safety goal policy statement is reasonable. We  
6 have not yet connected that in a quantitative way, and  
7 it's not going to be easy to do, with where the  
8 current body of reactors in this country is.

9 COMMISSIONER ROGERS: That has to come out  
10 of some kind of a study, some kind of a comparative  
11 study. Let me ask if this concept that I'll just  
12 sketch to you seems to fit what you're saying.

13 Safety goals are arbitrary, really. They're  
14 based on a policy decision as to what we're all  
15 comfortable with, what we think the public would be  
16 comfortable with, what we think those that put us in  
17 place would be comfortable with looking after their  
18 safety. So, they are arbitrary, but they can be  
19 defined fairly precisely because we have free choice  
20 to do that. Once the safety goals have been  
21 established as a policy matter, then in principle--  
22 we haven't done it yet, but in principle, one could  
23 test to see whether on the average, the regulations  
24 that we have in place have created a system of  
25 reactors which meets the safety goal on the average.

1 If the answer to that is yes, it does, and we don't  
2 have the answer to that yet, as Lewis has pointed out,  
3 but let's assume for the moment that one could find  
4 the answer to it and just for the sake of argument say  
5 that the answer turns out that yes, that on the  
6 average, but there will be deviations because in  
7 looking at the safety goal they're risk-based  
8 statements and there are going to be uncertainties in  
9 those risk assessments because of just how you have to  
10 do it.

11 So, one doesn't take a precise measure for  
12 an individual plant at this point, but what one does  
13 is to take the average of the whole constellation of  
14 these. If the answer comes back that yes, after  
15 having done all these studies we find that on the  
16 average the collection of U.S. plants that have  
17 evolved under the regulations meet the safety goals,  
18 then we will have validated the regulations. Once the  
19 regulations have been validated, then we have a basis  
20 for taking the next step that says, "If our  
21 regulations are safe, the plants are safe enough."

22 So, therefore, you have a firm basis for  
23 establishing what we've been saying all along, that  
24 our regulations define safe enough.

25 Yes?

1 DOCTOR LEWIS: I have only one problem with  
2 what you said, Ken. You've made a logical structure,  
3 but I have the chanticleer effect in mind. You said  
4 first that the safety goals have produced a group of  
5 plants -- I'm sorry, that the regulations have  
6 produced a group of plants that meet the safety goals  
7 and you can test that, but you really can't. What you  
8 can test is whether the plants meet the safety goals  
9 and whether it's due to the regulations or in spite of  
10 them is a deeper question. You know, Chanticleer  
11 believed that he made the sun rise every morning.

12 COMMISSIONER ROGERS: True, but -- it's a  
13 good point, but I think that logical leap is still  
14 something that some of us might be willing to  
15 consider.

16 CHAIRMAN CARR: As you say, why are we here,  
17 right?

18 DOCTOR LEWIS: I'm not prepared, you know,  
19 given the fact that I'm locked in this room with you,  
20 to say that it happened in spite of the regulations,  
21 but I think the degree to which the regulations have  
22 contributed to it is a separate question from the  
23 question of whether the plants meet the safety goals  
24 and I do think it's important that we find that out  
25 and do it.

1           COMMISSIONER ROGERS: Well, I think you've  
2 got a good point, but we still then don't have a way  
3 of defining adequate protection whereas if you use  
4 compliance with our regulations as defining adequate  
5 protection, you've made the connection.

6           DOCTOR LEWIS: Well, as a surrogate and  
7 certainly defining, yes, as a surrogate.

8           DOCTOR SIESS: I would argue --

9           CHAIRMAN CARR: Doctor?

10          DOCTOR SIESS: -- that we do have a way of  
11 defining adequate protection. We may not know, and we  
12 don't know, whether our existing plants meet the  
13 safety goal or not. We haven't, as you say, looked at  
14 enough of them. But any plant that's operating I can  
15 say provides adequate protection on the empiric basis  
16 that if it didn't provide adequate protection, the NRC  
17 would have shut it down.

18          CHAIRMAN CARR: That's a fact.

19          COMMISSIONER ROGERS: Well, if you trust the  
20 NRC. Suppose that you don't.

21          DOCTOR SIESS: I wouldn't touch that one  
22 with a ten foot pole. But again, we do have,  
23 following Bill's legal definition --

24          CHAIRMAN CARR: Well, that's our charge.

25          DOCTOR SIESS: -- a way of doing that. Is

1 it right? I don't know.

2 COMMISSIONER ROGERS: What I'm offering you  
3 is a way of giving a little additional comfort to the  
4 assertion that the NRC would shut it down because it  
5 would require people to follow its regulations. If  
6 its regulations were not followed, it wouldn't be  
7 operating. So, it's a little validation of that  
8 Commission.

9 CHAIRMAN CARR: There's no doubt that if we  
10 knew it were not providing adequate safety, we would  
11 shut it down. It boils down to the question of do you  
12 know and you may know today that it's all right and  
13 you may not know tomorrow. But you do the best you  
14 can by continual inspection and that's how we got  
15 where we are.

16 DOCTOR LEWIS: In fact, there's some virtue  
17 in the vagueness of the word "adequate," because what  
18 might be adequate protection under some circumstances  
19 might be inadequate in other circumstances. The whole  
20 question of decision making depends to some extent on  
21 what your losses are if you make the wrong decision.  
22 I could envisage a situation, perhaps an enormous  
23 national electricity shortage, in which you might very  
24 well decide that the definition of adequate in terms  
25 of numbers ought to be changed. Adequacy, after all,

1 we live our lives that way, is a judgmental matter and  
2 we trust these fine working people to make those  
3 judgments.

4 MR. WARD: I think the chain of thought that  
5 Commissioner Rogers expressed is exactly what we've  
6 tried to say. I agree with that. I'd add only--  
7 well, I agree with Hal's comment, but I'd add only  
8 that we do know something about the existing  
9 population of plants.

10 COMMISSIONER ROGERS: Yes.

11 MR. WARD: There's a good many -- 1150 and a  
12 lot of other PRAs have told us.

13 COMMISSIONER ROGERS: We haven't just made  
14 that total connection yet for the whole constellation  
15 though.

16 MR. WARD: We haven't.

17 COMMISSIONER ROGERS: Then, it seems to me,  
18 the next question, if you've gotten to that point of  
19 comfort, that you've found that the regulations as  
20 they now exist, in the constellation of plants as they  
21 now exist do, on the average, satisfy the safety goal,  
22 you will see deviations from that nevertheless. Then  
23 the question is, what do you do about those? It seems  
24 to me that's where they're arguing.

25 You've been arguing with the staff as to

1           whether there ought to be a backfit analysis done or  
2           not. I would submit that one should not think about  
3           using -- that your position is that you shouldn't use  
4           the safety goals for a regulatory purpose. You take  
5           them up to the point that you use them to validate the  
6           regulations or not and stop and that the next step to  
7           try to close the gap between the result of a PRA or  
8           something that leads you to a slight deviation or  
9           maybe some kind of deviation from safety goal average  
10          is not the basis on which you would consider further  
11          regulatory action, if I understand.

12                   MR. WARD: That's right.

13                   CHAIRMAN CARR: Counselor?

14                   MR. PARLER: Thank you, Mr. Chairman. I  
15          just thought that I would mention to the Commission  
16          that in the last year or so there was a case involving  
17          the legality of the backfit rule in which the  
18          opponents of the rule, among other things, argued that  
19          there should be a more precise definition of adequate  
20          protection.

21                   Now, Mr. Briggs and I signed a brief that  
22          was filed with the court on behalf of this Agency.  
23          The government won the case, but with your permission  
24          I would like to quote something briefly from that  
25          brief, which it seems to me to be in point. Whether

1 you agree with it or not or everybody would agree with  
2 it or not is another question. But if it's completely  
3 off the wall, somebody better tell me because I've got  
4 business to do with the United States Court of  
5 Appeals.

6 The brief says, in part, "In fact, however,  
7 there is no vagueness and ambiguity in the NRC's use  
8 of the adequate protection standard. Adequate  
9 protection is the level of safety required by Section  
10 182 of the Atomic Energy Act as a necessary condition  
11 for licensing. It is and has always been defined  
12 operationally in NRC practice by application of a set  
13 of objective criteria - the Commission's specific  
14 regulatory requirements for reactor licensing, 10 CFR  
15 Part 50, regulatory guides, orders, adjudicatory  
16 opinions, technical specifications and license  
17 conditions, together with case-by-case exercise of the  
18 Agency's expert engineering judgment.

19 "In deciding whether the adequate protection  
20 standard has been met, the Commission necessarily  
21 proceeds case by case whether the single case be a  
22 regulation applicable to all plants or a plant-  
23 specific action."

24 CHAIRMAN CARR: Stick to that. I like it.

25 DOCTOR SIESS: Wasn't there a question

1 raised that if by invoking the backfit rules you  
2 revise a regulation, if something did not meet the  
3 adequate protection standards, then you raised the  
4 standard? If you revise it by invoking the backfit  
5 rule, which meant it did meet adequate protection,  
6 right, and you could only increase the requirement by  
7 backfit and you now revise the regulations, you've now  
8 raised the standard of adequate protection, have you  
9 not?

10 CHAIRMAN CARR: I would -- that --

11 COMMISSIONER ROGERS: I would imagine so.

12 CHAIRMAN CARR: We've changed the  
13 regulations.

14 DOCTOR SIESS: Now, is there something wrong  
15 about that?

16 CHAIRMAN CARR: No, I think we learn as we  
17 move on.

18 DOCTOR SIESS: No, but you had to invoke the  
19 backfit rule to change the regulation. But once you  
20 got it changed, it's the new adequate protection  
21 standard.

22 CHAIRMAN CARR: If it's applicable across a  
23 range of plants, and certainly we have changed it for  
24 that plant. If it's generic, we've changed it for the  
25 whole population.

1 DOCTOR LEWIS: I don't think, Chet, that it  
2 requires that you think of a changed definition of  
3 adequate protection. You may have discovered  
4 something in the regulations that was ambiguous. What  
5 you're doing is giving yourself greater certainty that  
6 you met the previous standard of adequate protection.  
7 I think there's a logical progression you can hold,  
8 that you've not changed the standard of adequate  
9 protection, you've simply clarified the question of  
10 whether somebody has met it.

11 CHAIRMAN CARR: Or you --

12 DOCTOR LEWIS: I think that's a better one  
13 to stick with.

14 CHAIRMAN CARR: Or you may say we've got  
15 smarter and we learned something we should have known.

16 DOCTOR LEWIS: We do get smarter.

17 CHAIRMAN CARR: Yes.

18 DOCTOR SIESS: I read this somewhere. I'm  
19 no lawyer. I apologize.

20 CHAIRMAN CARR: Any other questions?

21 COMMISSIONER REMICK: Bill, what you read I  
22 think is consistent with what I thought the Committee  
23 was saying. They were saying that the regulations are  
24 a surrogate on an individual plant to plant basis for  
25 adequate protection, if I heard you. That was your

1 argument there, that the regulations and associated  
2 engineering judgment backed up by the other documents  
3 and so forth, that's the standards. I think that's  
4 consistent with what the Committee --

5 MR. KERR: I thought he just read that so  
6 that he would have a determination as to whether he  
7 should discard that brief completely. Since there was  
8 no move here --

9 CHAIRMAN CARR: I think he was focusing the  
10 conversation.

11 MR. KERR: Since there was no move to  
12 discard it --

13 COMMISSIONER REMICK: And Jim, I think you  
14 were saying why does the Committee hesitate to  
15 associate safety goal with adequate protection?  
16 Adequate protection, in my mind, is an individual  
17 plant decision. It's a judgment on an individual  
18 case-by-case basis, basically comparing it, does it  
19 meet the regulations.

20 COMMISSIONER CURTISS: But the body of  
21 regulations, and I think the brief confirms it, is the  
22 reflection of what we consider to be adequate  
23 protection and we're going around and around. You  
24 still have my original question which is, if you use  
25 the safety goal to assess the adequacy of regulations

1 and if we stipulate, as we argued in the court, that  
2 the regulations reflect some generic standard of  
3 adequate protection, why is it that you're not saying  
4 that the safety goal ought to be used to evaluate  
5 adequate protection in a general sense? That is to  
6 say in establishing that for the entire population of  
7 plants.

8 I do agree that when you get to the question  
9 of assessing the compliance of individual plants with  
10 that generically established standard of adequate  
11 protection, that is a plant-specific determination  
12 that may, in fact, involve some considerations that  
13 have been alluded to. But I guess I still am puzzled  
14 and need to go back and think about why it is that  
15 you're not prepared to say that the safety goal is, in  
16 fact, something that ought to be used to establish  
17 that general standard of adequate protection.

18 MR. KERR: I think we have.

19 CHAIRMAN CARR: For me it says you can't  
20 make a technical decision on the safety goal. You can  
21 make a technical decision on the plant.

22 COMMISSIONER REMICK: Yes. And another way  
23 that I look at it, I think that the adequate  
24 protection which we say, "Well, if you meet the  
25 regulations," presumably that's kind of a

1           deterministic type of thing. The safety goals is kind  
2           of in risk-based in which you're looking at your  
3           regulations then from a risk standpoint and saying,  
4           "Are we happy with those regulations from a public  
5           risk?" So, it's a different basis, I think.

6                    COMMISSIONER CURTISS: That's interesting.

7                    CHAIRMAN CARR: All right. Let's proceed.

8                    MR. MICHELSON: Thank you, Mr. Chairman.  
9           The next item for discussion is the highlights of our  
10          November meeting with the Atomic Energy Control Board  
11          Advisory Committee on Nuclear Safety. I will take  
12          this particular discussion item.

13                   As you know, the ACRS meets from time to  
14          time with some of its foreign counterpart advisory  
15          committees. In the case of the ACNS though, we met  
16          with them last about nine years ago. So, sometimes  
17          there's a long gap. The present meeting did conclude  
18          with the observation that maybe we should be a little  
19          more frequent in the future, perhaps like four years  
20          would be a better timing than the nine years, which  
21          was the last go-round. With some of the other  
22          advisory committees, we meet a little more frequently  
23          than every four years, although of late it's been  
24          getting back apparently to about that mode of  
25          frequency.

1           The Advisory Committee on Nuclear Safety  
2           advises the Atomic Energy Control Board and this  
3           advisory committee is free to work on issues that is  
4           of common interest to their members. Of course, keep  
5           in mind now in our discussions today, we've met with  
6           individual members. Although the Board was there, it  
7           was not a meeting of the Board. So, we picked up  
8           views of individual members and to some extent today  
9           you might hear these individual views, but you can't  
10          treat them as a position of the Advisory Committee  
11          because they weren't presented in that fashion.

12                 Like the ACRS, the ACNS reviews general and  
13          policy type documents through a standing committee, an  
14          ad hoc committee arrangement. Again, as with the  
15          ACRS, the ACNS has a companion committee called the  
16          Advisory Committee on Radiological Protection. So,  
17          they have something comparable to our ACNW.

18                 On occasion, the two committees in Canada do  
19          hold joint meetings on items that might be of mutual  
20          interest to both parties. We discussed during our  
21          meeting several areas. Among them were institutional  
22          QA, software QA, personnel training and licensing,  
23          severe accidents, containment design criteria, ALARA  
24          and diminimous dose rates and emergency planning.

25                 Now, we come prepared today to discuss in

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1 detail any one or all of these. However, I'm not sure  
2 you want to necessarily hear all of them. So, let me  
3 do it this way. First of all, I'll have Hal Lewis  
4 present what we learned from the ACNW on the software  
5 QA. Then, as your interests may indicate, we would be  
6 prepared to discuss any of these other subjects in  
7 whatever depth.

8 So, Hal?

9 DOCTOR LEWIS: The Canadians were concerned  
10 about software reliability for the following reason,  
11 that a site they have, Darlington, has for the first  
12 time a digital computer operated shutdown system,  
13 reactor protection system, with which they've had no  
14 experience in the past. They're concerned that  
15 because of the need for extreme reliability of the  
16 shutdown system, that taking it out of human hands is  
17 just a nervous thing to do. They're more concerned  
18 about the functioning of these computers than they  
19 would be if they were in less critical positions. So  
20 that they've tried to understand for themselves where  
21 the failures are and how they can best protect  
22 themselves against the failures.

23 As you know, there are two things that can  
24 go wrong with a computer system. One is hardware.  
25 That's not what we're talking about now. The other is

1 software. There are even two things that can go wrong  
2 with software which require a different remedy. One  
3 thing that can go wrong is that it's been written  
4 wrong. There's simply a bug in the code. When codes  
5 get pretty complicated, it's sometimes very, very hard  
6 to debug them or to be sure when you're finished  
7 debugging them. And their ideas for how to handle  
8 that are really not unusual ideas. That is, they've  
9 had the codes written in two different computer  
10 languages by two different groups and seen if they  
11 gave the same answers and they've debugged them  
12 according to fairly well established principles for  
13 quality assurance on software.

14 There's another class of problems with  
15 software of which they didn't seem to have thought  
16 very much. That is a class of problems that go under  
17 the name of formal specification or something like  
18 that in the computer business. That is, in fact, what  
19 it's called. That has to do with the question that  
20 even if the software is written correctly for its  
21 purpose, one never has explored all the things that it  
22 will do if it gets inputs that were unexpected. Many  
23 of the computer hacking successes have to do with  
24 discovering that if you press the Q, Z and B buttons  
25 while you hold the control key down, nobody thought

1 you would ever do that and therefore the consequences  
2 are sort of unexpected and strange things can happen.

3 It's extremely hard. Courses are taught in  
4 how to protect against that, but it can only be done  
5 with relatively simple systems. In particular,  
6 methods for avoiding that don't work very well on  
7 closely interlinked computer programs. So, for  
8 example, if you have many go-to statements in a  
9 program which take you out of one element of a thing  
10 and push you down here, it's almost impossible to  
11 really analyze what the program does under different  
12 circumstances. But a cure to that is just don't use  
13 go-tos and I think most writers understand that.

14 But in any case, they really haven't found a  
15 way to be entirely comfortable with this, with the  
16 question of whether they've protected their software  
17 for this shutdown system. They're holding up the  
18 licensing of a plant, incidentally, for this reason.  
19 They haven't found a way to become comfortable and I  
20 think they came to us more for comfort than for  
21 technical advice on the subject. We gave them  
22 comfort, but we couldn't give them much more.

23 I would only add that they are probably  
24 ahead of the United States in worrying about these  
25 systems because there may well be capability within

1 the NRC on the subject but I haven't found it yet.  
2 So, I can only say that ACRS has taken the first  
3 monumental step, we've set up a subcommittee and  
4 that's about as far as we've gone on the subject. But  
5 I think it's one that is simply going to be more  
6 important. Some of the advanced reactor systems will  
7 have digital computers within the control structures  
8 and we ought to get ahead of the game and they were  
9 concerned about it and that's more or less the end of  
10 the story. It's a deep and important subject.

11 CHAIRMAN CARR: Do they use this system as  
12 only a shutdown system? It's a go/no-go system or is  
13 it a control system?

14 DOCTOR LEWIS: No, people have been using  
15 digital computers in lots of other areas. They only  
16 became very concerned in the shutdown system. They  
17 had used the digital computers elsewhere.

18 MR. CARROLL: Historically, the Canadians  
19 have used computers in the control systems at the very  
20 beginning of their program and Darlington is the next  
21 step, where they move it into their protection or  
22 safety system.

23 CHAIRMAN CARR: It sounds like --

24 MR. CARROLL: So, they've got a lot of  
25 concerns.

1 CHAIRMAN CARR: -- the concern that they've  
2 got is it might not shut them down when it should?

3 DOCTOR LEWIS: That's correct and that's a  
4 serious event. They would like to get the kind of  
5 assurance for it -- see, there are two reasons --

6 CHAIRMAN CARR: What does it do for them?  
7 Does it say them an operator or is it an operator  
8 backup?

9 DOCTOR LEWIS: I don't remember. I'm sorry.

10 MR. SHEWMAN: It stays awake when the  
11 operator sleeps, I suspect.

12 CHAIRMAN CARR: Beg your pardon?

13 MR. SHEWMAN: It stays awake when the  
14 operator sleeps.

15 CHAIRMAN CARR: So, it's an operator backup?

16 MR. CARROLL: No, it's the basic reactor  
17 protection system, the SCRAM system. One of the major  
18 incentives to go from the historic analog channels and  
19 relay logics and stuff to computers is that you can do  
20 a much better job of maintenance and surveillance  
21 testing in the digital world than you can with the  
22 historically used equipment. Diagnostics, all that  
23 stuff works much better.

24 CHAIRMAN CARR: I'm trying to figure out,  
25 does it run all their indications as well as their

1 SCRAM system or does it only run the -- is it just  
2 sitting there looking at the indications that would  
3 say SCRAM and does it SCRAM?

4 MR. KERR: No, it performs a SCRAM function.

5 DOCTOR LEWIS: They have computers that do  
6 the other things too, but this is the only one they're  
7 genuinely concerned about. I think the reason it's  
8 different from valve failures, one of the reasons it's  
9 different from valve failures is that for valve  
10 failures the failure consequence is reasonably clear.  
11 The mode you're in when it fails is reasonably clear.  
12 With a computer, when it fails, you really don't  
13 know -- it may not just fail. It may do something bad  
14 and that's hard to predict.

15 CHAIRMAN CARR: I'm not making myself clear.  
16 If you get a low level in the reactor vessel and the  
17 computer is supposed to shut the reactor down, does  
18 the operator also see low level off of the same signal  
19 that tells the computer to shut it down?

20 DOCTOR LEWIS: Well, that's what I don't  
21 remember. I assume the operator has backup  
22 capability, but I don't know that.

23 MR. CARROLL: The level sensor would provide  
24 intelligence both to a control and indication system.

25 CHAIRMAN CARR: Independent?

1 MR. CARROLL: Isolated. It probably is the  
2 same one sensor and it also supplies --

3 CHAIRMAN CARR: Well, then I'm worried about  
4 their problem too.

5 DOCTOR LEWIS: But, you know, for example,  
6 at Rancho Seco during the famous light bulb incident,  
7 the same sensor gave bad information to the operators  
8 that gave bad information to the ICS.

9 CHAIRMAN CARR: Yes. Okay.

10 MR. CARROLL: We may not be adequately  
11 describing it. I'd hate for you to get a bad feeling  
12 about the CANDU system from our description of it.

13 CHAIRMAN CARR: It just depends on whether  
14 you believe basic instrumentation is better than  
15 electronic transmission or not, I guess.

16 MR. MICHELSON: The reason, perhaps, you  
17 should be interested in this problem is that, although  
18 I'm not acquainted with the details of how they're  
19 doing it at Darlington, we have been getting the  
20 details on how the APWR and the ABWR will do these  
21 same things. We're talking about a significant  
22 extrapolation of this technology into a new area.  
23 Now, there's a lot of advantages to what's been done,  
24 but there's some shortcomings that have to be  
25 carefully understood and that's what the Canadians are

1 working on in that area.

2 CHAIRMAN CARR: But certainly the nuclear  
3 industry is not the leader in this field. Space, the  
4 entire launch of the --

5 DOCTOR LEWIS: I think that's just a minor  
6 understatement.

7 CHAIRMAN CARR: I mean there is a body of  
8 technology out there that you could tap.

9 MR. MICHELSON: But we do have to look at it  
10 now because reactors are coming forth as next  
11 generation for review and the staff has to be capable  
12 of looking at these questions and answering a number  
13 of different considerations, including the software  
14 QA.

15 DOCTOR LEWIS: I did some research. I  
16 looked at the NRC ad in *Nuclear News* to find out what  
17 kind of people the NRC is advertising for and computer  
18 scientists was not in the list.

19 COMMISSIONER ROGERS: Just turning back to  
20 the Canadian situation, it is my recollection from the  
21 visit that I made up there a couple years ago that the  
22 ordinary operation, certainly at Pickering, was under  
23 computer control.

24 MR. CARROLL: That's correct.

25 COMMISSIONER ROGERS: And that it was

1 emergency functions which are under human control.  
2 That's just the opposite from what we've been doing in  
3 the U.S. Now, what it sounds to me is that they're  
4 extending that computer control off into the emergency  
5 area. That's where the concern now is.

6 MR. WARD: Well, no, I don't think that's  
7 quite right.

8 MR. CARROLL: I disagree with the emergency  
9 functions being under operator control. My impression  
10 is that they're done with analog systems and --

11 MR. WARD: Yes, more traditional analog  
12 hardwire relay logic and that's the change that the  
13 computer is replacing.

14 CHAIRMAN CARR: With an operator backup.

15 COMMISSIONER ROGERS: Oh, I see. Okay.

16 DOCTOR LEWIS: Well, I'm glad he asked the  
17 question on that.

18 COMMISSIONER ROGERS: I see. So, it's an  
19 introduction of a digital system.

20 DOCTOR LEWIS: Right.

21 COMMISSIONER ROGERS: Oh, okay. Well, my  
22 understanding is that the Canadians have had problems  
23 like this for a long time, that one of the most  
24 serious medical problems of several people being  
25 killed by over exposures from x-ray machines came from

1 a software glitch. It was in an automatic automated  
2 software -- automatic machine. They could either  
3 deliver a beam exposure or an x-ray exposure,  
4 depending upon how the target was in or out and the  
5 software was written with the assumption that  
6 something would be flipped out before a button was  
7 pushed and if you did it the other way around you got  
8 a full exposure to the beam instead of x-rays and that  
9 several people died as a result of that. That was  
10 purely a software problem and that was some time ago.  
11 So, I would imagine that they've worked pretty hard on  
12 this kind of a problem.

13 DOCTOR LEWIS: Well, there's considerable  
14 history. We know dozens of anecdotes of software  
15 problems that have done bad things.

16 COMMISSIONER ROGERS: It wasn't that there  
17 was a bug in it, it just didn't follow all the logical  
18 possibilities.

19 DOCTOR LEWIS: Well, that's the hard job.

20 CHAIRMAN CARR: What was item 2?

21 MR. MICHELSON: Beg your pardon?

22 CHAIRMAN CARR: Where we're going with the  
23 Canadian meeting.

24 MR. MICHELSON: Oh, you mean what were the  
25 other items in that Canadian meeting? The

1 institutional QA, personnel training and licensing,  
2 severe accidents, containment design, ALARA and  
3 diminimous and emergency planning. We're prepared to  
4 discuss any or all.

5 CHAIRMAN CARR: Can you hit the highlights  
6 or the significant things that came out or was it more  
7 or less routine and you didn't learn a lot?

8 MR. KERR: If the reactor system is  
9 significantly different from the ones that we're using  
10 in this country, so that what we learned was not  
11 directly applicable --

12 CHAIRMAN CARR: Personnel training, that's  
13 pretty standard.

14 MR. WARD: I think they came expecting to  
15 learn from us on personnel training. Their operator  
16 licensing training is really considerably less  
17 comprehensive than --

18 CHAIRMAN CARR: How about QA? Were they the  
19 teachers or the learners?

20 MR. WARD: Well, QA -- one of the members of  
21 the Committee is looking at what he calls  
22 institutional QA and he's addressing what he sees as a  
23 problem that most of the major accidents which we had  
24 in the nuclear business, in fact most of the major,  
25 serious accidents you see in any industrial,

1 technological activity, seem to be related more to  
2 institutional failures than to engineering system  
3 hardware failures. By institution, he means not just  
4 the operating plants, but all the human organizations  
5 associated with it, particularly the regulatory body,  
6 for example.

7 CHAIRMAN CARR: Procedures?

8 MR. WARD: That would be part of it, yes.  
9 That would be part of it. The institutional failure  
10 might give you bad procedures. What he said is,  
11 "Look, we've had something called QA in art or science  
12 or something which we've applied to systems and  
13 hardware and we think that may have given us better  
14 systems or hardware. Why can't we take those  
15 principles, that art of QA, and apply it to how  
16 institutions function and maybe it will give us better  
17 institutional performance where we won't have these  
18 institutional failures?"

19 So, I think most of the rest of us, perhaps  
20 including some of his colleagues, or maybe I shouldn't  
21 say that, agreed with his premise, that institutional  
22 failures are extremely important. We have some  
23 problems with attempting to apply what I call the art  
24 of QA to deal with those because it's not at all clear  
25 to us that in the area of hardware and systems that QA

1 had practiced -- at least in the U.S. nuclear power  
2 industry, has been particularly successful as an  
3 instrument in providing safe and high quality plants.  
4 I think it's a questionable exercise.

5 CHAIRMAN CARR: How about the emergency  
6 planning area?

7 COMMISSIONER REMICK: Excuse me. Before we  
8 leave that, Commissioner Rogers will be interested  
9 that in that he had something -- they didn't call it  
10 that, but the kind of principles of good regulation.  
11 He had principles applied to the regulator, to the  
12 operator and so forth. He had laid out a couple of  
13 levels of principles that he thought that were  
14 important to express from the regulator standpoint.

15 CHAIRMAN CARR: Emergency planning, how did  
16 that look to you?

17 MR. CARROLL: Well, I think they were  
18 coming, seeking information from us and we made an  
19 apparently lengthy presentation on the history of  
20 emergency planning and the current state of  
21 regulations and agencies and whatever that are  
22 involved in it in the United States. I think they're  
23 looking to improve their emergency planning in Canada  
24 and they're seeking information along those lines.

25 The one thing I did find interesting was the

emergency

1 / planning zone around their plants, I believe, was  
2 approximately ten miles, which does not take them into  
3 the United States in any case. But they did believe  
4 that we were somewhat remiss and that we hadn't put  
5 the effort into helping them with emergency planning  
6 around Fermi, which is greater than ten miles away  
7 from the Canadian border. So, there seemed to be a  
8 little political inconsistency there.

9 CHAIRMAN CARR: Okay.

10 COMMISSIONER ROGERS: Just before we leave  
11 this, do you think that their research support for  
12 understanding of severe accidents for CANDUs has been  
13 adequate? Did you get into that?

14 MR. KERR: We did not talk to them in any  
15 depth about their research support. I don't know.

16 CHAIRMAN CARR: How about their severe  
17 accident approach? Are they --

18 MR. KERR: They do not take severe accidents  
19 as seriously as we do, partly because they think that  
20 they can remove heat.

21 CHAIRMAN CARR: Chopped liver included, huh?

22 MR. KERR: And so, I don't think that  
23 they've done the research, nor do they look in as much  
24 detail as we have. They're probably correct. I think  
25 they probably do have heat removal capabilities and

1 they don't have the fission product accumulation that  
2 we have in our cores because of the feed-through  
3 system.

4 CHAIRMAN CARR: Continuous refueling.

5 COMMISSIONER REMICK: In the training area,  
6 if I recall, they were what I'd call pre-TMI in the  
7 United States. Traditional training. It's not --

8 CHAIRMAN CARR: Simulators?

9 COMMISSIONER REMICK: -- performance based.  
10 Yes, I think they do have simulators.

11 MR. WARD: Yes, they do.

12 COMMISSIONER REMICK: Not performance based,  
13 not systematic, not accredited, that type of thing.  
14 So, they admitted that they probably were far, far  
15 behind the United States in that area.

16 CHAIRMAN CARR: Any other questions on that  
17 subject? Let's move on.

18 MR. MICHELSON: Okay. The last subject we  
19 have should only take a moment. It's on the  
20 reevaluation of the ACRS role in how we will look at  
21 nuclear operating plants. The Committee, in its March  
22 letter of '89, indicated to you that we were in the  
23 process of this reevaluation. We're now giving it  
24 very serious attention to get closure on it.

25 At this point, I am not prepared to say what

1 the Committee plans might be. We're in the process of  
2 deliberation. We'll do so at this full committee  
3 meeting and perhaps next and then we will certainly  
4 give you a response on where we're at.

5 CHAIRMAN CARR: Okay. Any questions,  
6 Commissioner Remick?

7 COMMISSIONER REMICK: No, thank you.

8 CHAIRMAN CARR: Commissioner Roberts?

9 Commissioner Rogers?

10 Well, I thank you gentlemen for your time.

11 COMMISSIONER REMICK: I'd like to add, Mr.  
12 Chairman, I'm sure glad to see the Commission has such  
13 a distinguished body as this providing advice to it.

14 COMMISSIONER ROGERS: You mean it gets  
15 better all the time?

16 CHAIRMAN CARR: And there's no telling how  
17 much untapped talent there is over there, right?

18 COMMISSIONER REMICK: That's right.

19 DOCTOR LEWIS: I'm impressed that the newest  
20 member of the Commission doesn't get a set of the CFR,  
21 which much mean he knows them by heart.

22 CHAIRMAN CARR: I think they're a general  
23 use.

24 Thank you very much for this briefing.

25 I would also like to acknowledge receipt of

1 the ACRS' views on the systematic assessment of  
2 licensee performance process, which is a SALP process  
3 that you recently provided to the Commission. In your  
4 letter, you requested the Commission to consider  
5 suspension of the program and the issuance of no new  
6 SALP ratings until reforms are made to the process.

7 The Commission is considering this matter at  
8 this time. I have carefully reviewed your views and  
9 have prepared a memorandum for consideration by my  
10 fellow Commissioners. Although I do believe that a  
11 reassessment of the SALP process is in order, I do not  
12 believe that suspension of the SALP program is  
13 justified at this time.

14 As you may be aware, a reassessment of the  
15 SALP process is in progress by the staff. The staff  
16 is planning to send two papers to the Commission. The  
17 first paper will address SALP issues raised by the  
18 Inspector General and is expected in mid-January.

19 The second paper will include results of  
20 discussions on the SALP process from the senior  
21 management meeting to be held in Region 5 at the end  
22 of this month in which senior NRC management will  
23 consider the applicable results of the just completed  
24 senior management survey and the ACRS comments on the  
25 SALP process in the analysis. The analysis and

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1 recommendations are expected to be presented to the  
2 Commission in the March, April time frame.

3 I believe the Commission consideration of  
4 any changes to the SALP process should await the staff  
5 assessments and recommendations. The Commission will  
6 inform you of its final position in the near future.  
7 As the Commission has said in the past, we value the  
8 advice of the Committee in areas of its considerable  
9 technical expertise. I encourage you in establishing  
10 the priority of your activities to focus on providing  
11 advice on the highly technical issues facing the  
12 Agency, such as advanced reactor designs and technical  
13 criteria for license renewal. Also on issues such as  
14 reactor aging. I urge you to structure your reviews  
15 involving many technical disciplines in such a way  
16 that the advice to the Commission is well integrated.

17 Do any of my fellow Commissioners have any  
18 additional comments?

19 If not, we stand adjourned.

20 (Whereupon, at 3:04 p.m., the above-entitled  
21 matter was concluded.)  
22  
23  
24  
25

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This is to certify that the attached events of a meeting  
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TITLE OF MEETING: PERIODIC BRIEFING BY ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: JANUARY 11, 1990

were transcribed by me. I further certify that said transcription  
is accurate and complete, to the best of my ability, and that the  
transcript is a true and accurate record of the foregoing events.

Carol Lynch

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

November 20, 1989

Mr. James M. Taylor  
Acting Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: THE RELATIONSHIP OF THE QUANTITATIVE SAFETY GOAL TO THE  
CONCEPT OF ADEQUATE PROTECTION

During the 355th meeting of the Advisory Committee on Reactor Safeguards, November 16-18, 1989, we discussed the concept of "adequate protection" and its role in the plans for implementation of the NRC Safety Goal Policy. We discussed this subject during several previous meetings of the Committee and our Subcommittee on Safety Philosophy, Technology, and Criteria. During this review, we had the benefit of discussions with members of the NRC staff and of the documents referenced.

In a series of reports to the Commission culminating in the report of February 16, 1989, the ACRS has commented on the staff's proposals for implementing the Commission's Safety Goal Policy. We also discussed this subject in a meeting between the ACRS and the Commission on May 3, 1989. Following this meeting and a meeting with the staff on July 26, 1989, the Commission asked for a clarification of the seemingly different positions held by the staff and by the ACRS concerning the role of the concept of adequate protection in the staff's plan for implementing the Safety Goal Policy (Staff Requirements Memorandum dated August 21, 1989). We provided an interim response in our report to Chairman Carr on October 11, 1989.

As an instrument for providing the requested clarification to the Commission, the staff prepared a draft paper entitled, "Adequate Protection As It Relates to Safety Goals: ACRS and Staff Positions," that was forwarded to us for review as an attachment to a memorandum from E. S. Beckjord, Office of Nuclear Regulatory Research, to R. F. Fraley, ACRS, dated November 2, 1989.

We take exception to the description of the ACRS positions, as described in the draft paper, as follows:

- (1) On page 2 of the draft paper, the staff provides a quotation from the Committee's February 16, 1989 report (under Definition of "Adequate Protection"), as follows:

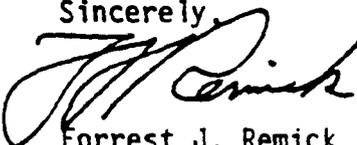
We believe that the safety goal should play an important, but indirect, role in defining adequate protection. Ideally, compliance with the Commission's regulations is a suitable surrogate for defining adequate protection of the public. However, we believe that the adequacy of the regulations should be judged from the viewpoint of whether nuclear power plants, as a class, licensed under those regulations, meet the safety goals. It is our understanding, following discussions with the staff, that the staff proposes the safety goal to be a sort of aspirational objective which would be sought but not necessarily reached.

To provide a better understanding of the ACRS position, the staff should also include the paragraph that precedes the above quotation, namely:

The term "adequate protection" has importance in the legal areas of safety regulation. Although it is needed and used with apparent precision in legal instruments, its technical definition is not precise. In general, it is accepted as equivalent to the term "with no undue risk to public health and safety" often used in other contexts. Another term, "in full compliance with the regulations" is used as a surrogate, on occasion, for either of these.

- (2) Following this quotation, the staff's draft paper describes the ACRS position as, in effect, equating the concepts of "safe enough" and "adequate protection." This is not correct. The ACRS believes that the safety goal sets a standard of what is "safe enough," for the population of plants or a class of plants. As we have consistently stated in our previous reports on this subject, the quantitative safety goal should be used only to judge the adequacy of the NRC's body of regulations and should not be used to judge the adequacy of the design and performance of a particular individual plant. We do not attempt to equate the safety goals to "adequate protection" in the sense in which the courts have recently considered it.

Sincerely,



Forrest J. Remick  
Chairman

References

1. Memorandum dated November 2, 1989 from Eric S. Beckjord, Office of Nuclear Regulatory Research, NRC, to Raymond F. Fraley, ACRS, transmitting Draft Commission Paper for the Commissioners, Subject: Adequate Protection As It Relates To Safety Goals: ACRS and Staff Positions (Predecisional)
2. Memorandum dated August 21, 1989 from S. J. Chilk, Secretary, to J. M. Taylor, Acting EDO, and R. F. Fraley, ACRS, Subject: Staff Requirements - Briefing on Integration of Policy Statements For Severe Accidents, Advanced Reactors, Safety Goals, and Standardization - July 26, 1989



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

October 11, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: ACRS COMMENTS ON THE SAFETY GOAL POLICY AND ITS RELATIONSHIP TO  
THE CONCEPT OF ADEQUATE PROTECTION

During the 354th meeting of the Advisory Committee on Reactor Safeguards, October 5-6, 1989, we discussed implementation of the Commission's Safety Goal Policy and the relationship of the concept of adequate protection to this policy. This was in response to a staff requirements memorandum (SRM) from Mr. Chilk to Mr. Fraley dated August 21, 1989. We had the benefit of discussions with members of the NRC staff during this meeting. We have previously provided our views on implementation of the Safety Goal Policy in several reports to former Chairman Zech, the most recent of which was dated February 16, 1989. We also met with the Commission on this subject on May 3, 1989.

Although our discussions with the staff provided a valuable exchange of views, we have not yet come to agreement with the staff on how the concept of adequate protection should be seen as it relates to the Safety Goal Policy, nor have we yet come to agreement with how the Commission's backfit rule, 10 CFR 50.109, comports with the Safety Goal Policy. We expect to be able to clarify areas of agreement and disagreement on these matters within another month or two, after the staff has had an opportunity to consider discussions held during this meeting.

In general, our position remains as stated in previous reports. That is, on the one hand, compliance with the regulations is generally regarded as presumptive evidence that the public is adequately protected from risk associated with operation of a nuclear power plant. On the other hand, as we have proposed, adequacy of the body of regulations should be judged by whether the population of nuclear power plants built and operated under these regulations is causing risk no greater than the objectives given in the Safety Goal Policy.

10/12..To Chairman's Office for Appropriate Action...Cpys to: RF  
89-1107

October 11, 1989

We believe that the backfit rule, as just one part of the general body of regulations, should be regarded as subordinate to the Safety Goal Policy. We have not developed a position at the present time on whether the backfit rule is entirely consistent with the policy. As we have recommended before, we believe a systematic review of the whole body of regulations and regulatory practice, to assess consistency with the safety goal, should be undertaken. We are not suggesting a massive, resource-intensive effort, but believe plans for a program with carefully developed goals and priorities should be started soon.

We note that, in addition to the issue of adequate protection, there were several other points in our report of February 16, 1989 that described significant disagreements with positions of the staff as expressed in their draft Implementation Plan for the Safety Goal Policy (SECY-89-102), dated March 30, 1989. These disagreements are yet to be resolved.

Sincerely,



Forrest J. Remick  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

IN RESPONSE, PLEASE  
REFER TO: M890810

August 18, 1989

OFFICE OF THE  
SECRETARY

MEMORANDUM FOR: Raymond F. Fraley, Executive Director  
Advisory Committee on Reactor Safeguards

Dade W. Moeller, Chairman  
Advisory Committee on Nuclear Waste

James M. Taylor  
Acting Executive Director for Operations

FROM: John C. Hoyle, Assistant Secretary

SUBJECT: STAFF REQUIREMENTS - PERIODIC BRIEFING BY  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
(ACRS), 2:00 P.M., THURSDAY, AUGUST 10,  
1989, COMMISSIONERS' CONFERENCE ROOM, ONE  
WHITE FLINT NORTH, ROCKVILLE, MARYLAND  
(OPEN TO PUBLIC ATTENDANCE)

The Commission met with the members of the Advisory Committee on Reactor Safeguards (ACRS) to discuss the following issues:

- NRC's Human Factors Program and Initiatives
- Generic Letter Relating to Occupational Radiation Exposure of Skin From Hot Particles
- Application of Diversity in Systems that Use Redundancy to Achieve High Levels of Reliability
- Proposed Resolution of Generic Issue 128, Electrical Power Reliability
- Boiling Water Reactor Core Power Stability

Chairman Carr encouraged the staff to submit by the end of November, 1989, for Commission review and approval the proposed "Interim Standard on Occupational Dose for Skin From Beta Radiation Emitted from a Hot Particle."

(EDO)

(SECY Suspense: 11/30/89)

Chairman Carr also requested the Advisory Committee on Nuclear Waste to provide its views on the ACRS letter of June 14, 1989, entitled, "Division of Responsibility Between the ACRS and the ACNW." These views should be provided following the September meeting scheduled for September 13-15.

(ACNW)

(SECY Suspense: 9/25/89)

Following the ACNW response to the June 14, 1989 ACRS letter, the Commission will provide its guidance to the Committees.

The ACRS stated that it will provide the Commission its recommendations on the following topics:

- a. Thoughts on how to best integrate the regulatory process.  
(ACRS) (SECY Suspense: 11/15/89)
- b. Recommendations on containment design criteria for advanced reactors (not for present and evolutionary reactors).  
(ACRS) (SECY Suspense: 1/19/90)

cc: Chairman Carr  
Commissioner Roberts  
Commissioner Rogers  
Commissioner Curtiss  
OGC  
GPA  
PDR - Advance  
DCS - P1-24

CM7ACRS

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

March 15, 1989

MEMORANDUM FOR: Chairman Zech  
FROM: Forrest J. Remick, Chairman, ACRS  
SUBJECT: CONTAINMENT DESIGN CRITERIA

A handwritten signature in dark ink, appearing to read "F. J. Remick", written over the printed name in the memorandum header.

During the 347th meeting of the Advisory Committee on Reactor Safeguards, March 9-11, 1989, we discussed our plan of action to develop containment design criteria for nuclear power plants, based on current knowledge, in response to the referenced Staff Requirements Memorandum.

Containment performance in response to severe accidents is being considered by several groups within the NRC staff for existing nuclear power plants via the NRC Severe Accident Policy Statement as well as criteria for evolutionary light-water reactors. The Committee will concentrate its efforts on containment design criteria for future reactors, taking into account the work already being done by the staff and others.

An initial subcommittee meeting has been tentatively scheduled for April 18, 1989 to consider this matter.

Reference:

Staff Requirements Memorandum dated July 28, 1988 from Samuel J. Chilk, Secretary, for Raymond F. Fraley, ACRS, Subject: Staff Requirements - Periodic Briefing by the ACRS, Thursday, July 14, 1988

cc: Commissioner Roberts  
Commissioner Carr  
Commissioner Rogers  
Commissioner Curtiss  
OGC  
EDO  
GPA

\*0N16 SP  
1DR6 Sec Record

OM7 ACKS



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

March 15, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED SEVERE ACCIDENT RESEARCH PROGRAM PLAN

During the 347th meeting of the Advisory Committee on Reactor Safeguards, March 9-11, 1989, we discussed with members of the NRC staff a draft Severe Accident Research Program Plan, dated February 1989. Our Subcommittee on Severe Accidents met with the staff on March 7, 1989 to discuss this matter. We also had the benefit of the document referenced.

Because of the staff's schedule for presentation of the plan to the Commission, we were unable to perform a detailed review before preparing this report. However, on the basis of a preliminary review, we make the following comments.

The NRC began the Severe Accident Research Program shortly after the TMI-2 accident. The emphasis was said to be on understanding severe accident phenomena, and in developing a capability to calculate the risks of severe accidents. Computer codes were expected to play a key role in these calculations, and development of these codes and experiments related to their validation have represented a significant part of the severe accident research. Our previous reviews of the program have frequently led us to question the relevance of this research to regulatory needs. As a result, we have written a number of reports to the Commission recommending that there be a closer correlation between the severe accident research proposed and the policy being formulated to ensure protection of the public from the risk of severe accidents. We saw much of the severe accident research as not properly focused to provide the information needed.

In contrast, the February 1989 program plan proposes a review of the information available from previous research to identify areas in which further information is needed for regulatory decisions. Existing and proposed research programs will be reviewed and, if necessary, redirected to make it more likely that the needed information will be developed. It is also proposed that a method of evaluation, such as Code Scaling, Applicability, and Uncertainty recently developed by the staff for analysis of thermal-hydraulic codes, be used to evaluate a number of the severe accident codes. Further, in

- IDRB Sev. Accid.

March 15, 1989

light of the fact that there appears to be duplication among some of the severe accident codes under development, it is proposed to examine which of these codes are needed for regulatory applications, and on the basis of the results, to decide which codes deserve further development. It is also proposed that documentation be required for both existing codes and those under development.

On the basis of our preliminary review, we believe that this program plan represents a substantial change and is a very positive step. We endorse the staff's requirement that all contractors show that their proposed and continuing work address analyses or phenomena important in the predictions of risk, and have clearly defined objectives. We recommend that the Commission encourage the staff to continue in the direction indicated. Because this represents a significant departure from previous practice, some parts of the program are likely to encounter opposition. It is important that this be monitored carefully to ensure that it does not deter the positive aspects of the proposed program.

We expect to continue our review. However, our initial examination leads to the following specific observations.

The near-term program dedicates a major fraction of the total resources to studies of various phenomena associated with direct containment heating (DCH). We believe that as an alternative, a greater priority should be given to studies that might very well demonstrate that risk from DCH is negligibly low, or could be made low by readily achievable plant modifications or procedural changes, thus making much of the proposed DCH related research unnecessary.

The draft plan we have does not indicate how results of previous work or expected results from existing research programs of U.S. industry or foreign organizations are to be factored into the NRC program. We expect to explore this further.

Sincerely,



Forrest J. Remick  
Chairman

Reference:

Memorandum dated February 10, 1989, from Brian W. Sheron, Division Director, Office of Nuclear Regulatory Research, to Forrest J. Remick, Chairman, ACRS, Subject: "Revised Severe Accident Research Program Plan" (Draft plan predecisional).

QMT ACKS



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

February 16, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: FURTHER ACRS COMMENTS ON IMPLEMENTATION OF THE SAFETY GOAL POLICY

During the 346th meeting of the Advisory Committee on Reactor Safeguards, February 9-11, 1989, and in meetings on October 6-7, December 15-16, 1988, and January 12-14, 1989, we continued our review of the NRC staff's plans for implementing the Safety Goal Policy. We had the benefit of a draft paper for Commission approval, "Implementation of Safety Goal Policy," dated January 17, 1989, and of presentations by a member of the staff. We had previously commented to you on this subject in our letters of May 13, 1987, and April 12, 1988, following a number of exchanges with the NRC staff, including several meetings with our Subcommittee on Safety Philosophy, Technology, and Criteria as well as with the full Committee.

Although we agree with the general direction of the staff's recommendations, we have substantive differences about a number of issues. We urge the Commission to implement the policy after considering our recommendations.

Background

The draft paper proposes guidelines for the NRC staff to use in implementing the Safety Goal Policy. These guidelines include the structure of an implementation plan, definitions, and quantitative objectives. The paper calls for these guidelines to be incorporated into the policy statement itself through an amendment. In addition, the paper proposes that potential averted on-site costs be used as an offset to licensee costs in cost-benefit analyses. And finally, the paper asks the Commission itself to consider whether the policy should be amended to clarify the relationship of the safety goal and the statutory standard of adequate protection.

HDR to Safety Goal

2-16-89

February 16, 1989

Before commenting specifically on the staff paper, an observation about the use of probabilistic risk assessment (PRA) and its relation to the safety goal is appropriate. Although it is frequently said that "the bottom line is the weakest part of PRA," the fact remains that the safety goal cannot be implemented without the bottom line. Without this bottom line and a safety goal to which it can be compared, either explicitly or implicitly, PRA becomes a never-ending search for outliers. Although it is satisfying to some engineers and analysts to identify "dominant" contributors to risk, especially those that can be eliminated readily, there is nothing necessarily less safe about a plant that has most of its risk embodied in one or two outlier sequences than a plant that has its risk distributed more or less uniformly over 20 sequences.

#### Structure of the Implementation Plan

The draft paper describes a structure similar to that suggested in our letter of May 13, 1987, but with some differences. We continue to prefer the structure we recommended, a hierarchical arrangement of five levels using the multiple goals in the policy statement of August 6, 1986.

The staff's current proposal is consistent with our recommendations for Levels One and Two. Level One is the pair of qualitative goals and Level Two is the two quantitative health objectives.

Our recommendation for Level Three would be the general performance guideline that large accidental releases should occur no more frequently than  $1E-6$  per reactor-year. The staff's Level Three proposal is similar, but differs in the definition of "large release."

The staff proposal defines a large release as "a release that has a potential for causing an offsite early fatality." We are still not satisfied with this definition for two reasons. First, it can or could be considered as little more than the quantitative health objective in Level Two, but at a level ten times more conservative. Second, this considerable additional conservatism is not accompanied by a significant simplification. The use of the word "potential" in order to encompass the release at Chernobyl will require the use of Level 3 PRA results with a suitable prescription or selection of potential meteorology and population distribution or location. Although this would be possible for specific plants, it would require arbitrary assumptions if the safety goals are to be used to test the sufficiency of the Commission's regulations or to provide a basis for establishing design criteria for containments for future plants.

We continue to believe that a definition in terms of the release itself is preferable. It might be defined in terms of curies, leak

February 16, 1989

or release rate, or fraction of the core or containment inventory. In any case, it should be independent of the site characteristics and should provide some criteria against which the design or performance of containments can be tested. We urge you to request the staff to continue seeking a means to define a large release that is not significantly more conservative than the Level Two health objectives and that focuses the mitigative function on containment design characteristics independent of site or population characteristics.

Our recommendations for Level Four consisted of three specific performance objectives: (1) core melt probability, an expression of the effectiveness of a plant's prevention systems, (2) conditional probability of containment failure, an expression of the effectiveness of a plant's mitigation systems, and (3) an expression of how well a plant is operated. (We use here the term "prevention" to describe those activities and systems intended to keep the reactor core from melting, and "mitigation" to describe those activities and systems intended to keep away from the public fission products that would be released from a melted core.) Level Four proposed by the staff is significantly different from what we recommended. It would consist of only one of the three objectives we recommended, a limit on core damage frequency. This loses the balance between prevention and mitigation, one form of defense-in-depth, that is inherent in our inclusion of a containment performance objective. We believe this balance should be retained.

The staff proposal for Level Four also omits the ACRS recommendation for a quantification or objective statement of how well a plant is operated. We called this a "plant performance objective." We have not been able to develop a workable definition for this, nor has the staff. In light of this, we rely upon the alternative recommendation made in our letter of April 12, 1988: "If this cannot be done, a prominent caveat, e.g., a warning that PRA results do not tell the full story, should be made a part of the policy or of the implementation plan." We recommend that such a statement be made an explicit part of the plan.

In our letter of May 13, 1987, we recommended a quantitative objective of  $1E-4$  per reactor-year for "core melt" as a part of the Level Four performance objectives. In our letter of April 12, 1988, we more carefully defined the event that should be associated with this quantitative objective as the "loss of adequate core cooling (core overheating beyond design-basis limits)." The staff proposal seems to agree with our recommendation. We caution, however, that comparisons of this objective with some of those proposed by others under the description of core melt probability can be misleading.

We disagree with the staff's proposal to use  $1E-5$  per reactor-year as the target for mean core damage frequency for future plants. This difference from the objective for existing plants introduces an arbitrary level of conservatism which conflicts with the criterion we suggested for linking the hierarchical levels of safety goal objectives; that is, that each subordinate level of the hierarchy should be consistent with the level above and should not be so conservative as to create a de facto new policy. Not only would the staff proposal introduce a major inconsistency with the Level Two and Three objectives, but it would result in loss of balance between prevention and mitigation because arguments could then be made that the higher levels of the safety goal hierarchy could be met readily without the need for accident mitigation systems such as containment buildings. The Commission's safety goal should be the same whether considering the adequacy of regulations for existing plants or for future designs, and whether for LWRs or other types of reactor plants.

#### Definition of "Adequate Protection"

The term "adequate protection" has importance in the legal areas of safety regulation. Although it is needed and used with apparent precision in legal instruments, its technical definition is not precise. In general, it is accepted as equivalent to the term "with no undue risk to public health and safety" often used in other contexts. Another term, "in full compliance with the regulations" is used as a surrogate, on occasion, for either of these.

We believe that the safety goal should play an important, but indirect, role in defining adequate protection. Ideally, compliance with the Commission's regulations is a suitable surrogate for defining adequate protection of the public. However, we believe that the adequacy of the regulations should be judged from the viewpoint of whether nuclear power plants, as a class, licensed under those regulations, meet the safety goals. It is our understanding, following discussions with the staff, that the staff proposes the safety goal to be a sort of aspirational objective which would be sought but not necessarily reached.

With the safety goal approach now proposed by the staff, a class of plants that meets existing regulations (therefore meeting a standard of adequate protection) would be obliged to make improvements up to the safety goal, if cost-benefit arguments so dictated. The implementation plan proposed earlier by the staff would have used the safety goal as the minimum standard (i.e., adequate protection) and cost-benefit arguments could have been used to justify further

February 16, 1989

improvements, without other limits. We believe that neither of these approaches is a proper use of the Safety Goal Policy.

We believe that the proper use of the safety goals is embodied in two principles which we have previously recommended:

- (1) The safety goal is a definition of how safe is safe enough.
- (2) At the present time, the safety goal should be applied to judging the adequacy of regulations and regulatory practices, and not to make specific decisions about individual plants.

The Commission has taken a bold and progressive step in proclaiming the Safety Goal Policy. It is an attempt to place the regulation of safety in nuclear power plants in an appropriate context relative to other risks in society. It is imperfect, but it is as useful a step as has been taken by any industry or regulatory agency. Using concepts of cost-benefit analysis or, even worse, ALARA (as low as reasonably achievable), dilutes the achievement and effectiveness of the Safety Goal Policy. We believe that the safety goal is a good present standard for "how safe is safe enough." Further, as we have stated earlier, we believe that the safety goals should be used to judge the adequacy of the regulations from the standpoint of whether those regulations result in classes of nuclear power plants which can be and are operated in such a way as to meet the safety goals, and thus provide adequate protection to the public.

A wide community of safety experts and policy makers has concurred, after extended deliberation, in accepting the Safety Goal Policy as reasonable, based on present knowledge. It may be that future information about reactor risk or societal risk will cause a need to adjust the safety goal one way or another, or to make different implicit allowance for uncertainty. Until that happens, we believe that the safety goal should be accepted as an unambiguous working standard for the regulation of nuclear power, along the lines we have suggested.

#### Cost-Benefit Analysis

The staff paper proposes that cost-benefit analyses made to evaluate proposed plant safety improvements should use averted on-site costs as an offset to the plant costs entailed in making such improvements. We believe that this is appropriate in making cost-benefit assessments, although it inevitably adds uncertainty to the results. However, as discussed above and as we stated in our letter of April

February 16, 1989

12, 1988, we believe cost-benefit analysis is not properly a part of safety goal implementation (in contrast to "backfit" implementation).

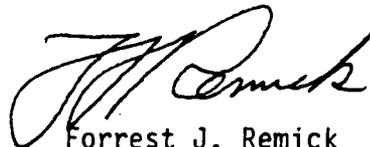
Incorporation of Guidelines Into the Policy

We concur with the staff proposal to incorporate certain of the implementation guidelines as amendments to the policy statement. We have no preferences or comments about the details of this, beyond the reminder that the safety goal is a policy statement, not a regulation.

Coherence Among Regulatory Policies

The Safety Goal Policy has been in existence for some time and has, in fact, been an influence in recent regulatory activities. We believe a clear implementation plan is necessary to ensure that it is applied comprehensively, consistently and unambiguously. Several major Commission decisions are presently on the horizon regarding, for example, the Severe Accident Policy, the issue of Mark I containment adequacy, certification of advanced reactor designs, and evaluation of plant operations. In each of the these, the question "how safe is safe enough" must be answered, either implicitly or explicitly. The safety goal can and should bring greater objectivity, consistency and clarity to deliberations and decisions about these issues.

Sincerely,



Forrest J. Remick  
Chairman

Reference

Draft Proposed Paper from V. Stello, Jr., Executive Director for Operations, to the Commissioners, Subject: Implementation of Safety Goal Policy (Predecisional) (received January 17, 1989).



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

IN RESPONSE, PLEASE  
REFER TO: M880714

July 28, 1988

OFFICE OF THE  
SECRETARY

MEMORANDUM FOR: Raymond F. Fraley, Executive Director  
Advisory Committee on Reactor Safeguards

FROM: Samuel J. Chilk, Secretary 

SUBJECT: STAFF REQUIREMENTS - PERIODIC BRIEFING BY THE  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
(ACRS), 2:00 P.M., THURSDAY, JULY 14, 1988,  
COMMISSIONERS' CONFERENCE ROOM, ONE WHITE  
FLINT NORTH, ROCKVILLE, MARYLAND (OPEN TO  
PUBLIC ATTENDANCE)

The Commission met with the Advisory Committee on Reactor Safeguards (ACRS) to discuss the staff's proposed generic letter on individual plant examination (IPE) and the Integrated Safety Assessment Program II.

Chairman Zech requested the ACRS to submit a paper on design criteria for containments based on present knowledge. He requested the ACRS to outline the issues and provide recommendations.

(ACRS)

(SECY Suspense: 3/31/89)

Commissioner Roberts reminded the Committee of the Commission's prior request for the ACRS' active participation in the staff's effort to develop a notice of proposed rulemaking on maintenance at nuclear power plants.

cc: Chairman Zech  
Commissioner Roberts  
Commissioner Carr  
Commissioner Rogers  
OGC  
EDO  
GPA  
PDR - Advance  
DCS - P1-124



## **POLICY ISSUE** **(Information)**

December 14, 1989

SECY-89-375

For: The Commissioners

From: James M. Taylor  
Executive Director  
for Operations

Subject: ADEQUATE PROTECTION AS IT RELATES TO SAFETY GOALS: ACRS AND  
STAFF POSITIONS

Purpose: To respond to the Commission's request to identify clearly the differences between ACRS and staff positions on the stated subject. (Staff Requirements Memorandum M890726A, dated August 21, 1989.)

Background: The staff recommendation on this subject was provided in SECY-89-102, Implementation of Safety Goal Policy, dated March 30, 1989. The ACRS recommendations for implementing Safety Goal Policy are contained in its letter dated May 13, 1987 and supplemented in letters dated April 12, 1988 and July 20, 1988. None of those letters make a specific reference to the statutory standard of adequate protection. In its letters dated February 16, 1989 and November 20, 1989, the ACRS has addressed its position on this subject.

Summary: The staff's position, as stated in SECY-89-102, is that none of the safety goal objectives should be construed as targets for a "generic" and quantitative adequate protection standard. The ACRS position is summarized in the last sentence of its November 20, 1989 letter, viz., "We do not attempt to equate the safety goals to 'adequate protection' in the sense in which the courts have recently considered it." On this key point, therefore, the ACRS and the staff positions do not differ.

Discussion: In its Policy Statement on Safety Goals for the Operation of Nuclear Power Plants, the Commission states that "its objective is to establish goals that broadly define an acceptable level of radiological risk." Taken in its entirety, the staff believes that the Commission did not

Contact: R. W. Houston, RES  
X23904

intend that the "acceptable level of radiological risk" as defined by the safety goals, be construed directly or indirectly, as a measure or threshold definition of the concept of adequate protection. For example, in the text of the policy statement dealing with the treatment of uncertainties, the Commission notes that the "use of mean estimates comports with the customary practices for cost-benefit analyses and it is the correct usage for purposes of the mortality risk comparisons." The staff understands this to mean that if new requirements were to be imposed to bring plants into closer conformance with safety goal objectives, it would be appropriate to employ cost-benefit considerations. Requirements imposed by a process that considers costs, however, cannot legally be part of the statutory standard of adequate protection. These are the considerations that led the staff to its recommendation "...that none of the safety goal objectives be construed as targets for a generic and quantitative adequate protection standard (SECY-89-102, pp. 5)."

The staff's earlier understanding of the ACRS position on this subject was discussed in SECY-89-102, pp. 4-5. The inference drawn by the staff at that time appears now to have been an incorrect interpretation of the ACRS position.

Under a general heading of Definition of "Adequate Protection," the ACRS stated in its February 16, 1989 letter (Enclosure 1) that:

"The term 'adequate protection' has importance in the legal areas of safety regulation. Although it is needed and used with apparent precision in legal instruments, its technical definition is not precise. In general, it is accepted as equivalent to the term 'with no undue risk to public health and safety' often used in other contexts. Another term, 'in full compliance with the regulations' is used as a surrogate, on occasion, for either of these.

We believe that the safety goal should play an important, but indirect, role in defining adequate protection. Ideally, compliance with the Commission's regulations is a suitable surrogate for defining adequate protection of the public. However, we believe that the adequacy of the regulations should be judged from the viewpoint of whether nuclear power plants, as a class, licensed under those regulations, meet the safety goals."

Further on, in the same section of the February 16, 1989 letter, the ACRS reiterated its view that "The safety goal is a definition of how safe is safe enough." The staff tentatively interpreted this as, in effect, equating "safe enough" with "adequate protection." This interpretation was based in part on the ACRS view that cost-benefit arguments should not be used to revise regulatory requirements when the purpose of the revisions is directed toward achievement of safety performance based upon safety goal guidance. (ACRS letters dated April 12, 1988 and February 16, 1989). In the final paragraph of its letter dated November 20, 1989 (Enclosure 2), the ACRS notes, however, that it did not equate the concepts of "safe enough" and "adequate protection."

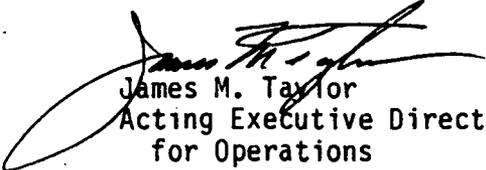
In the staff's recommendation the concept of "safe enough" is also equated with safety goals and not with "adequate protection." The staff interprets "adequate protection" in this context as having a connotation of a basic level of protection, consistent with its meaning in the Backfit Rule, 10 CFR 50.109. With respect to the concept of "safe enough", the staff interprets this to mean a level of safety such that no further improvements in safety would be justifiable on cost-benefit grounds for regulatory action. That is, the residual margin for further risk reduction would just be too small. Thus, the use or non-use of cost-benefit in conjunction with the concept of safe enough and safety goals remains a principal difference between staff and ACRS positions.

Thus, the staff views levels of safety at which plants are licensed to operate as falling within a conceptual range. The lower part of the range is at a (non-quantified) level of adequate protection that may vary somewhat from plant to plant, and the upper part is represented generically by the safety goals and "safe enough." The staff sees no need to quantify generically a basic level of adequate protection in terms of risk.

Conclusion:

The staff believes that its recommendation would harmonize the Backfit Rule (10 CFR 50.109) with Safety Goal Policy, as we understand it. Further, the staff continues to believe that past and current practice of addressing the statutory standard of adequate protection should continue as a case-by-case determination, and that compliance with the Commission's regulations continue to be presumptive evidence that provides the assurance of adequate protection, as discussed in the preamble to the 1988 revision of the Backfit Rule.

Coordination: The Office of the General Counsel has reviewed this paper and has no legal objection to it.

  
James M. Taylor  
Acting Executive Director  
for Operations

Enclosures: As stated

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SECY



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

February 16, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: FURTHER ACRS COMMENTS ON IMPLEMENTATION OF THE SAFETY GOAL  
POLICY

During the 346th meeting of the Advisory Committee on Reactor Safeguards, February 9-11, 1989, and in meetings on October 6-7, December 15-16, 1988, and January 12-14, 1989, we continued our review of the NRC staff's plans for implementing the Safety Goal Policy. We had the benefit of a draft paper for Commission approval, "Implementation of Safety Goal Policy," dated January 17, 1989, and of presentations by a member of the staff. We had previously commented to you on this subject in our letters of May 13, 1987, and April 12, 1988, following a number of exchanges with the NRC staff, including several meetings with our Subcommittee on Safety Philosophy, Technology, and Criteria as well as with the full Committee.

Although we agree with the general direction of the staff's recommendations, we have substantive differences about a number of issues. We urge the Commission to implement the policy after considering our recommendations.

Background

The draft paper proposes guidelines for the NRC staff to use in implementing the Safety Goal Policy. These guidelines include the structure of an implementation plan, definitions, and quantitative objectives. The paper calls for these guidelines to be incorporated into the policy statement itself through an amendment. In addition, the paper proposes that potential averted on-site costs be used as an offset to licensee costs in cost-benefit analyses. And finally, the paper asks the Commission itself to consider whether the policy should be amended to clarify the relationship of the safety goal and the statutory standard of adequate protection.

February 16, 1989

Before commenting specifically on the staff paper, an observation about the use of probabilistic risk assessment (PRA) and its relation to the safety goal is appropriate. Although it is frequently said that "the bottom line is the weakest part of PRA," the fact remains that the safety goal cannot be implemented without the bottom line. Without this bottom line and a safety goal to which it can be compared, either explicitly or implicitly, PRA becomes a never-ending search for outliers. Although it is satisfying to some engineers and analysts to identify "dominant" contributors to risk, especially those that can be eliminated readily, there is nothing necessarily less safe about a plant that has most of its risk embodied in one or two outlier sequences than a plant that has its risk distributed more or less uniformly over 20 sequences.

#### Structure of the Implementation Plan

The draft paper describes a structure similar to that suggested in our letter of May 13, 1987, but with some differences. We continue to prefer the structure we recommended, a hierarchical arrangement of five levels using the multiple goals in the policy statement of August 6, 1986.

The staff's current proposal is consistent with our recommendations for Levels One and Two. Level One is the pair of qualitative goals and Level Two is the two quantitative health objectives.

Our recommendation for Level Three would be the general performance guideline that large accidental releases should occur no more frequently than  $1E-6$  per reactor-year. The staff's Level Three proposal is similar, but differs in the definition of "large release."

The staff proposal defines a large release as "a release that has a potential for causing an offsite early fatality." We are still not satisfied with this definition for two reasons. First, it can or could be considered as little more than the quantitative health objective in Level Two, but at a level ten times more conservative. Second, this considerable additional conservatism is not accompanied by a significant simplification. The use of the word "potential" in order to encompass the release at Chernobyl will require the use of Level 3 PRA results with a suitable prescription or selection of potential meteorology and population distribution or location. Although this would be possible for specific plants, it would require arbitrary assumptions if the safety goals are to be used to test the sufficiency of the Commission's regulations or to provide a basis for establishing design criteria for containments for future plants.

We continue to believe that a definition in terms of the release itself is preferable. It might be defined in terms of curies, leak

February 16, 1989

or release rate, or fraction of the core or containment inventory. In any case, it should be independent of the site characteristics and should provide some criteria against which the design or performance of containments can be tested. We urge you to request the staff to continue seeking a means to define a large release that is not significantly more conservative than the Level Two health objectives and that focuses the mitigative function on containment design characteristics independent of site or population characteristics.

Our recommendations for Level Four consisted of three specific performance objectives: (1) core melt probability, an expression of the effectiveness of a plant's prevention systems, (2) conditional probability of containment failure, an expression of the effectiveness of a plant's mitigation systems, and (3) an expression of how well a plant is operated. (We use here the term "prevention" to describe those activities and systems intended to keep the reactor core from melting, and "mitigation" to describe those activities and systems intended to keep away from the public fission products that would be released from a melted core.) Level Four proposed by the staff is significantly different from what we recommended. It would consist of only one of the three objectives we recommended, a limit on core damage frequency. This loses the balance between prevention and mitigation, one form of defense-in-depth, that is inherent in our inclusion of a containment performance objective. We believe this balance should be retained.

The staff proposal for Level Four also omits the ACRS recommendation for a quantification or objective statement of how well a plant is operated. We called this a "plant performance objective." We have not been able to develop a workable definition for this, nor has the staff. In light of this, we rely upon the alternative recommendation made in our letter of April 12, 1988: "If this cannot be done, a prominent caveat, e.g., a warning that PRA results do not tell the full story, should be made a part of the policy or of the implementation plan." We recommend that such a statement be made an explicit part of the plan.

In our letter of May 13, 1987, we recommended a quantitative objective of  $1E-4$  per reactor-year for "core melt" as a part of the Level Four performance objectives. In our letter of April 12, 1988, we more carefully defined the event that should be associated with this quantitative objective as the "loss of adequate core cooling (core overheating beyond design-basis limits)." The staff proposal seems to agree with our recommendation. We caution, however, that comparisons of this objective with some of those proposed by others under the description of core melt probability can be misleading.

February 16, 1989

We disagree with the staff's proposal to use  $1E-5$  per reactor-year as the target for mean core damage frequency for future plants. This difference from the objective for existing plants introduces an arbitrary level of conservatism which conflicts with the criterion we suggested for linking the hierarchical levels of safety goal objectives; that is, that each subordinate level of the hierarchy should be consistent with the level above and should not be so conservative as to create a de facto new policy. Not only would the staff proposal introduce a major inconsistency with the Level Two and Three objectives, but it would result in loss of balance between prevention and mitigation because arguments could then be made that the higher levels of the safety goal hierarchy could be met readily without the need for accident mitigation systems such as containment buildings. The Commission's safety goal should be the same whether considering the adequacy of regulations for existing plants or for future designs, and whether for LWRs or other types of reactor plants.

#### Definition of "Adequate Protection"

The term "adequate protection" has importance in the legal areas of safety regulation. Although it is needed and used with apparent precision in legal instruments, its technical definition is not precise. In general, it is accepted as equivalent to the term "with no undue risk to public health and safety" often used in other contexts. Another term, "in full compliance with the regulations" is used as a surrogate, on occasion, for either of these.

We believe that the safety goal should play an important, but indirect, role in defining adequate protection. Ideally, compliance with the Commission's regulations is a suitable surrogate for defining adequate protection of the public. However, we believe that the adequacy of the regulations should be judged from the viewpoint of whether nuclear power plants, as a class, licensed under those regulations, meet the safety goals. It is our understanding, following discussions with the staff, that the staff proposes the safety goal to be a sort of aspirational objective which would be sought but not necessarily reached.

With the safety goal approach now proposed by the staff, a class of plants that meets existing regulations (therefore meeting a standard of adequate protection) would be obliged to make improvements up to the safety goal, if cost-benefit arguments so dictated. The implementation plan proposed earlier by the staff would have used the safety goal as the minimum standard (i.e., adequate protection) and cost-benefit arguments could have been used to justify further

February 16, 1989

improvements, without other limits. We believe that neither of these approaches is a proper use of the Safety Goal Policy.

We believe that the proper use of the safety goals is embodied in two principles which we have previously recommended:

- (1) The safety goal is a definition of how safe is safe enough.
- (2) At the present time, the safety goal should be applied to judging the adequacy of regulations and regulatory practices, and not to make specific decisions about individual plants.

The Commission has taken a bold and progressive step in proclaiming the Safety Goal Policy. It is an attempt to place the regulation of safety in nuclear power plants in an appropriate context relative to other risks in society. It is imperfect, but it is as useful a step as has been taken by any industry or regulatory agency. Using concepts of cost-benefit analysis or, even worse, ALARA (as low as reasonably achievable), dilutes the achievement and effectiveness of the Safety Goal Policy. We believe that the safety goal is a good present standard for "how safe is safe enough." Further, as we have stated earlier, we believe that the safety goals should be used to judge the adequacy of the regulations from the standpoint of whether those regulations result in classes of nuclear power plants which can be and are operated in such a way as to meet the safety goals, and thus provide adequate protection to the public.

A wide community of safety experts and policy makers has concurred, after extended deliberation, in accepting the Safety Goal Policy as reasonable, based on present knowledge. It may be that future information about reactor risk or societal risk will cause a need to adjust the safety goal one way or another, or to make different implicit allowance for uncertainty. Until that happens, we believe that the safety goal should be accepted as an unambiguous working standard for the regulation of nuclear power, along the lines we have suggested.

#### Cost-Benefit Analysis

The staff paper proposes that cost-benefit analyses made to evaluate proposed plant safety improvements should use averted on-site costs as an offset to the plant costs entailed in making such improvements. We believe that this is appropriate in making cost-benefit assessments, although it inevitably adds uncertainty to the results. However, as discussed above and as we stated in our letter of April

February 16, 1989

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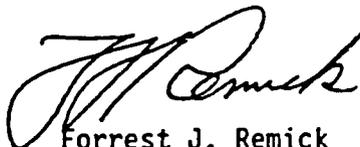
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Coherence Among Regulatory Policies

The Safety Goal Policy has been in existence for some time and has, in fact, been an influence in recent regulatory activities. We believe a clear implementation plan is necessary to ensure that it is applied comprehensively, consistently and unambiguously. Several major Commission decisions are presently on the horizon regarding, for example, the Severe Accident Policy, the issue of Mark I containment adequacy, certification of advanced reactor designs, and evaluation of plant operations. In each of these, the question "how safe is safe enough" must be answered, either implicitly or explicitly. The safety goal can and should bring greater objectivity, consistency and clarity to deliberations and decisions about these issues.

Sincerely,



Forrest J. Remick  
Chairman

Reference

Draft Proposed Paper from V. Stello, Jr., Executive Director for Operations, to the Commissioners, Subject: Implementation of Safety Goal Policy (Predecisional) (received January 17, 1989).



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

November 20, 1989

Mr. James M. Taylor  
Acting Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: THE RELATIONSHIP OF THE QUANTITATIVE SAFETY GOAL TO THE  
CONCEPT OF ADEQUATE PROTECTION

During the 355th meeting of the Advisory Committee on Reactor Safeguards, November 16-18, 1989, we discussed the concept of "adequate protection" and its role in the plans for implementation of the NRC Safety Goal Policy. We discussed this subject during several previous meetings of the Committee and our Subcommittee on Safety Philosophy, Technology, and Criteria. During this review, we had the benefit of discussions with members of the NRC staff and of the documents referenced.

In a series of reports to the Commission culminating in the report of February 16, 1989, the ACRS has commented on the staff's proposals for implementing the Commission's Safety Goal Policy. We also discussed this subject in a meeting between the ACRS and the Commission on May 3, 1989. Following this meeting and a meeting with the staff on July 26, 1989, the Commission asked for a clarification of the seemingly different positions held by the staff and by the ACRS concerning the role of the concept of adequate protection in the staff's plan for implementing the Safety Goal Policy (Staff Requirements Memorandum dated August 21, 1989). We provided an interim response in our report to Chairman Carr on October 11, 1989.

As an instrument for providing the requested clarification to the Commission, the staff prepared a draft paper entitled, "Adequate Protection As It Relates to Safety Goals: ACRS and Staff Positions," that was forwarded to us for review as an attachment to a memorandum from E. S. Beckjord, Office of Nuclear Regulatory Research, to R. F. Fraley, ACRS, dated November 2, 1989.

We take exception to the description of the ACRS positions, as described in the draft paper, as follows:

- (1) On page 2 of the draft paper, the staff provides a quotation from the Committee's February 16, 1989 report (under Definition of "Adequate Protection"), as follows:

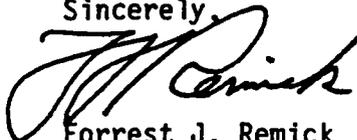
We believe that the safety goal should play an important, but indirect, role in defining adequate protection. Ideally, compliance with the Commission's regulations is a suitable surrogate for defining adequate protection of the public. However, we believe that the adequacy of the regulations should be judged from the viewpoint of whether nuclear power plants, as a class, licensed under those regulations, meet the safety goals. It is our understanding, following discussions with the staff, that the staff proposes the safety goal to be a sort of aspirational objective which would be sought but not necessarily reached.

To provide a better understanding of the ACRS position, the staff should also include the paragraph that precedes the above quotation, namely:

The term "adequate protection" has importance in the legal areas of safety regulation. Although it is needed and used with apparent precision in legal instruments, its technical definition is not precise. In general, it is accepted as equivalent to the term "with no undue risk to public health and safety" often used in other contexts. Another term, "in full compliance with the regulations" is used as a surrogate, on occasion, for either of these.

- (2) Following this quotation, the staff's draft paper describes the ACRS position as, in effect, equating the concepts of "safe enough" and "adequate protection." This is not correct. The ACRS believes that the safety goal sets a standard of what is "safe enough," for the population of plants or a class of plants. As we have consistently stated in our previous reports on this subject, the quantitative safety goal should be used only to judge the adequacy of the NRC's body of regulations and should not be used to judge the adequacy of the design and performance of a particular individual plant. We do not attempt to equate the safety goals to "adequate protection" in the sense in which the courts have recently considered it.

Sincerely,



Forrest J. Remick  
Chairman

References

1. Memorandum dated November 2, 1989 from Eric S. Beckjord, Office of Nuclear Regulatory Research, NRC, to Raymond F. Fraley, ACRS, transmitting Draft Commission Paper for the Commissioners, Subject: Adequate Protection As It Relates To Safety Goals: ACRS and Staff Positions (Predecisional)
2. Memorandum dated August 21, 1989 from S. J. Chilk, Secretary, to J. M. Taylor, Acting EDO, and R. F. Fraley, ACRS, Subject: Staff Requirements - Briefing on Integration of Policy Statements For Severe Accidents, Advanced Reactors, Safety Goals, and Standardization - July 26, 1989