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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEES ON REACTOR RADIOLOGICAL EFFECTS

AND

SITE EVALUATION

Room 1046
1717 H Street, N.W.
Washington, D.C.

Saturday, Nov. 13, 1982

The Subcommittees on Reactor Radiological Effects and Site Evaluation met, pursuant to recess, at 8:30 a.m., Dade Moeller, Chairman, presiding.

ACRS MEMBERS PRESENT:

D. Moeller
J. Ray
Mr. Axtmann

ALSO PRESENT:

Mr. Muller
Mr. Kathern
Mr. Shapiro
Mr. Parker

DESIGNATED FEDERAL EMPLOYEE:

Mr. McKinley

P R O C E E D I N G S

(8:30 a.m.)

MR. MOELLER: Good morning, the meeting will now come to order. This is a continuation of the meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Reactor Radiological Effects and Site Evaluation. We will simply pick up where we left off yesterday and continue, then, with our meeting. And we have two topics remaining on the agenda.

The first one is on the proposed amendment to 10 CFR Part 50, the ALARA rule for nuclear power plant operating licensees. And the second item we have this morning will be consideration of seismic events in nuclear power plant emergency planning.

After we have covered these two topics in open session, we will then go into Executive Session, remaining open to the public, but we will go into Executive Session to try to reach a consensus among the subcommittee members and our consultants on what our conclusions are regarding each of the several topics we covered yesterday and which we will cover today.

For the first discussion to lead us in the discussion and bring us up to date on the proposed amendment to 10 CFR Part 50 regulation, we have with us Bob Alexander from the NRC staff. Bob, why don't you

just sit at the table if you want to with us, wherever convenient. You know, Bob, of course, that yesterday we covered the proposed revised 10 CFR Part 20, and if there are tie-ins, which there are, between that and your proposed changes, we would like to hear about those.

MR. ALEXANDER: All right. I appreciate the opportunity to join you here on Saturday morning at 8:30. It's always a privilege.

(Laughter.)

I do look forward to meeting with the subcommittee. I don't know whether all of you know it or not, but for about the past 10 years I have been with the Occupational Radiation Protection Branch. Most of the regulation guides and research reports that we are able to publisy do not come easily. It's always a battle, usually one that takes several years.

There have been a number of times when this subcommittee has been of material assistance to us, and as I will point out -- are you going to devote an hour to this topic?

MR. MOELLER: Yes.

MR. ALEXANDER: We will have time to get into it depth. As I will point out, I believe there is an opportunity for the subcommittee to help us on this one. We have not rushed into this rule.

We started on it eight years ago in 1974 when the Director of the Office of Inspection and Enforcement wrote a letter to the Director of the Office of Standards Development saying that he felt some teeth needed to be put into the occupational ALARA concept; that they were having great difficulty in enforcing that concept because of lack of any firm criteria, and because the rule in Part 20 is preparatory, using the word "should" rather than "shall" and is considered to be unenforceable. We went to work on that rule, and issued a report in '77, I believe, and sent a full commission paper to the Commission in '78.

A little later on, after some additional activities took place, the Commission sent us what we call a Chilk-o-gram, a directive from the Secretary of the Commission giving us nine things they wanted us to do, or at least to consider. They gave us three things they wanted us to do and six things they wanted us to consider doing in the occupational ALARA area. I will only mention the three things they directed us to do.

One was to establish -- to take what we call the qualitative approach to the ALARA concept in a regulation. We used that -- those terms "qualitative" and "quantitative" -- to distinguish between quantitative rules which would establish numbers which

we would attach the ALARA concept to, which staff didn't want to do, and several other approaches.

The one the staff recommended to the Commission was to take an approach whereby we would attempt to bring the safety performance of the reactors that were not doing so well up to the level of those we considered to be doing very well. We thought that would be a reasonable thing to do. That was tantamount to assuming that the good performers were good enough, and suitable criteria. And the things they were doing were demonstrated by practice to be reasonable in cost. We haven't gone back yet to the Commission.

I wanted to get to all three things. The second thing they asked for was a rule which would require the power plants to establish occupational collective dose objectives, annual objectives. And the third thing was to require, for very high man rem tasks, a prior review by the NRC staff. They didn't specify a number for the size of the task, but we talked about 1000 man rems as being the cutoff point.

Now, what I want to talk to you about today is our response to this Chilk-o-gram.

MR. MOELLER: Bob, on that, I'm sure you will cover it, but when we reviewed 10 CFR 20, the proposed revision, one of the things it says, as I recall is,

that they will not establish collective dose objectives.

MR. ALEXANDER: That's right.

MR. MOELLER: Is that in concert with what you are thinking about here?

MR. ALEXANDER: Yes.

MR. MOELLER: All right.

MR. ALEXANDER: Before getting to the Commission paper that we are about ready to send forward, I thought we might discuss the need for this rule a little bit.

I mentioned that the rule that we have covering the ALARA concept is preparatory, and that is germane to our problem, because it affects enforceability so much.

Another thing that has pointed us in the direction of trying to do more in this area are the radiation protection deficiencies observed in the health physics appraisals conducted following TMI. I don't know whether you've had an opportunity to look at the report published of those appraisals, but --

MR. MOELLER: The subcommittee has met. I am not sure that any of the consultants here were at those meetings, but we did meet with the staff on that and they highlighted the major deficiencies.

MR. ALEXANDER: Fine. I think the appraisal

report was surprising to a lot of people who felt that occupational health physics was in much better shape than the appraisals revealed to be. It was surprising to a lot of people. It has affected the thinking of the staff.

Then I should, of course, mention an increase in collective dose at the power plants that we have been observing -- a steady increase over several years with a dramatic increase in 1980 over 1979 that was sutained for 1981. The doses are running about 50,000, 54,000 man rems per year now.

Another thing that weighs heavily on our minds is the experience, the nuclear Navy experience. At the risk of repeating something you already know, I should mention that in the nuclear Navy in the early sixties, they were experiencing the same thing we are experiencing now with their submarines and other vessels, and that is a steady increase in the annual collective dose.

They determined to turn that around and were able to do so. As I recall, the collective dose in that program peaked in 1967 and has been coming down steadily since that time, despite the fact that more and more ships have been launched. So that tells us that it can be done and makes us wish that we could do it in the

commercial nuclear power program.

MR. AXTMANN: Do you mean the total man rem per year is coming down, despite more ships?

MR. ALEXANDER: Yes, it has been since 1967. It continues to come down.

MR. AXTMANN: Sixty-seven?

MR. ALEXANDER: Sixty-seven. I believe it peaked in '67. Of course, the decline is not as rapid now as it was at first, but for several years there, for about a decade, 67 to 77, it was quite a dramatic reduction. So we know it can be done.

There are reasons why the Nuclear Regulatory Commission can't take the same -- many of the same actions as Admiral Rickover was able to take in his own program. But we are looking for ways to encourage the industry to do this itself. And one of the manifestations of that attempt has been to establish a rapport with INPO. Jack, what does that acronym stand for?

MR. BELL: Institute for Nuclear Power Operations.

MR. ALEXANDER: Institute for Nuclear Power Operations. We are interested in what they can do. They have a number of people from the nuclear Navy program in there, the Health Physics Program, and one of

the mangers is Bill Kimbley who was very instrumental in the success that the nuclear Navy enjoyed. He has a goal similar to that he enjoyed before with nuclear Navy. He hopes to see that happen in the commercial power industry. And of course, we are behind him 100 percent.

As a matter of fact, --

MR. MOELLER: What was his name again?

MR. ALEXANDER: Kimbley. He was assistant to Murray Miles. We are entering into an agreement with INPO in the radiological health protection area, a written agreement, which is I believe ready for signature now by Wilkinson, the head of INPO and by our Executive Director for Operations, Mr. Dircks. I believe the plan is to delay the signatures until this rule is presented to the Commission to get their reaction.

In our commission paper accompanying this rule we tell the Commission about our work with INPO. This is a very important aspect of my talk this morning that I will return to.

As a matter of fact, we see the rule primarily at this point as being a stimulus to utility performance. We look at the rule not as one that, by itself, would turn anything around, but as an

appropriate rule for a plan which would give INPO -- that is to say, would give the industry itself -- the opportunity to make the necessary corrections on its own without government interference, and only to interfere with proscriptive rules if the industry fails itself.

Many of us have high hopes that the INPO program will work and that the Nuclear Regulatory Commission will not have to go further. Are there any questions about the need for the rule at this point?

MR. MOELLER: Will you refresh us or tell us a little bit how INPO is going about this, or are they setting goals for each year -- a 10 percent or 5 percent reduction or something that you can measure or judge their performance by?

MR. ALEXANDER: I don't think they're that ambitious at this point. I think the first thing is to arrest the upward trend. Now, the upward trend may be arrested by itself, temporarily at least, by the fact that in a little while all of the additional chores we impose upon the plants because of TMI will be completed. There's no question but that those chores are causing a lot of the increase in collective doses that we're seeing.

I believe the staff estimates at least 33 percent of that additional dose is due to our own

requirements.

MR. AXTMANN: You said that the trend has been up, monotonically going up. But I imagine that is an average figure. Are there some older plants where the trend has gone down? That is, something that might be attributed to the particular management of a given utility, or is it the situation you described first, the older plants are worse than the newer plants? Is that it?

MR. ALEXANDER: I think we learned more about the answer to that question from the appraisal program than we can learn from examination of the dose data. The dose data jump around quite a bit. A reactor will go along for years at a few hundred man rems per year and then they will have a steam generator replacement or something like that and it will go up to 8000. At the same time, another reactor that had 8000 the previous year goes down to 400.

MR. AXTMANN: Well, you could just wipe that out if you knew how much actually was -- and I suspect you do -- how much was due to the steam generator.

MR. ALEXANDER: Yes, we do know and it would be interesting to subtract that out and then look at the individual plant. But the appraisal program showed us that the plants that do well in the radiological control

area are plants in which the management is particularly interested and active in radiological controls. And plants where a more cavalier attitude is taken don't do so well. So there seems to be a direct relationship between the interest of management and --

MR. AXTMANN: That is what my original question was. Can you identify good and bad management?

MR. ALEXANDER: I think that was done in the appraisal program pretty readily. I don't think it's difficult.

MR. MOELLER: It was just a few months ago, Bob, we had in a high, medium and low group to tell us something about their management. As I recall, Davis Besse was one of the best, so we had that manager in to try to review with us what he does, what they do. And it was a combination of things. But as Bob says, management has to support it. Herb Parker?

MR. PARKER: Bob, a comment about your reference to the very good Navy program. I agree that they are doing a good job but I think there is one factor that artificially makes it look better than it is, compared with the average program on the commercial side, and that is the Navy practice of sending a man into a hot area with a recording meter. For that occasion, it comes out and shows no positive signal so

it goes into his record as zero exposure, although you know perfectly well it could have been one millirem less than the detection limit of that particular measuremennt integreated over the year.

You go through the Navy records, you find men with zero exposure working on the front line of a submarine. It is totally artificial. The tendency in commercial is to have your personal recording meter that you use time and time again, and it not only integrates what you actually get but it adds the natural background to it which we rarely subtract in terms of collective dose. Someone needs to look at how large that differential could be. It could be a considerable fraction.

MR. ALEXANDER: Do you have a feeling for how large that would be, Herb?

MR. PARKER: I wouldn't want to give a number. I looked at these things in detail at Portsmouth some years ago, and I have forgotten what the cutoff is, but I was impressed with what I consider a deficiency in reporting when you report it that way. I would have insisted on continuously the same recording device for people who repeated go into zones. It can be as high as 100 millirems a year.

Now, when you get that in a collective dose,

it begins to count because that is getting close, not too far from the average commercial exposure, right?

MR. ALEXANDER: Yes.

MR. PARKER: So you might want to do some looking at your data with that in mind.

MR. ALEXANDER: I suppose we should. I find I'm bureaucratic enough after all of these years to point out for the record at this time that the Nuclear Navy is not an NRC licensed activity.

MR. PARKER: And I don't mean to imply they are not doing a good job. It is just a bad quirk in their recording as I see it. You do have a program to reduce dose which is very efficient I think.

MR. MOELLER: Another question I would have is the Navy, I assume, hires civilian contractors to refuel the submarines. Would that dose be in the Navy dose?

MR. ALEXANDER: Oh, yes.

MR. MOELLER: So it is all of them?

MR. ALEXANDER: Yes. The --

MR. KATHREN: Could I just comment, Herb? I will take exception with you. I think they all wear either TLDs or in the old days, film.

MR. PARKER: At Portsmouth they changed it at every entry they made.

MR. KATHREN: Their TLDs or film? I don't

think that's true at Mare Island or Bremmelton or Pascagoula.

MR. PARKER: It may not be. The one that I looked at was due to this flack at Portsmouth, and that feature that had so many people turning out with zero at the end of the year. It impressed me at the time. It may be different at other places.

MR. KATHREN: I've had direct experience at Mare Island and it was different there. But you are correct about the use of the pocket ion exchangers which were always recorded as zero if they read nothing, and they did.

MR. PARKER: Do you remember what their limit was?

MR. KATHREN: Zero to 200 mr was the range.

MR. PARKER: Well, --

MR. MOELLER: The only way you can really hope to get doses down considerably is by the design of the plant, and I wonder if in the present depressed state of the industry, whether the reactor vendors are doing much along this line at all now.

I don't know. I haven't followed it, but I know when I was with [illegible] had a nuclear maintenance task force in all of the components of the company that supplies parts to a nuclear plant. We had meetings

about three or four times a year in which we discussed just these things we are discussing here; the collective doses and ways of doing maintenance and ways that designs could be improved to enable people to do work without getting the exposures that they were getting. And I don't know if this has continued, what the other guys are doing.

I don't know whether you had a chance to look at that sort of thing at all.

MR. ALEXANDER: Yes, I have. At least in the Westinghouse program I have and I believe similar things are happening at General Electric. I hope at the others. They have a group set aside at Westinghouse to look for more efficient ways to perform maintenance tasks, which is the big end of the collective dose. And the reports I have heard and what little literature has been published are encouraging.

It is rather amazing sometimes how much working time can be saved by a small change. And of course, when you cut down on the working time you cut down on the dose. As a matter of fact, in the INPO program they maintained, those who were involved in it maintained, that this program actually saved the government money by bringing pressure on the shipyard people to find more efficient ways to do their work in

order to get their dose down -- that they actually saved money and it was not a costly program.

MR. MOELLER: On this, too, just reviewing what the subcommittee has done, we met with Westinghouse. I guess as I say the subcommittee, it was a full committee meeting with the Westinghouse people. Not to cite Westinghouse as a sole example, but they have this cooperative program with the Japanese now in which they are trying to design the next generation PWR.

And as I recall, their goal -- and the Japanese have been insisting upon it -- their goal for collective dose is 100 person rem per year or less, as I recall. So it is receiving a lot of attention. I was quite pleased to see what they were doing.

MR. ALEXANDER: I think Rags is right when he says if you want to keep the collective dose down, that is not simply a health physics matter; it's an engineering matter. As a matter of fact, the way they Navy was able to succeed was by getting the idea and the objective of keeping doses down pervading the entire organization so that everyone in the design stage of the plants, those doing process planning and everybody, was looking in that direction. And that is how they were able to achieve success.

So it involved a much broader application of

the idea than just with the health physics people.

MR. SHAPIRO: I think they made a tremendous effort in actually trying to cut down crud levels.

MR. ALEXANDER: Oh, yes.

MR. SHAPIRO: In other words, getting the source term down, in addition to operational approaches.

MR. ALEXANDER: Yes. They even changed some of their submarine operational procedures. They found that by varying the speed of the submarine, that they could knock the crud loose as the flow rate of the coolant changed, and then catch it in the traps they had installed. That was successful. All kinds of things like that were involved.

MR. AXTMANN: Fast starts and stops?

(Laughter.)

MR. ALEXANDER: We might take a look at the proposed rule. It is short. It says, "Each holder of a nuclear power reactor operating license shall develop and maintain a current written description of and implement an occupational radiation protection program including effective measures for maintaining radiation exposures for workers as low as is reasonably achievable."

These simple words, the number of years and the amount of work that has gone into it reminds me that

these words would probably be eligible for the Talud. But even so, we recognize -- and I would be less than frank with you if I didn't overtly point out -- that this rule would not be an extremely effective rule in dealing with our collective dose problem.

But let me hasten to point out that again, if the INPO program is not successful, we will come back to the Commission with a rule with a great deal more teeth in it than this one has. I can expand on that a little bit for you because I think this is an area where you might want to consider recommendation.

MR. MOELLER: I need to know, too, and you have pointed out, it is briefly stated here. But when you say "develop, maintain and implement an occupational rad protection program" are you including within the scope such things as Jack Shapiro just mentioned; looking at the source term, looking at perhaps decontamination procedures as well as what we would conventionally think of as training and doing things better? Or is this addressed primarily and principally to the more conventional occupational rad protection?

MR. ALEXANDER: We have these words "including effective measures for maintaining radiation exposures", ALARA, and of course, the connotation there is broad and does include things other than conventional --

MR. MOELLER: And you, when you are dealing with the INPO and they are going to implement or you are going to work out this agreement or you have worked it out, you are looking to them to look at the total problem, not just better training of people or hiring more health physicists.

MR. ALEXANDER: Yes, I certainly do. They have developed -- perhaps you have a copy of it within the subcommittee -- they have developed a book or report in which their criteria are given. These criteria have been carefully worked out, and they are applying these criteria to the pwwer plants. And they have an inspection program whereby at least every 15 months a team of INPO people shows up at the plant and inspects the plant against these criteria. And the criteria in the health physics area do not encompass everything that we would like to see in there.

But what they have is very good, and the reason given to me for this little problem is they feel that they need to put into their criteria number one, what the utilities can do, and number two, what they will do at this time. It is a matter of crawling before you walk, walking before you run. We expect to see their program get better and better as time goes by. But they were afraid if they hit these plants with too

much at once, their program would be killed on the spot and they would never get anywhere. I think there is some wisdom in that.

Now, we have agreed during an approximately two-year period to interfere with this program as little as possible. In other words, we want to help the program and not hurt it in any way. They have convinced us that a regulatory guide that we prepared to accompany this rule should not be issued. It is ready to print. We are going to just hold onto it for a couple of years.

Now, it says all of the things that their criteria include, plus quite a bit more. So we are just going to set that regulatory guide on the shelf until such time as INPO proves to us that their criteria approach won't work.

MR. KATHREN: Bob, might I ask if the regulatory guide says essentially what is in their statement of criteria? Presumably, they are going to follow, then, what will be said in the regulatory guide, and since regulatory guides are really not mandatory but merely suggestions as to how to comply with the regulations, of what benefit is it to hold up the regulatory guide?

MR. ALEXANDER: There, I would have to speak for them, which I am certainly not the best qualified to

do. I can tell you what my understanding is from talking with them at the number of meetings we have had. They feel that a regulatory guide in this area which tries to deal with and has the same purpose as the criteria, would be confusing. Not only would it be because different words are used, different ideas are stressed. Not only would it be confusing, but there would be a tendency, I think a natural tendency for a nuclear power plant to give precedence to the reg guide.

MR. KATHREN: But if the reg guide worked and achieved the desired goal of reducing radiation exposures then that would be fine, and why proceed with the INPO route?

MR. ALEXANDER: Why proceed with the INPO route?

MR. KATHREN: Yes, if the regulatory route would achieve the desired goal.

MR. ALEXANDER: Well, there I have to almost speak for the whole staff. My perception is that we would like to see this job done without government interference, if possible. Have as little in the way of regulations, reg guides as possible and still see that the job gets done, to give them a chance. That is what our position is. Give them a chance.

Now, we met with -- in the laborious process

of getting this paper ready for the Commission, we got all of the concurrences of the offices.

MR. MOELLER: This is the agreement with INPO?

MR. ALEXANDER: No, this is the Commission paper that goes with these rules. But it deals very much with the INPO situation, explaining it, trying to explain it to the Commission, trying to persuade them.

The headquarters offices concurred with our paper, and the concurrence from I&E was conditional upon our getting the opinions of the regions. This came at the last minute. Now, after eight years of things coming at the last minute, I was not dismayed by having to go to the regions. We simply arranged a meeting and had the regional people come in.

But it was an eye-opening meeting. Sometimes I think those people out there in the real world really do live in a different world than we do. We had all five regions represented by very competent, very articulate inspectors who had had years of experience inspecting these plants under our regulations. And they were able to convince us that our paper would probably be misinterpreted by people, that it wasn't clear exactly what we had in mind with respect to the INPO program, and they didn't understand what we were doing with INPO either. So we were able to explain that to

them.

As a result of this meeting, Jack Bell has rewritten the paper for the, I guess, one thousandth time, and we think have the story much better told. We are trying to leave the true impression that as far as NRC operations are concerned, there will not be much of a change associated with this rule. Inspectors will continue to work just about as they have.

Now here is the key reason for that, and the fact that I have sort of been building up to all morning. These inspectors said that as far as citing a licensee for failure to comply with his own procedures, even ALARA procedures, that they can do that now. They do it now, so they don't need this rule to give them the authority to cite a licensee for not complying with their own procedures. They said what they need to turn things around is a rule that will get good things into the procedures.

Now, this rule doesn't do that. This rule does not require -- we are giving no criteria for the procedures, for the programs. We are not requiring review by the staff for the programs review and approval. We are just saying have an ALARA program and then enforce it. So if the INPO program fails and we have to come back to the Commission with a rule with a

lot of teeth in it, I think it is going to have to be a rule which enables us to make sure that each plant has a high quality radiation protection program, not just a radiation protection program.

MR. MULLER: Bob, is it intended that this be restricted only to nuclear power operating licensees? It would seem that almost every other licensee, a university reactor.

MR. ALEXANDER: Rags, we tried for a year to make this change in Part 20 so it would be applicable to NMSS licensees, and it's only been in the last few months we have all come to realize that that would not be possible. The approach we are taking with these programs, we think that will be all right for 100 or perhaps a few hundred licensees. But when you have nine or 10 thousand licensees to apply this to, our NMSS people feel another approach has to be taken.

So what we are embarking on -- I don't know whether the subcommittee would be able to agree with it or not, but what we are embarking on is a program where one approach is taken for the materials and fuel cycle licenses by NMSS, and another approach is taken by NRR for the power plants. I think there are good reasons for that.

The approach, -- in order not to be incomplete

on this point, let me mention that the approach taken by NMSS with all of these licensees of theirs is to establish -- Jack, what are those limits called?

MR. BELL: Investigation levels.

MR. ALEXANDER: To establish investigation levels, and they intended to have different investigation levels for each major type of licensee. The investigation level is just that; it is a level such that if it is exceeded, then the steps will be taken to find out why by the licensee himself, and to prevent a recurrence. And NMSS is saying if you will do that, then we will consider you in compliance with our ALARA objectives. And we think that is a practical solution to an overpowering problem with so many thousands of licensees.

MR. MULLER: That's interesting. Yesterday we heard from the DOE labs and various people that are doing different types of radiation work with our reactors, and the objectives stated yesterday by the people we heard was they would like to have a uniform approach to the whole thing. And now you are suggesting just the opposite, which is sort of interesting. A bifurcation.

MR. ALEXANDER: Let me submit, Rags, that what you were talking about yesterday has to do with basic

radiological health protection standards, not agency operational procedures. What I am talking about is an operational procedure; a way to implement the basic standards you were talking about yesterday.

I would say that both these approaches, NRR and NMSS, will readily comply with anything set in the new Part 20. I think I can assure you of that.

Well, here at the Nuclear Regulatory Commission we are trained and forced to deal with value impacts at every turn. So let me spend a couple of minutes with you on that subject.

Both the value and the impact of what we are trying to do here is illusive. We know that if these things are done, we know from the Navy experience if from nowhere else, that if these things are done correctly, dose can be averted, both individual and collective dose. How much can be averted we don't know. It has been successful in the Navy program so we think it can be substantial, but at what cost.

When the plants are already operating below our regulatory limits, cost enters very much into the consideration. Now, cost to comply with the limits does not enter into consideration. They must comply with the limits. But when you start talking about doses below the limits and reducing doses already below the limits

and how much that costs, it's very important.

So one of the problems we face in this entire program is we don't know exactly how much the dose would come down, and we don't know exactly how much it would cost. We know to get doses down, particularly at existing plants, you have only two approaches. One is to reduce the radiation level; the other is to reduce the exposure time.

In the Navy program they found reducing the exposure time was the most effective way to go about it. When you reduce exposure time, when you introduce operational efficiencies to reduce exposure time, you save money.

So the cost to implement this program -- if we focus now on the next couple of years when we will be relying on INPO to implement this program -- the cost to implement the program may be almost entirely recovered. When I say that I don't include -- I'm not sure I should include -- the cost to INPO. The INPO program, the radiological health program that INPO has embarked upon costs INPO about $1.3 million per year, which is a substantial sum.

Now, the cost to the nuclear power plants themselves the INPO people insist will be recovered by efficiencies introduced into their operations. We are

very hopeful for this program.

Well, I hope I have been able to help you understand what the staff is doing. I am also hoping you will understand and agree with what we are doing. We expect to make our briefing to the CRGR next Tuesday. I will talk to them much as I have talked to you. The CRGR, as a result of that briefing, will decide whether or not to conduct a review, an in-depth review, of this rule. Then I would tend to predict they will want to review, that they will agree with it and that we will go to the Commission.

We think then it may be possible to publish a proposed rule in January.

MR. MOELLER: Well, let me make a couple of comments, Bob, and I don't mean these as conclusions of the subcommittee at all. I mean them simply as -- well, maybe to provoke discussion or to propose a position which we can then move forward on.

One is the concept of working with INPO and having this relationship. To me, I think this is something to be encouraged because it is attempting to have the utilities police themselves instead of you being involved every step of the way.

And I also, to argue a little with Ron, I would agree that the concept of the NRC not interfering

for a two-year period other than consultation -- obviously, you will keep up with what they are doing, you will get their data and so forth, but to give INPO a chance is pretty important. And I know the NRC is taking this same path in at least one or two other areas where they are hoping that the utilities can police themselves.

So those I think are good points. The other item I would mention -- and again, I think it is important for this subcommittee to look at it - and that is, what are the benefits that we can anticipate of this effort versus the rewriting of 10 CFR 20.

Let's say that one should be emphasized and the other should not, or maybe both should be emphasized but which one has priority? This, to my way of thinking, if it's done right has a chance for payoff within a year or two. Or maybe within a month or two. Whereas, I don't know that the rewrite of 10 CFR 20 has that much opportunity for payoff, meaning immediate reductions in occupational doses.

I just throw those out as some thoughts. Why don't we discuss this for a few minutes and then particularly find out from Bob what it is that you would like for us to do if we concur with it. Do any of you have comments?

MR. KATHREN: Only to say that I was making the point that it seems strange to me that if the regulatory guide was not in any way in conflict with what INPO was carrying out, I couldn't see any reason to hold it up.

MR. ALEXANDER: We don't really want to hold it up, Ron. We are doing that to be cooperative. It is a two-way street and this is something that INPO has asked us to do.

MR. KATHREN: To hold it up?

MR. ALEXANDER: To hold it up. They feel it would interfere with what they are trying to do, so we have agreed to do that. It is just a part of the agreement.

MR. MOELLER: Ron, of course, you have utility experience and you have insights that you should share with us, or we would appreciate it if you would share them with us. What do you see as problems here?

MR. KATHREN: I'm not sure they are really problems. The industry looks upon regulatory guides as mandatory. That may be one of their fears. One could, I think, alleviate this problem by putting in the regulatory guide a statement that participation in the joint INPO-NRC program would be considered as compliance with the regulation. You could even put a time period

on if you wanted to, which I think would resolve that problem.

My concern is that I believe the Navy program has worked quite well, and I would like to see it adapted to INPO. But my concern is the quality of personnel and equipment coupled with the fact that people are not in the Navy and, therefore, not subject to following orders of superior officers essentially unquestioningly. This will not lead to as good control as it would in the military situation. Was that clear, with all of those phrases and words?

MR. ALEXANDER: Yes, it is. I agree with you. I don't know think that any of us hope that the Navy experience would be repeated in the commercial arena. But I think we would be happy to see this trend just level off. If we could just see it level off and stop the upward rise, some of us would be very happy. If they are actually able to bring a downward trend, that would be absolutely wonderful.

MR. MOELLER: We have had utilities, of course, that have appeared before this subcommittee and the management people have said so what; we are complying with the dose limits. Why bother us about these increases in collective doses? They don't represent any problem at all.

MR. KATHREN: I can believe that.

MR. MOELLER: Is it our position to comment -- and, Herb, you can help us -- on comparing this effort versus the 10 CFR 20 rewrite? Which has the best chance of payoff?

MR. PARKER: That is a dirty question.

MR. MOELLER: I think we have to grapple with it.

MR. PARKER: I am impressed with the approach I have heard this morning which ceases to be a flogging approach. I think what has happened in the past -- without reflecting any criticism on individuals -- is that the people on the receiving end felt they were being flogged into doing things instead of the hortatory program you speak to this morning, Bob.

I think the hortatory approach is the only one. It is a qualitative thing anyway. One thing I would suggest that would help this is what we did years ago in Hanford. That is, to make a fairly comprehensive study of the cost of improving radiation protection, and we developed a rather universal formula to reduce the exposure by a factor of 10 would double the cost of the work.

If you could somehow get the present commercial people to contribute to the same kind of

study, the answer I don't think would be the same. This answer I gave you only applies when you are doing one heck of a lot of things, because there are some quantum jumps in this. Whenever the next step of improvement requires going to complete remote control, the cost just wants to fly up. So our general formula only worked because we had enough other things to smooth it out.

But there could be developed a study, and whatever the answer came out, the leaders of each organization could see what they would get for their money in the way of protection. You might want to think about some such approach if you haven't already done it. You may have.

MR. ALEXANDER: I have had similar thoughts recently, if I understand your point. I think that probably the best thing the NRC could do to turn the collective dose situation around for nuclear power plants would be to develop and make available to the highest levels of utility management, as based upon the Navy program, convincing argument that cost can be reduced. That is what managers listen for.

And if they could be convinced they could reduce their costs by taking steps, efficient steps to reduce the collective dose, then I think they could see that happening without INPO, NRC or anyone else bringing

pressure on them.

MR. MOELLER: That's similar but different to what Herb is saying.

MR. PARKER: I don't think you will reduce costs by improving the quality of protection, but you make a controlled investment in superior protection, is the thing you have to sell. And there is a big difference. In the Navy, similar to Hanford, everyone was willing to share the information, and the dollars available for the next day were not a great problem. Utilities don't have that, and I am not aware personally of the degree of competitiveness that would prevent them from sharing the best information.

Ron, you have been in that racket.

MR. KATHREN: They aren't really competitive in the sense that every utility is guaranteed a rate of return by the Public Utility Commission. So there isn't --

MR. PARKER: I haven't noticed a rush to share joyous information with others. Is that a correct observation?

MR. KATHREN: I don't really think it's wholly correct. It's not wholly erroneous either. They do, through the Edison Electric Institute and their task group on health physics, share information.

But for the record I will say the Edison Electric Institute task force on health physics conducts its affairs in a far different manner than we would in a scientific or professional society. Its membership is limited, for one. Its topic areas of discussion are also very restricted and for many years, they operated a closed shop in which they deliberately excluded any outsiders and in particular, the regulators, because they wanted to feel free to talk about problems that they felt might reflect adversely on their own capabilities.

I have been very outspoken, and for the record I will say that I believe that, again, the quality of staff and equipment has been relatively poor in the industry, although it is improving. And I think I would like to see that accelerated as well as what Bob has so well put, which is the need to get upper management to agree.

Until you get that accomplished, until the upper management is really concerned with keeping radiation exposures ALARA, I don't think it will ever happen. There is absolutely no incentive in the plants to do it. The big incentive is to produce the maximum number of megawatts.

MR. MOELLER: The other thing, too, or one of

the many that have to be fit into this total puzzle, we have heard this morning about steam generators and replacing steam generators at 2000 person rem each or whatever it takes.

Well, if we had a known proper way of operating or chemically handling the water and so forth, or designing and building steam generators so that this problem, the replacement, was not required, this would have a significant impact on the collective doses.

MR. KATHREN: Yes.

MR. MOELLER: And people are working on it. But I continue to be somewhat surprised that it seems like the group that is doing the most is EPRI, as far as I can tell. I am sure the vendors that manufacture steam generators have given it a lot of thought, too. But EPRI seems to be the one that really is coming out with some good recommendations. And I think it is true that an individual utility cannot have all the expertise to solve that problem.

Now, what is it on this, Ms. Tang? Do we write a letter?

MS. TANG: Whether we endorse the rule or have comments, we have to write it.

MR. MOELLER: Then we will in our Executive Session try to come up with something that we will write.

MR. ALEXANDER: The problem that I want to focus the subcommittee's attention on, Dade, is --

MR. MOELLER: Tell us what you want us to focus on and what will be helpful to you. What are the key factors?

MR. ALEXANDER: The key factor it seems to me is that what is really needed along the narrower lines we are talking about in this rule -- I'm not talking about now everything about collective dose in the nuclear power plant; all the engineering and everything. I am just talking narrowly about the subject we are trying to control in this rule.

What the NRC needs is a way to make sure that the procedures that each power plant has contain adequate directives to their employees with regard to the occupational ALARA concept. Once a plant has adopted such procedures, our problem is we have the enforceability we need.

But with the approach that we are taking now where the programs would not be reviewed by the staff and so forth, I think we will never be successful.

MR. MOELLER: Now, does INPO plan to develop a standard generic statement for each utility in terms of complying or developing an ALARA program? I hear what you are saying. You are saying to us what the regional

people emphasized to you.

MR. ALEXANDER: Yes, yes.

MR. MOELLER: I would think, then, in your cooperative plan with INPO either you -- and again, if INPO is going to carry the ball now -- not you, but INPO should give serious consideration to the development of what I would call a generic program for a PWR and one for a BWR if they differ.

MR. ALEXANDER: I don't think they are doing that. I could be wrong, but I don't believe they are. They are developing some guidance documents but they are highly technical in nature and don't deal with the sort of thing you are talking about.

The criteria themselves, of course, do, in broad and general terms, and if their program works most of the utilities will have radiation protection programs that comply with their criteria. To that extent, I think a lot can be gained. I think the INPO program will result in a lot of good things being included in these power plant procedures.

And perhaps what I am worried about will go away on its own. That is what we are all hoping. But if it doesn't, then we have to come back with another rule with more teeth in it. Then I think it must be a rule that requires a review of and approval by the NRC

of the radiation protection program.

MR. MOELLER: Jack Shapiro?

MR. SHAPIRO: I am a little concerned about certain aspects here as to what the role of government is, because the regulatory guides can provide a lot of good technical information. Some of them don't, but a lot of them can be very useful in terms of what they say they are doing, providing guidance and ways in which to accomplish certain objectives.

I just got across my desk the other day a regulatory guide for reducing occupational exposure in medical institutions; a great, big guide with all kinds of procedures. I haven't read it yet so I don't know how good it is, but it's there.

MR. ALEXANDER: It is excellent.

MR. KATHREN: Is that for the record, Bob?

MR. ALEXANDER: Yes. Dr. Brodsky prepared that, so it must be excellent.

MR. SHAPIRO: I don't feel as though I'm being coerced into doing these things. I feel I will get guidance and technical help. I feel in many areas, the government can provide technical information which industry won't do, can't do, isn't interested in doing.

In something like the ALARA concept, which is really so diffused and which I can see you don't want to

regulate it, I can see industry has a problem not wanting to be regulated because it's a philosophy more than an actual regulation. You still need a lot of guidance and technical information which should be available both to working people at the reactors, to the working health physicists who can then try to get to management and to your inspectors who perhaps give some advice.

So if your occupational regulatory guide is as excellent -- for reactors is as excellent as you say your medical guide is, I think that information should be made available. If the regulatory guide mechanism is a way that is abused, maybe you have to decide on some other mechanism of making information and guidance available. But I think your role is to help along the lines where you cannot really regulate the situation.

As far as those reactors are going, they are going by 10 CFR 20, and as long as they meet those standards they are in compliance. And unless there's a tremendous economic incentive, they won't do more. I don't care what INPO does or these other people do. And I think the guidance has to come from you, both from the working health physicist and through your own inspectors.

MR. ALEXANDER: We have made our guide available. All of the plants were sent a copy of this

document to comment on. It was published for comment. It was published a NUREG report first for comment. They all have it. We've made it available. So as far as making information available is concerned, we've done that. But it's not an official guide.

At least we've done part of what you're driving at.

MR. MULLER: You have given it to INPO. Has INPO incorporated -- you said not everything, but they have incorporated quite a bit of what you have in there in their directives.

MR. ALEXANDER: Right. Not everything, though. We would like to see it all. They think they will eventually have it all, but not to start.

MR. MOELLER: I think we have to be patient and tolerant here and give INPO a chance. You know, I really believe that.

MR. ALEXANDER: I really think that we are talking a little bit about the elusiveness of the ALARA concept and the philosophical nature of the concept. I really believe that the ICRP optimization analytical technique is the answer to this problem. It is going to take a number of years to work out, but I believe that is the answer because it is with the optimization technique that we can take an analytical technique which can be defined and explained to people and derive the point at which as low as reasonably achievable is obtained, and we can come up with a number, and we can say for this operation, for this situation this number is ALARA, this number is the point at which the health

effects cost and the dollar cost are at a minimum, that sum is at a minimum.

MR. PARKER: I must strongly disagree with that, Bob. You have loaded up the present description, as low as reasonably achievable, by so much crud with social, political and socioeconomic factors so that you can employ pregnant women who have no business whatsoever in the nuclear industry, that you can't select that out again because you will invoke a new set of socioeconomic factors for any situation you are forced into.

MR. ALEXANDER: I guess I was talking about applications where the socio part of it would be probably left out. When you get into the occupational arena where the public isn't exposed, you can do optimization studies on such things as how often to take care of samples, how often to take bioassay samples, how think the shield should be, whether or not to use an expensive respirator or an inexpensive respirator, whether or not to design a robot. You can do it. We are toying with it now.

I know it will be some time, but I hope that the very true observation you just made about optimization in general will prove not to be prohibitive in the occupational arena.

MR. AXTMANN: Don't such exercises require a dollar cost per man?

MR. ALEXANDER: Yes.

MR. AXTMANN: What is your dollar cost?

MR. ALEXANDER: We have one in Appendix I of Part 50.

MR. AXTMANN: What is it?

MR. ALEXANDER: One thousand dollars.

MR. AXTMANN: It's been the same for 15 years during which time inflation has run wild, and it's a hard number to defend, it seems to me.

MR. ALEXANDER: Well, any number would be hard to defend.

MR. AXTMANN: Well, that particular one since it has been constant for 15 years.

MR. KATHREN: Why don't you tie it to NRC salaries?

MR. PARKER: Confidential information.

MR. ALEXANDER: I think too much is already tied to NRC salaries.

MR. KATHREN: I mean the escalation factor.

MR. MOELLER: Any other questions or comments?

(No response.)

MR. MOELLER: Okay. Thank you, Bob, for your time, and we will certainly try to set out some remarks

and comments, and you have certainly clarified and filled us in on what we need to know.

Why don't we take a ten-minute break?

(Recess.)

MR. MOELLER: Why don't we resume?

The last item on the agenda is the discussion of seismic events as they relate to nuclear power plant emergency planning; and we have with us Brian Grimes to comment on this subject.

I might mention Brian has commented to us several previous times, but that the committee had questions about the matter, and they have asked us to explore it further.

MR. GRIMES: Before we get into the seismic issues, I want to make one follow-on comment to yesterday's discussion on potassium iodide.

I asked my staff to talk to the research people specifically on the source term point, and I now understand that the cost-benefit paper being done on potassium iodide will not document directly the iodine source term as you had expressed interest in, but that will rather be in the March time frame, and it will deal with a broader spectrum of things than iodine.

Also, the revision of the Sandia cost-benefit study will primarily be directed toward quantifying

things that were stated as being conservative assumptions but which were not quantified in the earlier report, which leads me to conclude that the statement in SECY-396A about refining the cost-benefit study should not have been as closely connected to the source term work as it was.

MR. AXTMANN: But that was --

MR. GRIMES: Based upon verbal discussions at that time.

MR. AXTMANN: But that was the only rationale given for changing your mind in six weeks, as I recall.

MR. GRIMES: Yes.

MR. AXTMANN: If you take that out --

MR. GRIMES: What my understanding is now is that that has somewhat reinforced the research view that this is a conservative assumption, that the assumptions warrant better quantification in that earlier study, and that if those things were quantified, a very negative cost-benefit balance might come out. So the fact that their intuition says that -- this is my interpretation of what they have told us -- the fact that their intuition says the source term should be lower makes it more worthwhile to pursue quantifying the other negative factors that would bear on use of potassium iodide. But they might not have bothered to do this had the source

term not changed.

MR. MOELLER: I think, Brian, though -- and I say this correctly, I believe -- that it is another example of the staff really not saying what they mean, and I increasingly seem to raise that type of question.

Had this SECY 82-396A have said that we have given this matter further consideration, and in view of the enormous research effort we have underway and the potentiality for new and better data coming forth on the source term that we believe we should delay any decision or delay our decision until such time as those data are available.

MR. AXTMANN: That would have been a reasonable position.

MR. MOELLER: Oh, sure. We would have all bought that, but that's not what it said.

MR. GRIMES: I would just suggest that January is a short enough time to wait to see what the Office of Research is coming up with in terms of recommendations on the matter, and that they have indeed said that March is the expected time frame for some quantification of the studies that have gone on. It would, I understand, be essentially a first report, a preliminary report on the results of research to date.

MR. AXTMANN: March?

MR. GRIMES: Yes.

MR. AXTMANN: And that will be NRC's summary of --

MR. MOELLER: Initial research findings, I gather.

MR. GRIMES: Yes.

MR. MULLER: Brian, yesterday I referred to the negative impact of the nonradioactive iodine in the KI, but I did not really emphasize the thrust of that German paper. Did you get a copy of that Kallee paper?

MR. GRIMES: No, I don't think so.

MR. MULLER: I believe she has a copy. I have mine with me if you want to xerox it while we're here. But the thrust is there is an intermediate dose of iodide, nonradioactive iodide, which is less conservative than either a lower or higher dose. It is kind of a funny curve. And it is this sort of thing which concerns me because there are variations in individual responses, and if you have a problem with an intermediate dose, to go to the high end or low end, how do you establish the amount of iodide that is administered?

It was that concern that was interesting there. It was called the Wolff-Chaikoff effect. Iodide is kind of complicated because it stimulates the

pituitary gland and affects the hormonal balance throughout the system. It affects hyperthyroidism, hypertension and various things. It is more complicated medically than just giving people a pill.

MR. GRIMES: I am not a medical expert myself. I guess my concerns with potassium iodide have been more on the logistical end of it. Even if it is perfectly safe to use, is it a practical thing from a logistics standpoint to rely upon; for example, to rely on people having it available when you are trying to make decisions?

MR. MULLER: Apparently Bernie Schleien didn't have any reservations, and they kind of hone in on that 25 R limit. But at our last meeting, our general meeting -- I don't know whether it was the last one or not -- we had a man here from the American Thyroid Association, which it would seem to me is probably the most competent group, and he recommended a higher level because he said they had no indication that any dose to the thyroid less than 100 R did anything perceptible to anybody's thyroid.

We have the minutes. I may be quoting him incorrectly. So I think if you aren't aware, you might want to get a transcript of his statement.

MR. AXTMANN: I finally remembered --

MR. PARKER: Excuse me. Go ahead.

MR. AXTMANN: The vendor who made the potassium iodine, it's Carter-Wallace Laboratories, the makers of Carter's Little Liver Pills.

MR. MOELLER: Herb.

MR. PARKER: This level is the thing that was thrashed through the pages of Science in this conflict between Rosalyn Yalow --

MR. MOELLER: And Von Hipple.

MR. PARKER: And it needs to be resolved to the scientific public's benefit, and I'm not sure it's resolved in the directions in which my dear friend Rosalyn Yalow refer to. But it shouldn't be left hanging, nor should it reside on one paper based upon a German population, because as I recall yesterday, their conditions of preplanning of iodine --

MR. MOELLER: They have an iodine deficiency in Germany. And our major question, of course, is th source term which can vary by orders of magnitude.

MR. PARKER: And at your last meeting you had access to a consultant who spent a great part of his distinguished career precisely on this thyroid question and is highly respected in the profession, namely Dr. Saenger. I would listen to him fairly carefully.

MR. MOELLER: Let's move on.

MR. GRIMES: We have had discussions in the past. I believe the last time I appeared before a subcommittee was in 1981. In fact, I have a note here that there was a full committee meeting on May 7, 1981.

Our position is essentially unchanged on seismic matters with respect to the emergency planning since that time. However, there have been a number of events that have occurred since that time which I would like to bring you up to date on.

MR. AXTMANN: Excuse me. When was the last report?

MR. GRIMES: The last formal report was, I believe, May 7, 1981.

MR. MOELLER: And give us all for our benefit, Brian, give us a --

MR. AXTMANN: That was an ACRS letter?

MR. GRIMES: No. It was an appearance by myself before the full committee.

MR. MOELLER: Give us a rundown on what the controversy is or what our question is, because I am not -- several of our consultants are new, and I think it would help.

MR. GRIMES: I will also reference a February 22, 1982 memo of Mr. Alderman to Dr. Moeller which fairly well brings the matter up to date to that point.

The main question involved was expressed by the Commissioners themselves in a memorandum dated March 1, 1982. These questions and the staff's answers are contained in the June 22, 1982 memorandum from Mr. Dircks to the Commissioners; and I believe you have copies of that June 22nd memorandum.

The two questions that the Commission posed were should the emergency planning activities of NRC licensees include consideration of the possible effects on emergency plans of very large earthquakes; and second, if NRC requirements are to include this consideration, what criteria should be applied in evaluating the adequacy of such plans in this respect.

There were also some questions by Commissioner Ahearne transmitted in the same memorandum which broadened the topic to all natural hazards, and by implication also to smaller earthquakes.

I think the key question is what do we pick as a basis on which to expend resources to plan for particularly offsite actions in the event of earthquakes or other natural hazards. The staff's answer to this has been first to rule out explicit planning for very large earthquakes. The basis for this is to look at what sort of things could be done to prepare for this sort of situation, and decide that some of them, such as

making earthquake-proof bridges and housing, are just not feasible anyway, and to also observe that many of the things that you would want to have in place for very large earthquakes are already put in place by other emergency planning measures such as backup communications capabilities.

The one exception to the staff's position against designing for earthquakes has been the areas of the country such as California where the frequency of moderate earthquakes, what I call in layman's terms moderate earthquakes, say below design basis earthquakes, are relatively high; and just by inspection those areas of the country in which bridges periodically fall down or houses are disrupted or other things, utilities are disrupted on a fairly frequent basis -- that is, in the U.S. the west coast of the United States, principally California and a few other high seismic areas.

It seems to us that for these areas where there is a moderate expectation that there will be disruptive events, while the events would not be disruptive necessarily to the plant itself, they would be disruptive to the surrounding communities, that there be some thought given to what one would do in an emergency situation if there were disruptions offsite.

We don't believe that requires picking a particular earthquake size. It requires only a relatively small earthquake compared to what plants are designed for to disrupt offsite facilities. So essentially we will assume that there could be in California at least which would disrupt offsite facilities but probably not disrupt the plant, but perhaps warranting some thinking.

What we have identified is that there are several things we would like in a place such as California. One is assurance that if the earthquake did disrupt nonnuclear parts of the plant and perhaps put you into a low class of an emergency, an unusual event or alert by disrupting the power supplies or nonnuclear systems in some way, that one be able to get personnel to the site. In other words, one way to do this is utilities in California have helicopter service arranged for so that if roadways were disrupted by an offsite occurrence, they would still have a good capability to immediately augment the plant staff, if they were on a back shift, for example.

The other thing that seems wise is some knowledge or agreement between the onsite and offsite responsible people that this will be a consideration in an emergency situation, that the offsite authorities

would be obligated to give some information back to the plant to help them formulate any recommendations that might be warranted for offsite action in the emergency situation.

The third thing would be assurance of backup communications. And as I said, radios are generally used as backup to telephone systems. And so we have in place already without doing anything particularly extraordinary, we have those systems in place.

MR. MOELLER: Excuse me, Brian. I followed the first and the last. I didn't follow the middle one.

MR. GRIMES: The feedback of information from offsite authorities -- for example, the police would know in what areas bridges might have been disrupted.

MR. MOELLER: To the plant officials.

MR. GRIMES: Yes. Telling the plant officials that so that if an accident situation developed, something were getting worse, they would know that evacuation in a northerly direction is not the thing to advise because it's not a practical response, or that sheltering in a particular area is the best option available in certain situations.

The last thing is the Federal Emergency Management Agency has suggested that in California sites at least there be a designated place for state and local

officials to relocate to if their primary emergency facility is disrupted by an earthquake. And this would apply in situations even not including a nuclear power plant problem, that the emergency operations center of offsite officials would probably be manned in an earthquake and disrupted; they would probably have to have another place to locate and operate.

So those are the principal considerations.

MR. AXTMANN: I'm not sure I caught that last sentence. Are you saying making the offsite emergency center, double it?

MR. MULLER: Have an alternate.

MR. MOELLER: You would have an alternate for it.

MR. GRIMES: Have a location from which you would gather and operate not necessarily all the equipment you would have in the primary location, but everyone would know what the agreed upon fallback location was so that one could operate out of there. You would probably be working on radios and things like that in any event.

MR. AXTMANN: The second site then would have the same controls the first did?

MR. GRIMES: The second site would be just a designated location that state and local officials would

go to and work out of, not having any particular design requirements.

MR. PARKER: Just a designated offsite communications center, is this it?

MR. GRIMES: They would probably have to relocate their radios to that location, or if it was another typical thing might be moving to another county, to the emergency operations center of another county, for example, would be a ready way to presdesignate a site which in that case would have the in-place communication facilities. But if they just wanted to designate a building some place outside the area, they could do that also if they had plans to take their communications equipment with them.

It is a difficult question in terms of how much is enough. And it is, I think, clearly a judgment on what resources we should expend and what reviews we should do for these remote situations while trying to keep the concept of emergency planning applicable to a wide spectrum of accidents and not saying we have no capability to respond to end-of-spectrum events, but rather saying that the capabilities you put in place for the plant accidents will, to some degree, give you a base to respond to even lower likelihood events.

Of course, those other external events have

effects of their own on the public, and it may be that for very, very severe earthquakes which would also cause power plant releases that release might be the least of the worries in that area.

I guess as far as status goes the Commission has not responded to the staff on the June 22nd, 1982 memorandum. So if the ACRS wished to comment on the questions which the Commission posed to the staff, I am sure that would be welcome. The Commission has not yet adopted the staff recommendation.

MR. MOELLER: Okay. There are several comments that I could make that may be helpful. Of course, first we have to crystallize what is the problem or what is the question we are trying to answer as a subcommittee. And I believe that in the transcript of the previous full committee meeting when Brian met with us it immediately became apparent to me there were misunderstandings.

Initially, the committee said has the staff considered the potential impact of an earthquake in disrupting bridges or roads or whatever it might do and communications? Has the staff considered this in terms of emergency planning?

Well, then the staff came back, and as I interpreted it, they were saying well, the chances of a

reactor of a nuclear power plant having an accident and an earthquake occurring coincidentally with it were very remote; and therefore, they really didn't see what we were asking.

Well, then we said back to them, we are talking about the potentiality where the earthquake itself causes the reactor failure, so they are simultaneous. Well, then, as Brian points out, if you had an earthquake severe enough to cause a failure in the safety systems of the reactor, which is of course designed to withstand an earthquake of a certain size, then the disruption of the total neighborhood would be so catastrophic that perhaps the reactor accident or release would be, you know, not be as important as it otherwise might have been.

Factoring into these questions you have the conclusions, perhaps tentative as they are, of the PRA, the probabilistic risk assessments, at Indian Point and Zion which showed -- and it depends upon how you read it, how you interpret it -- but it showed that seismic events constitute a major portion -- I mean, you know, 60, 70, 80 percent of the total risk of a nuclear power plant, meaning of all of the factors that might cause an accident and cause a release, major release to the environment, seismic events are the major contributor.

Well, with that as background then, we do need to go back, the committee felt, and look at the earthquake which causes somehow a failure in the nuclear power plant which causes a release, and then what impact does this have or what considerations might we do in emergency planning to foresee such a situation and perhaps to lessen its impact because we did better planning.

You have a whole variety of things. You have the highway, the bridges, the telephone lines. I can see the highway and bridges would influence evacuation. So, as Brian says rightfully, you might not be able to evacuate in that direction, so you have to do something different.

The telephone lines, he points out that they do have backup communication systems. They definitely don't depend solely on telephone lines. We for some time had the impression that the staff was, except for California, tending to ignore the potential impact of earthquakes on emergency planning; so I guess we were calling for some consideration of it.

One possible approach we might use on this -- and I believe it is obvious the reasons we are having problems with reaching a conclusion -- number one, we don't even really know what questions we are asking. We

have to clarify the questions. But even if we clarified the questions, I'm not sure we would have the answers we need because more data or more thought, more research needs to be done on the question.

Well, if that is true -- and I believe from my point of view that it is true -- there may be an approach that this subcommittee could recommend. The full committee at the present time is considering developing a proposal to the Commissioners for an extensive, in-depth study of the risk of earthquakes on nuclear power plants, meaning if the preliminary of the PRAs, the probabilistic risk assessments, of Zion and Indian Point show that earthquakes are the dominant factor, if that be true, then the whole subject of earthquakes and nuclear power plants needs a thorough evaluation, because if you set up your priorities, therefore you give that top billing.

That being the case, the committee is considering the development of a proposal for an in-depth study of the risk of earthquakes on nuclear power plants. And if indeed we follow through with that -- I am fairly certain the committee will -- then we could simply request that this be made a part of that more extensive study. And if that is the case, then our job is to formulate what are the questions we want to

have answered.

Am I making sense?

Brian, with me having said that, do you believe that there are questions that need answering, or do you believe it is more of a policy decision and you have concluded what should be done, and research really isn't needed to clarify it? That we need to hear.

MR. GRIMES: Based on current knowledge I think we have made the appropriate policy decision.

MR. MOELLER: And that policy decision in a nutshell is to consider it in areas where earthquakes are more probable.

MR. GRIMES: Yes, explicitly. And to say that measures taken for other purposes give us some assurance in the rest of the country that --

MR. MOELLER: We could cope.

MR. GRIMES: We could cope.

MR. AXTMANN: If it's 60 percent at Zion --

MR. MOELLER: The numbers were 80 percent.

MR. AXTMANN: It would be 99.92 at Diablo Canyon.

MR. GRIMES: Not necessarily.

MR. MOELLER: Diablo Canyon was double-checked and triple-checked in the design.

Herb, you are --

MR. PARKER: Dave, as an innocent listener I don't hear you and Dr. Grimes saying the same thing. It's probably my fault. You are talking about cases which include the disruption of the plant, and I thought that provisionally Dr. Grimes was restricting himself to those cases in which the plant properly survives because it was designed for the worst earthquake, and the surrounding community was disrupted. And I see some chances for there to be some positive benefits. With that pointed out, there may be a positive benefit in restoring order to a disrupted community instead of always having people knocking on their door saying you are going to blow up with an earthquake tomorrow.

So I would think this separation has considerable merit, not denying that overall the Commission might want to make a comprehensive study of earthquakes in the total picture. But I thought you, Dr. Grimes, were restricting yourself to this one case where the plant is operable except you can't get to it because your bridge is down, your telephone is down and the like.

MR. GRIMES: As far as explicit planning, but with the understanding that even for the case where the earthquake caused a release, that measures such as backup communication systems radios put in for other

reasons of realibility in the normal case would serve to give some capability even in that extreme case.

MR. PARKER: So you do want to include the released cases.

MR. GRIMES: Yes.

MR. PARKER: Which takes out the pleasure of having this a positive value to the utility.

MR. GRIMES: In terms of a qualitative argument only without any specific additional planning. It is kind of a side comment that for these extreme cases there is not zero capability; there are some things available.

I would say one question of interest to me would be what beyond measures currently in place -- for example, backup communications -- could be done readily to reduce risk in the severe earthquake case. It's really because we've not been able to think of those measures that we have not pursued the matter any further.

If there was a very simple thing that could be done that would give a high degree of assurance that many lives could be saved in such a situation, I think we would think about doing that. If there could be quantified a particular measure which would result in that risk being 20 percent instead of 60 percent total

risk, I am sure it might be worth looking at; but we have not identified those things at this point.

MR. MOELLER: Questions that immediately come to mind -- and I guess basically we have to answer the following question: Is the probability of an earthquake severe enough to disrupt the whole neighborhood as well as cause an accident in the plant, is that so remote it need not be considered?

If the answer is yes, we take one path. Now, if there is a possibility that such an earthquake could -- if the possibility is high enough, and I don't know what that possibility would be numerically; but if it's high enough that it needs to be considered, then immediately have an alert system -- you know, these horns that sound.

Is that seismically qualified?

MR. GRIMES: No, they are not.

MR. MOELLER: They are not. Then you have meteorological towers, and for some plants they were considering the ARAC system or the small computers that give you real time data. Well, you don't have any meteorological data if the meteorological towers went down with the earthquake, and they are not seismically designed. In communications you face that. You have answers.

Transportation, at least for the key people through the helicopters, you have answered that. But even distribution, we are talking initially distribution of KI. If they work out the system where they only distribute it after the accident occurs or have people come get it, there's going to be no distribution. So your question, I think, was very good that you just asked: what beyond the current measures might be done to decrease the risks, particularly simple things or minor alterations that could really be done. And I don't think we can sit around the table this morning and answer it. I think it takes more than just us doing it for the next ten minutes.

So I guess I am coming back to the following points. I still don't have all of the key questions written down, although Brian certainly has given us a start.

But, secondly, if we could get them written down or help others write them down, then the logical approach would be to ask that the full committee consider incorporating these needs in the master research plan on the evaluation of seismic risks.

Does that make sense to you? It doesn't, Herb, or it does?

MR. PARKER: No. I think there is an

opportunity to separate the case in which the utility becomes a good citizen and write that separately.

MR. MOELLER: I hear you. That's wonderful.

MR. PARKER: If the plant leaks in the earthquake, you've done everything wrong in your NRC rules because you designed it. You said that that wouldn't happen.

MR. MOELLER: You design it for an earthquake of a certain --

MR. KATHREN: Magnitude.

MR. PARKER: And you take the national experts to give you the highest magnitude reasonably developed at that site.

MR. MOELLER: Well, but as Dr. Okrent would point out, the history of data for the U.S. is what, 200 years, if that long? And when he asked the seismic experts or the NRC staff what do you predict as the return frequency of an earthquake a little higher than what you have designed for, they don't come up with one in one million years, you know. It is one in a thousand years or something like that.

MR. PARKER: Then you support the popular view that there should be no nuclear reactors in California if you are consistent in your policy.

MR. MOELLER: Yes, you could very well do that.

MR. PARKER: That is what I would do.

MR. MOELLER: Or design them to resist. And, of course, the other people come in and point out that the plant, although designed to withstand an earthquake of a certain magnitude, in actuality has a good degree of conservatism within that.

MR. MULLER: I recall in the San Fernando quake of '72 they had trouble with the Pacoima Dam, and I don't know what the emergency cooling ponds, the dams, how earthquake-resistant they are.

MR. MOELLER: They are seismic.

Your idea, Herb, we could certainly explore. And I am trying to think -- I agree completely. In other words, what could the utilities include in their planning to make them most useful to the neighboring community. And sure, we could just do it that way. We could ask that question: assuming the plant survives and doesn't really need a whole lot of effort, what might they do to help the community.

Well, Brian, Herb has given us a question, and you have given us one. Let me, though, as you again so that I go away from here knowing what you have said. You stated that you felt the current policy was adequate for the present, the proposed policy.

MR. GRIMES: Yes. And any comments the

committee would have on that as embodied in the June 22nd memorandum would be useful.

MR. MOELLER: Does anyone have additional comments or questions to ask of Brian on the policy statement, of course. Even this memo of June 22nd is confusing because it points out that the ASLB misinterpreted what the Commission meant with respect to the San Onofre case.

MR. GRIMES: Well, we are not certain of that because we don't know exactly what the Commission meant. In other words, the Commission's words could be read the way the San Onofre board read them, to eliminate all considerations of earthquakes. It could also have been read as the staff has proposed and the Commission just has not spoken one way or the other on it. In the case of San Onofre that would not have any impact on the hearing because it was not an issue raised by an intervenor.

MR. MOELLER: You also state in here that because of the relatively high risk current practice calls for California licensees and applicants to consider the effects of earthquakes in their emergency planning.

Now, the only thing that I see coming through in terms of licensees' response to that is they give you

the impact on evacuation. They give you a change in the time required for the people to move.

Is that totally their response? Does that answer your question that they consider the effects of earthquakes?

MR. GRIMES: That is an important piece of the answer. They will, based on information they get back from local officials on the severity of the earthquake on site, include that as a consideration in their recommendations and their knowledge of what is practical.

The other things which I have mentioned they have cited are their capabilities to bring people to the site by helicopter, for example, which would avoid the damage.

MR. MOELLER: So that is a part of their response.

MR. GRIMES: Yes, it is.

MR. MOELLER: And the communications.

MR. GRIMES: And communications is a part of the response.

MR. MOELLER: All right. Okay.

Now, for each nuclear power plant in the United States do we know the biggest blizzard, tornado, hurrican, tsunami and flood that might occur at that site that's estimated potentially to occur during the

operational life of the plant? And have their emergency plans taken each of those items into consideration?

MR. GRIMES: To date that has not been done consistently across the board. It has been done in particular situations where roads are subject to flooding, for example. I believe it was done in perhaps the Rancho Seco case in a roads flooded situation. A northern site subject to blizzards, for example, does not really need to revise their evacuation time estimates for a blizzard situation. If they have a blizzard, people will sit there until the blizzard is over essentially. And some estimate could be made, but certainly the length of the blizzard could potentially be long compared to the time to move people out. So really you have to make a judgment at the time on what the situation is.

Other than that kind of severe weather, things which occur might typically occur in the plant lifetime, which is more the order of things we would explicitly consider in emergency preparedness, don't really turn out to be very important in emergency preparedness. The river may be at a 20 or 40-year high, but perhaps it will affect a bridge, but it doesn't really affect the total situation.

MR. MOELLER: Okay. Any other questions from

any of the consultants or committee members, subcommittee members?

(No response.)

MR. MOELLER: On this particular topic I gather we are not under obligation to write a letter or anything.

MS. TANG: You will want to address this at next month's full committee meeting to wrap it up.

MR. MOELLER: Yes. I think the best approach still will be to try to have whatever needs to be done incorporated into the overall seismic risk research effort that the committee recommends.

Well, thank you very much, Brian for coming down today; and we appreciate your spending time with us on this, because it is obviously a difficult question to resolve.

One little item here I note in my own notes, the last time you talked to us I believe you thought that the parameter display system was going to be seismically qualified, and I gather now it is not. Do you know?

MR. GRIMES: That is a little bit up in the air right now because the Commission is still considering that. Our position had been changed slightly in the interim to say that the SPDS need not

itself be seismic, but controller room instruments which were seismic should be grouped in a way that would be convenient to interpret should that principal system fail. Whether or not that grouping requirement still remains when the Commission finishes its consideration, there would still be a capability in the control room to derive information from seismically qualified instruments.

MR. MOELLER: All right. Thank you for that added comment.

I believe with that we will wrap up our meeting, and we will take a brief break and go into executive session to try to reach consensus on each of the items we have discussed over the last two days. The executive session will be open so that any members of the public who desire to attend may do so.

Let me thank our Reporter for being here on a Saturday morning to help us out.

With those comments I declare the meeting adjourned.

(Whereupon, at 10:50 a.m., the meeting was adjourned.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

_____

in the matter of: ACRS/Subcommittees on Reactor Radiological Effects and Site Evaluation

Date of Proceeding: November 13, 1982

Docket Number: _____

Place of Proceeding: Washington, D. C.

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

Sharon Filipour

Official Reporter (Typed)

Sharon Filipour

Official Reporter (Signature)

OCCUPATIONAL RADIATION PROTECTION PROGRAMS RULE

PROPOSED AMENDMENT TO 10 CFR PART 50

BACKGROUND

- ALARA Task Force (11/74)
- Task Force Report, SECY 77-54 (2/77)
- "ALARA Rule" Proposed to Commission, SECY 78-415 (7/78)
- Inform Commission on Methods of Rule Implementation, SECY 80-186 (4/80)
- Commission Request for Rule (2/81)

NEED FOR RULE

- 10 CFR 20.1(c) HORTATORY
- HEALTH PHYSICS APPRAISALS - RADIATION PROTECTION DEFICIENCIES
- COLLECTIVE DOSE INCREASING (NUREG-0713)
- NUCLEAR NAVY EXPERIENCE
- INPO-NRC AGREEMENT
- RULE AS STIMULUS TO UTILITY-INPO PERFORMANCE

PROPOSED RULE

EACH HOLDER OF A NUCLEAR POWER REACTOR OPERATING LICENSE SHALL DEVELOP, MAINTAIN A CURRENT WRITTEN DESCRIPTION OF, AND IMPLEMENT AN OCCUPATIONAL RADIATION PROTECTION PROGRAM, INCLUDING EFFECTIVE MEASURES FOR MAINTAINING RADIATION EXPOSURES OF WORKERS AS LOW AS IS REASONABLY ACHIEVEABLE.

VALUE/IMPACT

- Dose Aversion, Individual and Collective
- Improved Operational Efficiency
- Cost to Implement
- Continuing Effort Cost